DISSERTATION

ADOLESCENT SUBSTANCE USE AND VIOLENCE: A CROSS-CULTURAL COMPARISON

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY KRISTOFFER W. RHOADS ENTITLED ADOLESCENT SUBSTANCE USE AND VIOLENCE: A CROSS-CULTURAL COMAPRISON BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

Primary Socialization Theory (PST) (Oetting & Donnermeyer, 1998) posits that the peer, family, and school environments interact to influence adolescent drug and alcohol use. The present study is an application of this theory, incorporating the additional component of negative affect as predictors of adolescent substance use and violence across Native American, Mexican American, and Anglo American males and females living in rural communities. Data were collected from over 65,000 rural adolescents as part of a repeated cross-sectional study, with 2000 participants randomly selected from each of the three ethnic groups for the final analyses. Analyses consisted of a series of MANOVAs and structural equation modeling (SEM) techniques to determine goodness of fit for the hypothetical model and parameter estimates for each of the six groups. Multigroup SEM analyses were also conducted to determine invariance between groups across the dimensions of gender and ethnicity. Results indicated several ethnic and gender differences in indicator variables (e.g., substance use, numbers of peers who use drugs, anger) at the multivariate and univariate level, as well as general consistency in parameter estimates across model analyses. Consistent with PST, the peer group was a significant positive predictor of substance use for all groups. The family and school factors did have significant protective effects against substance use, albeit indirectly moderated by peer drug associations. Results also indicated that substance use positively predicted violence for all groups. All analyses and relationships regarding negative affect yielded non-significant results. Multigroup analyses confirmed structural invariance between groups, indicating statistical similarity of the relationships between latent variables across gender and ethnicity. Results are discussed in terms of implications for primary prevention and intervention within rural settings.

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Introduction

While the problems facing adolescents in the United States are complex and many, few have the pervasive and deleterious impact of substance use and violence. Recent studies indicate that 41% of high school students have tried some illicit drug during their lifetime (Johnson, O'Malley, & Bachman, 2002). In addition, approximately 50% of all high school seniors, 39% of 10^{th} graders and 22% of 8^{th} graders had used alcohol in the past 30 days. While these rates of substance use appeared to be increasing from the early- to mid-1990's, they appear to have remained stable since that time (Johnson, et al., 2002). However, juvenile arrests for drug abuse violations increased 132% from1990 to 1999, serving as an indicator of the continued severity of this problem.

In terms of violence, juveniles are responsible for approximately 13% of all violent crime (Bilchik, 2000). Juveniles were involved in 9% of murder arrests, 14% of aggravated assault arrests, 33% of burglary arrests, 25% of robbery arrests, and 24% of weapons arrests in 1999. Recent studies indicate rates of violence and victimization in rural areas are catching up to those in urban centers, with approximately 2.6% of all adolescents reporting that they were victims of serious violent crime in the past year (Donnermeyer, 1995; Edwards, 1995). Recent increases in school violence and anecdotal evidence spanning the breadth of American culture serve as indicators of the

pervasiveness of violence. Costs to adolescents due to substance abuse and violence are many, ranging from injury to hospitalization, incarceration, and death.

Substance abuse and violence are highly related and influenced by a myriad of forces, with higher levels of substance use frequently accompanied by a higher incidence of violence (Bukowski, 1982; Donnermeyer, Edwards, Chavez, & Beauvais, 1996; Jumper-Thurman, Plested, & Edwards, 1996). Peer associations, family systems, school adjustment, and individual psychological factors all interact to shape the individual's experience with violence and substance use. Gender and ethnicity further complicate this interaction, leading to differential levels of substance use as well as the experience of violence.

Many studies (Bryant, Schulenberg, Bachman, O'Malley, & Johnson, 2000; Foxcroft & Lowe, 1995; Kumar, O'Malley, Johnson, Schulenberg, & Bachman, 2002; Oetting & Beauvais, 1996; Whitbeck, 1998) have examined specific relationships between singular aspects of this complicated picture. Some studies have looked at the influence of the peer group on substance use while others have attempted to discern the relationship between delinquent behavior and school adjustment or the family system. Few studies, however, have attempted to combine these elements in an attempt to derive a more comprehensive understanding of how the factors leading to violence and substance use converge and intersect. Furthermore, while literature on adolescent drug use and violence continues to accumulate, the majority of it maintains its focus on urban populations (Edwards, 1997). Relatively little remains known about adolescents in less populated areas of the country. Studies that have focused on rural populations reveal

problems and prevalence rates similar to those found in urban-based samples (Donnermeyer, 1994; Salts, Lindholm, Goddard, & Duncan, 1995).

The present study is an attempt to delineate those factors that shape the experience of violence and substance use for adolescents within rural areas of the United States. Furthermore, it is an attempt to examine how these factors change in their influence across gender and ethnicity, as these groups appear to vary greatly in terms of their incidence of violence and substance abuse (Arellano, Chavez, & Deffenbacher, 1998; Beauvais et al., 1997; Chavez & Swaim, 1992; Foxcroft & Lowe, 1995). Before examining these factors, it is essential to define the problems facing adolescents in rural, as well as urban, areas.

Substance Use and Abuse

Perhaps affording the broadest view of general adolescent drug and alcohol use over time is the Monitoring the Future Study by Johnson and colleagues. Over the course of this study, which was initiated in 1975, these researchers have provided a glimpse into the trends of use as well as specific prevalence rates. In general, they found that lifetime prevalence for overall adolescent drug use, after steadily decreasing from the early 1980's, began to rise in the early 1990's and has leveled off at approximately 40% circa 1995 (Johnson et al., 2002). Rates for previous month alcohol use were at congruent levels for adolescents within the national sample. Levels of binge drinking, however, have consistently registering around 30% for 12th graders since the early 1990's. They also found that drug use trends seem to be a partial function of the individual's attitudes about drug use. Specifically, drug use tends to increase when youth perceive less danger

in the use of substances and there is a reliably demonstrated shift in attitudes toward drug use preceding changes in actual use. Furthermore, they also found that drug use increases as peer norms change, especially when there are fewer peer sanctions for drug use (Johnson, O'Malley, & Bachman, 1994). This is a critical element in the prediction of drug use rates for adolescents, and will be discussed in greater detail below in the context of primary socialization theory.

Substance abuse rates reported in studies typically focus on urban populations or collapse all participants across degrees of rurality. However, within the paucity of research on rural adolescent substance use, studies suggest that levels are commensurate with those in urban settings. In an extensive overview of studies on substance abuse prevalence rates, including the Monitoring the Future studies, Donnermeyer (1992) found that lifetime prevalence rates for alcohol typically ranged between 70% and 100% for adolescents in rural communities. In addition, there was a consistent lack of any significant effect on the time of initiation or level of alcohol or hard drug use as a function of community size or population density. This speaks to the consistency and generalizability of findings from studies on drug and alcohol use rates, independent of their particular setting. Edwards (1992; 1997) also found that the etiology of substance use is similar across community size, and has also corroborated the similarity of substance abuse rates in rural settings as compared to urban ones. Other researchers indicate that any differences in substance abuse rates between urban and rural youth is non-significant by the time adolescents reach the 12^{th} grade (Peters, Oetting, & Edwards, 1992). While differences may or may not exist at earlier periods in adolescence, they

have effectively converged as youth mature. Furthermore, examination of gender differences in alcohol and other drug consumption reveals a consistent trend of higher use for males within rural communities (Edwards, 1995; Patterson, 2001). This finding matches results from studies based on more urban adolescent populations, as well as research findings for college students and adults.

While it may be the case that substance use rates within rural settings are not as different from those within urban settings, levels across gender and ethnic groups may not be as similar. There are distinct cultural influences on the use and abuse of substances, perhaps best thought of as parallel cultures of substance use (Trimble, 1998). However, many of these cultural differences are normally seen in the light of expectations and stereotypes of the cultures in which they are embedded. Results from research examining the role of cultural identification and acculturation as a factor in substance use have been highly conflicted (Beauvais, 1888a; Beauvais, 1998c; Oetting, 1993; Oetting & Beauvais, 1991; Trimble, 1994). Given the dearth or even complete lack of data supporting the theory that cultural identification is a salient factor in predicting substance abuse, some researchers have called for moving to a higher level of complexity, considering a variety of other factors such as peers, family, and school characteristics (Bates, Beauvais, & Trimble, 1997; Beauvais, 1998b). However, one cannot overlook the prominent cultural differences and deviations in substance use patterns. It is possible that by examining these differences as a function of factors other than cultural identification and acculturation will better account for these differences.

Trends within minority populations tend to parallel those found nationally, with some degree of variation in overall prevalence rates (Johnston, et al., 2002). For Native American youth these levels are significantly higher (Beauvais, 1992; Beauvais, Oetting, & Edwards, 1985; Beauvais & Segal, 1992). Furthermore, the pattern observed in other ethnic groups is reversed, with significant increases since 1992. Previous trends within the Native American population tended to be similar to those seen within the majority culture, but with a slight lag (Beauvais, 1992, 1996; Beauvais, Jumper-Thurman, Helm, & Plested, 1999). This may be due to the relatively isolated nature of many rural Native American youth. However, it also appears that Native American youth are susceptible to the same pressures and social forces that influence drug use patterns within non-Native American culture (Beauvais et al., 1999). By the time Native American youth reach the 7^{th} grade, a significant number of them have already experimented with alcohol and drugs (Beauvais, Oetting, Wolf, & Edwards, 1989). Marijuana, alcohol, and inhalant use are consistently higher for this group than overall national levels. In addition, they are also higher than levels found in Anglo American youth in particular (Goldstein, Oetting, Edwards, & Garcia-Mason, 1979; Oetting & Goldstein, 1979; Beauvais, 1992; Oetting, Edwards, Goldstein, & Garcia-Mason, 1980; Trimble, 1993; Velarde, Beauvais, & Oetting, 1980). Concurrent with this, use of psychedelics and other drugs that were historically less likely to be abused has increased dramatically from the early 1990's (Johnson et al., 2001; Beauvais, 1996). This further paints the picture of substance use as one of the primary problems facing Native American youth.

As another indicator of the severity of the substance abuse problem within the Native American adolescent population, reductions in drug use have not taken place within the subset of the population engaging in more heavy use. Attitudes and behaviors in these groups appear to be established, entrenched and resilient to prevention and intervention (Oetting, Edwards, & Beauvais, 1989). Native American youth in this category have a much higher risk for health-compromising behaviors, including injuries, emotional distress, and suicide. They also have a lower self-assessed health status compared to rural non-Native American youth (Blum et al., 1992).

While the prevalence rates for Native American youth are alarming, those within the Anglo American adolescent population are equally troubling. Contrary to prevalent stereotypes and assumptions, Anglo American adolescents use drugs and alcohol at similar if not greater levels than other groups. Beauvais et al. (1996) found that a greater proportion of Anglo American youth had used alcohol when compared to similarly aged Mexican American or Native American youth. Likewise, Anglo American youth also had higher levels of experimentation with cocaine and hallucinogens than did Native American youth. Rates for Mexican American youth were statistically equivalent to those for Anglo American youth.

Within these cross-cultural studies on adolescent substance use, Beauvais et al. (1996) also found that males across all ethnic groups had significantly higher levels of substance abuse than did females. There was no evident interaction between ethnicity and gender, indicating that although they used more of a particular substance than did females within their respective ethnic groups, Anglo American males did not use drugs and

alcohol any less than Native American or Mexican American males. This finding was also replicated by other researchers, where there were clear gender differences in quantity of substance use, but no differences across ethnic groups (Chavez, Deffenbacher, & Wayman, 1996). It is possible that while there were no significant differences in overall substance use, there are salient differences in the quantity of specific substances used within different ethnic groups. This is in part substantiated by findings that Native American adolescent females have higher rates of volatile inhalant use than do Native American males (Bates, Plemons, Jumper-Thurman, & Beauvais, 1997).

For Hispanic adolescents, prevalence rates are frequently difficult to ascertain. As one of the fastest growing ethnic sub-populations in the United States, even recent estimates of substance use rates may be outdated. In addition to this, the heterogeneity within the umbrella-like category of "Hispanic" makes specific estimates of use rates highly problematic. Those studies that have attempted to assess drug use in this adolescent population have frequently produced conflicting results (Betancourt & Lopez, 1993; Chavez & Swaim, 1992). Several studies that have broken the larger categorization of "Hispanic" down into more specific ethnic clusters consistently find varying degrees of substance use between the groups. For instance, Cuban American and Spanish American adolescents typically use less drugs and alcohol than do their Mexican American and Puerto Rican counterparts (Chavez, 1993; Chavez & Swaim, 1992). Little is known about the prevalence rates in these populations, as few studies have undertaken the arduous efforts to adequately define membership in an ethnic group.

Most of the studies conducted with a higher degree of specificity are those examining the Mexican American population. These studies indicate a rate of use that is lower than or similar to that of the majority culture or Anglo American adolescents (Chavez, 1993; Chavez & Swaim, 1992; Donnermeyer, 1992; Oetting & Beauvais, 1990). Bachman et al. (1991) also found that substance use rates were lower than those of Native American and Anglo American youth. While these results are more common than not, other studies reliably indicate no differences or higher levels of use between Mexican American youth and other populations. Drug use rates for Mexican American youth have been shown to be similar to those for Anglo American youth in particular, which is contrary to other studies as well as cultural stereotypes (Chavez, Beauvais, & Oetting, 1986; Chavez, Beauvais, Oetting, & Edwards, 1988). Chavez and Swaim (1992) assert that this may be due in part to gender differences in substance use within the Mexican American population. Males have a significantly higher level of substance use, and depending on the demographic distribution of the sample within a particular analysis, overall rates may vary by a great deal. This disparity between genders has been reliably shown to be at least twice as high for Mexican American adolescents as it is for Anglo American youth (NIDA, 1985, 1987, 1989). While this conflicts with studies by Beauvais et al. (1996) and Chavez et al. (1994), where no gender by ethnicity interactions were found, issues such as sample size, geographic region, and assessment of ethnic identification may confound the results. Chavez (1993) also found consistent gender differences in Mexican American adolescents that mirror those of other cultures. Like Anglo American and Native American youth, Mexican American males consistently

drink more than Mexican American females, although this difference is slightly less at younger ages.

It appears that while studies reliably indicate that there are salient gender differences in substance abuse rates, they are conflicted on the issue of how these play out across ethnic groups. Regardless, substance abuse continues to be a pertinent area of scientific interest, as well as a core concern for adolescents in rural and urban settings. Furthermore, research in the field of substance abuse continues to point to other social concerns as critical in the comprehension and prevention of substance abuse. In particular, the relationship between substance abuse and violence continues to call for attention.

Violence

Substance use also has other indirect widespread effects, marked by a significant correlation between drug use and violence in rural as well as urban communities (Edwards, 1995; Kingery, Pruitt, Brizzolara, & Heuberger, 1996; Yu & Williford, 1994). However, what little research exists on rural substance use appears voluminous when contrasted against that of violence in these same areas. This is especially true of those areas where ethnic minority populations are clustered (Jumper-Thurman, Plested, & Edwards, 1996). The most current reports from the U.S. Department of Justice state that Native Americans over the age of 12 experience violent crime at a rate that is twice that for the nation as a whole (Greenfield & Smith, 1999). In addition, over 70% of the perpetrators of violent crime against Native Americans are Native American themselves, among the highest percentages of inter-ethnic violence. In terms of victimization, the

rates for Anglo American and Mexican American individuals is approximately equivalent, with Native Americans exhibiting a rate that is more than twice that either group (Simon, Mercy, & Perkins, 2001). At this point relatively little is known about the incidence and/or causes of violence in non-urban areas. While living in a rural area may decrease the likelihood of experiencing some forms of violent crime, it is not a total protection. Per capita incidence of violence perpetration and victimization within rural areas is quickly catching up to that seen in urban areas.

While overall rates of crime and violence are still lower for rural communities than they are for urban ones, these rates continue to increase at unexpected rates. In fact, the percentage change for violent behavior and other forms of crime within rural communities has been higher for rural communities than it has for those in more urban settings (Donnermeyer, 1995). Crime rates in rural areas have more than tripled since the mid-1960's (Monsey, Owen, Zierman, Lambert, & Hyman, 1995). Rates for students who had been the victim of a violent crime differed only slightly for these locales, with 2% of urban adolescents and 1% of rural adolescents reporting that they had been victimized. Examining these results, Donnermeyer (1995) asserts that the weakening of the family, school, and other social institutions act in concert with stronger affiliations with deviant peer groups to contribute to the problem of violence in rural communities, just as it does in urban ones.

Other researchers have examined adolescent violence in rural areas with a particular focus on school dropouts (Chavez, Oetting, & Swaim, 1994). Chavez et al. examined the rates of violence and other deviant behavior within Mexican American and

Anglo American dropout and in-school adolescents in the rural southwestern United States. Comparing dropouts with currently enrolled students, rates of violence and delinquent behavior were highest among dropouts. When collapsed across school status, males had the highest rates of delinquency and violence, regardless of ethnic group. Beauvais and colleagues (1996) corroborated this in a separate study with the finding that males engaged in more violent acts than did females, across all ethnic groups. Chavez et al. (1994) also found that Mexican American youth were slightly less likely to engage in delinquent behaviors than were Anglo American youth. However, given the equivalently-sized samples, the overall rates of delinquency for this group may be higher in actuality given the higher dropout rates for Mexican Americans.

As with other Mexican American and Anglo American adolescents, Native American youth have also evidenced a relationship between substance abuse, violence, and other forms of deviance (Donnermeyer et al., 1996; Jumper-Thurman et al., 1996). Like their majority culture counterparts, Native American males have higher levels of violence perpetration than do females. For Native American youth, these levels of violence and substance abuse are significantly higher than those found in the Anglo American adolescent population (Beauvais, Chavez, Oetting, Deffenbacher, & Cornell, 1996). Like substance use, violence prevalence rates are difficult to assess given the heterogeneity within the Native American population. Research has demonstrated significant differences in prevalence rates depending on the location of the community, whether it is reservation-based or a non-reservation rural community (Beauvais, 1992). Despite these differences across settings, there is enough evidence to suggest that

violence is a problem worth assessing further within Native American communities as well as other areas of the United States.

Theories of Deviant Behavior

Researchers have proposed a myriad of competing theories to explain deviant behavior, including substance abuse and interpersonal violence. Among the more prominent are Problem Behavior Theory (Jessor & Jessor, 1977), Social Learning Theory (Bandura, 1977), stage theories (Kandel, 1980, 1985) the Social Development Model (Hawkins & Weis, 1985), biopsychosocial models (Kumpfer, 1987), stress/coping models (Kumpfer & DeMarsh, 1986), Peer Cluster Theory (Oetting & Beauvais, 1987), the Social Ecological Model (Kumpfer & Turner, 1990-1991), and Primary Socialization Theory (Oetting & Donnermeyer, 1998; Oetting, Donnermeyer, & Deffenbacher, 1998). In response to the complexity of the problems, these theories expand and contract in their scope as well as their elegance. Theories have risen and fallen over time, each providing some degree of descriptive if not practical utility. However, as with all theories, each has its shortcoming. This study will examine the influence of primary socialization theory (Oetting & Donnermeyer, 1998) which presents as the most parsimonious and thorough of the competing paradigms. Evolving from Peer Cluster Theory (Oetting & Beauvais, 1986), primary socialization theory incorporates the most critical elements of these other theories preceding it.

Primary socialization theory postulates that the principal aspects of socialization determine deviant behaviors, including violence and substance use (Oetting, et al., 1998; Oetting & Donnermeyer, 1998). These primary avenues of socialization are outlined as

the family, the peer group, and the school environment, all interacting in complex and subtle ways to produce behaviors. While other secondary socialization sources (i.e., the media, religious institutions, the neighborhood and community) also serve as predictors for substance use and violence, they are indeed secondary. Oetting and Donnermeyer (1998) assert that their influence is best gauged in terms of their impact on the primary peer, family, and school clusters. Unless there is a significant impact upon an adolescent's interaction with a primary socialization source, influence of a secondary source upon drug use and deviant behavior is likely to be minimal (Oetting, et al., 1998). Therefore, this study will tighten the focus of predictive weight upon these components of the primary socialization theory with the added influence of intrapersonal psychological factors.

The Family Cluster

The family unit is included as one of three main components of primary socialization theory, with particular emphasis on the impact in early childhood (Whitbeck, 1998). The family can be defined in a multitude of ways, and may change shape and structure over time and across cultures. It may consist of the typical nuclear family (e.g., parents and child), the extended family (e.g., inclusion of grandparents, aunts and uncles), or involve individuals that are unrelated but living with the child. Native American and Mexican American families are likely to be complex, if not qualitatively different from Anglo culture. These family constellations will likely include the influence of relatives other than the biological parents and may find the child moving between households (LaFromboise & Low, 1989). In essence, the family constellation is

comprised of those who inhabit the same space as does the child and has the capacity to bear a direct effect on them during the course of development.

The family can be a source of positive norm transmission, but this is contingent on a strong bond between the child and the family. Transmission is in effect a direct function of connection. Moreover, the family must utilize this bond to actively transmit these norms instead of relying on passive absorption by the child (Oetting & Donnermeyer, 1998). Positive parent modeling, expression of disapproval and discussion of the deleterious effects of drug use, and timely and consistent administration of negative consequences for use all contribute to the delivery of positive social norms.

Transmission of these positive norms can be inhibited by problems within the family cluster. Abuse and poor parenting styles contribute to a multitude of problems, including violence and substance use (Nurco & Lerner, 1999). Researchers have concluded that patterns learned in the family are amplified and repeated within other principal socialization outlets, such as peer groups and the classroom (Oetting & Donnermeyer, 1998; Whitbeck, 1999). Whitbeck (1999) found that the effects of abusive family histories impacted teen drug use and deviant behaviors through associations with other deviant peers. The intensity and influence of peer groups are increased as adolescents attempt to fulfill needs for attachment, belonging, and connection that are not being met by the family. How the peer group influences alcohol and drug use will be discussed below as another component of primary socialization theory.

The transmission of positive social norms can also be inhibited by an absence of parental action as well as behaviors such as abuse. Parents frequently avoid discussions

around alcohol with their children regardless of their own drinking behaviors (Oetting, Edwards, Goldstein, & Garcia-Mason, 1980). This may be an especially salient issue if parental drinking patterns are problematic and communication skills are limited. Without direct discussion, children may then model these behaviors or develop stronger bonds with delinquent peers. Although this has been reliably demonstrated, it should be noted that the negative effects of poor parenting have been shown to be reversible in some ways. Studies in which parental styles were manipulated yielded decreases in deviant behavior, including substance use, as a function of improved parenting (Kazdin, 1987; McMahon & Wells, 1989). Frequency of these problem behaviors was significantly reduced when parents who took a more direct and active role with their children, marked by increases in communication and the administration of sanctions for substance use. However, these improvements in parenting must also be accompanied by changes in the peer group in order to maximize the impact on behaviors such as substance use.

Within the primary socialization theory model, the family system not only has the potential to transmit positive norms and values, it can also be a preventative force in substance use and deviant behavior (Farrell, Barnes, & Banerjee, 1995). Strong bonds between the adolescent and the family unit serve as a buffer against stronger associations with deviant peers, which then reduces the likelihood that the individual will engage in delinquent or deviant behavior (Oetting & Beauvais, 1986, 1987, 1988; Oetting & Donnermeyer, 1998). Specifically, family sanctions against drug use reduce the chances of involvement with drug-using peers, thereby reducing the chance of actual substance use (Beauvais, Oetting, & Edwards, 1982; Oetting, Beauvais, & Edwards, 1989; Oetting,

Edwards, Kelly, & Beauvais, 1997). Adolescents who perceive their families as actively trying to intervene with their use of drugs and alcohol are less likely to form attachments with peers who engage in substance use. Within this, adolescents perceive their families to have greater levels of sanctions against use of drugs other than alcohol (Oetting et al., 1989; Oetting et al., 1997). This mirrors differences in peer sanctions against drug use, and may be a function of the greater levels of social acceptability for alcohol. The differences in family sanctions for type of substance used could also be contingent on use patterns within the family, which have been shown to impact both the attitudes and levels of use for adolescents.

While initial research using primary socialization theory indicated that the peer drug association cluster was the principal mediator of other risk factors (Oetting & Donnermeyer, 1998), more recent research implicates family sanctions as having a direct effect on drug use. Swaim, Bates, and Chavez (1998) found that family sanctions had both an indirect (mediated through peer drug associations) as well as a direct negative effect on polydrug use. Other elements of the child/family bond, such as family caring and strength, are also implicated in the determination of substance abuse patterns. However, these components are unlikely to have a sufficient impact unless the family clearly communicates strong sanctions against drug use (Oetting & Beauvais, 1987). In summary, family sanctions appear to have the greatest influence on actual substance use levels, be that directly or indirectly through the impact on peer associations. These findings further support the interactive roles of two of the principle components of primary socialization theory, those of the family and peer clusters.

Primary socialization theory further asserts that gender and cultural differences in substance use and the experience of violence are a function of differences in norms for these groups. Moreover, there is an interaction between culture and gender in that there is significant variation in gender norms across cultures, leading to drastic differences in how norms are transmitted by the family (Oetting & Donnermeyer, 1998). How the family interacts with children and their expectations for them may be culturally and/or gender constrained. For instance, parental monitoring was found to be more influential on drinking behaviors for adolescent girls than it was for boys (Foxcroft & Lowe, 1995). The same may be true for how behaviors are differentially modeled by children across cultures. Swaim and colleagues (1998) found that parental smoking behavior was influential for Anglo American adolescent females but not for Mexican American females. While there are many potential reasons for this, it appears that the differential effects of the family across gender and culture are both reliable and significant.

Other researchers examining the influence of the family's influence on substance use have also demonstrated salient differences across cultures. When compared to Anglo American youth, Native American youth report that their families have more influence on their levels of substance use (Brook et al., 1992; Catalano et al., 1992; Swaim et al., 1993). In particular, path models examining the impact of family sanctions on adolescent drug use reveal a significant direct influence on drug use for Native American youth but not for Anglo American youth. This is in addition to the indirect path mediated through peer drug associations found in both groups. Results presented by Chavez and colleagues (1998) confirm this pattern within Mexican American families as well. This seems to

support the theory that the heightened importance of the family in ethnic minority cultures has a positive impact on deviant behavior among adolescents from these groups (Oetting & Beauvais, 1989). It also highlights the crucial role that the peer cluster plays in the determination of substance abuse patterns across cultures.

The Peer Cluster

As another principle component in primary socialization theory, the peer group serves as perhaps the most critical element in predicting adolescent substance use and deviant behavior. As high as 90% of drug users report having friends whom also use drugs (Dinges & Oetting, 1993; Oetting & Beauvais, 1987; Oetting & Beauvais, 1988). The likelihood of this is especially high if the family and school bonds are weak. Oetting and Donnermeyer (1998) assert that positive as well as deviant norms are learned within the context of the peer group, which can consist of units as small as a best friend dyad, small groups of close friends, or couples. Peer clusters tend to be small groups of people with a high degree of cohesion and strong bonds, yielding a greater degree of influence.

Adolescents may belong to a number of peer groups, all of which may have very specific constraints regarding behavior, types of drugs that are acceptable for use, or sanctioned degrees of violence and/or delinquent behavior. Oetting, Edwards, Kelly, and Beauvais (1997) found that peers were more likely to try to stop their friends from using drugs like cocaine, heroin, or amphetamines than they were for alcohol. This is an important distinction, especially when regarded in light of the higher use levels for alcohol, when compared to other drugs.

Adolescents who are having problems at home or in school tend to associate with other adolescents having similar problems, and it is not likely that these individuals will gravitate toward peer groups that transmit positive norms (Oetting and Donnermeyer, 1998). Brook et al. (1990) demonstrated that peers with positive family bonds tended to have higher adherence to positive social norms and engage with peers who did not use drugs. Likewise, adolescents with weak bonds to their families, or those in abusive family constellations are more likely to associate with adolescents who engage in delinquent behavior. From these relationships, individual deviant behavior emerges and is reinforced by the peer group.

Deviant behavior such as drug use has been linked to peer associations for over five decades. As a precursors to the primary socialization theory, Sutherland (1947) posited that interactions with specific social groups led to certain exposure to messages about norms, which then determined learning of behaviors congruent with those norms. Becker (1953) provided a specific example of this in his finding that marijuana-using adolescents tended to have friends who also used the drug. Immediately preceding primary socialization theory, Oetting and Beauvais (1987) demonstrated that drug use within the peer group was the most proximal and significant predictor of individual drug use, accounting for over half of the variance within substance use. Among other results in this study, they found that family sanctions and school adjustment were both negative predictors of peer drug associations, evidencing further support of primary socialization theory.

As a concurrent source of support for the primary socialization theory of substance abuse, Donnermeyer and Park (1995) found that family and peer interactions were two of the principle factors that accounted for a large percentage of variance in drug use. Among the other significant factors were gender and the age at which adolescents first used the substance. Results from this study reinforce the importance of the peer group, as well as continue to implicate the role of the family in the establishment of substance abuse patterns.

The School Cluster

Addressing the third area of primary socialization theory, Oetting and Beauvais (1987) found that associations with delinquent peers are related to school adjustment problems. These associations are then related to drug use. Students with weaker bonds to the school are more likely to develop connections with peers whom engage in substance use. Several studies have demonstrated this effect across cultures, including Mexican American, Native American, and Anglo American adolescents (Swaim et al., 1993; Swaim et al., 1997). This effect has also been demonstrated with violence and victimization. Minority and non-minority dropouts were found to be more likely to be victims and perpetrators of violence, which may be a function of their peer associations (Beauvais et al., 1996; Chavez et al., 1989; Jarjoura, 1993).

As the third component of primary socialization theory, the school environment constitutes a critical experiential facet of adolescence. Researchers have demonstrated that strong bonds with the school system serve as negative predictors for associations with deviant peer groups as well as drug use (Kumpfer & Turner, 1990-1991; Oetting &

Donnermeyer, 1998). Based on their findings, Oetting and Beauvais (1987) assert that substance abuse problems are a product of school adjustment problems, and not the other way around. School systems in which students feel respected, rewarded, heard, and understood are those which foster strong adolescent-school bonds. These bonds then serve as buffers against forming close associations with substance abusing peers, as adolescents with positive attitudes toward school gravitate toward other students like them. It is within this context that the school system serves as a protective factor in the determination of drug and alcohol use.

It is also possible that there are direct protective relationships between the school and substance use. School environments in which there is a perceivable level of disapproval for drug and alcohol use has been shown to have a direct negative relationship with individual levels of heavy alcohol use (Kumar et al., 2002). While this also appears to be true for marijuana use, it appears to have a more salient impact on younger students as compared to those who are older. The differential between the degree of protection a disapproving school environment can provide may be partly due to the characteristics of the school system itself.

The ability of the school system to transmit positive social norms is highly variable and dependent on a variety of factors and interactions. School size, available resources, policies regarding the consequences for delinquent behavior, and attitudes toward minority students constitute problems within a school system that have been linked to higher rates of adolescent substance use (Kumpfer & Turner, 1990-1991; Oetting & Donnermeyer, 1998). This is further complicated by interactions between

parents and the school system. Ethnic minority parents may have greater difficulty communicating with teachers and administrators. Other parents, because of their own values or lack of education, may be unable or unwilling to help their children with homework or school-related problems (Curiel, 1991; Joe, 1994). Adolescents who engage in substance use are typically more likely to report that their parents are not involved or invested in their school (Oetting et al., 1997). Perceptions of teacher attitudes toward students have also been implicated in the prediction of both school performance as well as overall adjustment (Davalos, Chavez, & Guardiola, 1999; James, Chavez, Beauvais, Edwards, & Oetting, 1995). Adolescents who perceive teachers as respecting, liking, and believing in their abilities typically reported higher levels of positive school adjustment or lower levels of school related problems.

Research has been conflicted in delineating the specific role of school adjustment as a protective factor in the formation of associations with substance abusing peer groups. Some studies indicate that this is a significant effect for Anglo American students in particular (Oetting & Beauvais, 1987), or only for Native American students compared to Anglo students (Swaim et al., 1993), or only for Mexican American students as compared to Anglo students (Swaim et al., 1998). Other studies also indicate that there is a high degree of similarity between ethnic groups within the same academic category. Swaim et al. (1997) found that drug use rates were similar for minority and non-minority adolescents who were rated as well-adjusted and performing well in school. Likewise, substance use rates were also similar for minority and non-minority dropouts. While these rates were higher for dropouts than non-dropouts, they were essentially the same

across cultures. However, it is important to point out that far more minority students are having academic difficulties and are dropping out of school. For instance, dropout rates in the Native American population have been reported to be as high as 50% (Chavers, 1991). This, therefore, suggests that the higher rates of substance use by ethnic minority youth may be contingent on school adjustment and staying in the school system (Oetting & Donnermeyer, 1998). Oetting and colleagues (1997) assert that the relationship between school adjustment and substance abuse is not a linear nor exact one.

Intrapersonal Psychological Factors

Most research on substance use has attempted to link personality factors directly with substance abuse and other deviant behaviors. As an example of traditional thinking about the role of emotional distress in substance use, many researchers have pointed to the axiom that individuals engage in substance use, especially alcohol, when they are depressed. However, the depressed state is neither singular nor exclusive in the occurrence of use (Oetting, Spooner, Beauvais, & Banning, 1991). Depression may play a role in shaping the timing and selection of drug use, but the majority of research places it's predictive influence much lower than that of other negative affective components, such as anger.

Other researchers have attempted to examine the impact of these factors as they are mediated by their effect on the primary socialization process (Oetting & Beauvais, 1986). This approach circumvents the assumption that drug use is a function of a personality driven need or a desire to reduce trait related stress. These suppositions are a hallmark of many emotional distress and self-medication theories. Instead, the primary

socialization theory posits that personality traits would be influential in their determination of peer group associations, which would then lead to drug use and deviance (Oetting, et al., 1998; Oetting & Donnermeyer, 1998). In keeping with this theory, psychological characteristics such as depression, anxiety, and self-esteem play a more critical role in younger children, as they are exerting their influence during the height of primary socialization. Other traits such as anger, aggression, and sensation seeking have a higher order relationship with drug use and deviance because of their longitudinal influence on primary socialization. This longitudinal influence demarcates the impact of these traits across all ages. Support for this comes from Nurco and Lerner (1999), who found that early "psychic distress" was predictive of later addiction. The current experience of psychological distress, however, was not significantly related to addiction. They also found that one's experience of hostility and impulsivity was significantly correlated to addiction and was present during active stages of drug use.

Further analysis of the impact of psychological factors in the etiology of substance abuse and other deviant behavior indicates a differential in the impact of certain psychopathologies. Affective disorders and anxieties appear to have less of an impact on primary socialization than do more severe psychopathologies such as conduct disorder and attention deficit disorder (Oetting, et al., 1998). These more severe psychological disorders are most likely to be linked with drug use and other forms of deviance, such as violence (Kessler et al., 1996; Oetting, et al., 1998). It should be noted that it is extremely difficult to partial out causality in these findings. In addition, violent behaviors and/or substance abuse are often included among the criteria for diagnosis of

such disorders. While this complicates the picture, it is clear that deviant behaviors such as substance abuse are interconnected with negative affective states.

Other studies also implicate the role of psychological factors in predicting substance abuse. Swaim et al. (1989) found that emotional distress accounted for only approximately 5% of the variance in substance abuse when examined in direct relation. However, when mediated through peer drug associations, the proportion of variance accounted for increased to over 40%. Within this study, emotional distress items were those that were well represented in previous studies and included self-esteem, anxiety, depression, and anger. Of these, anger was determined to have the strongest relationship with peer drug associations and subsequent drug use. While the results from this study were significant and informative, they are in the specific context of drug use and only mediated through one of the key components of primary socialization theory. How these emotional distress items, especially anger, may be mediated through school or family relationships is largely unknown.

Based on the primary socialization theory of drug use and deviance, anger and aggression are highly likely to interfere with the socialization process. Researchers have found a direct relationship between trait anger and associations with substance-using peers, as well as with individual substance use (Brook et al., 1995; Swaim et al., 1989). Oetting et al. (1991) found that anger is not only a principal link to peer drug associations, it is the mediator of other emotional distress variables such as self-esteem, depression, and anxiety. Leibsohn, Oetting, and Deffenbacher (1994) found that high anger individuals had higher levels of alcohol use, with concurrently higher amounts of

alcohol-related negative consequences. In addition, they also found that males had higher levels of anger and alcohol use, which is consistent with other research.

While anger may be somewhat a function of temperament, it may also be a product of family interaction and learned by modeling. Regardless of etiology and genesis, anger can serve to weaken the protective bonds between the child and the family, as well as between the child and the school system. As discussed, these weakened bonds may then lead to stronger connections with deviant peer groups and subsequent substance abuse (Oetting, et al., 1998).

Aside from anger, another aspect of psychological functioning that has garnered much attention in substance abuse research is self-esteem. Results from research examining the relationship between self-esteem and substance abuse has been among the most highly conflicted and inconsistent. Some studies indicate lower self-esteem in substance abusers, whereas other have shown no differences or even higher levels of self-esteem within substance abusing individuals (Oetting, et al., 1998). This may be a function of the locus of one's self-esteem. If an adolescent's self-esteem is based on strong family or school connections, drug use may be a less likely outcome. Self-esteem derived from the peer group and one's standing therein may lead to higher levels of substance abuse, depending on the values of the peer group. Indeed, Young et al. (1989) found that adolescents with self-esteem derived from school performance and family relationships were less likely to engage in drug use than were those whose self-esteem was based on other sources. Although self-esteem based models of substance abuse

appear to be decreasing in their popularity, previous findings implicate it as at least questionable in its effect on deviant behavior.

Other studies have examined the cultural and gender differences in the experience and expression of psychological distress. Results from these studies point to subsequent differences in substance use as well as violence as a function of negative affect. Deffenbacher and Swaim (1999) found that males reported more physical assault than did females. This is consistent with the bulk of literature on gender related violence perpetration, reliably confirming that males engage in violent behaviors more frequently than do females (Baron & Richardson, 1994; Harris, 1995, Harris, 1996). Deffenbacher and Swaim also found that Anglo American adolescents reported more verbal assault than Mexican American youth, but had similar levels of other forms of assault. These forms included physical assault toward people as well as damage to property or inanimate objects.

Researchers have also repeatedly demonstrated significant differences in the experience of psychological distress between males and females. Females frequently report higher levels of depression and anxiety than do males. This is concurrently reported along with lower levels of self-esteem when compared to men. Males, on the other hand, frequently report experiencing more alienation and blame than do females (Swaim, 1991; Tani, Chavez, & Deffenbacher, 2001). Relating this to substance abuse, there is a significant relationship between negative affect and alcohol use for females, but not for males (Swaim, Chen, Deffenbacher, & Newcomb, 2002). This study examined the influence of general negative affect within Mexican American and Anglo American

adolescents, and included elements of anger, depression, alienation, and anxiety. Of these, and consistent with previous research, anger was the most salient and consistent predictor of alcohol use.

Examining the rationales for drug use also implicates the influence of negative affective states. In keeping with some of the emotional distress theories for drug use, substance abuse may be a result of the need to alleviate negative affective experiences. Caetano (1987) found that Hispanic individuals with alcohol problems were twice as likely to meet criteria for depression than individuals without drinking problems. While it is impossible to assign causation, the relationship stands and may indicate the use of alcohol as a function of a negative affective state. This seems to transcend culture, but may be more salient for Native American youth than for Anglo American youth, given higher order relationships of negative affect with substance abuse reported in some studies (Binion, Miller, Beauvais, & Oetting, 1988). However, it is important to remember that although some research does indicate a relationship between psychological factors and substance use, the effect thereof is usually small and accounts for little variance (Oetting et al., 1997; Spevack & Pihl, 1976; Swaim, 1991).

Even though the relationship between negative affect and substance use is statistically small across cultures, the ramifications of these relationships are critical. Speaking to cultural differences in the experience of negative affective states, accounts of Native Americans' experience of depression gives rise to a powerful picture. Duran and Duran (1995) pinpoint the ramifications of an oppressive colonization process upon American Indians, manifesting itself in serious and often fatal ways. In addition to

drastically inflated rates of substance use, depression, and other severe psychosocial problems, Native Americans have the highest suicide rates of any ethnic group. In their analysis of over three decades of Navajo, Apache, and Pueblo suicide records, May and Van Winkle (1994) found that alcoholism and depression were the most common conditions present at or before the time of suicide. This combination of negative affect, substance use, and violence is unfortunately epitomized within the Native American population. While not all Native American adolescents who use drugs or alcohol commit suicide, the complexity of negative affect and its consequences mediates any application of majority-based theories or treatment for this group (Duran & Duran, 1995).

There appear to be other cultural differences in the predictive power of negative affective states in the use of drugs and alcohol. In a large survey of Native American and Anglo American high school students, anger was the only significant affective predictor of alcohol involvement (Oetting, Swaim, Edwards, & Beauvais, 1989). However, the effect was in the opposite direction for the two cultures. While anger was a significant positive predictor for alcohol use for Anglo American youth, it was a negative predictor for Native American youth. Examining this in light of the stronger relationship between self-esteem and anger in the Native American sample, it is possible that anger actually serves as a protective factor (Oetting et al., 1989). However, other research has produced results that either fail to replicate these findings, or are in direct conflict with them (Binion et al., 1988; Swaim et al., 1989; Tani et al., 2001). These findings speak to the elusive nature of the effect negative affect has on deviant behaviors such as violence and

substance abuse. As much as this is true within cultures, it is echoed and amplified across them.

More recent studies indicate that the individual components of emotional distress may covary under a more general category of negative affectivity (Deffenbacher & Swaim, 1999; Swaim et al., in press). Examining a more singular, larger category of emotional distress may be warranted given the positive correlations between psychological components such as anger, self-esteem, and depression (Deffenbacher & Swaim, 1999). This may also contribute a greater degree of elucidation for the conflicting results regarding the role of negative affect in the prediction of substance use and abuse.

Conclusions and Hypotheses

In summary, substance use and violence continue to present as critical issues for adolescents of all ethnic groups and community sizes. Comprehension of the factors involved in substance use continues to grow. However, relatively little is known about violence within these same populations. Given the demonstrated strength of primary socialization theory in accounting for substance use in adolescent populations, as well as the corroborated link between substance use and violence, extrapolation of the theory to violence makes intuitive as well as theoretical sense. Although the evidence for the role that negative affect plays in the prevalence and etiology of substance use and violence is ambiguous, there is enough of it to warrant inclusion within a predictive model. The questions remain, however, as to how well these factors work together to explain substance use and violence across ethnic and gender lines.

The present study is an attempt to do just this. Although driven by primary socialization theory, conflicting findings from previous research renders it quite exploratory. In regard to specific differences between gender and ethnic groups for the model variables, some hypotheses can be made based on the literature. Foremost, it is predicted that males across all ethnic groups will have higher levels of substance use and violence, as well as higher levels of peer drug associations. Family sanctions are hypothesized to be lower for Anglo American adolescents compared to Native American and Mexican American adolescents. Finally, depression is hypothesized to be significantly higher for females than for males, whereas anger is hypothesized to be higher for males. Native American and Mexican American adolescents are hypothesized to have higher levels of anger and depression, as well as lower levels of self-esteem than Anglo Americans. All other differences in model variables between ethnic and gender groups will be elucidated post-hoc.

The hypothesized structural equation model (see Figures 1 through 3) is derived from relationships that have been established or indicated by primary socialization theory and other research. However, the paucity of data on how all of these relationships modulate over gender and ethnic groups makes the delineation of specific hypotheses difficult. Consistent with primary socialization theory, peer drug associations are predicted to have a positive and significant influence on both substance use and violence. Within this, it is hypothesized that there will be no significant differences between groups. In addition, family sanctions and school adjustment are hypothesized to have a significant negative relationship with substance use and violence. These relationships

may be direct, or they may be mediated through peer drug associations. The latent construct of negative affect is similarly hypothesized to positively predict substance use and violence. In addition, substance use is hypothesized to positively predict violence for all groups.

Method

Participants

The participant pool for this study was composed of Native American, Mexican American and Anglo American adolescents from rural communities across the United States. Data were collected for a repeated cross-sectional study from 1996 to 2000, resulting in a final sample of 360,183 adolescents from the 7th to 12th grade with an overall age range from 10 to 21 (M = 14.85, SD = 1.87). For the purposes of this study, equivalent random samples of 2000 were taken from each of the ethnic groups. The final sample was comprised of 2000 Native American adolescents (1054 males, 946 females), ranging from ages 11 to 21 (M = 14.83, SD = 1.87), 2000 Mexican American adolescents (1014 males, 986 females) ranging from age 10 to 21 (M =14.75, SD = 1.91) and 2000 Anglo American adolescents participants (1010 males, 990 females) ranging from age 10 to 21 (M = 14.83, SD = 1.87). Native American males had a mean age of 14.58 (SD=1.98), whereas females had a mean age of 14.33 (SD=1.90). The mean age for Mexican American males was 14.85 (SD = 1.93) and 14.65 for females (SD = 1.88). Similarly, the mean age for Anglo American males was 14.90 (SD = 1.88) and 14.77 for females (SD = 1.85). See Table 1 for means and standard deviations of age by ethnicity and gender.

Table 1
Age by Gender and Ethnicity

		Ethnicity		
		Native American	Mexican American	Anglo American
Male	M	14.58	14.85	14.90
	SD	1.98	1.93	1.88
	n	1054	1014	1010
Female	M	14.33	14.65	14.77
	SD	1.90	1.88	1.85
	n	946	986	990
Total	M	14.46	14.75	14.83
	SD	1.95	1.91	1.87
	n	2000	2000	2000

The overall sample was comprised of students in the defined rural communities who were currently enrolled in school. Rural communities were identified using census data examined via a modification of the 17-step Metropolitan Proximity Index. This system classifies a county as either a Metropolitan Statistical Area (MSA) or non-MSA county, with each community therein classified accordingly. Rural counties are delineated as those with a population of less than 20,000, whereas a rural community is one with a population of less than 2,000. Of all communities designated as rural, 180 were randomly selected and recruited for participation. During recruitment, approximately 70% of the communities contacted agreed to participate. Those that refused primarily did so because of the proximity of other surveys or studies previously agreed to.

For their participation in the survey, communities and schools received a stylized individual report on their substance use prevalence rates. The report included results, presentation scripts, overheads, and other adjunct materials. Since all surveys were completed during regular class times, students were not compensated for their participation.

Instruments

All scales and items used in the present study are components of a larger survey used to measures a broad array of social, psychological, and cultural dimensions of adolescents in school and those who have dropped out. The complete set of measures required approximately one and one-half hours to complete, with a maximum allotted completion time of two hours. All questions were asked in English, as reading ability in

other languages tended to be commensurate with English reading abilities. While the survey has been developed and calibrated over 20 years and contains many measures, only those pertaining to substance use, violence and victimization, family, peer group, school adjustment, and psychological functioning were used for the analysis in the present study. Scales used in this study have been tested on minority and non-minority adolescents, demonstrating consistently high reliability and validity across samples (Oetting & Beauvais, 1990).

Substance Use. Individual experience with substance use is measured via the Clinical Drug Assessment scale (CDAS), taken from the American Drug and Alcohol Survey™ (Oetting, Beauvais, & Edwards, 1990). This scale provides information on the frequency, quantity, and patterns of use over an assortment of substances; including alcohol, marijuana, hallucinogens, cocaine, heroin, amphetamines, and barbiturates. The scale contains 10 items measuring alcohol use and an additional 11 questions for other drugs. Participants are asked about the frequency of use via the question "How often in the last month have you (had alcohol to drink, used marijuana to get high)". Participants respond on a 6-point scale (0= "Never," 1= "1-2 times," 2= "3-9 times," 3= "10-19 times," 4= "20-49 times," 5= "50 or more times"). Participants respond via a 6-point scale to questions asking about intensity of drug use, such as, "In using (alcohol, marijuana) are you a ...?" (0= "Non User," 1= "Very Light User," 2= "Light User," 3= "Moderate User," 4= "Heavy User," 5= "Very Heavy User"). Additional questions measure the style or method of use, such as "How do you like to drink?" using a 5-point scale (0= "I don't drink," 1= "Just a glass or two," 2= "Enough to feel it a little," 3= "Enough to feel it a

lot," 4= "Until I get really drunk"). Similar questions were asked about other drugs. Higher individual and composite scores indicate higher degrees of drug involvement.

From these responses, a variety of drug use involvement measures are then derived. Participants are classified into one of nine independent drug use groupings, ranging from no drug use to multi-drug use. A more detailed version of this grouping, the Style scale, is computed through an algorithm using all types of substance use questions. This measure has a range from 1 to 36 (1= "Non User," 36= "Polydrug Dependent") and is used for finer distinctions among types of substance users. Finally, the responses are used to derive substance-specific scales for levels of alcohol, marijuana, LSD, cocaine, heroin, amphetamine, and barbiturate use. These scales are computed by amalgamating frequency, type, and quantity of use, and generally serve as measures of substance use severity within a particular class of drug. For the purpose of this study, the alcohol, marijuana, and an "other drug" scale were used as indicator variables for substance use. The "other drug" scale was derived as a summative composite of individual drug scales for heroin, cocaine, LSD, amphetamines, and barbiturates.

As it has been revised and calibrated over the past 20 years of use, the CDAS continues to meet several reliability and validity criteria (Oetting & Beauvais, 1990; Oetting, Beauvais & Edwards, 1985; Oetting, Beauvais, Edwards, & Waters, 1984). Scales assessing alcohol and drug use had overall reliabilities ranging from .80 to .90. These measures ranged from .76 to .95 for Native American adolescents, from .74 to .92 for Mexican-American youth and from .78 to .96 for Anglo American youth (Oetting & Beauvais, 1990). Cronbach alphas for the present study ranged from .77 to .92, from .72

to .90, and from .81 to .95, respectively. Further classification into the drug use groupings is highly reliable, as it is achieved via computer algorithms instead of raters or judges (Beauvais et al., 1996). Validity is demonstrated by significant differences in levels of major risk factors associated with drug use. These factors include family problems, school achievement, peer deviance, and psychosocial measures. Validity is also demonstrated by low rates of reporting use of a fake drug (less than 2%) and exaggerated or inconsistent response patterns (1 to 3.8%). Several other measures such as scale inter-correlations, age group norming, scale discrimination, and significant correlations with variables predictive of drug use also demonstrate validity and reliability for the drug grouping scale as well as the substance-specific scales (Oetting & Beauvais, 1990; Oetting, Edwards, & Beauvais, 1985).

Violence Perpetration. Measures of violence perpetration derived from seven items measuring a variety of behaviors on the severe end of the violence continuum (Beauvais et al., 1996; Chavez, Oetting, & Swaim, 1994; Chavez et al., 1989). These are comprised of one item dealing with physical assault (e.g., having "beaten someone up"), two items dealing with the use of a weapon (i.e., using a knife, gun, or a club to threaten or injure someone), two items related to vandalism (i.e., defaced or destroyed something on purpose), and two items dealing with robbery (i.e., using force or a weapon to take money or property from someone). Participants endorsed all items in which they had engaged, with higher scores indicating a greater frequency of violence perpetration. Given the typically low endorsement of high-frequency response options, responses were

collapsed so that individuals experiencing any degree of violence were given a "1," whereas those participants who did not were assigned a "0" (Beauvais et al., 1996).

The original violence scale (Beauvais et al., 1996; Chavez, Oetting, & Swaim, 1994; Chavez et al., 1989) on which these items are based has alpha reliabilities from .83 to .88. For the present study, a preliminary factor analysis using maximum likelihood methods with a varimax rotation revealed a four-factor structure. Results revealed significant loadings ($r > .50$) for each of the variables for their associated factor. Chronbach alphas for the present study were .75, .62, and .67 for the weapon, vandalism, and robbery indicators, respectively. Validity is and has been demonstrated by adolescent males scoring higher on measures of violence perpetration as compared to adolescent females. In addition, this scale has been shown to have significant positive correlations to anger and negative affect, as well as substance abuse.

Family Caring/Sanctions. The latent variable for the family cluster was measured by two indicator variables: family caring and family sanctions. The family caring scale is composed of 4 items, which included questions such as "Does your family care what you do?" and "Does your family care if you use marijuana?" Participants responded using a four-point scale (1= "A lot," 2= "Some," 3= "Not much," 4="No"). Responses were re-coded so higher scores indicated higher levels of family caring. Cronbach alpha reliabilities for family caring in previous studies has ranged from .77 to .89 when similar versions of this scale have been used (Arrelano, et al., 1998; Oetting et al., 1984; Oetting et al., 1994; Swaim et al., 1996) and was .79 in this study. Negative correlations with drug use and peer drug associations provide measures of validity for the family caring

scale (Oetting & Beauvais, 1987). Other findings indicate higher drug involvement for adolescents with lower family caring scores (Oetting, et al., 1984).

The family sanctions scale measures how much the family would disapprove of or attempt to stop drug use, and is composed of seven items. Questions include "Would your family try to stop you from drinking?" and "Would your family try to stop you from using marijuana?" Participants responded on a four-point scale (1= "A lot," 2= "Some," 3= "Not much," 4="No"). Responses were re-coded so higher scores corresponded with higher levels of family sanctions. Cronbach alphas for this scale range from .86 to .90 (Swaim et al., 1998), with a reliability of .84 for this study. As with family caring, negative correlations with peer drug associations and drug involvement serve as validity measures for this scale (Swaim, et al., 1998).

Peer Drug Associations. The peer drug association latent factor is measured by three separate indicator variables consisting of the following scales: peer drug use, peer encouragement for use, and peer sanctions for use. The peer drug use scale is comprised of four items, including "How many of your friends drink fairly often?" and "How many of your friends use drugs other than marijuana?" Participants responded to the items on a four-point scale (1= "None," 2= "1 or 2," 3= "Several," 4="Most of them"). Higher scores on this scale indicate higher levels of peer drug use. Reliability measures for this scale have ranged from .85 to .91 (Arrelano, et al., 1998), and were .89 for the current study. Numerous studies have revealed significant relationships between peer drug use and individual drug use, deviancy and delinquency, and peer encouragement for use.

The peer encouragement for use scale itself is composed of nine items, assessing the degree to which the participant's peer group support and promotes drug use. Questions include "How often have your friends asked you to use each of these drugs?" where the participant rates the frequency of encouragement for use of alcohol, marijuana, and other drugs on a three point scale (1= "Never," 2= "Some," 3= "A lot"). A higher score indicates a higher degree of peer encouragement of drug use. Reliability estimates for this scale range from .85 to .91(Arrelano, et al., 1998), with an alpha of .86 in the current study. Significant correlations with peer drug use, individual alcohol and drug use, as well as negative correlations with family sanctions demonstrate the validity of this scale.

The final measure of peer drug associations is the peer sanction for use scale, which is comprised of 5 items. Questions such as "Would your friends try to stop you from using (marijuana, cocaine, heroin)?" and "Would your friends try to stop you from getting drunk?" assess the degree to which the participants' peer group discourages drug use and would attempt to stop the individual from use. Participants respond on a four point scale (1= "A lot," 2= "Some," 3= "Not much," 4="No"). Responses were re-coded so higher scores corresponded with higher levels of peer sanctions. Cronbach alphas for this scale have ranged from .84 to .90 (Arrellano et al., 1998), with an alpha of .88 for the current study. Negative correlations with peer drug use and peer encouragement for use as well as individual drug use serve as measures of this scale's validity.

School Adjustment. Three indicators covering areas of attitude toward school, attitude toward teachers, and self-reported school performance measure the school

adjustment latent factor of the primary socialization theory. Each component was comprised of two items, such as "I like school" and "School is fun" as well as "I am a good student" and "I like my teachers." Participants respond to all items on a four-point scale (1= "A lot," 2= "Some," 3= "Not much," 4="No"). All responses were re-coded so higher scores corresponded with higher levels of school adjustment. Reliability estimates have ranged from .77 to .85 (Swaim et al., 1998), with a current alpha of .78. Validity of the school adjustment scale has been demonstrated by positive correlations with actual grade-point averages and other measures of academic performance taken from school records.

Negative Affect. The latent factor for negative affect was measured by three indicator variables consisting of affective scales. These scales were chosen based on findings from previous studies as well as their psychometric properties, and include depression, anger, and self-esteem.

Depression. An assessment of depression was obtained via a 7-item scale with items assessing the participants' affective state. Questions included "I have crying spells," "I am lonely," and "I feel sad." Items were rated on a four-point scale (1= "A lot," 2= "Some," 3= "Not much," 4= "No"). Items were re-coded so high scores indicated higher levels of depression. Alpha reliabilities for the depression scale have ranged from .89 to .94, with a Cronbach alpha of .92 in the current study. The depression scale and other emotional measures inter-correlated as follows; depression correlates negatively with self-esteem (-.26 to -.40) and positively with anxiety (.54 to .55) and anger (.37 to .38) (Oetting, Swaim, Edwards, & Beauvais, 1989; Swaim et al., 1989). The validity of this

scale was also examined in a study by Oetting et al. (1994), who indicated reporting higher scores on the depression scale among females, which is consistent with past results. Swaim et al. (1989) also found that depression was a significant predictor of drug use for women but not men, which is also consistent with previous results (Oetting, Dinges, & Beauvais, 1993).

Anger. The anger subscale is composed of six items, including "I am hotheaded," "I fly off the handle," and "I get mad." Items were rated on a four-point scale (1= "A lot," 2= "Some," 3= "Not much," 4= "No"), and were re-coded so high scores indicated higher levels of participants' experience of anger. Alpha reliabilities in previous studies have ranged from .84 to .89. (Oetting et al., 1984, Swaim et al., 1989; Tani et al., 1998), with a Cronbach alpha of .86 in the current study. The anger scale has been found to have greater correlations with aggressive anger expression than scales measuring anxiety (.16 to .39) or depression (.28 to .46). Deffenbacher and Swaim (1999) found that Mexican-American and Anglo American adolescents' scores on the anger scale were significantly related to self-reports of aggressive anger expression (.52 to .60). Additional researchers have repeatedly demonstrated a significant relationship between anger and substance abuse (Oetting, Deffenbacher, & Donnermeyer,1998; Oetting et al., 1989; Swaim et al., 1989).

Self-esteem. This 11-item scale was used to measure participants' degree of positive self-image and covered three general areas: social acceptance, self-confidence, and competence. Items included, " I am proud of myself," "People like me," and "I am good at games." All items were measured on a 4-point scale (1= "A lot," 2= "Some," 3=

"Not much," 4= "No"), and were re-coded so high scores indicated higher levels of participants' experience of self-esteem. Internal consistency measures for this scale have ranged from .62 to .89 (Arrellano, et al., 1998; Swaim et al., 1989), with current alpha of .77. Other researchers have indicated lower scores on the self-esteem scale for females rather than males (Oetting, Edwards, Kelly, & Beauvais, 1997). The self-esteem scale has also consistently demonstrated negative relationship with depression (-.31 to -.40), anxiety (-.10 to -.23), and blame-alienation (= -.27 to -.35) (Oetting, et al., 1989; Tani, et al., 1998).

Demographic Information. Information regarding age and gender was obtained through individual survey questions, whereas information about ethnicity, school performance, and academic status was obtained from additional survey items.

Procedure

Prior to data collection, all procedures and materials were reviewed and approved by the university IRB. After the rural communities were identified, school districts were contacted and representative schools were chosen to participate in the study. After school-level consent was obtained, survey instruments and consent forms were mailed to the school. Parents were given the opportunity to withdraw their children from the study as well as a chance to examine the survey and individual items thereon.

All surveys were completed during a period within the regular school day. Survey items were administered by teachers or other school personnel, who were provided with standardized written instruction for completion of the survey. These instructions included a statement to be read out loud regarding confidentiality and anonymity of the survey

answers, emphasis on the voluntary nature of the survey, and emphasis on the ability of participants to stop at any time or to not answer any questions without penalty. In addition, survey administrators explained procedures for submission of the survey that assured anonymity. Students placed their completed surveys in a container in a random order. This container was then sealed, returned to the main office, and promptly mailed back to the Tri-Ethnic Center. The only identification on the surveys or the container was the school identifier. After scanning, data cleaning, and validity checks were made, all surveys were destroyed.

As a function of these procedures, refusal and non-responder rates in the study were generally low. After making the initial contact, approximately 3% students or parents of students in school refused participation. Students who did not complete the survey were given an alternate school-related assignment to complete during the survey administration time. Data from any school who did not survey at least 85% of their enrolled students were dropped and then replaced by another, similar school. This procedure was enacted due to potential validity problems arising as a function of absences during the survey process.

Finally, to ensure the data's accuracy and reliability, each survey was subjected to a system of checks for inconsistency (e.g., marking using a drug everyday as less harmful than using it once or twice) and exaggeration (e.g., endorsing use of a non-existent drug) (Oetting & Beauvais, 1990). Surveys were also inspected for completeness, hostile graffiti, and inappropriate response patterns (e.g., marking all items the same). Approximately two percent of the surveys failed to pass the initial review or evidenced

three or more signs of inconsistency or exaggeration.

Results

Primary analyses for the current study consisted of a series of mean comparisons for all indicator variables. This was followed by an analysis of model fit and appropriateness using confirmatory factor analytic procedures on the complete sample. Subsequently, difference tests using multigroup structural equation modeling (SEM) techniques were then executed for ethnicity and gender. All SEM analyses were conducted using the maximum likelihood estimation method to account for missing data as well as robust statistics to correct for any violations of normality assumptions.

Mean Differences

The means and standard deviations for each of the variables comprising the six latent constructs are presented in Tables 2 through 7. A series of 3 X 2 MANOVAs (Ethnicity by Gender) were conducted on the six groups of indicator variables associated with each latent variable in the model. For each of the six groups, significant interactions were then explored with Tukey tests. Effect sizes were expressed in terms of $\underline{\eta}^2$, where an $\underline{\eta}^2$ of .01 to .04 is considered a small effect, .05 to .14 a moderate effect, and .14 or greater denotes a large effect (Cohen, 1988).

A 3 X 2 MANOVA for indicator variables measuring family sanctions against substance use (consisting of the family caring and family sanctions scales) indicated a significant multivariate main effect for ethnicity (Wilks' $\lambda = .985$, $\underline{F}(4, 8858) = 16.39$, $\underline{p} < .001$, $\underline{\eta}^2 = .01$). This was accounted for on a univariate level by the family caring scale ($\underline{F}\ (2,4430) = 20.11$, $\underline{p} < .001$, $\underline{\eta}^2 = .01$) and the family sanction scale

Table 2
Family Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
Family Care						
Drink Alcohol /	14.05	14.46	14.03	14.59	14.91	15.14
Get Drunk	(3.57)	(3.25)	(3.02)	(3.40)	(2.74)	(2.28)
Range: (4.0 – 16.0)						
Family Stop						
Drink Alcohol /	2.10	2.19	2.12	2.24	2.46	2.76
Get Drunk	(1.12)	(1.50)	(1.04)	(1.60)	(0.81)	(1.06)
Range: (2.0 – 8.0)						

Note. Top numbers are means, bottom numbers are standard deviations

Table 3
Peer Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
How Many Peers Use Drugs Range: (6.0 – 24.0)	9.74 (3.97)	9.67 (3.54)	10.39 (4.40)	9.90 (3.60)	9.20 (3.43)	9.28 (3.26)
Peers Stop You From Using Range: (6.0 – 24.0)	16.43 (6.53)	18.61 (5.77)	16.25 (6.52)	18.06 (6.32)	17.99 (5.86)	19.86 (4.94)
Peers Ask You to Use Drugs Range: (6.0 – 24.0)	9.33 (4.17)	8.76 (3.59)	9.55 (4.37)	8.80 (3.83)	8.65 (3.74)	8.10 (3.05)

Note. Top numbers are means, bottom numbers are standard deviations

Table 4
School Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
Attitude Toward Teachers	5.76	6.20	5.83	6.21	5.94	6.44
Range: (2.0 – 8.0)	(1.73)	(1.46)	(1.70)	(1.36)	(1.53)	(1.27)
Attitude Toward School	5.08	5.52	5.44	5.71	5.05	5.45
Range: (2.0 – 8.0)	(1.90)	(1.73)	(1.82)	(1.60)	(1.80)	(1.55)
School Performance	6.23	6.60	5.94	6.30	6.23	6.60
Range: (2.0 – 8.0)	(1.30)	(1.17)	(1.26)	(1.17)	(1.30)	(1.17)

Note. Top numbers are means, bottom numbers are standard deviations

Table 5
Negative Affect Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
Anger						
Range: (6.0 – 24.0)	14.75	15.02	13.75	13.96	14.58	14.05
	(4.98)	(4.72)	(5.01)	(4.65)	(4.55)	(4.24)
Depression						
Range: (7.0 – 28.0)	13.07	14.14	11.86	13.09	12.98	13.85
	(5.54)	(5.71)	(5.38)	(5.58)	(5.12)	(5.49)
Self Esteem						
Range: (11.0 – 44.0)	36.27	36.28	35.96	35.71	37.13	36.98
	(6.57)	(5.68)	(6.56)	(5.95)	(5.68)	(5.15)

Note. Top numbers are means, bottom numbers are standard deviations

Table 6
Substance Use Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
Alcohol						
Range: (0.0 –7.0)	1.51	1.29	1.51	1.21	1.38	1.13
	(1.79)	(1.56)	(1.76)	(1.44)	(1.70)	(1.34)
Marijuana						
Range: (0.0 – 7.0)	1.38	0.85	1.12	0.65	0.87	0.62
	(2.37)	(1.87)	(2.22)	(1.64)	(2.01)	(1.66)
Other Drugs						
Range: (0.0 – 35.0)	1.91	0.85	1.74	0.98	1.24	0.65
	(5.61)	(3.07)	(5.43)	(3.79)	(4.73)	(2.68)

Note. Top numbers are means, bottom numbers are standard deviations

Table 7
Violence Variables: Means and Standard Deviations

	Ethnicity					
	Native American		Mexican American		Anglo American	
	Males (N = 1054)	Females (N = 946)	Males (N = 1014)	Females (N = 986)	Males (N = 1010)	Females (N = 990)
Beat Someone						
Range: (0.0 –2.0)	0.65	0.38	0.52	0.29	0.49	0.16
	(0.47)	(0.49)	(0.50)	(0.46)	(0.50)	(0.37)
Used a Weapon						
Range: (0.0 –4.0)	1.41	1.17	1.32	1.12	1.28	1.05
	(0.72)	(0.49)	(0.66)	(0.41)	(0.62)	(0.25)
Vandalism						
Range: (0.0 –4.0)	1.31	1.11	1.29	1.13	1.20	1.06
	(0.60)	(0.37)	(0.61)	(0.41)	(0.52)	(0.28)
Robbed Someone						
Range: (0.0 –4.0)	1.69	1.50	1.61	1.37	1.68	1.38
	(0.82)	(0.75)	(0.81)	(0.67)	(0.82)	(0.66)

Note. Top numbers are means, bottom numbers are standard deviations

(F (2,4430) = 28.30, $p < .001$, $\eta^2 = .01$). Post hoc tests revealed significantly higher ($p < .01$) levels of family caring and sanctions for Anglo American youth (Ms = 2.62 and 15.03) as compared to Native American (Ms = 2.36 and 14.26) and Mexican American (Ms = 2.57 and 14.31) youth. All other post hoc comparisons were non-significant. There was, however, a significant multivariate main effect for gender (Wilks' $\lambda = .985$, $F(2, 4429) = 21.33$, $p < .001$, $\eta^2 = .01$), which was accounted for by the family caring scale (F (1,4430) = 41.39, $p < .001$, $\eta^2 = .01$) and the family sanction scale (F (1,4430) = 17.66, $p < .001$, $\eta^2 = <.01$). Females had significantly higher ($p < .01$) levels of perceived family caring and sanctions for substance use (Ms = 2.64 and 14.73) than did males (Ms = 2.40 and 14.33). Results failed to yield a significant multivariate interaction between ethnicity and gender (Wilks' $\lambda = .999$, $F(4, 8858) = 1.42$, $p = .22$).

A 3 X 2 MANOVA was conducted for indicator variables measuring overall school adjustment, consisting of scales measuring participants' attitude toward school, attitude toward teachers, and school performance. Results indicated a significant multivariate main effect for ethnicity (Wilks' $\lambda = .965$, $F(6,9382) = 28.09$, $p < .001$, $\eta^2 = .02$), accounted for at the univariate level by attitude toward teachers (F (2,4693) = 8.76, $p < .001$, $\eta^2 = <.01$), attitude toward school (F (2, 4693) = 15.43, $p < .001$, $\eta^2 = .01$), and school performance (F (2, 4693) = 30.49, $p < .001$, $\eta^2 = .01$). Tukey tests revealed significantly more positive ($p < .01$) attitudes toward teachers and school performance for Anglo American youth (Ms = 6.19 and 6.42) compared to Native American (Ms = 5.98 and 6.09) and Mexican American (Ms = 6.01 and 6.18) youth. Interestingly, Mexican American youth had significantly more positive ($p < .01$) attitudes toward school (M =

5.57) than Anglo American youth (M = 5.25) and higher ($p < .01$) levels of school performance (M = 6.18) than Native American youth (M = 6.09). All other comparisons were non-significant. Additional results yield a significant main effect for gender (Wilks' $\lambda = .976$, $F(3,4691) = 39.12$, $p < .001$, $\eta^2 = .02$), but failed to indicate a significant interaction between ethnicity and gender (Wilks' $\lambda = .999$, $F(6, 9382) = .763$, $p = .60$). The main effect for gender was accounted for at the univariate level by attitude toward teachers (F (1,4693) = 99.58, $p < .001$, $\eta^2 = .02$), attitude toward school (F (2, 4693) = 52.35, $p < .001$, $\eta^2 = .01$), and school performance (F (2, 4693) = 68.47, $p < .001$, $\eta^2 = .01$). Females reported more positive attitudes toward teachers and school with higher levels of school performance (Ms = 6.28, 5.56, and 6.38) than did males (Ms = 5.84, 5.19, and 6.08).

Another 3 X 2 MANOVA was conducted for indicator variables measuring negative affect, consisting of scales measuring anger, depression, and self-esteem. Results indicated a significant multivariate main effect for ethnicity (Wilks' $\lambda = .975$, $F(6,9140) = 19.12$, $p < .001$, $\eta^2 = .01$), which was accounted for at the univariate level by anger (F (2,4572) = 17.88, $p < .001$, $\eta^2 = .01$), depression (F (2, 4572) = 18.16, $p < .001$, $\eta^2 = .01$), and self-esteem (F (2, 4572) = 17.05, $p < .001$, $\eta^2 = .01$). Post hoc tests revealed that Native American youth endorsed significantly higher ($p < .01$) levels of anger (M = 14.87) than Anglo American youth (M = 14.31), with both groups endorsing significantly higher ($p < .01$) levels of anger than Mexican American youth (M = 13.85). While there was no difference between Native American and Anglo American youth in terms of depression (Ms = 13.61 and 13.41), both were significantly lower ($p < .01$) than Mexican

American youth (M = 13.84). Finally, Anglo American youth had significantly higher ($p < .01$) levels of self-esteem (M = 37.06) than both Native American and Mexican American youth (Ms = 36.27 and 35.84). All other comparisons were non-significant. Results also yielded a significant main effect for gender (Wilks' $\lambda = .976$, $F(3,4691) = 39.12$, $p < .001$, $\eta^2 = .01$), but no interaction between ethnicity and gender (Wilks' $\lambda = .998$, $F(6, 9140) = 1.37$, $p = .22$). The main effect for gender was singularly accounted for at the univariate level by depression ($F(1, 4572) = 42.27$, $p < .001$, $\eta^2 = .01$), with females reporting higher levels of depression (M = 13.69) than males (M = 12.64).

A 3 X 2 MANOVA was then conducted for indicator variables contributing to peer drug associations which were comprised of scales measuring peer drug use, peer sanctions for drug use, and peers encouraging drug use. This yielded a significant multivariate main effect for ethnicity (Wilks' $\lambda = .978$, $F(6,10286) = 18.79$, $p < .001$, $\eta^2 = .01$), which was accounted for at the univariate level by peer drug use ($F(2,5145) = 25.20$, $p < .001$, $\eta^2 = .01$), the peer sanctions scale ($F(2,5145) = 42.37$, $p < .001$, $\eta^2 = .02$), and the peer encouragement scale ($F(2,5145) = 21.97$, $p < .001$, $\eta^2 = .01$). Post hoc tests revealed significantly higher ($p < .01$) levels of peer drug use and peers asking participants to use drugs for Native American (Ms = 9.70 and 9.04) and Mexican American youth (Ms = 10.14 and 9.17) than for Anglo American youth (Ms = 9.24 and 8.38). In addition, Mexican American youth had significantly higher ($p < .01$) numbers of peers who use drugs than did Native American youth. Anglo American youth also endorsed significantly higher ($p < .01$) levels of peers trying to stop them from using drugs (M = 18.92) than both Mexican American and Native American youth (Ms = 17.52

and 17.15). All other comparisons were non-significant. Results did indicate a significant main effect for gender (Wilks' $\lambda = .968$, $F(3,4143) = 56.49$, $p < .001$, $\eta^2 = .03$), which was only accounted for at the univariate level by the peer sanctions for drug use scale ($F(1,5145) = 135.61$, $p < .001$, $\eta^2 = .03$) and peer encouragement to use drugs ($F(1,5145) = 34.17$, $p < .001$, $\eta^2 = .01$). Males reported lower ($p < .01$) levels of their peers stopping them from using drugs ($M = 16.89$) and higher ($p < .01$) levels of their peers asking them to use drugs and/or alcohol ($M = 9.17$) as compared to females ($Ms = 18.84$ and 8.55). Results failed to yield a significant interaction for ethnicity and gender (Wilks' $\lambda = .998$, $F(6, 10286) = 1.46$, $p = .19$).

A 3 X 2 MANOVA for indicator variables contributing to substance abuse (consisting of the alcohol, marijuana, and other drug use scales) resulted in a significant multivariate main effect for ethnicity (Wilks' $\lambda = .992$, $F(6,11216.00) = 7.44$, $p < .001$, $\eta^2 = < .01$). This was accounted for on a univariate level by the alcohol scale ($F(2,5610) = 3.99$, $p = .02$, $\eta^2 = < .01$), the marijuana scale ($F(2,5610) = 17.01$, $p < .001$, $\eta^2 = .01$), and the other drug scale ($F(2,5610) = 9.50$, $p < .001$, $\eta^2 = .01$). Subsequent post hoc tests indicated that Native American youth engaged in significantly higher ($p < .01$) alcohol, marijuana, and other drug use ($Ms = 1.39$, 1.13, and 1.49) than Anglo American youth youth ($Ms = 1.24$, 0.76, and 0.91). In addition, Native American youth also engaged in significantly higher ($p < .01$) marijuana use ($M = 1.13$) than Mexican American youth ($M = 0.87$). Mexican American youth endorsed significantly higher ($p < .01$) levels of other drug use ($M = 1.43$) than Anglo American youth ($M = 0.91$). A significant multivariate main effect was also found for gender (Wilks' $\lambda = .986$, $F(3, 5608.00) = 27.43$, $p < .001$,

η^2= .01), which was accounted for on a univariate level by the alcohol scale (F (1,5610) = 36.86, p < .001, η^2= .01), the marijuana scale (F (1,5610) = 66.47, p < .001, η^2= .01), and the other drug scale (F (1,5610) = 51.75, p < .001, η^2= .01). Males engaged in significantly higher (p < .01) levels of alcohol, marijuana, and other drug use (Ms = 1.42, 1.14, and 1.71) than females (Ms = 1.19, 0.71, and 0.85). All other results were non-significant, including the interaction between ethnicity and gender.

A final 3 X 2 MANOVA for indicator variables contributing to the violence latent variable (consisting of scales measuring physical assault, use of a weapon, vandalism, and robbery) resulted in significant multivariate main effects for ethnicity (Wilks' λ = .962, F(8,9606.00) = 23.18, p <.001, η^2= .01) and gender (Wilks' λ = .906, F(4, 4803.00) = 124.00, p <.001, η^2= .05), but failed to yield a significant interaction (Wilks' λ = .999, F(6, 11216) = 1.67, p = .44). The main effect for ethnicity was accounted for on a univariate level by the physical assault scale (F (2,4806) = 14.59, p < .001, η^2= .01), the use of a weapon scale (F (2, 4806) = 7.16, p < .001, η^2= .01), the vandalism scale (F (2, 4806) = 3.14, p < .001, η^2= .01), and the robbery scale (F (2, 4806) = 4.36, p < .001, η^2= <.01). Post hoc tests indicated that Native American youth engaged in significantly higher (p < .01) levels of physical assault and use of a weapon (Ms = 0.51 and 1.29) than Mexican American youth (Ms = 0.41 and 1.22), whereas both groups were significantly higher (p < .01) than Anglo American youth (Ms = 0.33 and 1.16). Both Native American and Mexican American youth endorsed similar levels of vandalism (Ms = 1.21 and 1.21), which were significantly higher (p < .01) than that for Anglo American youth (M = 1.13). Finally, Native American youth also endorsed significantly higher levels of robbery (M =

1.60) than Mexican American (M = 1.49, p = .05) and Anglo American (M = 1.53, p = .01) youth. All other comparisons yielded non-significant results. The main effect for gender was accounted for on a univariate level by the physical assault scale (F (1, 4806) = 413.62, p <.001, η^2= .02), the use of a weapon scale (F (1, 4806) =203.52, p < .001, η^2= .04), the vandalism scale (F (1, 4806) = 146.55, p < .001, η^2= .03), and the robbery scale (F (1, 4806) = 119.82, p < .001, η^2= .02). For all four scales, males (Ms = 0.55, 1.34, 1.27, and 1.66) engaged in significantly higher (p < .01) levels of violence than females (Ms = 0.27, 1.11, 1.10, and 1.42).

Model Evaluation

A confirmatory factor analysis (CFA) for the initial saturated model yielded a comparative fit index (CFI) of .90, which is at the lower limit of acceptable fit (Bentler, 1992), as well as non-significant factor loadings for the self-esteem and physical assault indicator variables. Subsequent results from the LM Test indicated a significant (χ^2 (1) = 385.192, p < .001) unspecified path from the residual term associated with the anger indicator to the residual associated with the self-esteem indicator. However, results failed to delineate any significant paths associated with the physical assault indicator variable or the violence latent variable. All other significant paths with large chi-square values were associated with the negative affect latent variable and appeared to be a function of the error associated with the self-esteem indicator. Given the conflicted results regarding the association of self-esteem to substance use (Swaim et al., 1996), the non-significant factor loading, and the LM Test results, the model was respecified and run without the self-esteem indicator. The CFA for the respecified model indicated substantially

improved fit (CFI = .96), as well as significant factor loadings for all variables including the physical assault indicator variable. Table 8 gives the initial and respecified model factor loadings and residuals of each indicator variable for their respective latent constructs. All factor loadings were significant ($p < .01$) with a magnitude greater than .40, signifying that the indicator variables were good measures of the latent constructs. Table 9 summarizes tests of model fit for the initial saturated and respecified models for the full sample collapsed across gender and ethnicity.

Tables 10 through 15 list the factor intercorrelations of the latent variables for Native American, Mexican American, and Anglo American males and females. For all groups, there are significant correlations between the family and school factors, ranging from .35 to .50. While consistently negative, the relationship between the family factor and the factor for negative affect ranged from -.04 to -.21 for males and from -.18 to -.29 for females. Likewise, correlations between the family factor and the peer factor were generally higher for Native, Mexican and Anglo American females (rs = -.39, -.28, and -.46) than they were for males from these ethnic groups (rs = -.36, -.18, and -.24). Regarding the correlations between the family factor and substance use, correlations for Mexican American males and females were lowest (rs = -.18 and -.24), whereas those for other groups ranged from -.26 to -.42. Correlations between the family factor and violence were similar to these, ranging from -.19 and -.20 for Mexican and Native American males to -.42 and -.46 for Native and Mexican American females.

In regard to the correlations between the school factor and other latent factors, relationships were all negative with the exception of the family factor. Relationships were

Table 8
Confirmatory Factor Analysis Standardized Loadings and Residuals for Saturated and Respecified Models

	Model			
	Saturated		Respecified	
Indicator	Factor Loading	Residual	Factor Loading	Residual
Family Caring	. 84	.55	.84	.79
Family Sanctions	. 62	.78	.62	.54
Attitude Toward Teachers	.82	.85	.85	.53
Attitude Toward School	.76	.66	.75	.66
School Performance	.56	.83	.56	.83
Peer Drug Use	.79	.61	.79	.61
Peers Sanctions	-.43	.90	-.43	.90
Peers Ask	.82	.58	.82	.58
Anger	.88	.48	.92	.38
Depression	.59	.81	.56	.83
Self Esteem	.01	1.00	N/A	N/A
Alcohol	.68	.73	.68	.73
Marijuana	.74	.67	.74	.67
Other Drugs	.62	.77	.65	.76
Beat Someone	.20	.98	.50	.87
Used a Weapon	.95	.30	.72	.70
Vandalism	.98	.22	.69	.73
Robbed Someone	.98	.22	.68	.73

Table 9
Summary of Confirmatory Factor Analysis

	Model	
Fit Indices	Saturated	Respecified
χ^2	1129.79	653.19
df	120	104
χ^2 /df	9.41	6.28
RMSR	0.65	0.36
CFI	0.90	0.96

Note. RMSR = root mean square residual; CFI = comparative fit index

Table 10
Factor Intercorrelations of Latent Variables for Native American Males

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.48	1.00				
Negative Affect	-.04	-.26	1.00			
Peer Cluster	-.36	-.34	.32	1.00		
Substance Use	-.34	-.30	.24	.91	1.00	
Violence	-.20	-.28	.54	.66	.67	1.00

Table 11
Factor Intercorrelations of Latent Variables for Native American Females

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.50	1.00				
Negative Affect	-.29	-.44	1.00			
Peer Cluster	-.39	-.40	.40	1.00		
Substance Use	-.32	-.41	.34	.83	1.00	
Violence	-.42	-.42	.58	.61	.77	1.00

Table 12
Factor Intercorrelations of Latent Variables for Mexican American Males

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.39	1.00				
Negative Affect	-.04	-.19	1.00			
Peer Cluster	-.18	-.20	.41	1.00		
Substance Use	-.18	-.16	.31	.89	1.00	
Violence	-.19	-.26	.50	.71	.74	1.00

Table 13
Factor Intercorrelations of Latent Variables for Mexican American Females

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.35	1.00				
Negative Affect	-.18	-.34	1.00			
Peer Cluster	-.28	-.40	.40	1.00		
Substance Use	-.24	-.42	.36	.88	1.00	
Violence	-.46	-.43	.53	.76	.78	1.00

Table 14
Factor Intercorrelations of Latent Variables for Anglo American Males

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.50	1.00				
Negative Affect	-.21	-.37	1.00			
Peer Cluster	-.24	-.38	.31	1.00		
Substance Use	-.26	-.37	.29	.94	1.00	
Violence	-.36	-.45	.44	.76	.77	1.00

Table 15
Factor Intercorrelations of Latent Variables for Anglo American Females

	Family Cluster	School Cluster	Negative Affect	Peer Cluster	Substance Use	Violence
Family Cluster	1.00					
School Cluster	.42	1.00				
Negative Affect	-.23	-.55	1.00			
Peer Cluster	-.46	-.43	.38	1.00		
Substance Use	-.40	-.41	.28	.87	1.00	
Violence	-.38	-.50	.60	.66	.62	1.00

the lowest magnitude for Mexican American males, with correlations between the school and negative affect factors and the school and peer factors of -.19 and -.20, respectively. For all other groups, relationships between these factors ranged from approximately -.37 to -.55. Correlations between the school and two deviant behavior factors (substance use and violence) were -.16 and -.26 for Mexican American males, whereas they ranged from -.30 to -.50 for all other groups.

Results also revealed consistently high factor intercorrelations between the peer factor and substance use for all groups, ranging from .83 to .94, as well as between the peer cluster and violence, ranging from .61 to .76. All groups also exhibited a significantly high correlation between substance use and violence, ranging from .62 to .78. While non-significant in the final SEM analyses, the relationship between negative affect and violence factors was consistently around .50 for all groups, whereas the relationship between negative affect and substance use was slightly lower and around .30 for all groups. Finally, the factor intercorrelations between the negative affect and peer drug use factors ranged from approximately .31 to .41.

Structural Equation Model Analyses

After initial model calibration, SEM analyses were conducted for each of the six samples as well as all participants collapsed across gender and ethnicity. Results indicated satisfactory fit of .94 or above for all groups, indices of which are presented in Table 16.

Table 16
Summary of Fit Indices for Structural Equation Models

		Fit Indices			
		CFI	RMSR	χ^2	df
Native American Sample	Males	.97	.43	315.50	104
	Females	.98	.34	201.48	104
Mexican American Sample	Males	.97	.46	289.09	104
	Females	.94	.44	368.79	104
Anglo American Sample	Males	.96	.36	331.68	104
	Females	.95	.21	277.40	104
Total		.96	.35	1215.01	104

Note. CFI = comparative fit index; RMSR = root mean square residual

Results also revealed significant loadings for all indicator variables on their associated latent constructs. While these values ranged from .34 to .89 across gender and ethnicity, all standardized loadings for observed variables were significant ($p < .05$) for all groups. Figures 1 through 3 present all factor loadings for Native American, Mexican American, and Anglo American males and females, respectively.

Furthermore, model analyses also revealed differences in the significance levels of path values between latent constructs. All groups exhibited a significant ($p < .05$) negative relationship between the family factor and the peer drug association factor. There were also significant ($p < .05$) positive relationships between peer drug associations and substance use for all groups. Mexican American and Anglo American males and females had a significant ($p < .05$) negative path between the school factor and peer drug associations, whereas Native American and Mexican American youth had a significant ($p < .05$) positive relationship between substance use and violence. Mexican American males and females also had a significant ($p < .05$) negative relationship between the family factor and violence. All other paths were non-significant. All standardized structural path coefficients are presented in Figures 1 through 3.

Given the similarities across groups, model analyses were also conducted on the full sample collapsed across gender and ethnicity. Overall fit for the model with the full sample was adequate (CFI = .96). As with all specific group analyses, all factor loadings for indicator variables were also significant ($p < .05$). Significance levels for structural paths were also consistent with those found across the individual groups. Analyses revealed significant ($p < .05$) negative paths from the family and school factors to peer

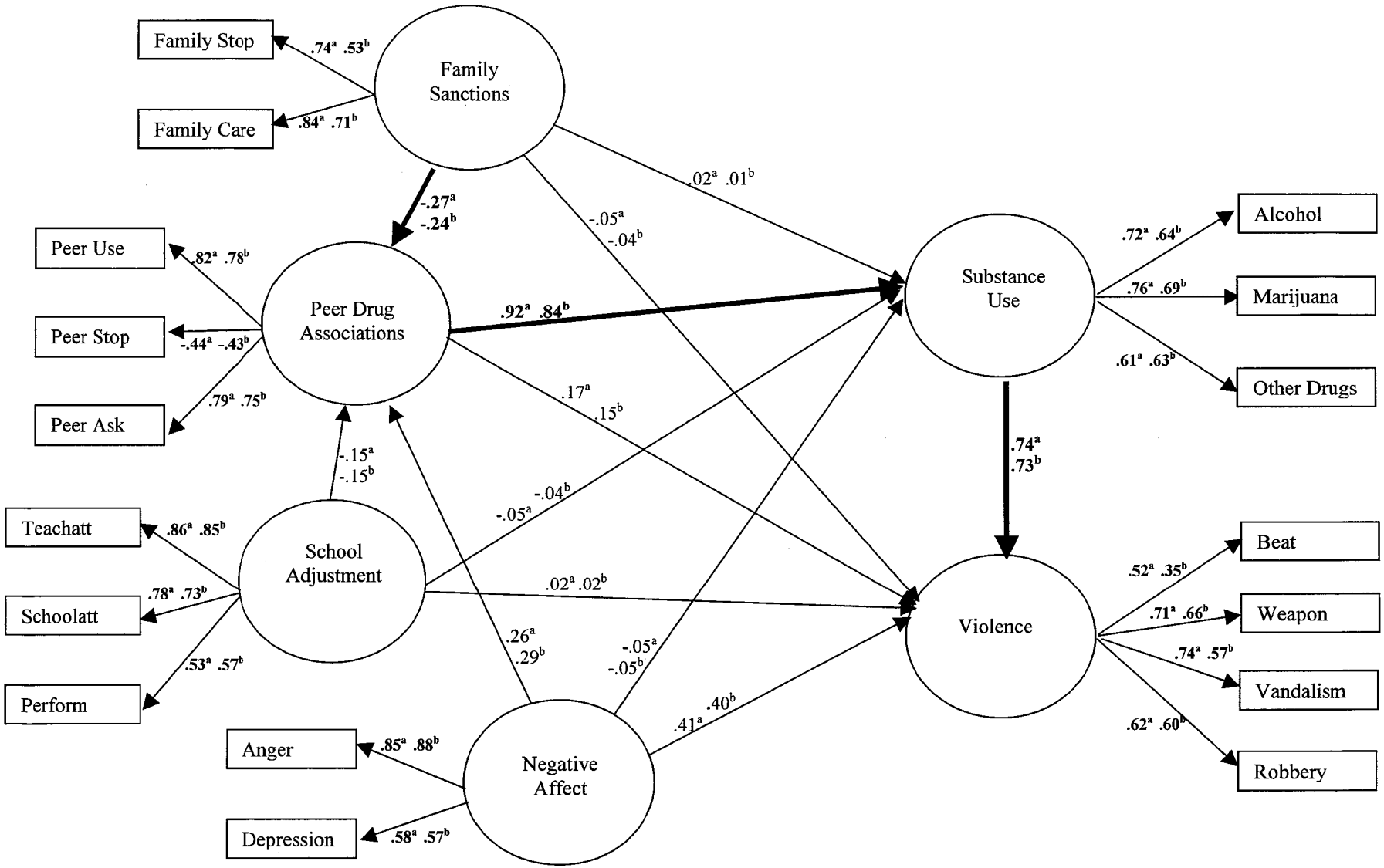

Figure 1. Structural Equation Model for Native American Males[a] and Females[b]

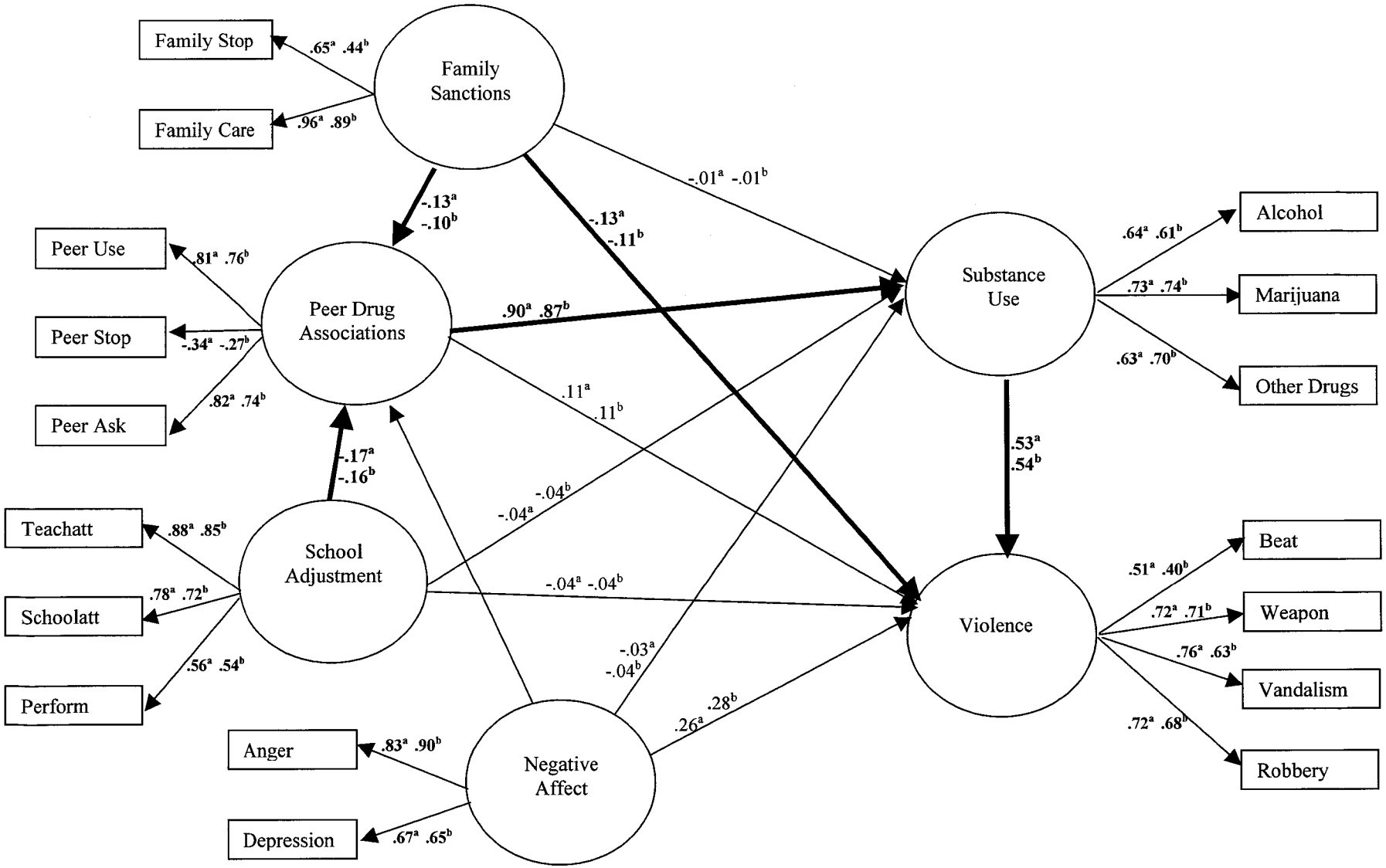

Figure 2. Structural Equation Model for Mexican American Males[a] and Females[b]

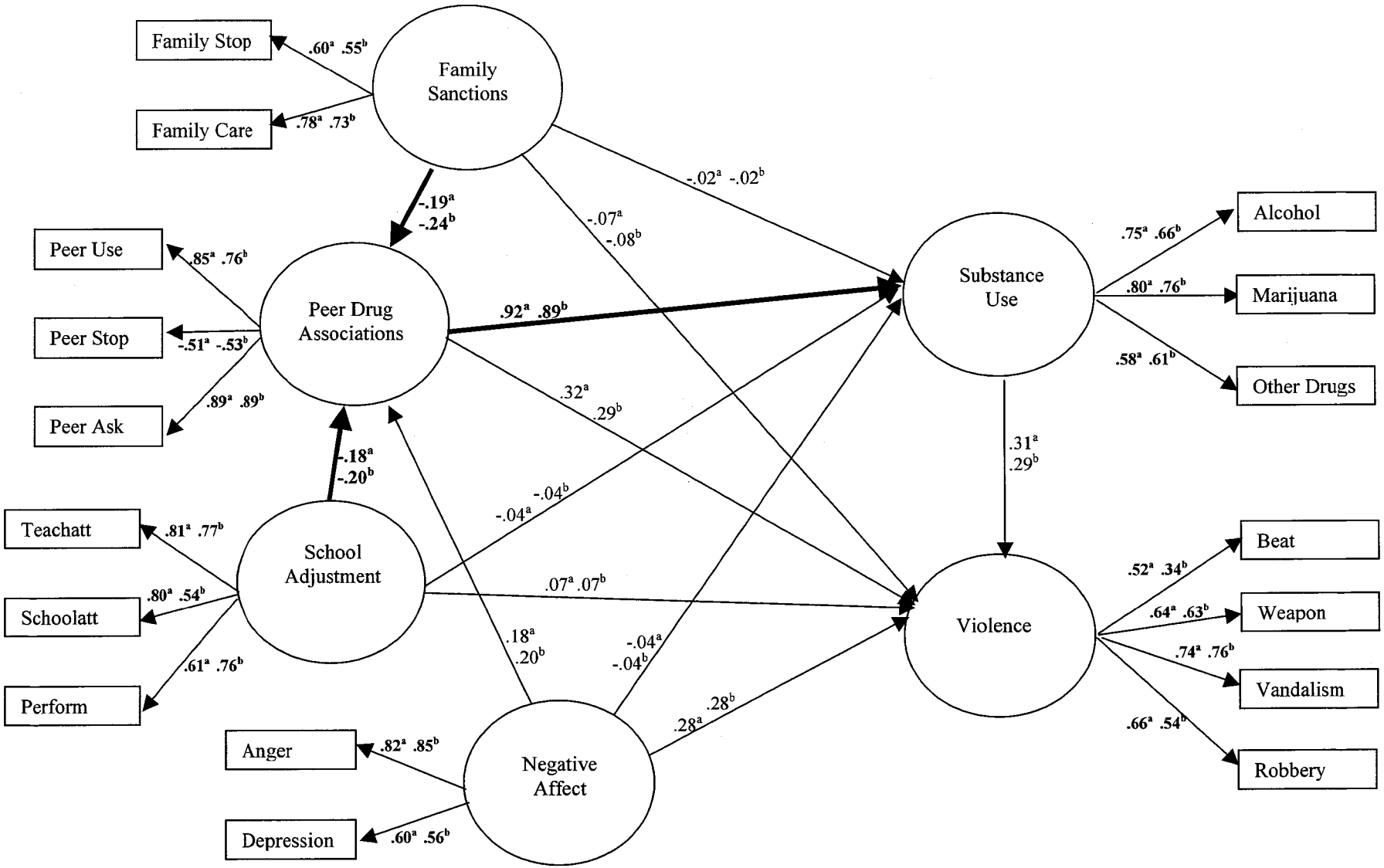

Figure 3. Structural Equation Model for Anglo American Males[a] and Females[b]

drug associations as well as significant ($p < .05$) positive relationships between peer drug associations and substance use. There was also a significant ($p < .05$) positive relationship between substance use and violence and a significant ($p < .05$) negative relationship between the family factor and the violence latent variable. All other paths were non-significant. All standardized path values for the full sample are presented in Figure 4.

Multigroup Analyses

Multigroup analyses for the respecified structural model were conducted by ethnicity as well as by gender. Tables 17 and 18 reveal the fit indices, chi-square and difference test results for ethnic and gender analyses, respectively. For all groups, baseline tests with no constraints resulted in acceptable comparative fit indices of .94 or higher. These unconstrained baseline tests were then followed by fixing all measurement paths in the respecified model to equality. Difference tests indicated no significant differences for males across the three ethnic groups (χ^2 (34) = 24.45, $p = .75$) or for females across ethnicity (χ^2 (34) = 26.13, $p = .75$). Furthermore, there were no significant differences between Native American (χ^2 (17) = 14.41, $p = .60$) or Mexican American (χ^2 (17) = 19.09, $p = .30$) males and females. There was, however, a significant difference between Anglo American males and females (χ^2 (17) = 38.43, $p = .01$), where males had significantly higher ($p < .01$) factor loadings for the physical assault and vandalism indicator variables. Removing the constraints on these two indicator variables yielded a non-significant difference from the initial unconstrained model (χ^2 (15) = 8.36, $p = .65$).

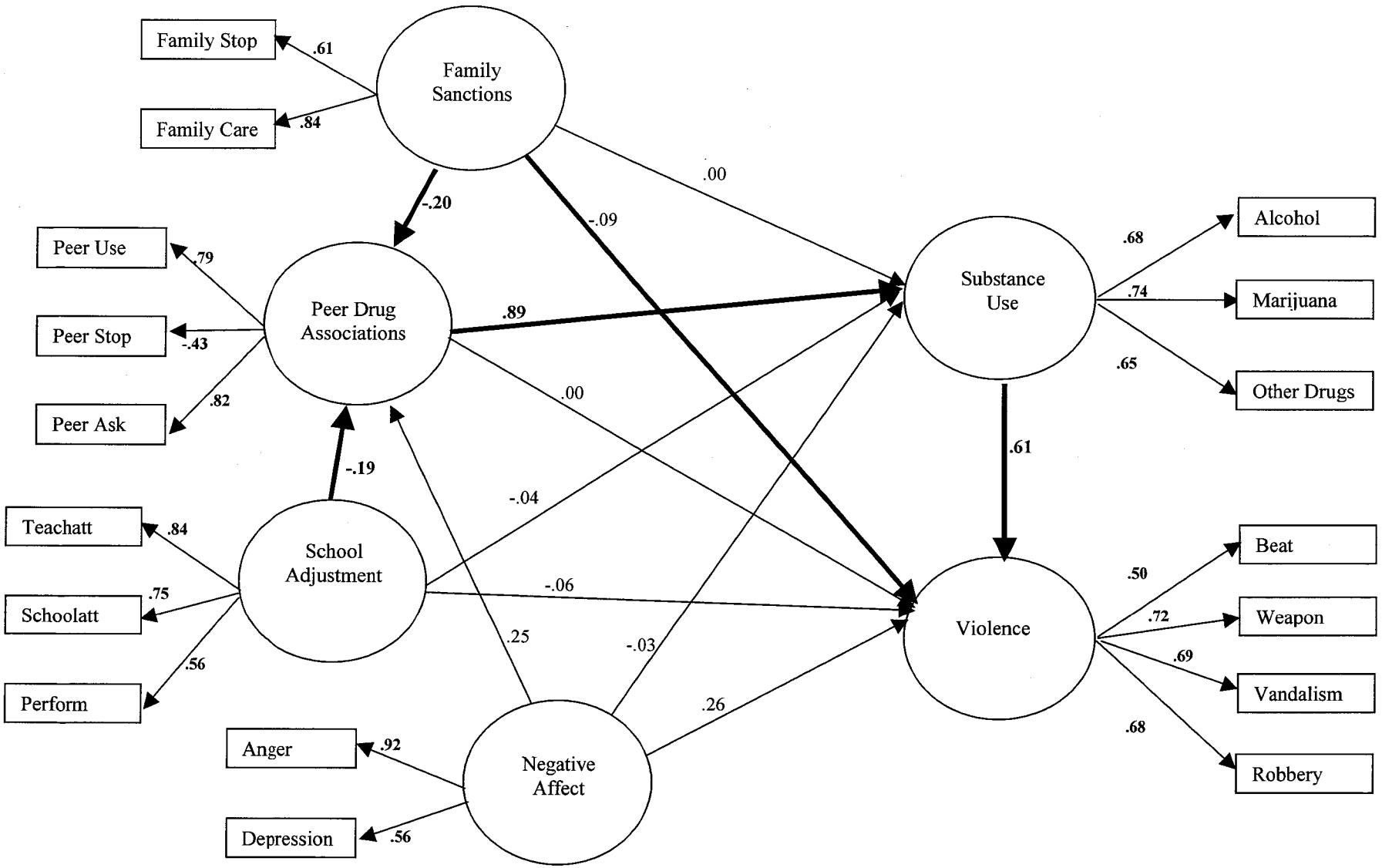

Figure 4. Structural Equation Model for Complete Sample

Table 17.
Summary of Fit Indices & Difference Tests for Ethnicity

		Fit Indices			
		CFI	χ^2	df	p=
Native American Measurement Model	Unconstrained	.97	300.49	196	
	Constrained	.96	314.90	213	
	Difference	-.01	14.41	17	.60
Native American Structural Model	Unconstrained	.97	337.17	208	
	Constrained	.97	336.53	220	
	Difference	.00	0.64	12	.99
Mexican American Measurement Model	Unconstrained	.96	368.25	196	
	Constrained	.95	387.34	213	
	Difference	-.01	19.09	17	.30
Mexican American Structural Model	Unconstrained	.96	411.87	208	
	Constrained	.95	420.29	220	
	Difference	-.01	8.42	12	.75
Anglo American Measurement Model	Unconstrained	.95	444.52	196	
	Constrained	.95	482.95	213	
	Difference	.00	38.43	17	.01
Anglo American Structural Model	Unconstrained	.95	483.63	208	
	Constrained	.95	490.58	220	
	Difference	.00	6.95	12	.90

Note. CFI = comparative fit index

Table 18
Summary of Fit Indices & Difference Tests for Gender

		Fit Indices			
		CFI	χ^2	df	p=
Female Measurement Model	Unconstrained	.95	558.69	294	
	Constrained	.94	584.82	328	
	Difference	-.01	26.13	34	.75
Female Structural Model	Unconstrained	.96	603.74	312	
	Constrained	.95	603.22	336	
	Difference	-.01	0.52	24	.99
Male Measurement Model	Unconstrained	.96	554.59	294	
	Constrained	.96	579.04	328	
	Difference	.00	24.45	34	.75
Male Structural Model	Unconstrained	.97	628.92	312	
	Constrained	.96	635.56	336	
	Difference	.00	6.64	24	.99

Note. CFI = comparative fit index

Measurement model difference tests were then followed by fixing all structural paths in the respecified model to equality. In comparison to the unconstrained model, difference tests indicated no significant differences for males across ethnicity (χ^2 (24) = 6.64, p = .99) or for females across ethnicity (χ^2 (24) = 0.52, p = .99). There were also no significant differences between Native American (χ^2 (12) = 0.64, p = .99), Mexican American (χ^2 (12) = 8.42, p = .75), or Anglo American (χ^2 (12) = 6.95, p = .90) males and females.

Discussion

There are several ways the present study advances previous research on substance use and violence among Native American, Mexican American, and Anglo American youth. First, by delineating males and females within these three ethnic groups, the study reveals important etiological and epidemiological factors concerning substance use as well as violence. Second, this study demonstrates the moderating effects of gender on adolescent substance use and violence as well as the overall mediating effects of substance use on the perpetration of severe forms of violence. Third, the use of structural equation modeling techniques provides for the inclusion of multivariate predictors, and allows the analysis of interactive relationships between these variables. Finally, additional questions and implications for future research are raised, leading to a discussion of clinical applications based on these results.

Mean Differences in Model Variables and Related Hypotheses

In general, results from multivariate analyses for the indicators of all six latent model variables indicated significant main effects for gender and ethnicity. However, the analyses failed to yield any significant interaction between these terms for any of the variables. This is consistent with results from structural equation modeling analyses, which also produced non-significant differences between groups for the relationships among these variables.

This study did, however, yield several significant gender differences in variables comprising the family cluster. Females indicated more parental caring and sanctions for substance use than males. However, it should be noted that gender differences in the level of perceived family sanctions accounted for less than one percent of the variance in

differences within these scores for males and females. Thus, it appears that perceptions of family sanctions for drug use are practically equivalent. However, previous research by Griffin and colleagues (2000) showed that parental monitoring for drug use was lower for males than females, and was associated with higher levels of delinquent behavior in males in particular. Messages to daughters regarding the use of drugs are typically more frequent and explicit. In addition, drug use is typically viewed as an expected part of the developmental process for males, and is frequently treated with less concern by parents than potential use by daughters (Moon, Hecht, Jackson, & Spellers, 1991; Patterson, 2001). Males are significantly more likely than females to receive drug offers from family members, which undoubtedly has an effect on the perception of family sanctions against drug use. Differences are also present in that families are more likely to exhibit overt signs and verbalizations of caring for female children as compared to male children (Patterson, 2001). Mothers and fathers are more likely to use supportive communication and affection in relating to daughters. Daughters may also be more likely to elicit these behaviors (e.g., asking for help, being more "dependent") as a function of socialization.

Results revealed that Anglo American adolescents reported more family caring and sanctions for substance use than either Native American or Mexican American youth. This is contrary to the hypothesis that Native and Mexican American youth would have higher levels of family caring and sanctions than Anglo Americans. However, this hypothesis was hinged on findings that Native American adolescents report a higher influence from the family in their decisions to use drugs or alcohol, which may have little to do with perceived amounts of family caring and/or sanctions. Results from the present study are consistent with results reported by Flom (1996), who found that Native

American adolescents typically perceived lower levels of family intervention in their lives, which includes the use of drugs and alcohol. It is also possible that the present findings are related to levels of substance use within the family unit, which are typically lower in Anglo American family systems than in Native or Mexican American families (Beauvais, 1992; Flom, 1996). An important caveat, though, is that although there are significantly higher levels of family caring and sanctions against adolescent substance use for Anglo Americans, this does not imply an absence thereof in Native American and Mexican American families. Examination of the results indicates high overall levels of caring and sanctions for all three groups, with Anglo American adolescents reporting the highest.

Further group comparisons for levels of school adjustment revealed differences in adolescents' attitudes toward school and teachers as well as school performance between males and females. For all three aspects of school adjustment, females reported more positive levels than males. This is not surprising, given the large amount of literature indicating better overall school performance for females compared to male students. In addition, female students typically have better attitudes toward teachers and their school experience, whereas males have a more difficult time working within the academic structure (Patterson, 2001).

Anglo American adolescents reported more positive attitudes toward teachers and higher levels of school performance than Native American and Mexican American youth. Although analyses indicated that ethnic differences accounted for less than one percent of the variance in adolescents' attitudes toward teachers, this trend is consistent with results described by Machamer and Gruber (1998), who found that Native American youth

reported significantly more negative beliefs about teachers and lower perceived levels of teacher goodwill. Interestingly, Mexican American youth reported significantly more positive attitudes toward the school environment than Anglo American adolescents within the current study. Hernandez and Descamps (1986) report that Mexican Americans typically view education as a means of attaining success, which has bearings on the overall positive regard for school within the group. While this may be true, it is also possible that higher levels of positive regard for school are a function of acculturation and/or group identification within the Mexican American adolescents sampled. Guzman (2002) reports that positive attitudes toward school were significantly higher for Mexican American youth who identified more strongly with majority culture than for those with more traditional identifications. While the current study did not include estimates of acculturation or ethnic identification, this may be an important contribution to these results.

Mexican American youth also reported higher levels of school performance than Native American youth. This is consistent with previous research that suggests higher academic performance and slightly lower levels of dropping out of school for Mexican American as compared to Native American students (Chavez et al., 1992; Swaim et al., 1997). However, estimating dropout rates in these populations is extremely difficult, and has produced a range of prevalence rates. Dropout status is an important consideration in any analysis of school adjustment or adolescent substance use and violence, and will be discussed at length in the section on limitations of this study.

Analyses examining differences in adolescents' experience of anger, depression, and self-esteem provided partial support for hypotheses in the present study. As

hypothesized, Native American youth endorsed significantly higher levels of anger than did Anglo American adolescents. However, both groups were higher than Mexican American youth, whereas Mexican American adolescents were predicted to have higher levels of anger than Anglo Americans. Native and Anglo Americans also had higher levels of depression than Mexican American youth but were not significantly different from each other. Although self-esteem was removed from the final analyses due to poor statistical properties, results from mean comparisons indicated that Anglo American youth had significantly higher levels of self-esteem than did Native American and Mexican American youth, which is also as hypothesized. The findings for higher anger and lower self-esteem in Native Americans are congruent with prevalence rates and findings reported by a variety of researchers and clinicians (Barlow & Durand, 1996; Beauvais, 1992; Duran & Duran, 1995; May & Van Winkle, 1994; Sue, Sue, & Sue, 2001). Findings regarding depression however, are contrary to reported differences in rates across cultures. As Duran and Duran (1995) state, it seems likely that the clinical features and experience of depression in Native American youth manifests itself in culturally-specific ways. In addition, questions that are sensitive to Anglo Americans experience of depression may be relatively poor at assessing the presence of depression in Native American youth. Again, the results from the current study should not be construed as a relative lack of depression in Native American youth, as overall levels were significant and unfortunately high.

There was also a main effect within negative affect for gender. Unlike for ethnicity, the only significant difference was observed in higher levels of depression for females, as hypothesized. This is also consistent with a wide array of studies and

literature (e.g., Barlow & Durand, 1996; Patterson, 2001; Sue et al., 2001). The non-significant difference between males' and females' level of anger is not surprising, as reported levels of anger are typically consistent between genders. However, subsequent violent behavior and aggression is generally higher for males than females (Baron & Richardson, 1994; Harris, 1995, Harris, 1996). Results seem to confirm that gender differences in anger lie more in it's expression rather than the experience of it, which was measured in the present study independent of any perpetration of violence or expression of anger. Although multivariate analyses yielded a non-significant interaction for the three variables comprising negative affect, there was a significant interaction between gender and ethnicity for anger on a univariate level. Native American males and females had the highest levels of anger, whereas Mexican American females had the lowest levels of anger. While the non-significant multivariate results preclude the interpretability of this finding, it is an important implication for future research and follow-up studies. It may also account for the non-significant difference in levels of anger between males and females, which was potentially obscured by collapsing across ethnicity and embedding this measure within a multivariate analysis. Further analysis of the role anger plays in substance use and violence may benefit from focusing on anger as a singular variable.

Differences in peer drug associations were also observed between males and females, as well as between the three ethnic groups. As hypothesized, males had more peers who encouraged them to use drugs and alcohol and fewer peers who tried to stop them from using these substances. This is consistent with higher levels of personal substance use reported by male respondents across all cultures. There were, however, no gender differences in the actual numbers of peers who used drugs and alcohol. This may

be an artifact of male and female participants belonging to peer groups that include both genders. Indeed, Oetting and Donnermeyer (1998) assert that adolescents belong to several peer groups, each with their own unique composition and influence.

It is also possible that the similarity between males and females in the numbers of peers whom use drugs and alcohol are due to factors not measured in the current study. Brooks et al. (1998) examined the influence of peers, among other factors, on a sample of Mexican American adolescents and found that the perceptions of peers similarly predicted substance use for males and females. The more youth perceived student use to be the norm, the more students used substances. A similar study by Flannery et al. (1994) delineated increased substance use was positively related to perceptions of pressure from peers and having close friends who drink alcohol across cultures and gender. How actual pressure differs from perceptions of pressure was not discussed. Within the present study, it appears as though males are more susceptible to peer pressures to use drugs and alcohol than are females, whereas both males and females are influenced by the presence of peers that engage in substance use themselves.

Peer drug associations were also different as a function of ethnicity. Native American and Mexican American youth reported more peers who used and subsequently asked them to use drugs and alcohol and fewer peers who tried to stop them from engaging in substance use. This is consistent with results reported by Gfellner (1994), who found that Anglo Americans had lower levels of drug use within peer groups as well as lower levels of perceived peer pressure when compared to Native Americans. This is also congruent with the higher levels of overall substance use in the Native American population and supported by studies demonstrating significant relationships between peer

drug use and actual self-reported substance use for adolescents across ethnicity (Barrera, Biglan, Ary, & Li, 2001; Beauvais et al., 1996). The lack of a significant difference between the numbers of peers who use drugs in Mexican American and Anglo American samples is congruent with a variety of research examining substance use in these two adolescent populations (Chavez et al., 1996; Grunbaum, Basin, & Pandy, 1998; Swaim et al., 1998). Anglo American adolescents appear to be more similar to Mexican American adolescents in terms of substance use than are either of the groups to Native American adolescents.

As with peer drug associations, there were also significant differences in actual levels of self-reported substance use. There was a multivariate main effect for ethnicity, indicating higher levels of alcohol, marijuana, and other drug use for Native American youth compared to Anglo American youth. However, ethnicity accounted for less than one percent of the variance in alcohol and other drug use within the rural population examined in the present study. However, ethnicity did account for a meaningful amount of variance in marijuana use. This is congruent with the majority of the previous research on this topic (Beauvais, 1992; Beauvais et al., 1996; Johnson, O'Malley, & Bachman, 2002; Wallace & Bachman, 1991). The finding that Native American youth had higher marijuana use than Mexican American youth is also in keeping with prevalence rates for Native Americans within rural populations (French & Picthall-French, 1998). Also, Mexican American youth had higher levels of other drug use than Anglo American youth. This is consistent with previous research demonstrating higher levels of cocaine and heroin use with no significant differences in alcohol or marijuana use when comparing Mexican American and Anglo American adolescents still enrolled in school

(Beauvais et al., 1996; Maddahian, Newcomb, & Bentler, 1996; Wallace & Bachman, 1991). However, it is imperative to note that these differences either disappeared or reversed directions when dropouts were included. Differences in alcohol and other drug use across ethnic groups may indeed account for a more substantial portion of the variance should dropouts or other factors (i.e. ethnic identity, acculturation levels, or nationality/generation status) be included as moderators.

There was also a multivariate main effect for substance use as a function of gender. As hypothesized, males consistently reported higher levels of use for all types of substances than did females. This is not surprising, given the vast bulk of literature that has demonstrated this effect over long periods of time (Johnston, O'Malley, & Bachman, 2002; Oetting & Beauvais, 1990). The lack of an interaction between gender and ethnicity is also consistent with a variety of previous studies which have discerned differences between males and females and between ethnic groups but not between the groups within and across these dimensions. Beauvais and colleagues (1996) reported no significant interaction between gender and ethnicity for the groups examined in the present study for use of eight different substances. However, measures were focused on having ever used the substance over the course of the lifetime. The current study confirms that examining frequency and/or quantity use of these individual substances does not yield an interaction between ethnicity and gender.

Finally, there were also mean differences between groups in terms of levels of violence perpetration. Males had significantly higher levels of violence perpetration on all four measures than females, which is as hypothesized. The results are also consistent with the vast majority of the literature on adolescent violence, indicating that males

typically engage in more serious forms of violent behavior (Beauvais et al., 1996; Donnermeyer, 1995; Grunbaum et al., 1998). Furthermore, Native American youth were shown to have higher levels of physical assault and use of a weapon than did Mexican American youth, whereas both groups endorsed higher levels than Anglo Americans. Both groups, although not significantly different from each other, also had higher levels of vandalism and destruction of property than Anglo American adolescents. These findings are consistent with those reported by Jumper-Thurman et al. (1996), who report higher levels of physical assault, robbery, and other forms of violence within Native American communities. Violence for reservation and non-reservation based Native Americans has been well documented within these communities, as have the serious, often fatal consequences.

Few empirical studies have been conducted examining differences in levels of violence between the three ethnic groups examined in the current study. Even fewer have focused on rural populations. Findings regarding violence from the present study conflict with those of Grunbaum and colleagues (1998), who failed to demonstrate any differences in perpetration of violence between Anglo and Mexican Americans. However, it is important to note that their findings are based on a single rural community. Furthermore, indicators of violence in their study were limited to fighting and carrying a weapon and are significantly different from those in the present study. It seems likely that expanding the definition and scope of violence out, as in the present study, would aid in the detection of specific differences in the perpetration of violence between ethnic groups, as well as the relationships between violence, substance use, risk, and protective factors. Moreover, actual forms and amounts of violence may not be consistent across

rural communities, necessitating a larger representative sample of rural locales. Thus, the present study serves to enhance the understanding of violence in rural areas of the United States.

Latent Variable Relationships and Related Hypotheses

As previously stated, structural equation modeling analyses failed to reveal any significant differences between groups regarding relationships among the latent variables. It appears that while there were differences in the degrees to which the six different groups experienced each of the observed variables, the way that these factors relate to and predict one another as specified within this model are generally the same across gender and ethnic groups. While some paths between latent variables were statistically significant for one ethnic group and not another, the overall magnitudes of the paths remained statistically constant. In addition, for paths that were statistically significant in one group but not another, such as the path between school adjustment and peer drug associations for Native Americans, test statistics were only slightly below the critical value for significance. Thus, the differences in relationships between latent variables between groups appeared to be smaller than differences between obtained path values and the criteria for statistical significance. This being the case, interesting differences were revealed between ethnic groups.

The Family Cluster, Substance Use and Violence

Family sanctions against substance use and family caring were hypothesized to negatively predict substance use and violence, either directly or indirectly through a negative influence on adolescents' associations with drug using peers. This hypothesis was partially supported. Although the direct relationships between the family cluster and

the measures of delinquent behavior were not significant, there were reliable significant negative relationships with peer drug associations. For all groups, parental caring and sanctions for substance use appears to decrease the likelihood with which adolescents form affiliations with drug using peers. This is consistent with primary socialization theory, which states that the family unit can serve as a protective factor against drug and alcohol use in that it is a buffer against forming relationships with deviant peers (Oetting & Donnermeyer, 1998; Whitbeck, 1998). In fact, Oetting and Donnermeyer assert that positive changes in parenting are unlikely to directly affect changes in adolescents' drug use on their own; they must be accompanied by changes in the peer group.

The indirect relationship between the family cluster and substance abuse as mediated through the peer group is also consistent with a number of previous studies. Brook et al. (1990) confirmed that the family was a primary source of positive norm transmission and was directly responsible for the internalization of these norms within children. This then led to stronger affiliations with peers who did not engage in substance use. Confirming this, Whitbeck and colleagues (1998, 1989) found that strong parent/child bonds served to reinforce conventional norms within children, including the abstinence of drug use. These values were then shown to decrease the affiliations with peers who engaged in drug use, thus serving as a protective factor.

Other studies also reveal the relationship between the family and peer clusters as they relate to adolescent substance use. Swaim et al. (1998) found direct relationships between family sanctions for drug use and actual levels of substance use for Anglo American and Mexican American male dropouts only. However, the relationship between sanctions and peer drug associations was significant for both males and females in both

ethnic groups. Although this study was conducted with dropouts in only two of the three ethnic groups involved in the present study, current results are in line with the trends observed in the relationship between the family and peer clusters.

Family sanctions for drug use and family caring were also shown to have a significant direct negative relationship with violence for Mexican American adolescents, but not for Native American or Anglo American youth. Although model analyses failed to reveal significant differences in the path coefficients between the family cluster and violence for groups, previous studies suggest that Mexican American families may have additional protective effects for adolescent violence. Within the present study, Mexican American males and females were the only groups with a significant direct path between the family and violence factors. In addition, this path is significant for all participants when collapsed across ethnicity and gender. This compliments the potential indirect relationship with violence as mediated by peer drug associations and actual substance use, which is present in all groups and will be discussed below. Additional studies are needed to clarify the relationship between the family cluster and violence, including examination of how aspects of the family would serve as protective factors.

Select studies do provide potential theories accounting for the non-significant relationship between the family and adolescent substance use. Beck and Bargman (1993) found that parents across the United States are frequently uncertain and have substantial misconceptions regarding their children's alcohol and drug use. While parents have a general awareness of substance use problems in adolescent populations, they may be more apt to view this as a problem for other children and not their own. Thus, it is possible that parents' efforts in regard to preventing drinking and drug use are largely

focused on limiting their children's access to substance abusing peers. Additionally, the effect of the family has been shown to be stronger in early adolescence as compared to later stages (Vega & Gil, 1998). Family sanctions regarding substance use may have more of a direct impact on actual levels of drug and alcohol use during this time, whereas sanctions may continue to have effects on peer associations throughout adolescence (Brown et al., 2001). The present study seems to corroborate this, and comparisons with younger adolescents would help clarify this theory.

The School Cluster, Substance Use and Violence

It was hypothesized that the school cluster would also have protective effects on substance use and violence, either directly or by reducing peer drug associations. As with the family cluster, this was partially supported in that there was a significant negative relationship with peer drug associations. This path was significant for Anglo American and Mexican American adolescents only, and not for Native American youth. However, the overall magnitudes and differences in these paths was relatively low. Direct relationships between the school cluster and the two measures of delinquent behavior were not significant. Findings related to the school cluster provide some degree of support for primary socialization theory. While the theory posits that the school cluster may have direct protective effects against delinquent behaviors (Oetting & Donnermeyer, 1998), Swaim et al. (1998) found that school adjustment was only significantly related to peer drug associations for Mexican American adolescents and not their Anglo American counterparts. However, this study was conducted with a dropout population, which has reliably been shown to have higher levels of substance use (Beauvais et al., 1996; Swaim et al., 1997). This has potential implications for the subsequent relationships between the

use of drugs and alcohol and protective factors such as school adjustment. However, for Mexican American and Anglo American youth in the present study, positive school adjustment appears to decrease the likelihood that adolescents form associations with substance using peers. Results suggest that the strength of the school environment as a protective factor in the association with substance using peers may be weaker for Native American youth compared to their Anglo and Mexican American counterparts. Future studies are necessary to clarify this trend.

Several studies support findings that education is highly valued and encouraged by most Mexican and Anglo American parents (Buriel & Cardoza, 1988; Delgado-Gaitan, 1990; Hernandez & Descamps, 1986). The similarity between Mexican American and Anglo American youth in the relationship between the school cluster and substance use may be partial function of higher levels of "other group" identification (Guzman, 2002). Research shows that Mexican American students with better school adjustment tend to be those whom have higher identifications with majority culture and lower identifications with their traditional culture. In turn, Mexican American students with higher school adjustment typically use alcohol and other drugs to lesser degrees (Arellano et al., 1998; Brooks et al., 1998; Flannery et al., 1996). Native American youth, however, typically have lower levels of encouragement and involvement in their academic lives. In addition, they are more likely to have significant numbers of peers who use drugs at school (Beauvais, 1992). While reservation-based youth have the highest prevalence of peers using drugs on school grounds, non-reservation Native American rates are still substantially higher than are those of non-Native adolescents. This undoubtedly changes

the school environment for Native American students, and may have salient effects on how the school cluster relates to delinquent behaviors.

It is also possible that potential differences in the role the school cluster plays for Native American youth is related to or mediated by the family. Machamer and Gruber (1998) examined relationships between the school environment, the family, and substance use for Native American, Anglo American, and African American students. They found that Native American youth reported significantly lower connections within the family unit, which then negatively influenced school performance and substance use. This is consistent with findings in the present study in terms of group differences in observed variables. However, there were no hypothesized paths between the school cluster and the family unit. Future studies may want to include this relationship to better account for the variance in deviant behavior related to the school cluster.

Other factors related to the school environment might also influence delinquent adolescent behaviors. A variety of researchers have addressed the influence of perceived risks and perceptions of disapproval for substance use (Bachman et al., 1998; MacNeil et al., 1999). Kumar et al. (2002) report that the protective effects the school environment has on substance use and violence may be higher for younger adolescents compared to older ones. As part of the ongoing Monitoring the Future Study, the researchers found that eighth-grade students were more impacted by the level of perceived school disapproval of marijuana use compared to students in their senior year. This is of interest, as the current study examined the influence of attitudes toward teachers and school, as well as reports of school performance. Perceptions of school attitudes toward drug and alcohol use, however, were not included in analyses. Their inclusion may enhance the

effect of the school cluster in protecting against delinquent behaviors such as substance use and violence as well as clarify ethnic differences in the protective role of the school.

Negative Affect, Substance Use and Violence

Results failed to confirm any hypotheses regarding the relationships between negative affect and the other latent variables in the present study. While relationships were in the expected direction, no paths were significant after corrections for non-normally distributed data. Relationships between negative affect and peer drug associations as well as with violence were strongest and approached significance for all groups, whereas all other relationships were near zero. Thus, results suggest a possible indirect relationship between negative affect and substance use by increasing peer drug associations as well as a direct positive relationship between negative affect and violence. However, since these relationships only approach significance, little can be said about them without verification by additional studies. It should be noted that the factor intercorrelations between negative affect and violence were generally around .50 for all groups, indicating a strong relationship between these two factors. The relationship between negative affect and substance use was slightly lower, but also consistently strong for all groups. It is entirely possible that parsing out negative affect into specific components (e.g., anger or depression alone) would have increased the predictive power of these variables.

Results from the current study are certainly not conclusive about the absence of a relationship between negative affect and problem behaviors. Given that self-esteem dropped out of the final analyses due to poor factor loadings, it is possible that using depression and anger to define the negative affect construct influenced the results.

Studies including other components of psychological distress (i.e., anxiety, alienation, blame, etc) have demonstrated a significant relationship between negative affect and substance use. Swaim et al. (1989) found that although there was no direct relationship between negative affect and substance use, there was a significant relationship between this construct and peer drug associations. As with a myriad of other studies, there was also a direct relationship between peer drug associations and drug use. This is consistent with primary socialization theory in that negative affect would only impact substance use through an influence on the socialization process. Results from the present study are consistent with findings from previous research in this vein. In keeping with primary socialization theory, Kessler et al. (1996) indicated that conduct disorders and antisocial behaviors were more strongly related to substance use than negative affect. The authors assert that these disorders are much more likely to affect the socialization process, thus influencing deviant behavior.

Furthermore, results from Swiam et al. (1989) indicate that constructs within negative affect may be mediated by anger. Within the present study, there were significant group differences in depression and anger, which may have more individual bearings on observed relationships with other latent variables. For Native Americans, a relationship between depression and substance use or between anger and violence may yield significant effects whereas the construct of negative affect did not. Indeed, research indicates that anger is both the most reliable and significant predictor of alcohol and drug use, as well as violence (Deffenbacher & Ball, 1996; Deffenbacher & Swaim, 1999; Leibsohn et al.,1994; Patterson, 2001). Future studies may be well served by either expanding the indicators of negative affect or specification of relationships.

The Peer Cluster, Substance Use and Violence

Results yielded significant positive relationships between peer drug associations and substance use for all groups, partially confirming hypotheses. Therefore, drug and alcohol use seems to be a function of associations with peers whom engage in these behaviors. This finding is of little surprise, as it has been reliably demonstrated by a number of previous studies (Beauvais et al., 1996; Donnermeyer & Park, 1995; Elder et al., 2000; Epstein et al., 1999). MacNeil and colleagues (1999) found that peers were the most salient predictor of substance use for Anglo, Native, and Mexican American youth, followed by the family unit. Barrera and colleagues (2001) replicated this finding across time, indicating the stability and robust nature of peer influence on drug and alcohol use. For males and females across ethnic classifications, the peer group constitutes the principle source of socialization during adolescence. While few studies have examined this relationship in exclusively rural populations, findings from the current study support the consistency across this group as well. In regard to primary socialization theory, which focuses on the relationships between the peer cluster and substance use, the present study confirms this relationship.

The hypothesis that substance use would significantly predict violence was only supported for some groups. For Native and Mexican American males and females, there was a significant positive relationship from drug and alcohol use to the perpetration of violence. While this relationship was positive for the Anglo American sample, it was not significant. This seems to indicate that as Mexican American and Native American adolescents engage in substance use, they are more likely to engage in violent acts, including physical assault, vandalism and destruction of property, use of a weapon and

robbery. Generally, research related to substance use and violence seems to indicate this, as multiple studies have demonstrated significant positive correlations between these two problem behaviors (Chavez et al., 1996; Grunbaum et al., 1998; Komro et al., 1999; Patterson, 2001; Salts et. al, 1995). Like all other differences in path significance levels, the value for this path approached significance for the Anglo American group, and subsequent model analyses revealed no significant differences when paths were constrained to equality across groups.

The non-significant path from substance use to violence in the Anglo American sample may be related to the hypothesis that peer drug associations would positively predict violence. For all groups, the relationship was positive but non-significant, which fails to provide confirmation. Interestingly, analyses did reveal differences between groups in the magnitude of this path. Compared to Native American and Mexican American youth, the path value for Anglo American adolescents was considerably larger and only slightly below the critical value. Findings suggest that for Anglo American youth, associations with substance using peers may contribute to their perpetration of violence. For Native American and Mexican American youth, there appears to be an indirect relationship between peer drug associations and violence, mediated through individual substance use. This relationship appears to exist for Anglo American youth, although at a non-significant level. It is possible that a direct relationship between peer drug associations and violence pulls enough variance away from an indirect relationship as mediated through substance use, rendering both non-significant.

The majority of existing research on ethnic differences in adolescent violence is concentrated on prevalence and general epidemiology. However, select studies have

examined the incidence of violence as a function of affiliations with gangs. Donnermeyer (1995) reports that gangs are increasingly prevalent in rural communities. Gang-related crime and violent behaviors are also increasing in these locales. Edwards (1995) reports that links between gangs, substance use, and violence within rural communities are similar to those found in more urban ones. It is possible that the direct relationship between affiliations with substance abusing peers and violence for Anglo American rural youth is at least a partial function of gang affiliations. While there is a dearth of research as to the ethnic differences in the motivations and rates of joining gangs in rural communities, future studies may help elucidate the connections between gangs, substance use and violence.

While many of studies report relationships between substance use and violence, few have examined the directionality of this interaction. Edwards (1995) cautions that the relationship between substance use and violence is a "classic case of the 'chicken and egg' dilemma" (p. 87). In the sense that studies are cross-sectional, this is a cogent and salient point. However, results from the current study implicate the use of drugs and alcohol as a significant positive predictor of violence. Other researchers have also hypothesized links between substance use and violence in rural adolescent populations. Donnermeyer (1995) describes the ties between escalating prevalence rates of violence and substance use in rural communities, highlighting the interactive link therein. Rural adolescents' use of alcohol is at levels similar to those of more urban youth, with drug use rates that are quickly converging as well. Thus, problems and behaviors related to the use of drugs and alcohol are likely to follow, including increasing levels of violence. In addition, gangs may be experiencing displacement out of urban communities and into

more rural ones as a result of increased policing efforts (Donnermeyer, 1995). With gangs come the related problems of drugs and violence. Future studies would be well advised to examine longitudinal changes in the prevalence and relationships between violence and substance use, perhaps mediated by the presence of gangs in these rural areas.

Currently, very few studies have examined how the interaction between substance use and violence differs across gender and ethnicity. In the present study, the relationship was significant and positive for all groups regardless of gender or ethnicity. While the magnitude of the path coefficient changed, constraining this relationship to be equal across groups yielded non-significant difference in the model analyses. Although this study replicated significant ethnic and gender differences in the perpetration of violence and use of drugs and alcohol, the predictive relationship between these two factors appears consistent. It seems as though differential levels of substance use predict differential levels of violence in proportional ways. Interestingly, Native American and Mexican American adolescents had larger path coefficients between substance use and violence than Anglo American adolescents. They did not, however, have any indication of a direct relationship between latent variables measuring peer drug associations and violence which was slightly below the critical value for significance in the Anglo American sample. It is possible that the amount of variance in violence accounted for by substance use and peers is equivalent in the three ethnic groups, only distributed slightly differently. Additional studies may clarify whether or not there are larger indirect relationships between peer drug use and violence for Native American and Mexican American adolescents.

Limitations

The present study yields results that are both illustrative and laden with clinical and research potential. However, several limitations must be clearly acknowledged. Since this study relies completely upon the self-reporting of sensitive information by adolescents, there arise questions of validity and reliability regarding the data. While the lack of corroborative information from sources such as collaterals and/or school records could indeed be a limitation, a number of researchers have demonstrated the validity of self-report methodologies. Regarding the present study, Fowler (1993) and Oetting and Beauvais (1990) have documented the validity of self-report substance use measures used in large populations, including the survey materials administered in the present study. In addition, O'Malley, Johnson, Bachman and Schulenberg (2000) found that there were no significant differences between substance use data collected via anonymous versus confidential methods. Primary concerns with self-report data focus on underreporting as a function of participants' fears that they will be identified and connected with their answers. As previously discussed, strident efforts were taken in the present study to maintain the confidentiality of all participants. In addition, the multiple checks of consistency and accuracy enhance the overall validity of the data retained for analyses.

A related limitation of the present study is the lack of qualitative data. A variety of researchers advocate employing a combination of quantitative and qualitative methodologies, yielding additive properties in terms of description and validity (Newman & Benz, 1998). In addition to providing collateral information, interviews with respondents' families, peers, and teachers would increase the descriptive power of the study. Qualitative data would also provide more information about the meanings that the

respondents ascribe to the constructs under investigation. An improvement to the research would be to include individual interviews with adolescent participants as well as with their parents, peers, and school staff. Questions should include those regarding values, attitudes, and behaviors regarding alcohol consumption, as well as the quality of their interactions. The object of such interviews should be to clarify participants' subjective experiences leading to and influencing alcohol use. Such qualitative procedures are all the more important in view of possible misunderstandings of terms used in questions. Participants' degree of mastery of a second language and cultural attitudes toward the topics and terminology of the questionnaire could also confound results. Qualitative data could aid in the detection and handling of such problems.

Another limitation to the present study is the limited sample of adolescents who were currently enrolled in school. Failure to include dropouts certainly reduces the scope of generalizability of these findings to adolescents at large. Although rates of school dropout are highly debated, it is generally agreed upon a significant percentage, perhaps as much as half to the majority of Mexican American and Native American adolescents are not attending school at any given time (Chavers, 1992; Chavez et al., 1996; Swaim et al., 1997). Dropout rates for Anglo Americans have not been reported at this magnitude, but also account for a significant proportion of the adolescent population. Researchers have demonstrated the significant increase in levels of substance use and violence within the school dropout population (Chavez et al., 1996; Swaim et al., 1997). Substance use rates have been shown to be up to 6.4 times greater for adolescents who have dropped out of school than those remaining in school. Therefore, the present study and others like it will undoubtedly under-represent levels of delinquent behaviors in Native American,

Mexican American, and Anglo American youth. Moreover, changes in relationships between variables may not be proportional or reflective of differences in dropout rates between groups. Careful consideration should be paid to the limits of the groups being described as well as the power of description itself. Clearly, results obtained from the present study speak to characteristics of rural students whom are currently attending school.

Similarly, the current study may also be limited by the scope of communities from which participants were sampled. A singular focus on rural communities omits information about adolescents who are living in suburban and urban communities. Rural communities with 2,000 or fewer inhabitants have an undeniably different set of experiences and exposures than do communities that are more urban or even suburban. While a number of researchers have asserted that rates of substance use and violence are similar across levels of rurality (Donnermeyer, 1992; Donnermeyer, 1995; Edwards, 1997), it is possible that salient differences exist in the relationships between these problem behaviors and predictive factors. Any discussion of results from this study is necessarily limited to communities across the United States within similar degrees of rurality. Inclusion of adolescents from other rural-sized communities may change the dynamics observed in the present study. In addition, a distinction between reservation and non-reservation based Native American adolescents may change the relationships observed, as these groups have been shown to have differential rates of substance use (Beauvais, 1992).

Another possible limitation is the restriction of age and academic year range. Vega and Gil (1998) report that substance use patterns typically have their roots in

developmental periods preceding high school. Kumar et al. (2002) also support the idea that younger adolescents are more influenced by the school system than older adolescents. It is not difficult to imagine that the interaction between predictive factors may be qualitatively different during these times as compared to later high school years. There have also been a number of recent debates regarding the time period comprising adolescence as well as the major developmental tasks and events contained therein. A specific focus on grades 9 through 12 definitely tightens the focus on a developmental period that covers a tremendous social, physiological, and psychological scope. Expanding this to encompass a broader age range or comparing different age groups within the adolescent population may reveal significant relationships between risk and protective factors for substance use and violence.

Future Directions for Research

Discussions of findings in the present study have briefly hinted at the myriad of possibilities and needs for future studies. Among the foremost would be to examine the same interaction of latent constructs with a different approach to the issue of violence. Given that this study only examined fairly severe forms of violence, it may be advantageous to measure violence across a broader range, with finer distinctions for frequency and quality of violent behavior. In addition, it may also be of interest to use violence as a moderating variable instead of its inclusion as a dependent or downstream variable. As reported by Beauvais et al. (1996), the frequency with which individuals engage in these forms of violence is incredibly low, yielding little variability in subsequent scores. It may be more advantageous to examine differences between groups based on perpetration of violent acts. Thus, the relationships between latent constructs

would be compared between those who have engaged in violent acts and those who have not. While the sample size of individuals having engaged in these behaviors would undoubtedly be small, especially maintaining ethnic and gender comparisons, the interactions between the latent variables may be quite different than those observed in the present study.

Also, to more accurately assess for differences across cultures, future studies may want to include measures of ethnic identification as a qualifier of ethnic classification. A number of studies have indicated the significance of group identification and/or ethnic identification. Results in the present study reveal cultural differences in the levels to which rural adolescents experience their family, school, and peer environments, as well as amounts of substance use and violence. However, it appears as though these factors relate to one another in similar ways across ethnic groups. While this study attempted to examine the interaction of a broad range of factors across six groups, no delineation was made regarding the degree to which participants identified with their or any other culture. While results from studies examining the importance of cultural identification vary, future studies may benefit from including these constructs as moderators of substance use and/or violence. It is possible that neglecting the issue of cultural identification effectively subsumes cultural differences under a gloss of American rurality.

Further research may also be warranted to tighten the focus on each of the predictive latent constructs used in the current study. While the sample was taken from a variety of predominantly rural communities, the inherent assumption is that these communities are homogeneous and definitions of the school, family, and peer cluster are the same across ethnicity and location. Furthermore, it presupposes that constructs such

as "anger," "depression," and "self-esteem" are also consistent across location and affiliation.

Regarding the family, structure and system may vary as much within a culture as it does between them. It is possible that certain family structures or dynamics influence the degree to which those families express care or impose sanctions, let alone the perception of these aspects of the family cluster by the adolescent. Future studies may benefit from examining differences in perception of family care and sanctions as a function of family structure (i.e., nuclear vs. extended) as well as system (i.e., patriarchal, matriarchal, or egalitarian). In addition, families, as well as children, are interacting agents within their own and other cultures. Acculturation and identification may play as salient of a role in family influence on the adolescent as does the adolescent's level of ethnic identification on his or her experience of the family. Future studies may also benefit from accurately assessing the degree to which the family system identifies with particular cultural beliefs and traditions.

Likewise, definitions of the peer group may vary between and within groups. Individuals denoted as "peers" may be done so based on classification of friendship or simply proximity. It may also be of interest to examine qualitative and quantitative differences in the individuals that comprise the peer group. For instance, there may be differential influence if the peer group is comprised of individuals of one ethnicity or gender as compared to multiple ethnic groups. There also may be salient differences in the influence of the peer group if they are of the same ethnicity and/or gender as the adolescent, or if they are of a different culture. These differences may also be a partial function of the interaction of the adolescent's ethnic identification and level of

acculturation, which may mediate the influence of peer groups depending on their composition. Future studies, particularly those examining rural populations, may want to examine these distinctions.

Like the family and peer clusters, school is another potentially variable contextual environment. School adjustment has been shown to be one of the most significant predictors of peer drug associations and subsequent substance use (Brooks et al., 1998; Flannery et al., 1994; Oetting and Beauvais 1987). While it is easy to assume homogeneity of school environments in rural settings, future studies may want to take into account factors such as classroom size, teacher training, faculty composition, and overall teaching style/philosophy. In addition, future studies examining delinquent behaviors should also examine school policies for discipline as well as adolescents' perceptions thereof. As previously discussed, other aspects such as adolescents' perceptions of school attitudes toward substance use and violence may also be salient aspects of the school environment's ability to serve as a protective buffer against forming associations with drug abusing peers.

Finally, future studies may benefit from a more thorough examination of factors comprising negative affect. Given the cultural differences in the manifestation of symptoms, as well as the differences in the experience of psychological disorders, more finely attuned instruments may be warranted (Duran & Duran, 1995). While epidemiological research has showed relatively stable rates of depression, anxiety, and other more chronic mental health concerns within the majority culture, there is still a paucity of valid information regarding minority manifestations and experience of these conditions. It is viable that future researchers making stringent efforts to accurately assess

for these conditions may yield more descriptive information regarding the role negative affect and/or its factors play in substance use and violence.

Implications for Prevention and Intervention

The results from the current study have several implications for prevention and intervention efforts with adolescents. The primary socialization model (Oetting & Donnermeyer, 1998; Oetting et al., 1998) posits that treatment approaches should address substance use within the context of family and school, with a heightened emphasis on peer relations. The results from the present study unmistakably indicate that peer influence is the essential, if not primary component in the prediction of substance use. Given the consistent predictive power of peers on substance use, interventions should focus their effort on minimizing contact with substance abusing peers. This can be done directly or indirectly, which would involve increasing the strength of protective factors.

For all three ethnic groups, the family cluster is a negative predictor of peer drug associations. Strengthening a sense of family caring or imposing clearer appropriate family sanctions for substance use may decrease the likelihood of associating with deviant peers, thereby decreasing subsequent substance use. For Mexican American and Anglo American youth, the school cluster also seems to be a protective factor in that it reduces the likelihood of peer drug associations. Cultivating better relationships between the school and the adolescent may enhance the protective factor the school cluster plays in substance use. Furthermore, fostering positive relationships between parents and the school system may yield an additive property in the capacity to reduce affiliations with substance abusing peers.

Results from this study also have implications for violence prevention programs. For all groups regardless of gender or ethnicity, there is a strong positive predictive relationship between substance use and the perpetration of serious forms of violence. Programs focused on reducing violence or violent behavior should include foci on substance use. Furthermore, violence interventions and prevention programs would benefit from maintaining a peer-based orientation, as this is the principle influence on substance use. For Anglo American adolescents in particular, intervention at the peer level appears as though it would have the added benefit of reducing violence as well as substance use. Peer drug associations appear to predict violence for this group directly and indirectly through substance use. This bespeaks the importance of peer-based intervention and prevention programs.

The current study also highlights a relationship between violence and protective factors. For Mexican American adolescents, the perpetration of serious forms of violence seems to be enhanced by substance use, but diminished by family sanctions and caring. Thus, enhancing a sense of caring and sanctions for substance use in Mexican American families may have another benefit of directly reducing violence. This is in addition to a potential benefit of indirectly decreasing substance use through the reduction of peer drug associations.

In general, rural adolescents may benefit from affiliations with groups that convey prosocial norms while teaching and reinforcing positive health skills (Oetting & Donnermeyer, 1998). Although structured clinical interventions may do their best to address peer and social contexts contributing to substance use and violence, the scope of their influence frequently ends at the termination of the program. Upon return to their

original environment, adolescents are likely to reintegrate back into deviant peer groups should no healthy alternative exist (Lefner, 1997). Primary and relapse prevention programs would benefit from enforcing and deepening the skills needed to maintain positive peer relationships. The efficacy of these programs would be greatly enhanced with a focus on cultivating positive peer interactions and the maintenance of healthy peer groups. While the content and structure of these groups would necessarily shift by region and cultural context, core components should focus on enhancing communication skills and feelings of belonging while providing viable and attractive substance-free alternative activities. The value of peer-based substance use and violence intervention could only be bolstered by the inclusion of the family and school clusters.

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