

THESIS

EFFECTS OF GENDER ON SOCIALIZATION FACTORS
IN ADOLESCENT DRUG USE

Submitted by

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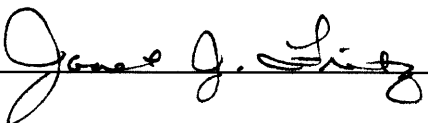
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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR
SUPERVISION BY DANIEL RIAL ENTITLED EFFECT OF GENDER ON
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THESIS ABSTRACT

EFFECTS OF GENDER ON SOCIALIZATION FACTORS

IN ADOLESCENT DRUG USE

This study investigated differences, by gender, in the roles that various socialization factors play in a model of causal processes leading to adolescent drug use. Five latent socialization variables (family strength, family sanctions against drug use, religious identification, school adjustment, and peer drug associations) were based on 15 observed variables, and the dependent latent variable (polydrug use) was based on 3 observed variables. Data from a representative national sample of 2306 public school students from grades 7 to 12 were analyzed using the socialization model posited by Peer Cluster Theory. MANOVAs (Developmental Level by Gender) were conducted on the groups of indicator variables associated with each latent variable, and several significant multivariate main effects were found for gender. Female participants reported higher levels of the variables contributing to family sanctions, religious identification, and school adjustment. Male participants reported higher levels of the variables contributing to peer drug associations and polydrug use. The socialization model was evaluated using structural equation modeling methods. The measurement and structural components of the basic model were evaluated first, followed by the test of a new model that included an additional direct path from family sanctions to polydrug use. Some differences in paths between variables were observed across gender. Among the 7th- to 9th-grade students, two paths were found to be significantly different across gender: 1) while for younger males, family strength correlated significantly and positively with family sanctions, this

path was not significant for the younger females; and 2) while the relationship between religious identification and school adjustment was significant and positive for both genders in the younger age level, religious identification had a stronger effect on school adjustment for younger males than for younger females. Among the 10th- to 12th-grade students, three paths were found to significantly differ across gender: 1) while for both males and females increased family sanctions was associated with reduced peer drug associations, the effect was more pronounced for females; 2) while higher school adjustment led to lower peer drug associations for males, the effect for females was not significant; and 3) while for both genders, higher levels of peer drug associations were associated with higher polydrug use, this effect was stronger for males. Finally, when the models were rerun after adding a direct path from family sanctions to polydrug use, and this new model was compared against the original model, there was a difference in change of fit across developmental level. This new path did not significantly change fit for the younger students, but it did for the older students. Among the older students the strength of this path varied by gender, being stronger for males than females. Consistent with Peer Cluster Theory, these data can be interpreted as supporting the role of peer drug associations as mediating the effects of other socialization variables on adolescent drug use. Implications of these findings of differences by gender and developmental level for development of intervention and prevention programs are discussed, and suggestions are made for future directions in adolescent drug use research.

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CHAPTER I

INTRODUCTION

The Problem

There is widespread concern in the United States about the problems caused by adolescent delinquent behavior. One example of problematic adolescent delinquency is the use and abuse of both licit and illicit psychoactive substances. Research on drug use and abuse can provide knowledge useful in design and implementation of prevention and intervention programs. At the current time, however, our research-based understanding of the etiology of adolescent drug use contains important gaps, and much investigation remains to be done. Future directions in drug use etiology research will inevitably include more intensive examination of the roles of various demographic characteristics in adolescent drug use patterns. These demographic characteristics include age, SES, ethnicity and gender. Greater availability of empirical knowledge at this more refined level of analysis will allow development of drug use prevention and treatment programs that are specifically tailored for particular target sub-populations. The primary purpose of this paper is to examine the interaction of gender and those socialization factors which are established predictors of adolescent drug use. An improved understanding of gender-specific influences of socialization factors should lead to a richer understanding of the pathways to adolescent drug use, and hence, to better prevention and treatment technology.

Models of Drug Use

Local and regional legal statutes vary in their specific definitions of "delinquency", yet all converge on the general notion that an act of delinquency is an "act committed by a minor that violates the penal code" within the local jurisdiction (Bartollas, 1990). A number of theoretical models have been introduced to explain delinquency, and in some cases (e.g., Elliot, Huizinga, &

Ageton, 1985) models developed for delinquency other than drug use have been later successfully applied to adolescent drug use. Such extensions of explanatory models to drug use have been justified on the grounds that (1) use of illicit drugs is a specific form of delinquency, given that possession of such substances, including the status offense of "Minor in Possession" (of alcohol), violates penal codes, and (2) the use of alcohol, marijuana and other drugs is part of a general deviance syndrome involving a wide range of delinquent acts and other norm-violating behavior (Brook, Whiteman & Finch, 1992; Donovan & Jessor, 1984; Elliot & Huizinga, 1984; Kandel, 1980;). There is a notable similarity between the predictors of adolescent drug use and of other adolescent problem behaviors (Hawkins, Jenson, Catalano, & Lishner, 1988; Newcomb & Bentler, 1989), suggesting a common set of causal processes for this broad class of delinquent behavior.

Of the many theories developed to model delinquent behaviors in general, eight theories intended to specifically explain drug use predominate in the current literature (Hansen & O'Malley, 1996). Recent reviews of drug use studies (Hansen, Rose, & Dryfoos, 1993; cf. Petraitis, Flay, & Miller, 1995) found that the most frequently represented theoretical approach was Problem Behavior Theory (Jessor & Jessor, 1977; Jessor, Donovan, & Costa, 1991), which posits that behavior results from the interaction of three systems: personality, perceived environment, and the behavior system. The perceived environment system integrates social influences on behavior, such that weak attachments to parents and school, and strong attachments to delinquent peers is predictive of delinquency, including drug use.

Second in numerical representation was Social Learning Theory (Bandura, 1977). Social Learning Theory proposes that people learn behaviors, including delinquent behaviors, through social observation (see, for example Akers, Krohn, Lonza-Kaduce, & Radosevich, 1979), and perform learned behaviors when they believe reinforcement will follow.

The third most cited theory is Ajzen and Fishbein's Theory of Reasoned Action (1980), which posits that behavior is determined by one's intentions which, in turn, are determined by relevant attitudes and subjective norms. Attitudes develop from beliefs about consequences of a given behavior and evaluations of those consequences, while normative beliefs result from interaction between beliefs about the values of relevant others and an individual's motivation to comply with external demands.

The fourth most cited theory to explain drug use is Social Control Theory (Elliot, Huizinga, & Menard, 1989; Hirschi, 1969). Social Control Theory focuses on the strength of bonds that individuals establish with conventional social institutions. These social bonds consist of one's attachments, commitments, involvements, and beliefs in social institutions. Through strong bonds with pro-social agents, typically parents, school and religion, the individual internalizes society's values and norms for social behavior, which act to control against expressions of norm-violating behaviors. Conversely, weak bonding with representations of the conventional social order facilitates bonding with deviant peers, which, in turn, leads to delinquent behavior.

Peer Cluster Theory

Fifth in rate of citation is Peer Cluster Theory (Oetting & Beauvais, 1986; Oetting & Beauvais, 1987). Peer Cluster Theory will be described in greater detail than the previous theories, and will form the backdrop for the remainder of this work. As with the preceding theories, Peer Cluster Theory attends to social influences on behavior, modeling the influence of family, school, religion and peers. Unique to Peer Cluster Theory is the postulation that the socialization process during adolescent development results in the formation of peer clusters, which range from dyads (such as best friends or romantic partners) to small cohesive groups of peers. There has been ample documentation of the importance of peer drug use and general peer influence in prediction of adolescent drug use (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Coombs, Paulson, & Richardson, 1991; Flannery, Vazsonyi, Torquati, & Fridrich, 1994).

Among all factors identified as influential in youthful initiation of drug involvement, peer influences are the most consistent and strongest of all factors (Newcomb & Bentler, 1989). Membership in peer clusters is an active process involving exchange of information and values, with reciprocal influences on attitudes and beliefs. Membership in drug-using peer clusters is termed "peer drug associations". Also unique to Peer Cluster Theory is the postulate that peer drug associations tend to be the direct, proximal causal links to adolescent drug use, and that these peer drug associations mediate other more distal socialization variables (cf. Flannery, Vazsonyi, Torquati, & Fridrich, 1994). Relatively distal variables, including perceived family caring, family sanctions against drug use, school adjustment and religious identification affect drug use only indirectly through their effect on peer drug associations.

Previous Applications of Peer Cluster Theory

The socialization model embodied within Peer Cluster Theory has been applied to a variety of adolescent populations, and has repeatedly been successful in accounting for large portions of the variance in substance use. Studies implementing Peer Cluster Theory have examined drug use among White non-Hispanic adolescents (Oetting & Beauvais, 1987; Swaim, Oetting, Edwards, & Beauvais, 1989), drug use among American Indian adolescents (Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993) drug use among school dropouts (Swaim, Bates, & Chavez, 1998) and more specifically, alcohol use among American Indian adolescents (Oetting, Swaim, Edwards & Beauvais, 1989), alcohol use among Hungarian adolescents (Swaim, Nemeth, & Oetting, 1995), and cigarette use among migrant and non-migrant Mexican-American youth (Swaim, Oetting, & Casas, 1996).

The theoretical model within Peer Cluster Theory received early validation in studies involving White American youth (Oetting & Beauvais, 1987; Swaim, Oetting, Edwards, & Beauvais, 1989), demonstrating that peer drug associations were the dominant and proximal predictors of adolescent drug use and that other socialization factors and emotional distress factors

acted distally through mediation by the factor of peer influence. In addition, Oetting & Beauvais (1987) found a small direct effect of school adjustment on drug use, while the Swaim, Oetting, Edwards, & Beauvais (1989) study, which looked at the role of emotional distress on drug use, found a minor path directly from anger to drug use.

Swaim et al. (1993) found in their application of Peer Cluster Theory to American Indian adolescent drug use that the generic path model (of peer drug associations as the dominating force in youth drug use, mediating the influence of other factors) applied to this population as well, with two notable modifications. Peer drug associations retained a dominant role in American Indian adolescent drug use, but were not as highly correlated with drug use as had been found with other populations, and family sanctions against drug use had a direct influence on drug use as well as an indirect influence. Similarly, Oetting et al. (1989) earlier found an attenuated influence of peers on adolescent American Indian alcohol use, relative to the role of peer drug associations in drug use by White non-Hispanic youth.

Swaim et al. (1995) applied Peer Cluster Theory to Hungarian adolescents and developed separate path models for each gender. Males were found to have a direct link from family sanctions to alcohol involvement, and from family caring to peer alcohol associations, while the model for females had a new direct path from family caring to alcohol involvement. These new links were not observed among the 8th grade subsample. Therefore, the differences by gender appeared to arise from within the 11th grade subsample.

Finally, Swaim et al. (1996) found support for models that were similar across gender, though the importance of family influence on cigarette smoking among Mexican-American high school students was not as clear among migrant females as it was for the other subgroups within the sample. It was hypothesized that this difference for migrant females was due to a lack of modeling of cigarette use by migrant Mexican-American mothers.

Application of the socialization model has elucidated some of the ways that socialization forces differ in their relationships to drug use across different groups, highlighting some of the unique aspects of each group examined. However, previous analyses often combined genders and focused on systematic differences between groups defined by race, ethnicity or immigrant status. The models resulting from these analyses mixed race and gender, and therefore, may reveal race-based uniquenesses rather than gender-based uniquenesses in the effects of socialization factors on adolescent drug use. To date, Peer Cluster Theory's socialization model has not been used to examine differences, by gender alone, in the relationships between various socialization factors and adolescent drug use. Given that male adolescent drug use tends to exceed that of females, it was hypothesized that the social influences associated with drug use would differ by gender as well.

Before applying Peer Cluster Theory to assess differences by gender, it would be useful to examine the existing delinquency, drug epidemiology and child development literature in order to develop hypotheses about expected gender differences in the role of particular socialization factors in adolescent drug use. Specifically, gender differences in family sanctions against drug use, perceptions of family caring, school adjustment, religious identification and peer drug associations will be reviewed.

Differences in Drug Use by Gender

Most authors in the field of adolescent delinquency agree that delinquency occurs at lower rates and tends to involve less serious forms of delinquency among females than males (Barlow & Ferdinand, 1992; Eisenman & Kritsonis, 1993; Gottfredson & Hirschi, 1990). The literature on gender differences in drug use states that, in general, young males use more alcohol and other drugs than females (Johnston, Bachman, & O'Malley, 1986; Johnston, O'Malley, & Bachman, 1989; Pascale, Trucksis, & Sylvester, 1985; Pascale & Evans, 1993). Toray, Coughlin, Vuchinich & Patricelli (1991) reported that males had higher rates of drug experimentation than did females. Similarly, research specifically on adolescents finds that males use drugs, in general,

more than do adolescent females (Ensminger, Brown, & Kellam, 1982; Hansen & O'Malley, 1996; Kandel, 1980; Newcomb, Chou, Bentler, & Huba, 1988). These differences by gender tend to be smaller for younger adolescents, possibly due to the earlier maturing of females and the tendency for young females to associate with slightly older males (Hansen & O'Malley, 1996). There are but few exceptions to this observation that adolescent males use more psychoactive substances than do adolescent females.

Barnes and Welte (1986) found higher prevalence rates of alcohol use among males (74%) than females (68%) in 7th to 12th graders in New York State. The rate of heavy drinking among males was more than twice the rate for females (18% vs. 8%), but the rates for light and moderately heavy drinking were the same for males and females, at 14%. Among adolescent minority groups, Barnes and Welte (1987) found that males drink more than females across ethnic groupings. Similarly, drug use was much higher among minority males than females, though among White youth the females used drugs at nearly the same rate as the males. Hansen and O'Malley (1996) found higher rates of marijuana use for males than for females in grades 8, 10 and 12. These differences increased with advancing grade level. Similar patterns were found for use of LSD and cocaine. Finally, males also reported higher rates of heroin and inhalant use.

On the other hand, females in the Hansen and O'Malley (1996) study reported using higher levels of amphetamines at all three grade levels. Newcomb and Bentler (1989) similarly reported higher prevalence of amphetamine use among girls than boys. Females reported levels of tranquilizer use that were roughly equal to boys' use overall, though females had slightly higher levels of tranquilizer use during some years. Kandel (1980) concluded that more females than males report use of cigarettes. Similarly, Newcomb and Bentler (1989) reported that more girls than boys smoke tobacco. These exceptions, in which adolescent girls used specific drugs at higher levels than their same-age peers, do not appear to have been carefully examined in the literature in order to deepen understanding of gender-related variables in adolescent drug use.

Thus it is well established that adolescent males tend to use drugs more than females, with a few exceptions. Given that peer cluster theory explains adolescent drug use through social influences on behavior, the literature on the effects of socialization forces on problem behaviors is next examined. First, the non gender-specific effects are reviewed, then there is an examination of gender-specific effects of various socialization factors. Knowledge of previous theoretical and empirical work on socialization factors could contribute to the development of gendered etiologies of adolescent drug use, with clear implications for the construction of gender-specific prevention and treatment programs.

Effects of Socialization Factors Across Genders

In Peer Cluster Theory the primary socialization forces that contribute to adolescent beliefs and attitudes about drug use, and hence drug use behavior, are peers, family, school, and religious identification. Adolescent drug use is distally linked to family, school and religious factors, all of which influence choice of peer associations. These peer associations mediate the effects of the other socialization factors and are, themselves, directly linked to drug-using behavior. Weak or problematic relationships with family, low school adjustment or poorly developed religious identification can all contribute to development of deviant peer groups (Baumrind, 1985; Kandel & Andrews, 1987). Association with deviant peer groups is a powerful predictor of adolescent drug use (Chassin, Pillow, Curran, Molina, & Barrera, 1993; Jacob & Leonard, 1991). Positive attitudes toward drug use within the peer group, or actual drug use by peers, are the strongest single predictors of adolescent drug use (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Oetting & Beauvais, 1986; Oetting & Beauvais, 1987).

Peer Cluster Theory conceptualizes family socialization factors as (1) perceived family caring (herein labelled "family strength") and (2) family sanctions against drug use. Life generally begins with experience within the family, and the nature of subsequent socialization follows from early family experience. Schumm, Bugaighis, Bollman, & Jurich (1986) reported that the main

correlates of quality of life for adolescents were their reported satisfaction with family life and their relationship with their parents. Maladaptive parenting is associated with adolescent problem behaviors such as drug use (Barnes, 1990; Baumrind, 1989, 1991). Adolescents who perceive low caring within their family are at greater risk for drug use (Oetting & Beauvais, 1987; Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993; Swaim, 1991). Faulty parental discipline, erratic expressions of anger and deficits in parental support may result in disrupted identification of children with their parents (Hirschi, 1969; Jacob & Leonard, 1991; Vuchinich, Bank, & Patterson, 1992). Such disrupted identification is believed to interfere with internalization of conventional norms. Conversely, adequate parental support, discipline and monitoring can decrease the likelihood of adolescent affiliation with deviant peer groups (Snyder, Dishion, & Patterson, 1986; Durbin, Darling, Steinberg, & Brown, 1993). Positive family relationships, marked by attachment and involvement, correlate negatively with adolescent initiation of drug use (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Brook, Gordon, Whiteman, & Cohen, 1986; Selnow, 1987). As an individual moves from early to late adolescence, the importance of parents relative to the importance of peers on core values issues does not change: parents and family remain the predominant influence on youth. Although youthful peers become influential in matters of style, throughout adolescence parents are usually more highly valued than peers for their support and advice in domains of long-term importance such as occupational choices and educational decisions (Wilks, 1986; Foxcroft & Lowe, 1991). Coombs, Paulson, and Richardson (1991) found in a sample of Hispanic and Anglo youth ages 9-17 that parental influence on youths' drug use was stronger than that of peers, regardless of drug use behavior, but that drug users were more influenced by peers than were non-drug users. This same study found that youth, regardless of their drug use behavior, generally reported stronger affiliations with parents than with peers. Research (Stice & Barrera, 1995) has demonstrated full reciprocal relations between adolescent

drug use and perceived levels of parental control and support. That is, parenting influences child development and children affect parenting behavior.

Family sanctions against drug use are important in influencing adolescent drug consumption patterns (Oetting & Beauvais, 1987; Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993). Parental tolerance of drug use is a significant predictor of teenage drug use (Brook, Gordon, Whiteman & Cohen, 1986). Perceived parental attitudes toward drug use may be of equal or greater importance than actual parental drug use in determining the adolescent's drug use (McDermott, 1984). Parental approval of drinking has been observed to be a significant predictor of the quantity of alcohol consumed by teenage children (Barnes & Welte, 1986)

Peer Cluster Theory's socialization model considers school adjustment another powerful predictor of adolescent drug use. Poor school adjustment is correlated with increased drug use (Eggert & Herting, 1993; Oetting & Beauvais, 1987; Swaim, 1991). A low degree of commitment to education, as indicated by time spent on homework and perceptions of relevance of course work (Friedman, 1983), and by whether students expect to eventually attend college (Johnston, O'Malley, & Bachman, 1989), are all predictive of adolescent drug use. Exceptions to this finding exist, at least within samples of college students, such as Free's (1994) finding of a weak or no relationship between school bond variables (attachment, commitment and involvement) and substance use.

Finally, identifying oneself as religious and participating in religious activities such as attending church and praying is often associated with lower levels of drug use (Amey, Albrecht, & Miller, 1996; Amoateng & Bahr, 1986; Burkett, 1993; Cochran & Akers, 1989; Hadaway, Elifson, & Petersen, 1984; Oetting & Beauvais, 1987; Schlegel & Sanborn, 1979; Turner & Willis, 1984; Wallace and Bachman, 1991). Initiation of use of alcohol, marijuana and other drugs has also been reported as having a low and negative correlation with church attendance (Kandel et. al, 1978). Schlegel and Sanborn (1979) found that church attendance has a substantial impact on

the rate of heavy drinking among high school students, regardless of particular religious affiliation. In comparing attenders with nonattenders, there was a marked increase in prevalence of heavy drinking, across genders, in all boys and girls attending church less often. However, research findings have not been unanimous: not all researchers have found the predicted relationship between religious identification and drug use (Sarvela & McClendon, 1988). The most notable exception comes from Hirschi and Stark (1969).

Gender-Specific Effects of Socialization Factors

It is plausible that given different socialization patterns for males and females, the causes of many behaviors, including drug use, would differ systematically by gender. The establishment of gender differences in the determinants of drug use patterns would clearly have useful implications for treatment and prevention programs. Often researchers in this field note the potential value of such research, while observing that, thus far, little empirical work has been conducted to examine differences between genders in the risk factors for adolescent drug use. A recent example of this comes from Jang et al. (1997), who state, "Some studies have found multiple etiological pathways to alcohol and drug use and abuse..., but the extent to which these pathways are gender-specific has not yet been explored" (p. 1275). In spite of this paucity of literature on gender differences in etiology of adolescent drug use, there are theoretical offerings and a few empirical reports worthy of examination in an attempt to generate hypotheses about how socialization factors vary by gender in their influence on adolescent drug use.

The first question to address is whether, and how, societal pressures on youth regarding drug use differ for boys and girls. It has been suggested (Robbins & Martin, 1993) that society may be unprepared to recognize and deal with female antisocial deviance; the popular notion is that society has a harsher evaluation of female intoxication than male intoxication. This more negative societal reaction to female drug use was observed by Erickson and Murray (1989). In further support of this notion, Lo (1995) found that among freshman students at a state university in the

Deep South (97.8% of whom were under age 21), significant others (parents and peers) showed more approval of males' drinking than females', and parents are more likely to be restrictive of their daughters' drinking than their sons'. Finally, in their sample of teenagers, Rienzi et al. (1996) found that both genders expected higher approval by boys of teen drug use, and that girls would be more disapproving of teenage substance use. However, there are some dissenting voices on this issue. For example, Robbins and Martin (1993) found that "female intoxication is tolerated and perhaps even encouraged by significant others at least so long as it is not associated with aggressive or unruly (unfeminine) behavior" (p. 316), and that significant others are no more likely to criticize girls or women for their drinking than they are to criticize boys or men. Similarly, Ridlon (1988) interviewed female alcoholics in treatment, and found 81% expressing the opinion that others are more critical of female than of male heavy drinkers. Yet, these women were personally no more likely to be rejected by significant others (spouses, family, friends) than were alcoholic men in treatment. Overall, it appears that girls are targeted with more societal pressure from family and peers to not use drugs and alcohol than are boys.

In considering the issue of which gender is more susceptible to influence from social pressures, Social Control Theory (Hirschi, 1969), as originally formulated, postulated that female youth maintain stronger attachments to socialization agents such as family and school, which results in the tendency for lower rates of delinquent behavior among girls than boys. Girls report greater agreement with the need for social controls on behavior (Turk, 1969). Compared to boys, girls have traditionally been considered as having stronger social attachments to parents, teachers, and conventional values (Jensen & Eve, 1976; Turk, 1969). As would be predicted by Social Control Theory, in a study which statistically controlled level of social bonds, gender differences in self-reported delinquency were significantly reduced (Jensen & Eve, 1976).

To some in this field, girls appear to be more concerned than boys with violating adult behavioral expectations (Dweck & Elliot, 1983; Sears, Ray, & Alpert, 1965), and by sanction

threats (Tittle & Rowe, 1973). Dweck and Elliot (1983) summarized the relevant literature as indicating that girls place greater emphasis on adult evaluation and approval, while boys show greater performance impairment under conditions of evaluation by peers. Maccoby and Jacklin (1974) found that girls appear to be more compliant with adult requests than boys are. Male gender role socialization emphasizes differentiation from others, while female gender role socialization stresses connection to and concern about significant others (Chodorow, 1978) and dependence (Rienzi et al, 1996). Within the female gender role there is an idealization of responsiveness to the needs of others (Gilligan, 1982). Males tend to be relatively more concerned with developing independence and asserting status, and male friendship groups tend to be larger than those of females (Karweit & Hansell, 1983). The smaller friendship groups of females may lead to greater intimacy and affiliation, leading, in turn, to greater attachment to and attunement with family. In the end, these closer family ties may result in girls being more open to the influence of family members.

There are mixed conclusions in the empirical literature on drug use for whether one gender is more influenced by significant others. Some results suggest that males conform more readily to their perceptions of group norms (Barnes & Welte, 1986; Prentice & Miller, 1993). Other authors conclude the opposite: that females tend to be more conforming to social influences. One noted researcher (Baumrind, 1985) suggests that girls may be more susceptible to interpersonal influences on drug use. Two meta-analytic studies which examined whether adult women and men differ in how easily they are influenced (Becker, 1986; Eagly & Carli, 1981) concluded that women are more persuadable and more conforming than men. In the adolescent drug use literature, two studies (Gliksman, Dwyer, Wlodarczyk & Pierce, 1989; van Roosmalen & McDaniel, 1992) found that the smoking behavior of girls is more influenced by family smoking patterns. Fisher et al. (1987), in a study of undergraduate drug use, found a gender difference in the effect of perceived parental drug use: men's use of drugs was relatively independent of

perceived parental drug use, while women's use of drugs was strongly related to it. Congruent with these results, Anglin, Thompson and Fisher (1986) found that use of hallucinogenic mushrooms by male undergraduates was most associated with peer mushroom use, in contrast to female mushroom use which was most associated with parental drug use, and particularly with father's marijuana use. Similarly, Lo (1995) observed in her sample of freshmen that females are more likely to be affected by their parents than are males: parental norms had a stronger influence on the processes females employ to choose friends, while peer drinking norms exerted stronger influences on male drinking.

In a study of adolescent substance use (Ensminger, Brown, & Kellam, 1982), females showed strong relations between family and school bonds (defined by these authors as attachments and commitments) and substance use, while for males bonds with peers and with school were the stronger predictors of substance use. This study showed some differences between the strength of bonds and the power of those bonds as predictors of drug use. Females reported stronger bonds to school while males reported slightly stronger family bonds and much stronger peer bonds. Yet females exhibited strong relations between family and school bonds and drug use, and males showed strong associations between peer and school bonds and drug use. In partial contrast to the previous citation, Johnson (1979) reported that girls' deviant behavior is more influenced by attachment to school than is boys', while boys' deviant behavior is more influenced by attachment to parents, perceived parental love, susceptibility to peer influence, deviant peer associations, school performance, and perceived risk of apprehension. These two studies appear to disagree on which gender's drug use is more predictable from strength of attachments to parents.

In a research sample of heroin addicts in treatment (Binion, 1982), gender differences were observed in retrospective perceptions of family history and socialization. For women, drug use was more associated with unresolved problems with family of origin, especially problems dating back to adolescence. These problems tended to be of an interpersonal, affective nature, and

resulted in feelings of alienation from the family which motivated drug-taking behavior. In contrast to the women, for men the greatest difficulties were with extra-familial societal forces such as school. Adolescent peer activity was a much more powerful force in male addict's initial drug use: men were much more likely to use drugs in order to be accepted by others, and to be introduced to drugs by a friend.

To add to the diversity of conclusions, there are studies which find females more affected by peer norms, purportedly due to greater sensitivity to their social environments (Berkowitz & Perkins, 1987; Newcomb, Chou, Bentler, & Huba, 1988). At least one other study has found very similar patterns across genders for the correlations between drug use and both parental attachment and drug-using friends (Johnson & Marcos, 1988). Congruent with this, in a general population study of parent-adolescent interaction and deviance, Barnes, Farrell, & Windle (1990) examined four parental support variables and five parental control variables and found that none of them were significantly related to adolescents' gender. There was not a significant intercorrelation between adolescents' gender and either parent/peer influence on life view or parent/peer influence on decision-making.

There is conflicting evidence indicating that, in general, fathers have greater influence on both daughters and sons than do mothers (Wilks, Callan, & Austin, 1989), or that children may be more likely to be influenced by their same gender parent (Thompson & Wilsnack, 1987; Yu & Perrine, 1997). Yu and Perrine found in their sample that fathers' drinking is more likely to serve as a role model for young sons' age of onset of drinking, while young girls are more likely to take their mothers' drinking as models for age of onset of their own drinking.

It is not uncommon to observe no gendered differences in the roles of socialization factors on adolescent drug use. For example, in the Hansen et al. (1987) study involving sixth and seventh graders, structural models of how psychosocial variables predicted substance use were very similar across gender. In a study by Flannery et al. (1996) which looked at the influence of

factors including parenting, peer pressure and school adjustment on early adolescent drug use, similarity in etiology of drug use across gender was found.

Little examination of gender differences in the influence of religious identification on adolescent drug use was found in the literature. In the adolescent drug use research program associated with Judith Brook (see, for example, Brook et al., 1986), independent variables that included aspects of family caring, family sanctions against drug use, religious identification and school adjustment were found to have few interactions with gender. Therefore, sample populations were not divided along gender. Similarly, Hundleby (1987) found that of tobacco, alcohol and marijuana, only tobacco showed a significant (though minor) sex difference in correlation with religious behavior, with a higher negative correlation for adolescent girls. Congruent with these findings, Johnson and Marcos (1988) found that the correlates of adolescent drug use examined (including use of drugs by friends and attachment to parents, school and religion) showed very similar effects by gender.

Schlegel and Sanborn (1979) found that among high school students who did not attend church regularly, there were no significant differences in drinking by religious affiliation (including nonaffiliates). However, among students who were either non-attending nonaffiliates or who regularly attended church and expressed particular sectarian affiliations, there were significant differences between fundamentalist proscriptive Protestants who drank and all other groups. The proscriptive Protestants were less likely to drink, and significantly less likely to drink heavily. This difference in drinking, though not in heavy drinking, was more marked among girls than among boys. After religious affiliation had been adjusted for several potentially confounding influences, it continued to have a significant effect on drinking for both boys and girls. These authors concluded that church attendance, regardless of particular religious affiliation, has a substantial influence on the rate of heavy drinking.

Conclusions Leading to Hypotheses in the Current Study

Given the scarcity of published work on gender differences in the influence of socialization factors on adolescent drug use, and the mixed results in the few studies which have examined this issue, there is no secure basis for developing hypotheses about the gender-specific pathways from socialization factors to drug use. It is tempting to side with Flannery, Vazsonyi, Torquati, and Fridrich (1994), who state, "...there is little reason to expect gender differences in the pattern of variables that may reflect the underlying processes predicting substance use in early adolescence." (p. 197). However, patterned differences by gender in adolescent drug use are well-established, and suggest the existence of patterned differences by gender in those socialization factors which are powerful predictors of drug use in adolescents. Overall, it appears that girls are targeted with more societal pressure to not use drugs than are boys. As far as gender differences in susceptibility to influence by these pressures, the trends are less clear. While there appears to be something approaching a consensus in the *theoretical* literature that girls are more influenced by social pressure, be it from family, friends or social institutions, the *empirical* literature contains a wide variety of findings which are difficult to condense into any strong conclusions. Though inconclusive, the preponderance of available *empirical* evidence, with backing in developmental theory, suggests tentative support for the hypotheses that (1) the drug use behavior of adolescent girls will be more influenced by family (perceptions of family caring and family sanctions against drug use) and school, relative to the influences on boys' drug use, while (2) adolescent boys' drug use will be more influenced by peer drug associations than will girls' drug use behaviors. In other words, in the socialization model for adolescent females, it is likely there are stronger effects for family caring, family sanctions, and school adjustment (the socialization factors which Peer Cluster Theory posits as mediated by peer drug associations) to drug use, and in the model for boys there are stronger links from peer drug associations to drug use. The socialization model presented in Peer Cluster Theory is hypothesized, then, as applying better to male adolescents than to females.

That is, for males there is more of a tendency for the effects of socialization factors such as family, school and (perhaps) religion to be indirect and mediated through the proximal factor of peer drug associations. However, due to the diversity of conclusions found within the set of empirical studies examined, these hypotheses must be held only tentatively, and perhaps in the case of religious identification no hypothesis can be made at the present time. Current research on gender differences in socialization processes leading to adolescent drug use can derive few clear expectations from prior work in this area, and in essence must be considered exploratory.

The two hypotheses lead to specific predictions about how models should differ by gender. As just described, it is predicted that the peer cluster socialization model will fit better for males than for females. It is further predicted that individual paths within the model will differ by gender. Consistent with Hypothesis 1, relationships between latent constructs that include family or school variables will be stronger for females than for males. This includes regression paths from family strength to family sanctions, family strength to religious identification, family strength to school adjustment, family sanctions to peer drug associations, and school adjustment to peer drug associations. In addition to evaluation of the original socialization model, an alternative model that includes a direct path from family sanctions to polydrug use will be evaluated. It is predicted that this model will result in greater improvement in fit over the original model for females compared to males. It is also predicted that this direct regression path will be stronger for females than for males. Hypothesis 2 predicts that the regression path from peer drug associations to polydrug use will be stronger for males than for females.

CHAPTER 2

METHOD

Participants

This study analyzed data collected from a representative national sample of 2306 adolescent public school students in grades 7 through 12, with participation of 82% of all enrolled students at schools surveyed. Schools were selected from an initial sampling frame of communities with populations of at least 2500, of which at least 10% was Mexican American. Communities were randomly chosen from the range of sizes from rural to urban communities. A total of 26 middle schools and 25 high schools were surveyed.

Of the students surveyed, 48% were male and 52% were female; 51% were from grades 7-9 and 49% were from grades 10-12. Among the younger students, 46% were male and 54% were female, while there were equal numbers of male and female students among the older group. Those not surveyed included school dropouts, students who were absent from school during days of survey administration, and students who refused to participate (less than 1%).

Survey Administration

Principals of the schools involved in this survey were contacted by researchers with Western Behavioral Studies, Colorado State University (now the Tri-Ethnic Center for Prevention Research) to obtain their permission to conduct the survey of their students. During the 1987-1989 school years anonymous self-report drug use surveys were administered to students enrolled in junior and senior high schools. Consent to participate in this survey was obtained from 98% of contacted students and their parents. Parents of students were notified by mail about the survey, and passive consent was obtained. The survey was administered during regular school days by

classroom teachers who read standardized instructions. Teachers stayed apart from students during completion of surveys so that student responses could not be observed. Detailed written instructions were distributed with the questionnaire to assure proper administration. Anonymity was maintained through use of questionnaires that did not ask for respondents' names and that instructed respondents to omit reporting their names. Surveys, upon completion, were collected and mailed to Western Behavioral Studies.

Measures

Participating students completed two paper-and-pencil self-report instruments, the Socialization Questionnaire, 1988 Form, and the American Drug & Alcohol Survey™ (ADAS™) (Oetting & Beauvais, 1990). The Socialization Questionnaire is an anonymous questionnaire that asks about family strength, family sanctions against drug use, school adjustment, religious identification, and peer drug associations. The ADAS™ is an anonymous questionnaire involving multiple-choice questions about respondent's use of several drugs, including alcohol, marijuana, inhalants (specifically naming glue, gas, sprays), tranquilizers, downers (specifically mentioning barbiturates and other street names), stimulants (including prescription and illicit stimulants such as cocaine, crack, amphetamines, methamphetamines), narcotics (including prescription and illicit narcotics such as heroin and opium), various psychedelic drugs (including LSD, mescaline, mushrooms), and tobacco. The ADAS™ provides several measures of drug involvement for each drug, including self-identification as a user of a substance, use during the previous 12 months, use during the past month, and how various substances are used. Peer use is also asked about for the above-mentioned drugs. The wording of questions is simple and straightforward and is at approximately a 4th grade reading level.

Latent and Observed Variables

Six latent variables, including five socialization factors and the outcome variable of polydrug use, were established *a priori* from 18 measured variables. The five socialization factors

are family strength, family sanctions against drug use, school adjustment, religious identification, and peer drug associations. These factors, or variables defined and measured in similar ways, have been used in previous studies (Oetting & Beauvais, 1987; Swaim, Oetting, Edwards & Beauvais, 1989; Swaim et al., 1993; Swaim, Nemeth, & Oetting, 1995; Swaim, Oetting & Casas, 1996; Swaim, Bates & Chavez, 1997). These prior uses have resulted in the following ranges of observed Cronbach alpha reliabilities: family strength .72 to .80, family sanctions .86 to .87, religious identification .69 to .88, school adjustment .74 to .85, peer drug associations .85 to .91, and polydrug use .81-.96.

All socialization variables except school performance are measured on a four-point Likert scale (4 = "a lot", 3 = "some", 2 = "not much", 1 = "not at all"). Family strength was assessed using a two-item scale with items asking whether the respondent cared about family, and whether family cared about the respondent. Family sanctions against drug use was assessed using three substance-specific indicators: family sanctions against alcohol use, marijuana use, and other drug use. Three indicators measured school adjustment: attitude toward school, attitude toward teachers, and self-reported school performance. Attitude toward school is a two-item scale with questions that ask whether the respondent likes school and whether school is fun. Attitude toward teachers is also a two-item scale, asking whether the respondent likes his/her teachers and whether teachers like him/her. Finally, school performance was assessed using a two-item scale with items that ask the student to report his/her own grades and to describe how good a student he/she is using a 4-point scale ranging from "poor" to "very good". Religious identification was measured using three indicators with survey questions that ask "Are you religious", "Do you take part in your religion", and "How important is religion in your life". Like family sanctions, peer drug associations was assessed using three substance-specific indicators: peer alcohol associations, peer marijuana associations, and peer other drug associations. Each of the substance association indicators is a composite of low peer sanctions against a particular class of substance use (assessed

with questions that ask how much friends would try to stop the respondent from using substances), and high peer encouragement to use a particular substance (assessed with questions asking how many friends use particular substances, and how much friends have asked the respondent to use a substance). Finally, the latent factor for polydrug use was assessed using 3 indicators of substance involvement: alcohol, marijuana, and other drugs. For alcohol and marijuana, items asking about use in the last 12 months, use in the last month, self-identification as a user, and how substances are used are combined to form scales that range from 0 (little or no use) to 7 (daily or addictive pattern of use). For other drug use, these variables are combined for six substances, resulting in a scale that ranges from 0 to 42. These substance use involvement scales have been found to be reliable and valid across diverse groups of adolescents (Oetting & Beauvais, 1990).

Analyses

The total sample of respondents was divided by developmental level, with the younger group consisting of 7th- to 9th-grader students and the older group consisting of 10th- to 12th-grade students. MANOVAs (Developmental Level by Gender) were conducted on the groups of indicator variables associated with each latent variable in order to assess the significance of mean differences in model variables with main effects for gender, developmental level, and their interaction.

The EQS version of Structural Equation Modeling (SEM) was the primary method of data analysis used in this study (Bentler, 1995), and was used to evaluate two nested models based on Peer Cluster Theory. SEM is a common methodology for multivariate analysis of data in nonexperimental research when guided by a theory of causal processes. SEM takes a confirmatory approach, and yields sets of structural (i.e., regression) equations, based on entry of an *a priori* hypothesized model. These equations are typically displayed schematically in order to illustrate how the variables are theoretically related to one

another. For an example of the generic model posited by Peer Cluster Theory, refer to Figure 1. The strengths of regression paths between variables are indicated by standardized regression coefficients. When goodness of fit indices are adequate, the plausibility of the theorized model of relations among variables is supported.

EQS was used in stepwise fashion to evaluate measurement and then structural components of the original structural model for each subpopulation (four groups, based on two developmental levels by gender). Evaluation of measurement components of the model consisted of assessment of the measurement quality of a set of observed variables that were used to measure the latent constructs. Evaluation of structural components of the model consists of assessment of relationships among latent constructs (such as the relationships between peer drug associations and polydrug use). Measurement characteristics were evaluated with confirmatory factor analyses (CFA's), followed by assessment of the basic structural model (Initial STR).

Next, multigroup analyses tested for differences in the structural paths across each of the four subgroups. The data for each subgroup were fit to the same basic model, retaining all recursive paths, i.e., all paths leading toward the outcome variable of polydrug use (whether direct or indirect). For difference testing, analyses were first conducted without equality constraints applied in order to establish a baseline against which to compare subsequent nested models. Then equality constraints were imposed on all structural paths across gender to test the hypothesis that paths were equal across male and female groups. These tests were conducted within developmental level. Difference tests were next conducted to determine whether the imposition of equality constraints could be statistically justified. These determinations were made by examination of Chi-square values. The difference in Chi-square between a model and a nested comparison model is distributed as Chi-square, with degrees of freedom equal to the difference in degrees of freedom between

the two models. A significant Chi-square resulting from this comparison indicates that one or more equality constraints should be removed in order to specify the model more accurately. The Lagrangian Multiplier test (LM test) (Chou & Bentler, 1990) was used to identify which paths to free from equality constraints. These paths were then unconstrained, models were rerun, and difference test values were recalculated. This cycle was repeated until nonsignificant difference tests indicated the remaining paths in the model were not significantly different across gender. Although the strengths of paths can be compared by examining standardized solutions, the LM test is based on Maximum Likelihood Estimates (MLEs). In the final analysis, the original structural model was compared against a new model that included a direct path from family sanctions to polydrug use, in order to determine whether this model fit significantly better for females. Fit of models was assessed using Chi-Square, the normed fit index (NFI) (Bentler, 1989), the comparative fit index (CFI), and standardized RMR (Root Mean Squared Residual) (Bentler, 1990). A non-significant Chi-square is indicative of good fit, but is highly sensitive to number of subjects and complexity of models (Bentler, 1980). Fit of a given model was considered adequate upon reaching the following criteria: NFI at least .90, or CFI at least .90. Although there is no established criterion for RMRs, this measure indicates the portion of variance not accounted for by a model, with low values indicating better model fit.

CHAPTER 3

RESULTS

Mean Differences

The means and standard deviations for each observed indicator variable that was used to measure each latent variable are presented in Table 1 for grade 7-9 males, grade 7-9 females, grade 10-12 males, and grade 10-12 females.

A series of 2 X 2 MANOVAs (Developmental Level by Gender) were conducted on the 6 groups of indicator variables associated with the 6 latent variables in the model. MANOVAs, rather than ANOVAs, were conducted in order to control Type 1 errors associated with multiple ANOVAs.

A 2 X 2 MANOVA for indicator variables contributing to family strength (consisting of family caring and family monitoring) resulted in a non-significant multivariate main effect for gender (Wilks' $\lambda = .99995$, $F(2, 2391) = .061$, $p = .941$). A significant multivariate main effect was found for developmental level (Wilks' $\lambda = .9892$, $F(2, 2391) = 13.047$, $p = .000$), which was accounted for on a univariate level by family monitoring, $F(1, 2392) = 17.835$, $p = .000$. Younger students reported higher levels of family monitoring than did older students. No significant multivariate interaction between developmental level and gender was found for this group of indicator variables (Wilks' $\lambda = .99988$, $F(2, 2391) = .14564$, $p = .864$).

A 2 X 2 MANOVA for indicator variables contributing to religious identification (consisting of: "Are you religious?" "Do you take part in religion?" "Is religion important to you?") resulted in a significant multivariate main effect for gender (Wilks' $\lambda = .99352$, $F(3, 2406) = 5.2319$, $p = .001$), which was accounted for on a univariate level by "Are you religious?", $F(1,$

2408) = 7.716, $p = .006$), by "Do you take part in religion?", $F(1, 2408) = 14.0776$, $p = .000$), and by "Is religion important to you?", $F(1, 2408) = 12.2444$, $p = .000$). For each of these variables females reported higher levels of religious identification than males. There was a significant multivariate main effect for developmental level (Wilks' $\lambda = .97188$, $F(3, 2406) = 23.2076$, $p = .000$), which was accounted for on a univariate level by "Do you take part in religion?", $F(1, 2408) = 23.4995$, $p = .000$), and by "Is religion important to you?", $F(1, 2408) = 4.3367$, $p = .037$). For each of these variables, younger students reported higher levels of religious identification than did older students. The multivariate interaction between developmental level and gender was significant for this group of indicator variables (Wilks' $\lambda = .99365$, $F(3, 2406) = 5.122$, $p = .002$), which was accounted for on a univariate level by "Are you religious?", $F(1, 2408) = 4.612$, $p = .032$, and by "Is religion important to you?", $F(1, 2408) = 10.9376$, $p = .001$. For both of these variables, mean values increased with age for females, but decreased with age for males. In other words, older females described themselves as more religious and ascribed a higher importance to religion than did younger females, while older males described themselves as less religious and ascribed a lower importance to religion than did younger males.

A 2 X 2 MANOVA for indicator variables contributing to family sanctions (consisting of family sanctions- alcohol, family sanctions- marijuana, and family sanctions- other drugs) produced a significant multivariate main effect for gender (Wilks' $\lambda = .99153$, $F(3, 2434) = 6.9277$, $p = .000$), which was accounted for on a univariate level by family sanctions- alcohol, $F(1, 2436) = 12.4931$, $p = .000$), family sanctions- marijuana, $F(1, 2436) = 13.8177$, $p = .000$), and family sanctions- other drug, $F(1, 2436) = 16.5361$, $p = .000$). For each of these variables, females reported higher levels of family sanctions against substance use than did males. There was also a significant multivariate main effect for developmental level (Wilks' $\lambda = .96069$, $F(3, 2434) = 33.1965$, $p = .000$), which was accounted for on a univariate level by family sanctions- alcohol, $F(1, 2436) = 41.8767$, $p = .000$), family sanctions- marijuana, $F(1, 2436) = 4.5516$, $p = .033$),

and family sanctions- other drug, $F(1,2436) = 16.0615$, $p = .000$). For each of these variables, higher levels of family sanctions were reported by younger students compared to older students. There was a significant multivariate interaction between developmental level and gender for this group of indicator variables (Wilks' $\lambda = .99328$, $F(3, 2434) = 5.4917$, $p = .001$), which was accounted for on a univariate level by family sanctions- marijuana, $F(1, 2436) = 13.2.65$, $p = .000$, and by family sanctions- other drug $F(1, 2436) = 9.6811$, $p = .002$. For both these indicator variables, the levels of family sanctions reported by females was generally stable among both younger and older students, while older males reported higher levels of family sanctions than younger males.

A 2 X 2 MANOVA for indicator variables contributing to school adjustment (consisting of attitude toward school, attitude toward teachers, and school success) produced a significant multivariate main effect for gender (Wilks' $\lambda = .9713$, $F(3, 2353) = 23.1720$, $p = .000$), which was accounted for on a univariate level by attitude toward school, $F(1,2355) = 27.3128$, $p = .000$, attitude toward teachers, $F(1,2355) = 39.7217$, $p = .000$, and school success, $F(1,2355) = 57.3443$, $p = .000$. Females reported higher mean levels than males for each of these variables. There was also a significant multivariate main effect for developmental level (Wilks' $\lambda = .97908$, $F(3, 2353) = 16.7624$, $p = .000$), which was accounted for on a univariate level by attitude toward school, $F(1,2355) = 20.1458$, $p = .000$, attitude toward teachers, $F(1,2355) = 49.5457$, $p = .000$, and school success, $F(1,2355) = 8.9774$, $p = .003$. Younger students reported higher levels on all school adjustment variables compared to older students. No significant multivariate interaction between developmental level and gender was found for this group of indicator variables (Wilks' $\lambda = .99790$, $F(3, 2353) = 1.64694$, $p = .177$).

A 2 X 2 MANOVA for indicator variables contributing to peer drug associations (consisting of peer alcohol use, peer marijuana use, and peer other drug use) was conducted. There was a significant multivariate main effect for gender (Wilks' $\lambda = .9846$, $F(3, 2434) =$

12.7065, $p = .000$), which was accounted for on a univariate level by peer alcohol use, $F(1,2436) = 26.9162$, $p = .000$, peer marijuana use, $F(1,2436) = 18.5132$, $p = .000$, and peer other drug use, $F(1,2436) = 25.9532$, $p = .000$). Males reported higher mean levels of peer substance use on each of these variables compared to females. There was also a significant multivariate main effect for developmental level (Wilks' $\lambda = .8516$, $F(3, 2434) = 141.3549$, $p = .000$), which was accounted for on a univariate level by peer alcohol use, $F(1,2436) = 350.5673$, $p = .000$, peer marijuana use, $F(1,2436) = 145.6285$, $p = .000$, and peer other drug use, $F(1,2436) = 3.9161$, $p = .048$). Older students reported higher mean levels of peer substance use compared to younger students. There was a significant multivariate interaction between developmental level and gender for this group of indicator variables (Wilks' $\lambda = .99091$, $F(3, 2434) = 7.4423$, $p = .000$), which was accounted for on a univariate level solely by peer marijuana use $F(1,2436) = 15.7859$, $p = .000$. This interaction was due to rising rates of peer marijuana use over time. Although females reported increased peer marijuana use at the older developmental level, the increase in use among males' peers was even greater across these developmental levels.

A 2 X 2 MANOVA for indicator variables contributing to polydrug use (consisting of alcohol, marijuana, and other drugs) resulted in a significant multivariate main effect for gender (Wilks' $\lambda = .9938$, $F(3, 2434) = 5.0642$, $p = .002$), which was accounted for on a univariate level by alcohol use, $F(1,2436) = 10.7382$, $p = .001$, marijuana use, $F(1,2436) = 11.7245$, $p = .001$, and by other drug use, $F(1,2436) = 5.0372$, $p = .025$). Males reported higher levels of substance use than females across each of these substances. There was also a significant multivariate main effect for developmental level (Wilks' $\lambda = .91476$, $F(3,2434) = 75.605$, $p = .000$), which was accounted for on a univariate level by alcohol use, $F(1,2436) = 225.0248$, $p = .000$, marijuana use, $F(1,2436) = 52.0569$, $p = .000$, and other drug use, $F(1,2436) = 19.232$, $p = .000$). Older students reported higher levels of substance use for all variables compared to younger students. There was a significant multivariate interaction between developmental level and gender for this

group of indicator variables (Wilks' $\lambda = .99542$, $F(3, 2434) = 3.7356$, $p = .011$), which was accounted for on a univariate level by alcohol, $F(1, 2436) = 10.5542$, $p = .001$) and marijuana, $F(1, 2436) = 4.9931$, $p = .026$). This interaction was due to rising rates of both alcohol and marijuana use over time. Although females reported increased alcohol and marijuana use at the older developmental level, the increase in use among males for both these drugs was even greater across these developmental levels.

Model Evaluation

Table 2 presents a summary of tests conducted on models across gender and developmental level. The first test was based on CFAs to determine the quality of measurement for each of the latent variables. CFA results indicated that measurement of the latent variables across all subgroups fit the data quite well. One subgroup (males, grades 10-12) had an NFI of less than .90 (.89), but all other NFIs and CFIs for all subgroups reached or exceeded .90. Standardized RMRs ranged from .057 to .071, indicating that a large portion of the variance was accounted for by the model for each group. Overall, fit of the measurement models showed that the latent variables were well-specified by their respective indicator variables. Table 3 presents the standardized factor loadings and residual variances for all CFAs. All factor loadings were significant ($p < .001$). Table 2 also presents results from the next level of analysis: evaluating the structural model for each subgroup individually. Again, one subgroup (males, grades 10-12) had an NFI of less than .90 (.88), but all other NFIs and CFIs for all subgroups reached or exceeded .90. Standardized RMRs ranged from .063 to .080, again indicating that a large portion of the variance was accounted for by the model for each group. The magnitudes of these fit indices indicate that for each of the four subgroups the structural model provides a reasonable description of the relationships between latent and observable variables.

Multigroup Analyses

Multigroup analyses were conducted to test for differences in the structural paths across groups. Two sets of multigroup analyses were conducted across gender, one on the younger students (grades 7-9), and one on the older students (grades 10-12). Analyses were first conducted on the basic model without equality constraints applied, in order to obtain a baseline against which to compare subsequent nested models. These first analyses resulted in good fits for both younger and older students, with $\chi^2(224) = 941.26$, NFI = .91, CFI = .93 for the younger group, and $\chi^2(224) = 921.162$, NFI = .89, CFI = .91 for the older group.

Following the baseline test, equality constraints were imposed on all structural paths to test the hypothesis that paths were equal across subgroups. Significant difference tests indicated that structural paths were not all equal across gender in both grade groups: for the 7-9th graders, $\Delta\chi^2(8) = 47.08$, $p < .001$, and for 10-12th graders, $\Delta\chi^2(8) = 35.11$, $p < .001$. LaGrangian Multiplier tests were examined to determine which paths were significantly different across gender. Paths that were significantly different across groups were then unconstrained, the model was rerun, and difference test values were recalculated. For younger students results for the revised difference test was $\Delta\chi^2(6) = 7.08$, $p = .31$, while for older students it was $\Delta\chi^2(5) = 3.92$, $p = .56$. These difference test values indicate that the remaining paths are equal.

Among the 7-9th grade students, two paths were significantly different across gender and were unconstrained: family strength to family sanctions, and religious identification to school adjustment. For the first of these paths, the relationship between family strength and family sanctions, was not significant in younger females (MLE = .030, $p > .05$), whereas it was highly significant in younger males (MLE = .267, $p < .001$). The second of these two differences involved the effect of religious identification on level of school adjustment. While this relationship was significant and positive among younger students of both genders, religious identification had a

stronger effect on school adjustment for younger males ($MLE = .431, p < .001$) than for younger females ($MLE = .252, p < .001$).

Among the 10-12th grade students there were three significantly different paths across gender. Equality constraints were freed for these three paths: family sanctions to peer drug associations, school adjustment to peer drug associations, and peer drug associations to polydrug use. For the first of these differences, while for both males ($MLE = -.310, p < .01$) and females ($MLE = -.680, p < .001$) increased family sanctions was associated with reduced peer drug associations, the effect was more pronounced for females. The second difference involved the role of school adjustment on the level of peer drug associations: while higher school adjustment appears led to lower peer drug associations for males ($MLE = -.572, p < .001$), the effect for females ($MLE = .026, p > .05$) of school adjustment on peer drug associations was not significant. Finally, the third significant difference between the models for older students was in the relationship between peer drug associations and polydrug use. While, for both genders, higher levels of peer drug associations were associated with higher levels of polydrug use, this effect was stronger for males. Note that these paths (from peer drug associations to polydrug use) do not appear to be of different magnitude, based on a comparison of standardized solutions. However, LM tests are based on maximum likelihood estimates. The maximum likelihood estimates and significance levels for these two paths were males ($MLE = .655, p < .001$) and female ($MLE = .442, p < .001$). After freeing the paths described above, difference tests were recalculated. These revised tests resulted in nonsignificant difference tests, which indicated that the remaining paths in the model were not significantly different across gender. For the younger students this difference test resulted in $\Delta\chi^2(6) = 7.08, (p = .31)$, and for the older students $\Delta\chi^2(5) = 3.92, (p = .56)$.

Finally, when the models were rerun after adding a direct path from family sanctions to polydrug use, and this new model was compared against the original model, there was a difference in change of fit across developmental level. This new path did not significantly change model fit

for the younger students, but it did for the older students. Table 4 compares χ^2 , NFI and CFI values between the original and revised model, and includes the regression coefficient of the direct path from family sanctions to polydrug use for each of the four groups. While the MLEs for this path were non-significant for younger students and significant for older students, they varied in strength between older girls (MLE = -.28, $p < .01$) and older boys (MLE = -.38, $p < .001$).

CHAPTER 4

DISCUSSION

The purpose of this study was to investigate differences, by gender, in the roles that various socialization factors play in a model of causal processes leading to adolescent drug use. Secondly, differences by developmental level and the interaction of gender and developmental level were to be examined, although inferences about developmental processes would be difficult to make with confidence due to the cross-sectional nature of the data. These differences could be observed through examining mean differences in model variables, comparing the strengths of effects across gender in the basic socialization model suggested in Peer Cluster Theory, and, after modifying the basic model in ways suggested by the relevant literature, examining the change in fit of models to this data. The results of this search for differences are discussed in the present section, followed by an analysis of the implications of these findings for intervention efforts and suggestions for future research on adolescent drug use.

Mean Differences in Model Variables by Gender

This study found significant differences by gender in self-reported levels of all the socialization variables examined, with the single exception of family strength. Females described their families as expressing more sanctions against use of the three classes of drugs examined (alcohol, marijuana and other drugs). This finding has been reported previously (Erickson & Murray, 1989; Lo, 1995; Rienzi et al., 1996; Robbins & Martin, 1993), and is consistent with the hypothesis developed from literature that indicates drug use behavior of girls will be more influenced by family. Female students also reported a higher average level of school adjustment, which was found consistently across all three observed measures loading onto this latent

socialization variable. This matched the finding by Ensminger, Brown and Kellam (1982) wherein females reported stronger attachments and commitments to school than did males. Finally, females described themselves in terms that could be interpreted as having stronger religious identification. This difference was observed for all three observed variables contributing to this latent variable. Insufficient work has been published on gender differences in the importance of religious identification to assess whether this is consistent with past findings.

It is within the variables related to drug use that higher values among male respondents account for the significant gender differences observed. Males reported higher levels of peer drug associations for all three classes of drugs examined. This matches the higher levels of peer drug associations among males (or trends toward significantly greater male peer drug associations) reported by Swaim, Nemeth and Oetting (1995) and by Swaim, Bates and Chavez (1998). This result could be due to the confluence of two factors: 1) it is well established that male adolescents exhibit higher levels of drug use (Hansen & O'Malley, 1996; Johnston, O'Malley, & Bachman, 1989; Newcomb, Chou, Bentler, & Huba, 1988; Pascale & Evans, 1993) and 2) although not yet empirically tested, it may be that peer drug associations among adolescents may involve more same-sex combinations than cross-sex combinations. Since males use drugs at higher levels than females, if same-sex groupings are more common among drug-using youth this would lead to more peer drug associations among males compared to females. Since the validity of this second point awaits testing, however, this is presented as a tentative explanation for the higher levels of peer drug associations observed among males.

Finally, male students consistently reported a significantly higher level of drug use across drug classes. This last finding matches the general finding in the drug literature that males use more drugs than do females (Johnston, O'Malley, & Bachman, 1989; Pascale, Trucksis, & Sylvester, 1985; Pascale & Evans, 1993), and matches the more specifically pertinent research results indicating that among adolescents, males use drugs, in general, more than females do

(Ensminger, Brown, & Kellam, 1982; Hansen & O'Malley, 1996; Kandel, 1980; Newcomb, Chou, Bentler, & Huba, 1988). It has been found elsewhere (Hansen & O'Malley, 1996) that these differences across gender tend to be smaller for younger adolescents, and this generalization was supported by the present study. While mean levels of drug use were higher for both older males and older females, relative to their younger counterparts, the mean difference between male and female drug use was higher among the older students. Hansen and O'Malley (1996) speculate that this gender gap in drug use may be smaller (or even reversed) among younger adolescents due to earlier maturing of females and the tendency for earlier maturing females to associate with older males.

Mean Differences in Model Variables by Development Level

This study also found significant differences by development level in model variables. Younger students reported significantly higher levels of family strength, religious identification, family sanctions and school adjustment. Older students reported significantly higher levels of peer drug associations and polydrug use, as has generally been reported elsewhere (Johnston, O'Malley & Bachman, 1989; Kandel & Yamaguchi, 1985).

Analysis of Models

When the overall sample of survey respondents was divided by developmental level and gender into four subgroups, the quality of measurement of latent variables was quite good for all four groups. The structural model, evaluated for each of these subgroups, was found to provide a good description of relationships between latent and observable variables. Finally, upon testing for differences in the structural paths across groups, differences were found across gender, within both the younger (7-9th grade) and older (10-12th grade) groups.

This study set out to test the following two hypotheses: 1) adolescent girls' drug use will be more influenced by family variables (family strength and family sanctions against drug use) and school adjustment, relative to the influences on boys' drug use, and 2) adolescent boys' drug use

will be more influenced by peer drug associations than will girls' drug use. Support for these hypotheses would be found in different strengths of regression path coefficients. Support for the first hypothesis would be found in the original model in stronger effects for girls from family strength to family sanctions, religious identification and/or school adjustment, and from family sanctions and/or school adjustment to peer drug associations. Support for this would also be found in the revised model in stronger effects for girls from family sanctions to polydrug use. Support for the first hypothesis was found in one of these six effects, from family sanctions to peer drug associations, though only in the 10th to 12th grade developmental level. Two other significant differences by gender found within this sample were counter to the differences predicted by the first hypothesis. First, among the 7th to 9th grade students the relationship between family strength and family sanctions was highly significant (and positive) for males but non-significant for females. Second, among the 10th to 12th grade students the significant and negative relationship seen for males between school adjustment and peer drug associations was not found for females. Instead, females exhibited no significant relationship between these two variables.

Rerunning the models after adding a direct path from family sanctions to polydrug use did not significantly change fit from the basic model for younger students, but it resulted in a significant change in fit for the older students. The nature of this change, however, was the reverse of the pattern predicted: for older students the direct path from family sanctions to polydrug use was stronger for males than for females. What this may signify is that as mean level of drug use increases during adolescence, youths experience and report increasing levels of family sanctions as a reaction against drug use. The absence of a direct relationship between drug use and family sanctions for the younger students may be explained by their relatively low drug use, compared to drug use at the older developmental level. Therefore, parents of younger adolescents have less youthful drug use against which to react with sanctions. This explanation would also account for the stronger path among older males than older females, since male drug use tends to

be greater than female drug use, and particularly at this older level. Overall, support for this study's first hypothesis was not found.

Support for the second hypothesis comes from examining differences by gender in the relationship between peer drug associations and the individual's actual drug use. Though for both genders this is a significant and positive effect, the effect among the older students was stronger for males, as predicted. As proposed in Peer Cluster Theory (Oetting & Beauvais, 1986; Oetting & Beauvais, 1987) and other theories of adolescent deviance (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Coombs, Paulson, & Richardson, 1991; Flannery, Vazsonyi, Torquati, & Fridrich, 1994; Newcomb & Bentler, 1989), these findings attest to the robust importance of peer drug use and peer influence in general in the prediction of drug use. But these results also confirm this study's second hypothesis, at least for the 10-12th grade students in this sample, that adolescent boys' drug use will be more influenced by peer drug associations than will girls' drug use behaviors.

Within the younger respondents two relationships between latent variables were found to significantly differ across gender. The first of these differences, that the relationship between family strength and family sanctions was highly significant (and positive) for males but non-significant for females, is supported by literature which has found that society is less accepting of female deviance in general, including female substance use (Robbins & Martin, 1993). This might have been expected since in many studies females reported higher sanctions against drug use applied to them than males reported (Erickson & Murray, 1989; Lo, 1995; Rienzi et al, 1996). It is plausible that the higher sanctions reported by the females in this sample tend to be applied to females in the general population, independently of level of caring or level of attachment to socialization agents.

The second of these significantly different relationships among the younger students was that the significant and positive relationship between religious identification and school adjustment

observed for both genders was stronger for males than females. This result could not have been predicted from the literature reviewed, although, as previously noted, there appears to be very little published work in this area. Thus, interpretations of this finding must be made with caution. One possible explanation may be that higher religious identification and higher school adjustment are both less frequently observed among early adolescent males than females, and since both variables appear to involve attachment to conventional institutions and values, there may be common mediating factors underlying both.

Among the older students three differences across gender were observed in the structural paths. First, the significant and negative relationship between family sanctions and peer drug associations was stronger among older females than males. This finding could have been predicted from a fairly large body of literature stating that females appear to conform more than males to socialization pressures from family, here specifically in regard to drug use (Dweck & Elliot, 1983; Fisher et al., 1987; Gliksman, Dwyer, Wlodarczyk & Pierce, 1989; Hirschi, 1969; Lo, 1995; Maccoby and Jacklin 1974; van Roosmalen & McDaniel, 1992). For example, Dweck and Elliot (p. 666) comment on "the greater emphasis girls versus boys tend to place on adult evaluation and approval" and the relatively greater impact adult evaluators have on girls' performance relative to boys' performance. In their study of college undergraduates, Fisher et. al (1987) demonstrated this gender difference, in that parental use of cocaine and hallucinogens was significantly associated with daughter's use but not with sons' use. Similarly, Lo (1995) found among college freshmen that females were more likely to be affected in their use of alcohol by their parents' norms than were male students. Finally, in a study of adolescent smoking behavior, van Roosmalen & McDaniel (1992) concluded that "female adolescents, more than males, are influenced by the smoking behaviors of family members" (p. 92). Although these studies examined gender differences in actual drug use among adolescents, it is plausible that this pattern of differences would pertain to peer drug associations as well, given this peer variable is closely

linked to adolescent drug use. Still unexplained is the problem of why the older girls' stronger relationship between family sanctions and peer drug associations was not also observed in the younger girls. One plausible explanation is that, developmentally, boys become more independent, and thus less influenced by parental sanctions in their development of peer associations, relative to their same-age female peers.

Second, the significant and negative relationship seen for males between school adjustment and peer drug associations was not found for females, who exhibited no significant relationship between these two variables. Although this finding involves peer drug use rather than the individual's drug use, peer drug use has been found to be the best single predictor of drug use (Newcomb & Bentler, 1989; Oetting & Beauvais, 1987; Swaim, Oetting, Edwards & Beauvais, 1989). Since school adjustment, like numerous other socialization factors, has been found to have a negative relationship with drug use, and since females are hypothesized to conform to the influences of family and institutional pressures more than are males (Dweck & Elliot, 1983; Ensminger, Brown & Kellam, 1982; Hirschi, 1969; Jensen & Eve, 1976; Johnson, 1979; Maccoby and Jacklin 1974; Turk, 1969) it would have been reasonable to predict a significant negative relationship between school adjustment and peer drug associations for females. However, this relationship was not found. The explanation for this unexpected observation awaits further study. Perhaps the explanation is in the females' putatively higher need for affiliation, leading to less discrimination based on drug use or attitudes among potential friends, and therefore, there is a delinking of peer drug associations from school adjustment.

The third significantly different relationship between latent variables seen among the older students involves the previously discussed relationship between peer drug associations and the individual's actual drug use. Though for both genders this was a significant and positive effect, for boys there were stronger direct links from peer drug associations to drug use than for girls,

confirming this study's hypothesis (2) that adolescent boys' drug use will be more influenced by peer drug associations than will girls' drug use behaviors.

Implications of These Findings

Given these statistically significant differences across gender in the strengths of paths in both the original socialization model and the revised model containing an additional direct path from family sanctions to peer drug associations, what is the practical significance of these differences in development of prevention and intervention efforts? Do these differences justify tailoring drug use programs for better fit with target groups defined simultaneously by gender and age? Although a cost/benefit analysis of the effectiveness of developing and implementing group-specific intervention elements is beyond the scope of this study, these results do not suggest the need for major differences in programs directed at each of the subgroups. The data for all groups fit the original model reasonably well, and lend support for programs that emphasize the central role of peer drug associations in adolescent use. For the most part socialization variables can be interpreted as contributing to drug use behavior through the mediation of peer drug associations, supporting efforts to reduce these peer associations.

It may be useful to approach the task of reducing peer drug associations and polydrug use with at least subtle differences across target subgroups. For example, among younger adolescents it may be more profitable when addressing male drug use to emphasize family strength variables, such as perceptions of caring between the individual and his family. This suggestion follows from the observations that 1) for younger males there is a significant and positive relationship between family strength and family sanctions against drug use, and family sanctions are, in turn, associated with reduced use of drugs by peer clusters; and 2) for younger males there are significant paths from family strength directly to school adjustment and indirectly to school adjustment via religious identification, and, in turn, from school adjustment to peer drug associations. The data suggest that increasing family strength will tend to ultimately lead to reduced drug use by younger males,

while the link in the theoretical chain of causation from family strength to family sanctions is non-significant for younger females. It may be that younger females are not using drugs at sufficient levels for family sanctions to have much impact on other variables such as peer drug associations or polydrug use. Note that adolescent drug use tends to increase developmentally, and though developmental inferences must be made tentatively from cross-sectional data, the direct path from family sanctions to polydrug use appears to eventually become significant for both older males and females. In addition, among older adolescents the link between family sanctions and peer drug associations is stronger for females than for males. Together these facts suggest family sanctions may be a particularly effective variable to address in prevention efforts directed toward both older females and older males.

Another implication for intervention from these results is the greater utility with younger males in increasing level of religious identification. Although this may be a useful strategy for both genders, the data suggest a stronger positive link between religious identification and school adjustment for younger males. Although it remains unclear whether the differences between the younger and older groups of participants indicate normal developmental trends, if this is a normal part of development the data suggest that increasing religious identification in younger adolescents of both genders leads to greater school adjustment. However, in the older adolescents the next link, from school adjustment to peer drug associations, has an important difference across genders. While this is a significant and negative path for older males, it is not significant for females. Though the direct path from religious identification to peer drug associations is not significantly different between older males and females, the non-significant link for older females between school adjustment and peer drug associations suggests that work towards decreasing drug use by increasing religious identification may ultimately be more fruitful for males than for females.

The final implication of ways to specifically program efforts toward subgroups comes from the finding of a stronger path for older males than older females from peer drug associations to

polydrug use itself. Although this path is highly significant and positive for all four subgroups examined, intervention with a strong emphasis on reducing peer drug use may be more effective in reducing drug use among older males than among older females.

One note of explanation is warranted in considering the implications of these findings. Because this study is based on cross-sectional data, temporal sequencing of changes in these variables is obscured. This makes it impossible to confirm causal relationships between variables within the socialization model. Hays and Revetto's (1990) reanalysis of Oetting and Beauvais' (1987) structural equation modeling results illustrated the problematic nature of interpreting cross-sectional data. Hays and Revetto reanalyzed the Oetting and Beauvais data, and were able to find support for a plausible causal model that is an alternative to Peer Cluster Theory. In this respecified model, Oetting and Beauvais' variables were rearranged, such that school adjustment was the outcome variable. In the Hays and Revetto model, family strength and peer drug associations indirectly led to school adjustment, while family strength and peer drug associations, plus family sanctions, religious identification, and drug use led directly to level of school adjustment. The Oetting and Beauvais (1987) model and the Hays and Revetto (1990) model share two essential similarities, however: each suggest the family has a central role in reducing adolescent drug use through the mediating effects of peer drug associations, and each indicate that religious identification may reduce drug use through peer drug associations. Therefore the results of Hays and Revetto's (1990) reanalysis are essentially quite comparable to Oetting and Beauvais' (1987) Peer Cluster Theory, in their models of the interaction of socialization variables leading to adolescent drug use (with the exception of school adjustment). The present study is based on Peer Cluster Theory, and adds to the support for that socialization model. The results of the present study are also quite comparable to Hays and Revetto's findings, with the exception of the hypothesized role of school adjustment in the interaction of these variables. The validity of the

above implications would be more seriously threatened if support for a more radically different model of variables related to adolescent drug use is eventually found.

Limitations of the Study and Suggestions for Future Research

The foregoing study is vulnerable to certain criticisms. One of these criticisms is that the data were developed through self-report of behavior. Although the implications of this are not completely resolved, there is accumulating evidence that self-report among adolescents is likely to be reasonably reliable and valid. For example, in a review of the reliability of self-report data, Oetting and Beauvais (1990) cite numerous studies which examine issues of accuracy and trustworthiness of reporting about deviant behaviors such as drug use. For example, in a comprehensive evaluation (Marquis, Duan, Marquis, & Polich, 1981) conducted by the Rand Corporation of past studies that had collected data through both self-report and corroborative methods, the authors concluded there is little evidence that individuals underreport drug and alcohol use. Numerous studies (Single, Kandel, & Johnson, 1975; Barnea, Rahav, & Teichman, 1987; Oetting, Dinges, & Beauvais, 1989) suggest the proportion of inconsistent responders in drug use surveys of adolescents is well under 10%. Oetting and Beauvais (1990) conclude that adolescent subjects in self-report of drug use probably try to be reasonably truthful and under the right conditions can be relied on to be reasonably accurate. Similarly, Hundleby (1987), in his assessment of the validity of self-report in the study of adolescent drug use, concluded that with attention to well-known potential problems, survey data of this type can yield valid data. The present study avoided circumstances known to cause problems with validity of self-report data, through assurances of anonymity, use of pre-tested measures and internal tests of consistency in responding.

Another important criticism of this study is that it relies on cross sectional data in making causal inferences. Structural equation modeling, the method of data analysis used in this study, is driven by *a priori* hypotheses derived from preexisting theories intended to explain causal

processes. Therefore, this kind of modeling is based on hypotheses about the structure of relationships between variables. Prior theory helps to specify the sign or strength of covariance relationships in these models. However, without more than one data point, the temporal ordering of relationships cannot be confirmed. Furthermore, plausible rival models may also provide good data fits, making the choice between competing models problematic. The results of the aforementioned Hays and Revetto (1990) reanalysis of Oetting and Beauvais' (1987) data lend support for the routine consideration of plausible alternative models, particularly in the analysis of cross-sectional data, in order to maximize evidence of internal validity when attempting to make causal inferences. These results also support a search for converging evidence supporting a hypothesized relationship through the use of multiple research strategies, including the use of cross-lagged panel (longitudinal) designs and cohort analysis of multiple cohorts. Future research on the relationships between various socialization variables and adolescent drug use is likely to profitably employ this variety of methods.

Finally, the limited measurement of family influence variables used in this study is subject to critical assessment. The latent variable "family strength" was based solely on two self-report measures of whether the respondent cared about his or her family, and whether his or her family cared about the respondent. A number of useful ways have been established to broaden the assessment of family influence variables. For example, family caring and family sanctions could be assessed separately for each parent, with attention paid to patterns in the roles these variables play relative to gender combinations between parent and child. Adolescents could show differences in their perceptions of parents as caring or rejecting, depending on these gender combinations. Use of drugs by mothers or fathers could show another dimension of gender differences in family influence on adolescent drug use. Some of the results found in the present study may have been due to the depth of examination of family variables, and therefore need to be

interpreted with some caution. For example, if additional measures of the influence of family had been used, the results might have been more consistent with past literature.

In looking beyond the level of intrapersonal processes to group dynamics within a given community of interacting adolescents, the importance of peer drug associations on individual drug use suggests that changes in drug use may have wider synergistic effects within adolescent groups. That is, there may be multiplier effects in which changes in drug use in particular individuals who participate in peer drug associations lead to changes in drug use for other individuals, who, in turn, contribute to peer influences on other individuals. Therefore, reducing drug use in targeted individuals may have wider effects on other individuals, with reciprocal influences on the drug use of the targeted individual. This may be akin to "spreading activation" among a widening circle of individuals. There may be "critical masses" in drug use within groups, i.e., thresholds of levels of use (or other indices of use such as "kind of drug used" or "amount of drug used per episode") above or below which large changes in group drug use behavior are observed. Graphical representation of group drug use over time may require S-shaped curves to reflect relatively large, step-wise changes in drug use that may occur when group drug use reaches these critical thresholds. In addition, certain individuals may be particularly influential on the drug use behaviors of their peers, and these individuals may have personal characteristics that differ systematically from their peers in general. It is plausible that such individuals could be identified and preferentially targeted for intervention into their drug use in order to maximize returns on investment of intervention resources. All of these issues bear further investigation in the future.

This study reviewed the theoretical and empirical literature on differences, by gender, in the interactions between various socialization factors and both adolescent deviant behaviors in general and drug use in particular. Overall, the literature reviewed suggested that the influences of family and school on adolescent drug use tends to be greater for females than for males. This gender difference, suggested by the literature, was not found in the present study. The data did not

support this study's first hypothesis of stronger influences for girls of family variables and school adjustment on drug use. In light of the present pattern of findings, it appears that the notion that girls' drug use is more influenced by family and school is simplistic. The gendered pattern of relationships between variables, observed within this study's sample of adolescents is more complex than that predicted by current theory. There is a need for new, more complex theory to explain these observed relationships. As for this study's second hypothesis, that drug use is more influenced by peers for adolescent males than for adolescent females, the findings in the empirical literature were confirmed by this study. Among the older adolescents in this sample, adolescent boys' drug use was more influenced by peer drug associations than was girls' drug use.

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Table 1

Table of Means and Standard Deviations for Indicator Variables

Latent Variable	Indicator Variable	Grade 7-9				Grade 10-12			
		MALE		FEMALE		MALE		FEMALE	
		Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
FAMILY STRENGTH	FAMILY CARING	7.743	(.724)	7.756	(.674)	7.733	(.768)	7.726	(.700)
	FAMILY MONITORING	7.475	(.966)	7.446	(.943)	7.281	(1.025)	7.279	(1.035)
RELIGIOUS IDENTIFICATION	SOC21	2.841	(.949)	2.865	(.968)	2.780	(.924)	2.968	(.881)
	SOC22	2.761	(.990)	2.867	(.981)	2.523	(.973)	2.717	(.976)
	SOC23	3.143	(.994)	3.151	(.980)	2.929	(1.00)	3.200	(.920)
FAMILY SANCTIONS	FAMILY CARING ALCOHOL	3.434	(.920)	3.563	(.740)	3.215	(.922)	3.332	(.851)
	FAMILY CARING MARIJUANA	3.720	(.816)	3.900	(.497)	3.861	(.541)	3.863	(.497)
	FAMILY CARING OTHER DRUG	3.732	(.825)	3.901	(.499)	3.900	(.492)	3.922	(.425)
	SCHOOL ATTITUDE	5.513	(1.705)	5.944	(1.647)	5.896	(1.465)	6.135	(1.348)
SCHOOL ADJUSTMENT	TEACHER ATTITUDE	6.108	(1.357)	6.426	(1.170)	6.463	(1.194)	6.766	(1.041)

Table 1 (Continued)

Table of Means and Standard Deviations for Indicator Variables

Latent Variable	Indicator Variable	Grade 7-9				Grade 10-12			
		MALE		FEMALE		MALE		FEMALE	
		Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
PEER DRUG ASSOCIATIONS	SCHOOL SUCCESS	5.880	(1.260)	6.192	(1.158)	5.977	(1.100)	6.376	(1.017)
	PEER ALCOHOL	5.873	(2.253)	5.756	(2.489)	8.044	(2.325)	7.168	(2.341)
	PEER MARIJUANA	3.384	(1.567)	3.126	(1.465)	4.174	(1.658)	3.882	(1.638)
	PEER OTHER DRUG	22.588	(9.764)	20.730	(7.757)	23.174	(8.784)	21.511	(7.566)
POLYDRUG	ALCOHOL	1.877	(1.122)	1.876	(1.175)	2.887	(1.706)	2.526	(1.419)
	MARIJUANA	1.391	(1.106)	1.326	(1.004)	1.901	(1.797)	1.596	(1.348)
	OTHER DRUG	6.323	(1.936)	6.250	(1.374)	6.769	(2.553)	6.491	(1.776)

Table 2

Summary of Model Evaluation by Gender and Grade Level

Group	Chi-square	df	NFI	CFI	Standardized RMR
Male 7-9					
CFA	400.26	104	.92	.94	0.057
Structural Model	415.14	112	.91	.94	0.067
Female 7-9					
CFA	503.73	104	.92	.93	0.062
Structural Model	526.13	112	.92	.93	0.067
Male 10-12					
CFA	488.51	104	.89	.91	0.071
Structural Model	529.25	112	.88	.90	0.080
Female 10-12					
CFA	377.36	104	.90	.93	0.060
Structural Model	391.91	112	.90	.93	0.063

Note. df = degrees of freedom

NFI = Normed Fit Index

CFI = Comparative Fit Index

RMR = Root Mean Square Residual

Table 3

Standardized Factor Loadings and Residuals for Model Variables

Latent Variable	Indicator Variable	Male 7-9: _____		Female 7-9: _____		Male 10-12: _____		Female 10-12: _____	
		Factor Loading	Residual	Factor Loading	Residual	Factor Loading	Residual	Factor Loading	Residual
FAMILY STRENGTH	Family caring	.64	.77	.73	.69	.81	.59	.70	.72
	Family monitoring	.97	.26	.97	.25	.80	.60	.95	.33
RELIGIOUS IDENTIF.	Are you religious?	.85	.52	.86	.51	.88	.49	.90	.44
	Take part in religion?	.87	.49	.92	.41	.87	.50	.87	.49
	Religion is important?	.78	.63	.85	.53	.87	.50	.83	.57
FAMILY SANCTIONS	Sanctions: Alcohol	.58	.82	.46	.89	.35	.94	.38	.93
	Sanctions: Marijuana	1.00	.00	.98	.18	1.00	.00	1.00	.00
	Sanctions: Other Drug	.96	.30	.98	.20	.87	.49	.80	.61
SCHOOL ADJUSTMENT	School: Attitude	.73	.68	.74	.68	.66	.75	.64	.77
	Teacher: Attitude	.79	.61	.79	.62	.71	.71	.69	.72
	School: Success	.58	.81	.65	.76	.50	.87	.56	.83
PEER DRUG ASSOCIATION	Peer Alcohol Use	.57	.82	.71	.71	.55	.83	.58	.81
	Peer Marijuana Use	.95	.31	.95	.33	.97	.24	1.00	.00
	Peer Other Drug Use	.75	.67	.70	.71	.69	.72	.63	.78
POLYDRUG	Alcohol Use	.54	.84	.69	.73	.62	.79	.58	.82
	Marijuana Use	.86	.51	.79	.62	.87	.50	.82	.57
	Other Drug Use	.60	.80	.51	.86	.70	.71	.59	.81

Table 3 (Continued)

Standardized Factor Loadings and Residuals for Model Variables

Note.

Sanctions: Alcohol = Family sanctions against use of alcohol

Sanctions: Marijuana = Family sanctions against use of marijuana

Sanctions: Other Drug = Family sanctions against use of other drugs

School: Attitude = Attitude toward school

Teacher: Attitude = Attitude toward teachers

School: Success = Level of success in school

Table 4

Results of Adding Direct Path from Family Sanctions to Polydrug Use

Developmental Level:	Grades 7-9						Grades 10-12					
Gender:	Females			Males			Females			Males		
	Chi-square	NFI	CFI	Chi-square	NFI	CFI	Chi-square	NFI	CFI	Chi-square	NFI	CFI
Original Model:	521.13	.92	.93	415.14	.91	.94	391.91	.90	.93	529.25	.88	.90
Revised Model:	525.47	.92	.93	414.24	.91	.94	382.70	.90	.93	517.30	.88	.91
Δ Chi-square:	0.66			0.90			9.21			11.95		

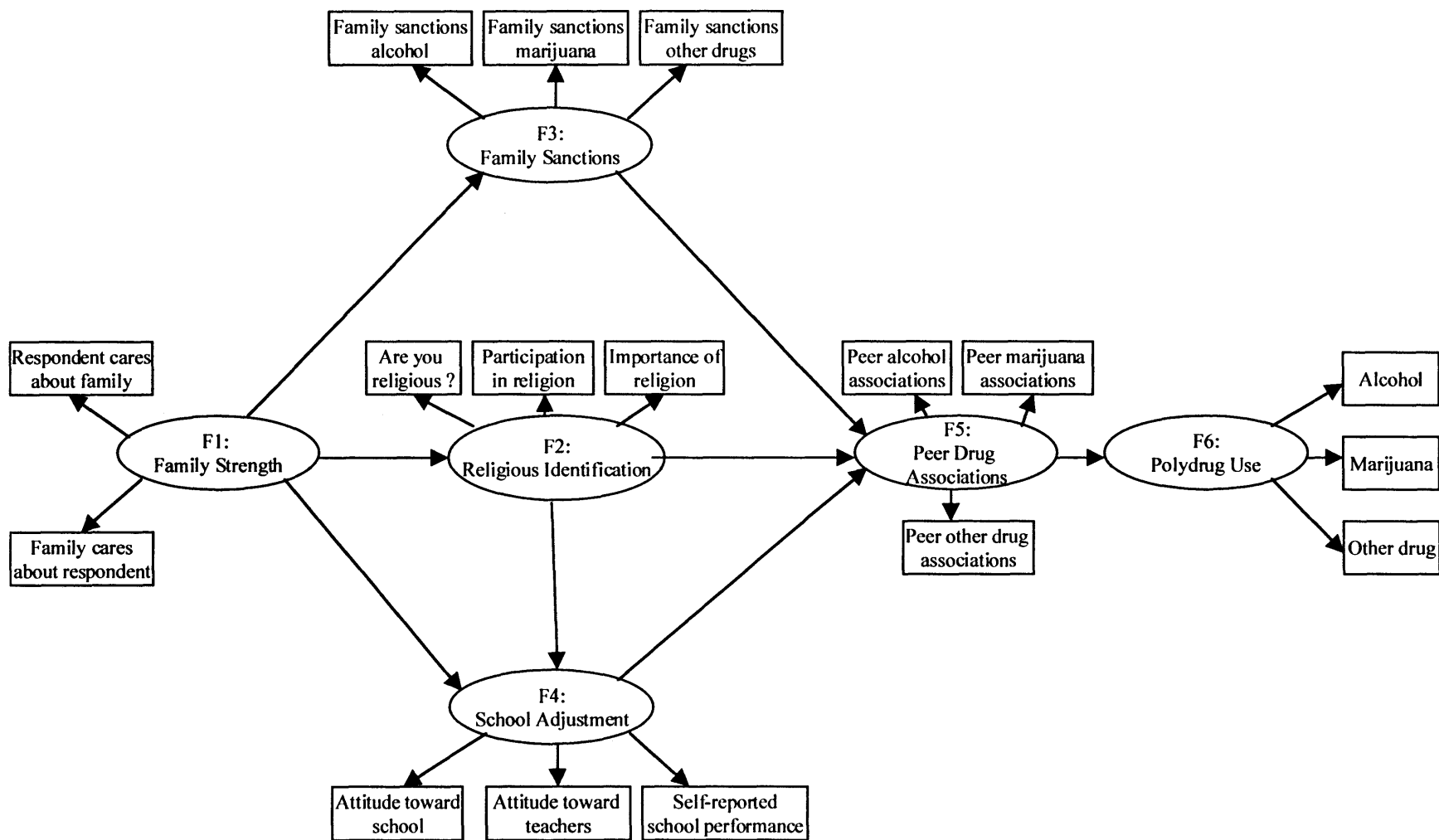


Figure 1: Basic Socialization Model in Peer Cluster Theory

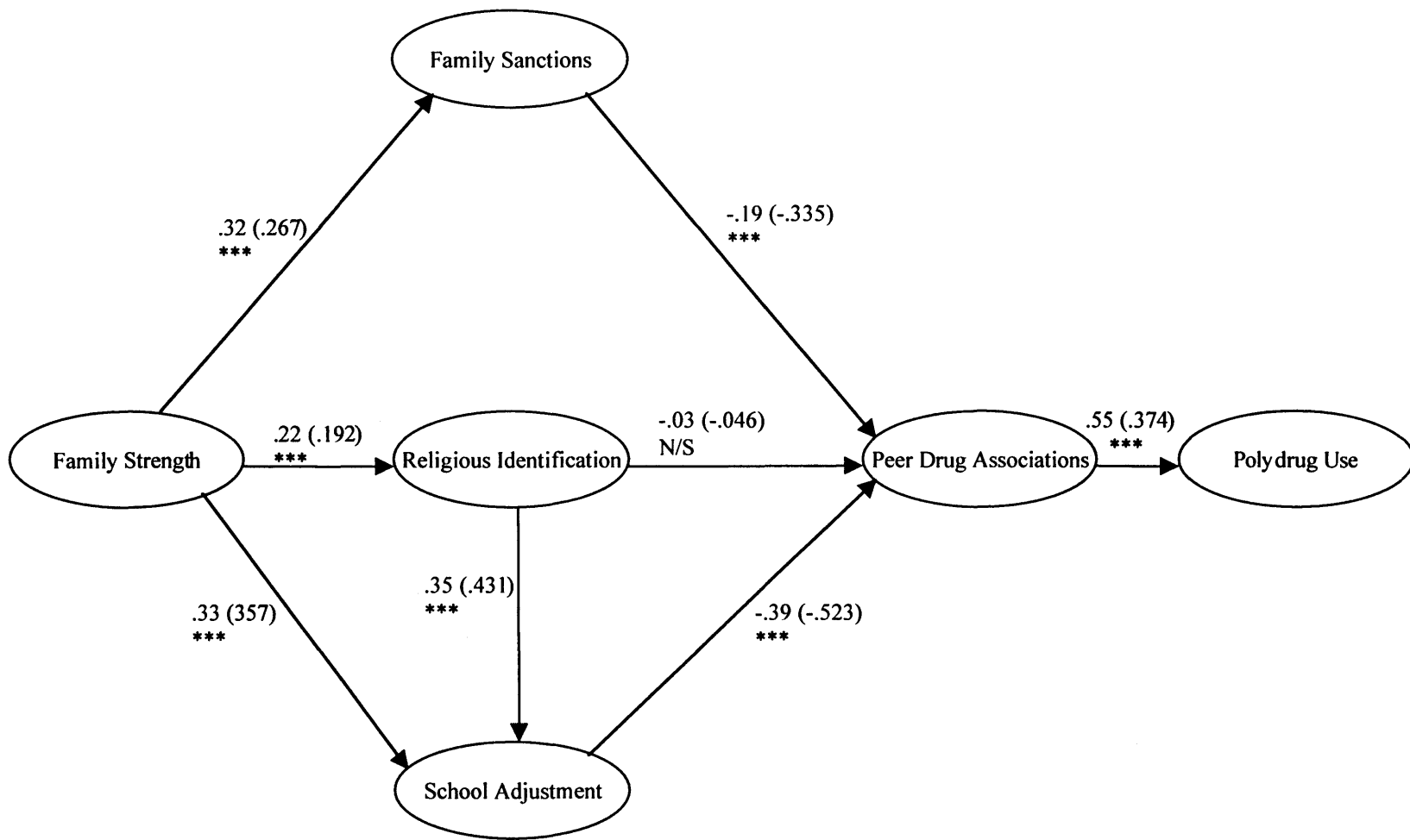


Figure 2: Basic Structural Model for Males, 7-9th Grade

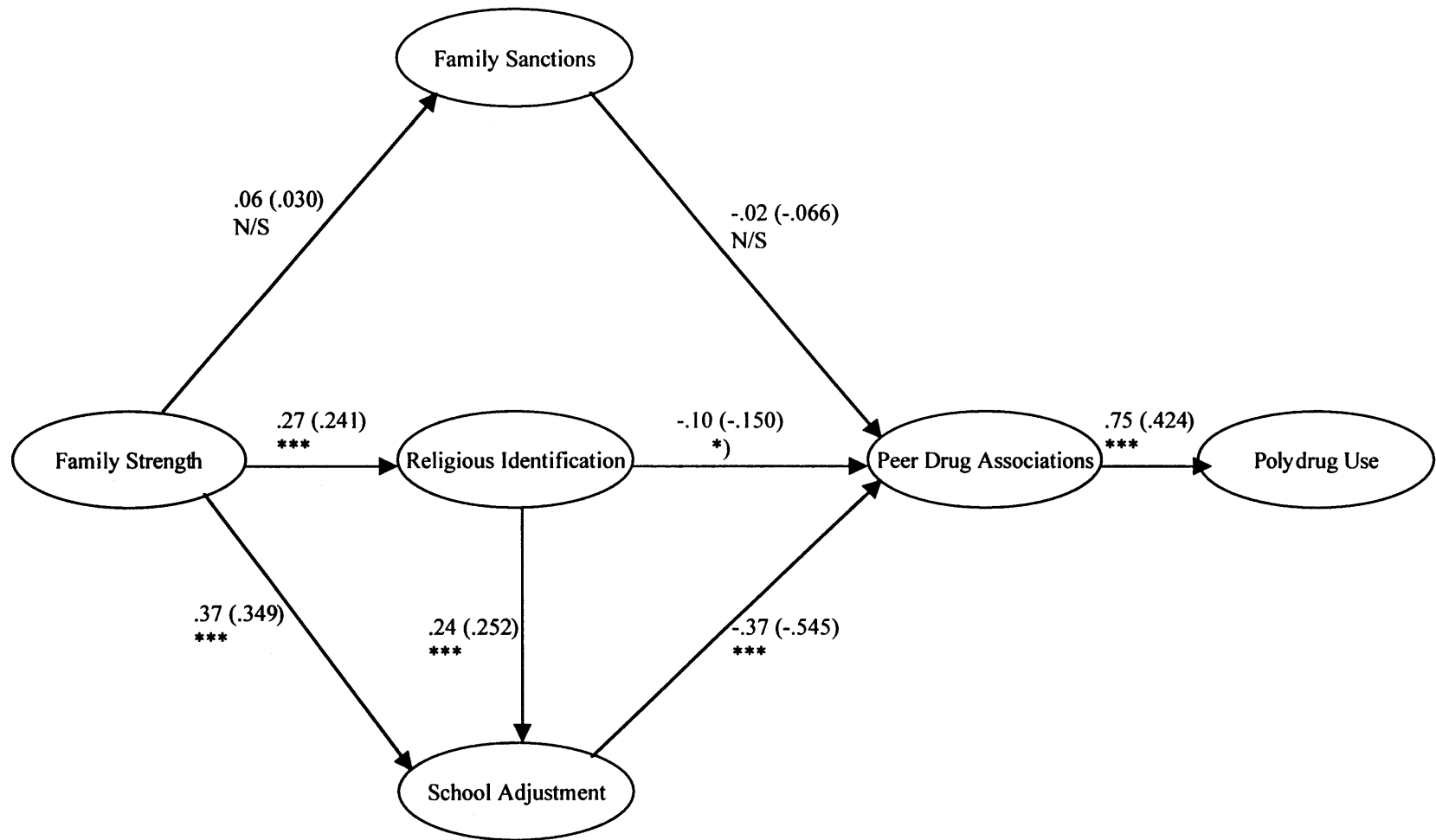


Figure 3: Basic Structural Model for Females, 7-9th Grade

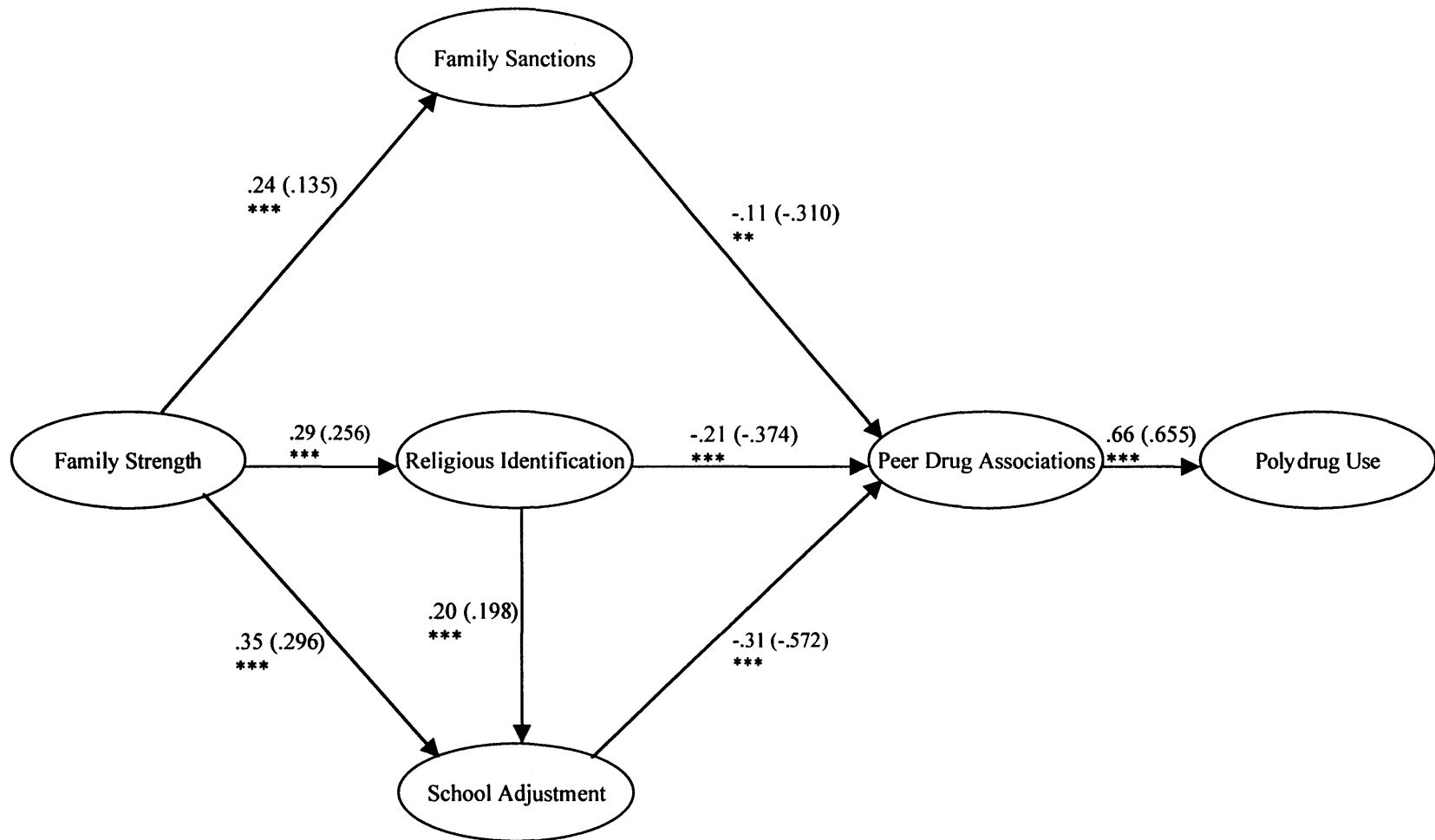


Figure 4: Basic Structural Model for Males, 10-12th Grade

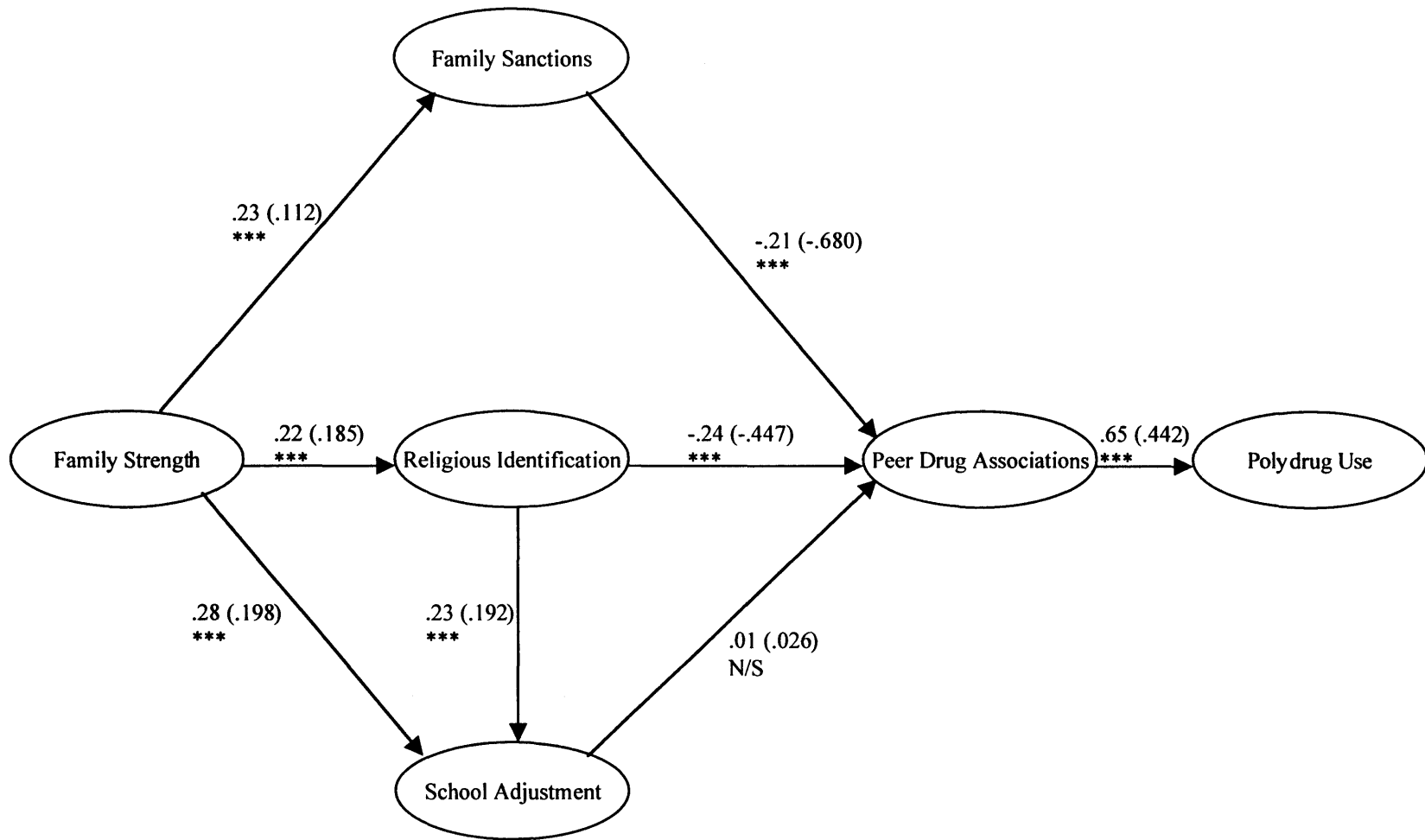


Figure 5: Basic Structural Model for Females, 10-12th Grade

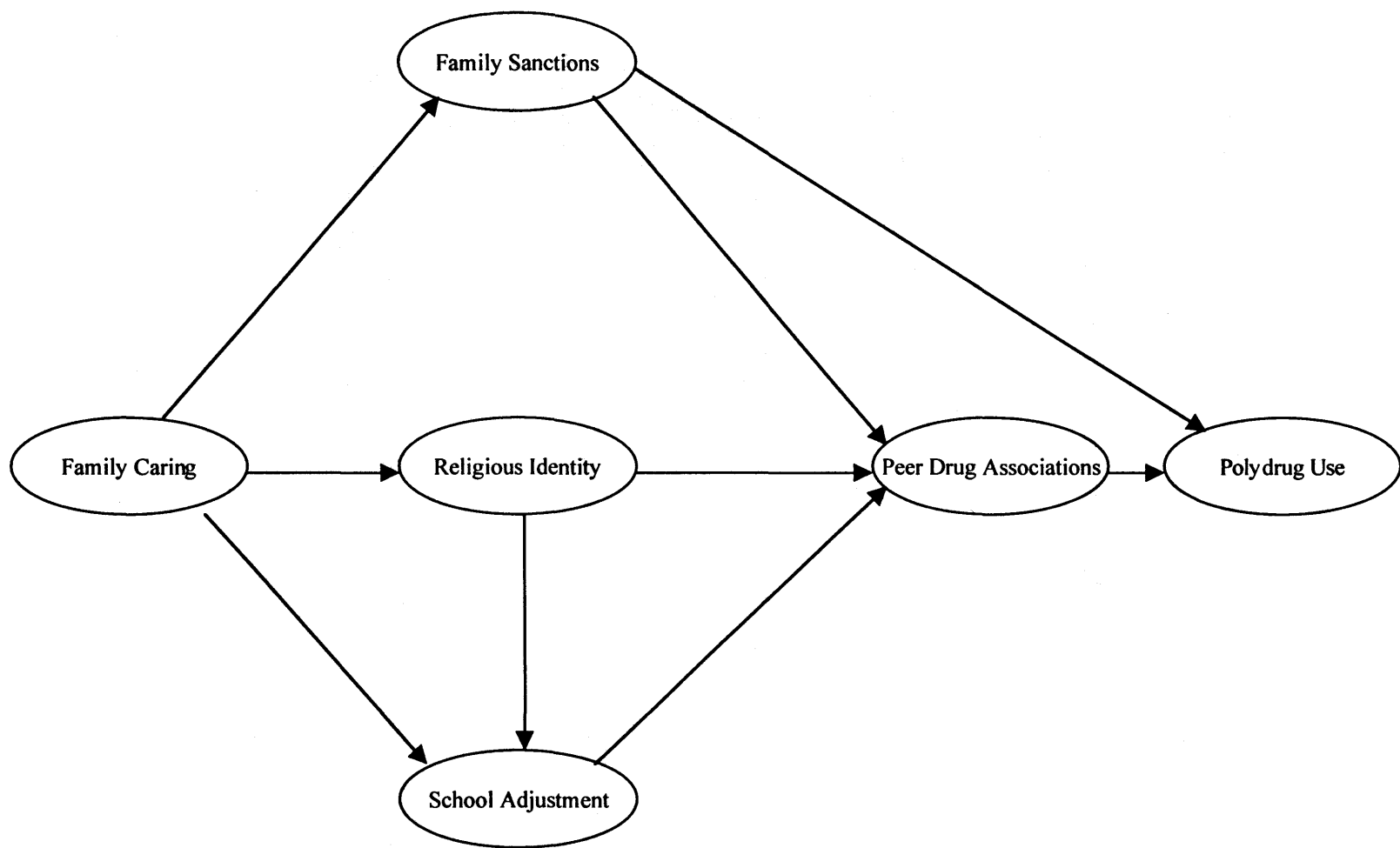


Figure 6: New Structural Model with Direct Path: Family Sanctions to Polydrug Use

APPENDIX

Socialization Questionnaire, 1988 Form (Form S):

These questions ask about school, family, friends and the town you live in. (Please answer every question)

- A lot Some Not Much Not at all
1. I like school.
2. My teachers like me.
3. I like my teachers.
4. School is fun.
5. Have you ever... Yes No
Failed a grade in school
Been kicked out of school
Been suspended from school
Skipped school
6. What adults live at home with you? (Mark all that live with you)
Mother Guardian
Father Other relatives
Stepmother Other relatives (not relatives)
Stepfather
- Very good Good Not too good Poor
7. Do you get good grades?
8. What kind of student are you?
9. Do your parents have good jobs?
- Always Most of the time Some of the time No
10. Do your parents make enough money to buy the things they want?
- I don't know 6 or less 7 8 9 10 11 12 1 2 3 4 5 or more College
11. What is the highest grade your mother finished?

I don't know 6 or less 7 8 9 10 11 12 1 2 3 4 5 or more College

12. What is the
highest grade
your father
finished?

13. Does your family care about you? A lot Some Not Much Not at all
14. How much do you care about your family?
15. Does your family care what you do?
16. Are you close to your family?

How much does your family care if you...

- A lot Some Not Much Not at all
17. Take a drink of alcohol?
18. Use marijuana?
19. Use drugs other than marijuana?
20. How much would your family try to stop you from using the following:

A lot Some Not Much Not at all

Marijuana
Cocaine
"Sniff" something like glue or gasoline
Uppers
Downers
Drinking a beer
Getting drunk

- A lot Some Not Much Not at all
21. Are you religious?
22. Do you take part in your religion?
23. How important is religion in your life?

24. What people have you used drugs with during the last few months? (You can check more than one answer in each row.)

	Did <u>Not Use</u>	Best Friend	Boyfriend/ Girlfriend	Close <u>Friends</u>	Other <u>People</u>	Used <u>Alone</u>
Marijuana						
Cocaine						
"Sniff" something like glue or gasoline						
Uppers						
Downers						
PCP						

25. These questions ask about where you live, the town or city you live in or live near.

	<u>A lot</u>	<u>Some</u>	<u>Not Much</u>	<u>No</u>
Do you like it here?				
Do you feel safe here?				
Do you want to stay here?				
Do your friends like it here?				
Does your family like it here?				

Subset of specific items administered from v.A5 of AMERICAN DRUG AND ALCOHOL SURVEY™ (ADAS™)

1. What grade are you in?
5 6 7 8 9 10 11 12 College
2. How old are you?
10 11 12 13 14 15 16 17 18 19 or older
3. Sex Male Female
4. Have you ever had alcohol to drink?
Yes No
5. Have you ever gotten drunk?
Yes No
6. How old were you the first time you got drunk?
Never gotten drunk 7 or younger 8 9 10 11 12 13 14 15 16 17 18 19 or older
7. How often in the past 12 months have you...
None 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times
Had alcohol to drink
Gotten drunk
8. How often in the past month have you...
None 1-2 times 3-9 times 10-19 times 20 or more times
Had alcohol to drink
Gotten drunk
10. How much would your friends try to stop you from getting drunk?
A lot Some Not much Not at all
11. How often have your friends asked you to get drunk?
A lot Some Not much Not at all
15. During the past 12 months , where have you used alcohol?
Never 1-2 times 3-9 times 10 or more times
At weekend parties

At night with friends
At school events
On the way to school
During school hours at school
During school hours away from school
Right after school
While driving around
At home

16. How many of your friends...

None One or two Some of them Most of them

Get drunk once in a while

Get drunk almost every weekend

17. Have you ever tried marijuana (pot, grass, hash, etc.)?

Yes No

19. How old were you the first time you tried marijuana?

Never used 7 or younger 8 9 10 11 12 13 14 15 16 17 18 19 or older

20. How often in the past 12 months have you used marijuana?

None 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

21. How often in the past month have you used marijuana?

None 1-2 times 3-9 times 10-19 times 20 or more times

22. In using marijuana are you a...

Non user Very light user Light user Moderate user Heavy user Very heavy user

23. Have you ever "sniffed" (or "huffed") glue, gas, sprays, or anything like that to get high?
(Do NOT include cocaine.)

Yes No

24. How old were you the first time you "sniffed" (or "huffed") glue, gas, sprays, or
anything like that to get high? (Do NOT include cocaine.)

Never used 7 or younger 8 9 10 11 12 13 14 15 16 17 18 19 or older

25. How often in the past 12 months have you "sniffed" (or "huffed") glue, gas, sprays, or
anything like that to get high? (Do NOT include cocaine.)

None 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

26. How often in the past month have you "sniffed" (or "huffed") glue, gas, sprays, or anything
like that to get high? (Do NOT include cocaine.)

None 1-2 times 3-9 times 10-19 times 20 or more times

28. Have you used any of the following drugs to get high or taken extra doses just to get
high?

Yes No

Tranquilizers

Downers (barbiturates, goofballs, reds, yellows, etc.)

29. Have you used any of the following drugs just to get high or taken an extra dose just to get high during the past 12 months?

No 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

Tranquilizers

Downers

30. Have you used any of the following drugs just to get high or taken an extra dose just to get high during the last month?

No 1-2 times 3-9 times 10-19 times 20 or more times

Tranquilizers

Downers

31. In some states you can buy stimulants and pep pills legally (fake pep pills, imitation speed, look-alikes). Have you tried any legal stimulants?

Yes No

32. Have you use any legal stimulants in the last 12 months?

No 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

33. Have you ever tried...

Yes No

Stay-awake pills (No Doz, etc.)

Diet pills

34. During the past 12 months have you used...

No 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

Stay-awake pills

Diet pills

35. Have you ever used a narcotic other than Heroin to get high (Codeine, Demerol, Methadone, Talwin, Opium, Morphine)?

Yes No

36. Have you ever used steroids to try to increase your strength or improve how your body looks?

Yes No

37. During the past 12 months, how many times have you used steroids?

None 1-2 times 3-9 times 10-19 times 20-49 times 50 or more times

38. Have you ever tried any of the following drugs?

Yes No

Amphetamines

(uppers, bennies, speed, etc. Do NOT include legal stimulants)

Cocaine

Crack
"Sniff" something like glue or gasoline
Amyl or butyl nitrites (poppers, snappers, "rush", etc.)
LSD (acid)
Other psychedelic (mescaline, peyote, mushrooms, etc.)
"Ecstasy" ("XTC", MDMA)
Drugs like MDA, MDPT, etc.
PCP
Heroin
Adrenochromes (spinners, Eddies)
Quaaludes (ludes, soapers, quacks)
Methamphetamines (Crystal meth, ice, etc.)

39. Have you used any of these drugs to get high during the last 12 months?

No 1-2 times 3-9 times 10-19 times 20 or more times

Uppers
Cocaine
Crack
"Sniff" something like
glue or gasoline
Amyl or butyl nitrites
LSD (acid)
Other psychedelic
PCP
Heroin
Narcotics other than heroin
Adrenochromes (Eddies)
Methamphetamines
(Crystal meth, ice, etc.)

40. Have you used any of these drugs to get high during the last month?

No 1-2 times 3-9 times 10-19 times 20 or more times

Uppers
Cocaine
Crack
"Sniff" something like
glue or gasoline
Amyl or butyl nitrites
LSD (acid)
Other psychedelic
PCP
Heroin
Narcotics other than heroin
Adrenochromes (Eddies)
Methamphetamines
(Crystal meth, ice, etc.)

41. Have you ever used...

Yes No

Cigarettes

Smokeless tobacco (chewing tobacco, snuff, etc.)

42. Do you smoke cigarettes?

Not at all Once in a while 1-5 times a day Half a pack a day A pack or more a day

43. Do you use smokeless tobacco?

Not at all Once in a while 1-5 times a day 6-10 times a day Almost all the time

44. During the last 12 months, where have you used marijuana or any other illegal drug (except alcohol)?

Never 1-2 times 3-9 times 10 or more times

At weekend parties

At night with friends

At school events

On the way to school

During school hours at school

During school hours away from school

Right after school

While driving around

At home

45. In using each of the following, are you a...

Non user Very light user Light user Moderate user Heavy user Very heavy user

Uppers

Cocaine

Crack

"Sniff" something

like glue or gasoline

Amyl or butyl nitrites

LSD (acid)

Other psychedelics

Downers

PCP

Heroin

Steroids

Cigarettes

Smokeless tobacco

46. Have you ever...

Yes No

Gotten drunk when alone?

Used marijuana when alone?
 Used another drug when alone?
 Used a needle to take cocaine?
 Used a needle to take uppers?
 Used a needle to take heroin?
 Used a needle to take any other drug?
 Shared a needle?
 Used a needle to take steroids?
 Used a needle to take methamphetamines?
 Smoked methamphetamines?

47. How easy do you think it would be for you to get each of the following types of drugs if you wanted some?

	Very easy	Fairly easy	Hard	Very hard	Probably impossible
Alcohol					
Marijuana					
Uppers					
Cocaine					
"Sniff" glue or gas, etc.					
LSD (acid)					
Other psychedelic					
Downers					
PCP					
Heroin					
Other narcotic					
Tranquilizers					
Cigarettes					

48. How much would your friends try to stop you from using the following drugs?

	A lot	Some	Not much	Not at all
Marijuana				
Cocaine				
"Sniff" glue or gas, etc.				
Uppers				
Downers				
LSD (acid) or other psychedelics				
PCP				

49. How many of your friends use each of the following drugs?

	None	A few	Most of them	All of them
Marijuana				

Cocaine
"Sniff" glue or gas, etc.
Uppers
Downers
PCP

50. How often have your friends asked you to use...
Very often Some Not very often Not at all

Marijuana
Cocaine
"Sniff" glue or gas, etc.
Uppers
Downers
LSD or other psychedelics
PCP

51. Have you ever done any of the following things?
Yes No

Used free-base cocaine
Used coca paste
Stayed high more than 7 hours
Took a "designer" drug
Used nitrous oxide to get high
Used alcohol and marijuana together
Used alcohol and another drug together
Took 2 drugs at the same time
Used cocaine or crack and heroin together

55. When I answered the questions about alcohol...
I was very honest
I said I used them more than I really do
I said I used them less than I really do

56. When I answered the questions about drugs...
I was very honest
I said I used them more than I really do
I said I used them less than I really do

57. Which of the statements below best describes your drug use? (Do NOT count alcohol use for this question.) I have...
never used drugs and never will
never used drugs, but may in the future
used drugs, but don't plan to use them again

used drugs, and probably will use them again