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Interpersonal and intrapersonal variables predicting early adolescent substance use: A risk factor model

Vázsonyi, Alexander Thomas, M.S.

The University of Arizona, 1993
INTERPERSONAL AND INTRAPERSONAL VARIABLES PREDICTING EARLY ADOLESCENT SUBSTANCE USE: A RISK FACTOR MODEL

by

Alexander Thomas Vázsonyi

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APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Daniel J. Flannery
Assistant Professor of Family Studies and Psychology
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DEDICATION

To my parents, Kris, Gab, Timea, Nana, and Opa — and in memory of Hedwig and Miklos Vázsonyi. Without your love and direction over the years, I wouldn’t have been able to complete this. There is one Roman proverb that will forever be part of my life: "Non scholae, sed vitae discimus!"
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ABSTRACT

This study examined early adolescent risk for substance use in a sample of 1,170 sixth and seventh graders. Risk was assessed by inspecting the predictive strength of thirteen continuous variables from the interpersonal (peer pressure, peer substance use, parental monitoring, parent-child involvement, academic achievement, and school adjustment) and intrapersonal (self efficacy, impulsivity, withdrawal, depression, somatization, delinquency, and aggression) domains. Consistent with expectations, mean levels of substance use did not differ by gender or ethnicity (Caucasians and Hispanics). In addition, model-free LISREL analyses revealed underlying process similarity of predictors between sixth and seventh graders and between Caucasians and Hispanics. Interpersonal variables accounted for significantly more variance in early adolescent lifetime substance use than intrapersonal variables (39% versus 25%). Finally, weighting continuous independent predictors did not meaningfully improve prediction of lifetime substance use. The importance of process similarity and the significance of the peer domain in early adolescent substance use are discussed.
INTRODUCTION

Despite concerted efforts to control the problem, substance use remains prevalent among teenagers. The National Institute on Drug Abuse estimated that approximately 25% of teenagers sampled between the ages of 12 and 17 have used illicit drugs at some point in their lifetime (NIDA, 1989). Similarly, figures for licit substances, such as alcohol and tobacco, were estimated at about 50% for alcohol and 42% for cigarettes. By the age of 13, approximately 30% of boys and 22% of girls are drinkers (Zucker & Harford, 1983). These substances are more readily available, socially acceptable, and cost less.

Recent longitudinal analyses examining national trends show that lifetime prevalence of substance use among younger groups and current prevalence for all ages have declined since 1979. Illicit drug use, for example, such as marijuana, inhalants, cocaine, hallucinogens, and heroin, occurred in 12.1% of the population age 12 and over in 1985 (over 23 million) but declined to 7.3% in 1988 (14.5 million; DHHS, 1991). Despite such encouraging findings, these numbers clearly speak to the epidemic magnitude of substance use in the United States and to the necessity of determining its etiology.

Both substance abuse prevention programs as well as ongoing etiological research about underlying mechanisms
continue to direct efforts at understanding this behavior and limiting its occurrence. Research efforts are directed not only at assessing the magnitude of the problem but also at determining which variables define, explain, and predict the behavior patterns of substance users. This goal has important social implications since, for example, polydrug abuse significantly increases adverse health consequences.

Hospital reports to DAWN (Drug Abuse Warning Network) about Emergency Room visits and treatments related to substance use show that cocaine related admissions increased five-fold between 1984 and 1988 (DHHS, 1991). Polydrug abuse is also responsible for most drug-related deaths. In 1988, 49% of deaths reported to DAWN involved cocaine use and 31% involved heroin use.

Studies on the developmental process of adolescent drug use have shown that individuals who smoke and consume alcohol at a young age are more likely to progress to use hard drugs within a fairly short time period. For example, Kandel (1975) found that 27% of high school students who used licit drugs progressed to using marijuana in 5 to 6 months. Similarly, after having followed seventh graders for four years, Ellickson, Hays, and Bell (1992) suggest that for most adolescents, involvement with legal drugs constitutes an important step in the transition to hard drug use. They concluded that prevention efforts must be aimed
at stopping regular use of alcohol and tobacco at
initiation. Others have argued for greater fluidity in the
process and that use is not always a progressive occurrence,
because some youthful users become increasingly involved
while others discontinue use (Coombs, Fawzy, & Gerber,
1986). The overwhelming weight of evidence suggests,
however, that our efforts need to be directed at delaying or
preventing initiation of the "gateway drugs", i.e. alcohol,
cigarettes, and marijuana, at a very early age.

Despite the fact that intervention efforts have
dramatically increased over the past decade, efforts at
controlling the use of licit and illicit substances have
been varied, and therefore differentially successful. This
is partly due to diverse strategies that have assessed
different sets of variables predicting substance use. It is
also the result of competing research traditions which have
not integrated their findings. Almost 20 years ago,
Sadava's (1975) review concluded that most investigations of
substance use lacked an integrated approach. The majority
of studies he reviewed investigated single variables in
isolation, void of any consistent conceptual framework. He
concluded that "an adequate understanding of the phenomena
can develop only from the simultaneous investigation of
sociocultural and personality factors within a field-
theoretical framework" (p. 41). Although there have been an
increasing number of integrative studies, many approaches remain focused on a limited set of variables based on a specific theory to predict substance use (e.g., Coombs, Paulson, & Richardson, 1991).

The approach of classifying children who are at-risk by identifying protective factors that help a child overcome adversity can also be applied to substance use research (Brown, Clasen, & Eicher, 1986; Steinberg, 1986, 1987a). In order to arrive at a more complete formulation of a developmental-process framework or model, cross-sectional analyses must first identify which variables place children at-risk to use substances and then determine who is at-risk for continued use and abuse. This process requires including both intrapersonal and interpersonal variables in a theoretical framework while simultaneously assessing their relative contributions to "substance use."

Research on competence and incompetence in children at-risk for behavioral disturbances and psychopathology has found that children who possessed protective factors, such as above-average IQ or strong social support were able to overcome adverse conditions (Garmezy & Masten, 1986; Garmezy, Masten, & Tellegen, 1984; Luthar, 1991; Masten, Garmezy, Tellegen, Pellegrini, Larkin, & Larsen, 1988). Despite disrupted family milieus or unusual life experiences, these children have been found to be resilient.
Although researchers have found a correlation between life stress and substance use (Shiffman & Wills, 1985), resilient children are able to cope more adequately with life stressors, and as a result, do not succumb to them by engaging in substance use.

This investigation seeks to examine the relationship of interpersonal and intrapersonal variables to variation in early adolescent substance use. Because the sample consists of 11 and 12 year old children, substance use was operationalized as the lifetime use of licit and illicit drugs. Research has shown that use may be more widespread among 12 year olds than many might imagine, and that such early use is indicative of later use as well as of progressive polydrug involvement (Gillmore, Hawkins, Catalano, Day, Moore, & Abbott, 1991; Kandel, 1975; Oetting & Beauvais, 1990; Sarvela & McClelland, 1983). Research has also shown that a number of different factors such as depression, aggression, sensation seeking behaviors, low self esteem, low academic achievement, and peer use are involved in increasing the likelihood of alcohol or other drug initiation (Bry, McKeon, & Pandina, 1982; Newcomb, Maddahian, & Bentler, 1986). Therefore, the present study seeks to identify specific groups of youth at-risk for substance use across age, gender, and ethnicity (Caucasians
and Hispanics) as predicted by a combination of risk factors from both the interpersonal and intrapersonal domains.

Theoretical Overview

Over the past 20 years, numerous factors have been implicated in adolescent drug use. Researchers have attempted to determine systematically which factor(s) place an individual at risk for substance use. Both cross-sectional and longitudinal self-report studies have yielded often "conflicting" and incongruent results. In the early 1970s, when there was widespread substance use across SES and ethnic groups, researchers put forth theories based on longitudinal studies that accounted for this phenomenon. Most of these studies were organized conceptually around social learning theory, such as Kandel’s developmental model (Kandel, 1975) or the problem behavior theory formulated by Jessor and Jessor (1977).

According to social learning theory two factors account for increased substance use in early adolescence: (1) modeling; and (2) reinforcement (Akers, 1977). Peers influence the behaviors of children by providing positive reinforcement for substance use behaviors. For example, an individual using drugs in a peer group that uses substances might experience greater acceptance from peers, resulting in improved self esteem. The argument is that peer approval helps shape an individual toward initiation as well as
maintenance of use. Akers (1977) found that improved self esteem via peer acceptance increased the likelihood of this process taking place.

Social learning theory also posits that substance use might act as a negative reinforcer. Simons, Conger, and Whitbeck (1988) suggest that individuals may engage in drug use as a result of emotional distress and an inability to cope with stressors. Once using drugs, an individual might experience a reduction in feelings of tension, anxiety or depression. Drug use becomes a process of self-medication in an attempt to control emotions brought on by stress.

Self-efficacy has also been implicated in the development of drug use behaviors (Bandura, 1982). Individuals who have deficient coping skills and low self esteem are likely to experience feelings of helplessness and inefficacy when rejected. Self efficacy is an individual's perception or judgement about his or her competence to affect the environment in a particular situation (Bandura, 1982). Self doubt and a low sense of mastery of the environment influence both thought patterns and behaviors. Consequently, inefficacy would contribute to increased vulnerability and susceptibility to peer pressure, which in turn might result in a greater likelihood of engaging in drug use. A greater sense of mastery, on the other hand, would enable an individual to cope more effectively with
his/her environment, which would reduce susceptibility to peer or family pressures.

Empirical analyses of the social learning model as a framework explaining the etiology of substance use have generated modest findings. Akers, Krohn, Lanza-Kaduce, and Radosevich (1979) found that a saturated social learning model yielded an effect size of $R^2 = .32$ for alcohol use and .39 for marijuana use. They distinguished between an initiation path model and a maintenance path model, which essentially contained the same variables. Some variables, such as "imitation," remained in both models but accounted less for drug use behaviors (see Krohn, Skinner, Massey, & Akers, 1985). Although conceptually sound as an approach, social learning includes a limited number of explanatory variables. Critics have maintained that a learning process by itself falls well short of accounting for widespread substance use (Sadava, 1975).

A related variable often associated with placing youth at risk is self esteem. Kaplan's explanatory framework, for example, deals with self derogation. He has found that self derogation, a low sense of self esteem, was predictive of substance use initiation primarily by increasing an individual's overall disposition toward deviance (Kaplan, 1975). Kaplan's study examined 22 deviant acts including licit and illicit substance use. He concluded that
increases in antecedent attitudes of self-rejection consistently preceded deviant acts. In addition, mean levels of substance use were also significantly different prior to engaging in deviant acts. In contrast, a more recent study on 6th, 7th, and 8th grade rural adolescents concluded that self esteem was not related to alcohol use (Bloch, Crockett, & Vicary, 1991).

Deviance itself has often been linked to substance use, most prominently by Hirshi's (1969) social control theory, but also by Jessor and Jessor's (1977) problem behavior theory. While Hirshi suggested that deviance was the result of weak ties to social institutions, such as the family and school, the Jessors theorized that diverse problem behaviors, including substance use, are manifestations of a single underlying "behavioral syndrome." This syndrome includes anything that "is socially defined as a problem, a source of concern, or as undesirable by the norms of conventional society" (Jessor & Jessor, 1977, p.33). This includes delinquency, precocious sexual intercourse, problem drinking, and illicit drug use.

The Jessors' model was based primarily on findings from two parallel longitudinal studies of junior high and college students. Perhaps one of the most comprehensive conceptual formulations of deviant behavior to include substance use, their model consisted of 1) antecedent variables, including
demographics and socialization (parental ideology);  
2) social-psychological variables, such as the personality system and the perceived environmental system; and 3) social behavioral variables, such as school involvement or church attendance (Jessor & Jessor, 1977). This model exhaustively includes all possible sources that might contribute to delinquency and alcohol use. Also, while conceptually satisfying, this approach does not identify variables that specifically predict substance use. As in Kaplan's research, drug use is conceptualized simply as a sub-domain of deviance. The approach has also been criticized for being derived from non-representative samples and for being an artifact of the 1960s and early-70s.

Recent secondary analyses by Donovan and Jessor (1985), however, have found that a single factor or behavioral syndrome does underlie problem behaviors. Even when applied to a large representative sample, the 1978 National Study of Adolescent drinking, the deviance-theory is confirmed. While the model shows a structural relationship among the problem behaviors, it does not clearly identify factors that place youth at risk for substance use. An even more recent analysis of Jessor & Jessor's problem behavior theory did not support the single factor premise (Gillmore, Hawkins, Catalano, Day, Moore, & Abbott, 1991). In fact, in a sample of early adolescents, this group found that while factors
were correlated, multiple factor structures underlying problem behavior existed. The best factor solution for boys and girls at this age consisted of three distinct structures or factors: 1) school problem behaviors; 2) delinquent behaviors; and 3) substance use. Similarly, on their adolescent sample of adjacent sibling pairs, Rowe, Flannery, and Gulley (1993) found that delinquency predictors were not single factored.

Another approach perhaps more clearly and directly addressing the etiology of substance use is the research program led by Kandel. Her research, which also took place primarily in the early 1970s, focused on process or the sequential progression of adolescent drug use. From her studies, Kandel identified four distinct stages which spanned initiation to "hard drug use." She argued that an analysis of distinct stages in isolation was necessary, since subsequent stages contained a progressively smaller number of adolescents (Kandel, 1975). This way, a more complete understanding of the process could be developed. Her research does not, however, attempt to identify underlying factors contributing to this process (see Kandel, Davies, Karus, & Yamaguchi, 1986). A composite of variables that can reliably predict substance use onset and/or substance use progression remains to be defined. Once these
factors have been identified, longitudinal process models differentiating each step can be tested.

Clearly, the models and theoretical frameworks presented thus far do not present a unitary explanation for adolescent substance use. On the contrary, they all seem to explain a small piece of the pie, thereby ultimately contributing to the whole. Some of the variables studied recently that are associated with adolescent substance use are income and availability (Maddahian, Newcomb, & Bentler, 1986); ethnicity (Bettes, Dusenbury, Kerner, James-Ortiz & Botvin, 1990; Moncher, Holden, & Trimble, 1990; Oetting & Beauvais, 1990); geographical location (Oetting & Beauvais, 1990); psychological distress (Cockerham, Kunz, & Lueschen, 1989; Hansell & Raskin-White, 1991); aggression-submission (Pulkkinen, 1983); depression (Simons et al., 1988); personality structure and family environment (Block & Block, 1988); peer modeling (Huba, Wingard, & Bentler, 1979; Newcomb & Bentler, 1985; Sarvela & McClendon, 1983); parental models (Pulkkinen, 1983); parent-child relationships (Brook, Brook, Gordon, Whitman, & Cohen, 1990; Johnson, 1987; Kafka & London, 1991); family characteristics and social stress (Rhodes & Jason, 1990); and school performance and academic aspirations (Paulson, Coombs, & Richardson, 1990). This enumeration is far from complete; nevertheless, it gives us some insight into the variety of
approaches taken and the multitude of variables that have been shown to be related to the development and maintenance of drug use.

Interpersonal and Intrapsychological Risk Variables

The overwhelming evidence suggests that youthful substance use cannot be conceptualized as a phenomenon derived from a single causal framework, but rather as one that is multifaceted. Nevertheless, the Jessors' conceptual framework seems the most comprehensive attempt at formulating a coherent and testable theory. This is in part due to its inclusion of both interpersonal and intrapsychological variables. However, substance use is only one part of the underlying problem behavior factor which, as discussed before, limits the theory's utility. Furthermore, as Gillmore et al. (1991) found in their recent replication study on a sample of 11 and 12 year old children, there may be multiple factors underlying early adolescent drug use etiology.

At this time, there is no other theoretical framework that transcends specific variable domains to adequately account for drug use. For this reason, this study seeks to examine drug use etiology as predicted by risk scores composed of both interpersonal and intrapsychological variables. Besides composite models, it further seeks to examine the
relative contributions of variables from each domain to predicting early adolescent substance use.

Risk factor models hypothesize that drug use cannot be adequately accounted for by individual theoretical frameworks, such as addiction theory or social learning theory. Instead, substance use is the result of exposure to a multitude of risk factors which, as recent research indicates, can account for as much as 50% of the variance in adolescent use (Newcomb et al., 1986). One of the first studies using a risk factor approach to study substance abuse was conducted by Bry, McKeon, and Pandina (1982). They sampled about 2000 high school students from a working-class county in New Jersey. Included in their assessment were sociodemographic variables, psychiatric symptoms, self esteem, parent-child relationships, and drug use. Results indicated that drug use was a function of the number of risk factors examined; findings were similar to those for medical research on heart disease or psychiatric illness. These researchers concluded that the number of etiological risk factors better predicted substance use behaviors than best-fit designs employing a limited number of salient variables.

Over the past decade, numerous researchers have emulated the work of Bry et al. (1982) and have explored the effectiveness of explaining drug use by composite etiological risk factor scores (see Bloch et al., 1991;
Brook, Whitman, Gordon, Nomura, & Brook, 1986; Dembo, Blount, Schmeidler, & Burgos, 1985; Johnson, Pentz, Weber, Dwyer, Baer, MacKinnon, Hansen, & Flayet, 1990; Needle, Su, & Lavee, 1989; Newcomb et al., 1986; Newcomb, Maddahian, Skager, & Bentler, 1987). For example, as part of a five year longitudinal investigation on high school students in Los Angeles County, Newcomb et al. (1986) explored the predictive power of ten risk factors for later substance use. Their findings can be summarized in two important ways: (1) the number of risk factors showed a consistent linear association with lifetime use, frequency of use and heavy use; and (2) in comparing scores from year 4 and year 5 of their study, they found that this composite index predicted use one year later even after controlling for earlier use. The ten risk factor variables included in their index were: academic achievement, religiosity, early alcohol use, self esteem, depression, parent-child relationship, deviance, sensation seeking, peer drug use, and adult drug use (Newcomb et al., 1986).

In a similar study, Bloch et al. (1991) found that a year 1 risk index predicted alcohol use three years later. They used a six item risk index on a rural sample of 7th, 8th, and 9th graders. Like Newcomb et al. (1986), they found no gender differences for the predictors. Brook et al. (1986) also examined alcohol use using similar variables
although their study did not form a risk index but compared variables and their effects on drug initiation from the three domains of family, peers, and personality. Their findings indicated that variables from all three domains independently predicted alcohol use and contributed to initiation, although some functioned as buffers to offset high-risk variables. For example, maternal non-use might buffer the child from the effects of peer use or personality characteristics might increase the effects of peer use, thereby making initiation more likely. Important here is the finding that etiologically, each of the three domains can directly lead to initiation and continued use of alcohol (see also Brook et al., 1990).

Predictor Variables

The variables selected for this study have been consistently shown to be important in predicting drug use for adolescents. Although not all variables previously examined were included, the study contains a representative set of variables from both the interpersonal and intrapersonal domains.

From the intrapersonal domain, seven variables have been selected to predict substance use: impulsivity, aggression, delinquency, depression, withdrawal, somatization, and self efficacy. Impulsivity, or sensation seeking, is a variable that has been demonstrated to place
youth at-risk. Friedman, Bransfield, Tomko, and Katz (1991) found that in combination with a poor family environment, impulsiveness placed individuals at-risk for later substance use. Others have suggested that the degree of impulsivity was associated with the degree of drug use severity (see Tarter, Laird, Kabene, Bukstein, & Kaminer, 1990). Newcomb et al. (1986) also identified sensation seeking behaviors as predictive of substance use.

A similar yet distinct personality dimension is aggressiveness. The Chicago Woodlawn study found, for example, that for a poor urban black population aggressiveness and shyness at ages 6 and 7 predicted substance use at ages 16 and 17 (Kellam, Brown, & Fleming, 1982). A further personality dimension that has been shown to predict substance use is delinquency (Jessor & Jessor, 1977; Newcomb et al., 1986; Orive & Gerard, 1980). Pulkkinen (1983) examined the rate of smoking and drinking of 14 and 20 year old criminal offenders and concluded that offenders consistently smoked and drank more than non-offenders. Ralph and Morgan (1991) found that chemically dependent adolescent males scored significantly higher than normative samples on all problem behavior scales of the Child Behavior Checklist (CBCL), with the highest scores on the delinquency subscale.
For a number of years now, research has shown that drug users consistently exhibit a greater number of psychiatric symptoms than controls (Gilbert & Lombardi, 1967). In addition to impulsivity, aggression, and delinquency, this study will also include depression, withdrawal, and somatization as predictors of substance use. Although studies have shown that some of these personality dimensions have little impact on drug use (see Ralph & Morgan, 1991), others have demonstrated the opposite effect. Examining adolescents in treatment, Pandina and Schuele (1980) linked depressive symptomology to very high substance use rates. They found that a generally heightened level of psychological distress, which manifested itself in these symptoms, paralleled progressive substance use. Thorlindsson and Vilhjalmsson (1991) also found that withdrawal and depression significantly predicted use. Furthermore, Mercer, Hundleby, and Carpenter (1978) found that, particularly for females, internalizing behaviors positively predicted the use of marijuana. Newcomb et al. (1986) found that depression or severe psychological distress predicted substance use in early adolescence.

Finally, self efficacy and a strong self concept have been demonstrated to be instrumental in the formation and maintenance of peer acceptance and social relationships (Ladd, 1981). A child’s ability to influence a peer’s
behaviors and feelings is an integral part of social competence. Social competence, in turn, is a pre-requisite for children to be able to develop a sense of identity and to form meaningful relationships. Failure to do so influences an individual's sense of mastery which ultimately predisposes a child to be more susceptible to peer pressure and to engage in peer conforming behaviors, such as substance use.

Six variables have been selected from the interpersonal domain for this study: susceptibility to peer pressure, peer substance use, parent-child involvement, parental monitoring, academic performance, and school adjustment. Evidence suggests that users associate with individuals who use the same substances (Huba et al., 1979). This means that substance use does not occur in isolation, but as part of the socialization process among peers. Clasen and Brown (1985) examined peer pressure and concluded that it was highest in the area of peer involvement activities as compared to family or school domains. Although the authors caution that peer pressure can have positive as well as negative effects, they suggest that even moderate pressures toward drug use or delinquency may have a profound impact on the adolescent's well-being.

Similarly, Brown, Clasen, and Eicher (1986) found that perceived peer pressure and peer conformity disposition (the
willingness to conform to peers) both independently predicted peer conforming behaviors in 6th-8th and 9th-12th graders (see also Gorsuch & Butler, 1976; Jessor & Jessor, 1977; Newcomb et al., 1986). This is important, since it links both an internal variable, peer conformity disposition (perhaps partially determined by self-efficacy) to an external variable, the influence of the peer group. Interestingly enough, Brown et al. (1986) did not find consistent developmental trends in peer conformity dispositions across grades (cf. Steinberg, 1987b; Berndt, 1979). This suggests that children are vulnerable at any time in their development. Besides a sense of self efficacy, other intrapersonal variables undoubtedly influence peer relations and behavioral conformity.

Involvement with antisocial peers, in particular, has been indicative of adjustment problems such as substance use. Dishion, Patterson, Stoolmiller, and Skinner (1991) found that parental monitoring and discipline practices as well as academic failure significantly predicted early adolescent involvement with antisocial peers at the age of 12 (for academic failure, see also Smith & Fogg, 1979). Specifically, they found that parenting practices and general family context, such as number of children and parental occupations, each accounted for unique variance in antisocial behavior. Inconsistent parental disciplinary
practices have also been shown to be predictive of drug use among adolescents (Hirshi, 1969; Patterson & Dishion, 1985). A child that is not adequately monitored by his/her parents is more likely to belong to a deviant peer group, thereby being exposed to substance use. For the early adolescent, poor parental monitoring would increase the likelihood of drug initiation.

Parent-child relationship variables have also been examined to determine their effect on drug use. Grichting and Barber (1988) concluded that the affective quality of the parent-child relationship directly affected drug and alcohol consumption. Similarly, Needle, Lavee, Su, Brown, and Doherty (1988) found that drug using adolescents reported lower-quality parent-child relationships than non-using adolescents. Steinberg (1987b) adds to this by suggesting that children enjoying affectively positive relationships with their parents are easier to socialize and also less likely to engage in delinquent acts, such as substance use. Finally, Gorsuch and Butler (1976) found that a poor parent-child relationship together with a lack of positive peer relationships predispose adolescents to initiate illicit drug use.

The following four hypotheses will be examined:

(1) lifetime substance use will be best predicted by a composite of intrapersonal and interpersonal variables.
Since research has shown that both the sociocultural and personality variables are associated with substance use, simultaneously investigating a representative number of variables from both the intrapersonal and the interpersonal domains reduces the likelihood of including only a limited number of predictors at the expense of excluding others.

(2) In the interpersonal domain, susceptibility to peer pressure and peer substance use will best predict early adolescent use. Consistent with social learning theory, research on interpersonal variables has shown that peer use in particular was the most reliable predictor of substance use (Coombs, Paulson, & Richardson, 1991; Dishion, Patterson, Stoolmiller, & Skinner, 1991). Although the quality of the parent-child relationship may serve as a buffer to peer influence, a high susceptibility to peer pressure and reported peer drug use will strongly predict early adolescent substance use. Some researchers have found other intrapersonal variables to be most predictive (e.g. somatization; Thorlindsson & Vilhjalmsson, 1991), consistent with Jessors' problem behavior theory and with recent research (e.g. Brook, Whitman, Gordon, Nomura, & Brook, 1986), reported delinquent behaviors will most consistently predict use from the intrapersonal domain.

(3) Significant differences in total lifetime, lifetime licit, and lifetime illicit substance use will exist across
gender and grade level, while no differences will exist across ethnicity. In general, males will report higher levels of substance use. Steinberg (1987b) found that during early adolescence, permissive parenting practices have greater behavioral consequences for males than females. Studies have shown that males are more socially irresponsible and have less impulse control than females during this age period. Early adolescents in grade 7 will report higher levels of substance use than adolescents in grade 6. This is in part due to consistent developmental trends in peer orientation that have been established by a number of researchers (Berndt, 1979; Brown, Clasen, & Eicher, 1986; Steinberg, 1986, 1987a, 1987b). During seventh grade, early adolescents are particularly susceptible to peer pressure due to the increased importance of the peer group and the decreased importance of parental influences.

Finally, Caucasian and Hispanic adolescents will report similar levels of substance use. While some studies have found mean level differences in reported substance use among other ethnic groups (i.e., Blacks or Asians; e.g., Maddahian, Newcomb, & Bentler, 1985), most studies specifically examining Hispanics and Caucasians concluded that they were very similar. For example, Gilbert and Alcocer (1988) found that the overall patterns of substance
use between Caucasians and Hispanics are very similar (see also Coombs, Richardson, & Paulson, 1991; Flannery, Vazsonyi, Torquati, & Fridrich, in press).

(4) Adding weighted independent predictors of drug use will better predict early adolescent substance use than employing an unweighted sum of predictor variables. The risk factor approach as commonly used in medical research includes variables that transcend specific variable domains; consequently, it is necessary to demonstrate that not only the number of variables predicts substance use, but in effect, the "quantity" of risk contributed by each variable independently. Variables differentially place youth at-risk not only by their number, but also by their relative strength of association with an outcome. Risk factor models traditionally include variables from multiple domains, because they all have been shown to predict substance use, but rarely in combination. The underlying assumption of such a continuous approach is that each variable contributes to an outcome in an equally additive way. Furthermore, applying differential weighting tests whether this assumption is true or not, and if substance use for at-risk adolescents can be better predicted. Finally, weighting contest variables retains the quantitative information provided by each predictor. This in turn will enhance our understanding of which variables, independently or in
combination, are the best predictors of substance use in early adolescence.

This analysis will both determine the utility of a multidimensional risk factor approach and provide a direct comparison to the weighting scheme employed by Newcomb's group. Newcomb et al. (1986) used a dichotomous weighting scheme of their predictors, in applicable cases based on theoretical grounds and otherwise based on mathematical considerations. They assigned individuals to at-risk groups based on scores above a certain cut-off on each variable. Summing at-risk "status" on each variable, they found that this procedure revealed a linear relationship between number of risk factors and percentage of adolescents reporting substance use. By dichotomizing the predictor variables, this scheme did not use the full information provided by essentially continuous variables. Also, it primarily examined the relationship of substance use and number of risk variables for "high scorers." For example, in the proposed weighting scheme, an individual that is at-risk based on grades, high aggression and high delinquency scores will not receive the same composite risk score as an individual at-risk based on high depression, high withdrawal and high somatization scores. In the weighting procedure used by Newcomb's group, both individuals would receive a risk score of 3 based on the number of predictors. In the
scheme being employed in this study, the final risk score and the number of predictors might be very different based on the differential predictive capacity of each variable.
METHOD

Sample and Procedure

A cross sectional research design tested the effectiveness of a multidimensional risk factor approach to drug use in early adolescence. A representative number of interpersonal and intrapersonal variables were included. Self report data were collected during a three-month period, from March to May 1992, on a sample of 1,170 early adolescents in three different middle schools. These children were all part of the Amphitheater School district in Tucson, Arizona.

Children in grades 6 and 7 (mean age 12.7 years) were asked to participate. The original purpose of the survey was to evaluate the relative effectiveness of the substance abuse prevention program "Project Pride" and to determine the extent of early adolescent substance use. Based on information provided by the district, families in the three middle schools were representative of a wide range of socio-economic classes. A passive consent procedure was used in this study. Teachers sent home a consent form with the child at the beginning of the semester allowing a parent to indicate whether his/her child was permitted to take part in the study. Parents were asked to indicate if they did not want their child to participate. If no form was returned by the parents, the child was eligible to participate in the
survey. Of the original available number of 1,437 students, 67 students (4.7%) did not participate due to parental concerns, and 134 students were absent during data collection (9.3%). This represents a participation rate of approximately 86%. An additional 66 surveys (4.6%) were not usable due to incomplete or missing data, defined as a completion rate below 50% of all items. This resulted in a final sample size of 1,170 students, an effective response rate of 81.4%.

The final sample was about equally divided between males and females and 6th and 7th graders. The mean age of the adolescents was 12.7 years (sd = .67) at the time of data collection. The sample was ethnically diverse. Five ethnic groups were identified, although the sample was predominantly Caucasian (63.6%) and Hispanic (23.8%); therefore, analyses focused on Caucasian and Hispanic early adolescents only. About 28% of the sample reported that they lived in a single-parent home which included cases where a child lived with a parent and a grandparent or the boy/girlfriend of the parent. Table 1 provides a breakdown of the sample by grade, gender, age, ethnicity, and family structure.

Students were surveyed in their class rooms during two 30 minute class periods on consecutive days. On the first day, a research assistant followed a protocol to provide
Table 1

**Demographic Characteristics**

<table>
<thead>
<tr>
<th>Demographics</th>
<th>6th</th>
<th>7th</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>575 (49.1%)</td>
<td>595 (50.9%)</td>
<td>1170 (100%)</td>
</tr>
<tr>
<td>Mean age</td>
<td>12.2</td>
<td>13.2</td>
<td>12.7</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>278</td>
<td>323</td>
<td>601 (51.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>291</td>
<td>271</td>
<td>562 (48.0%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>6</td>
<td>1</td>
<td>7 (0.6%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African Amer.</td>
<td>13</td>
<td>15</td>
<td>28 (2.4%)</td>
</tr>
<tr>
<td>Asian</td>
<td>16</td>
<td>15</td>
<td>31 (2.6%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>353</td>
<td>390</td>
<td>743 (63.7%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>137</td>
<td>141</td>
<td>278 (23.8%)</td>
</tr>
<tr>
<td>Native Amer.</td>
<td>32</td>
<td>20</td>
<td>52 (4.4%)</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>7</td>
<td>15 (1.3%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>14</td>
<td>7</td>
<td>21 (1.8%)</td>
</tr>
</tbody>
</table>
general information about the study and its purpose and provided specific instructions about how to complete the survey. Students were also informed that any information they provided would be kept strictly confidential.

At least one research assistant and one teacher was present in every classroom on each day of data collection to provide ongoing assistance and answer any questions students had. At the end of the first day, students were asked to place their survey in a closed envelope with their name written on it, and packets were collected by research team members. Surveys were not left at the schools overnight. On the next data collection day research staff returned the surveys to each student. In a few cases, when a student was absent or sick on the first day, the student was given the option of starting the survey the second day and then completing it in later class periods. On average, there were about 25 students per classroom completing the survey at one time.

Measures

All instruments described in the following sections are included in Appendix B (questionnaire).

Demographic Information. Students provided information on demographic variables including age, gender, ethnicity, and grade (Table 1). They also provided information about their siblings (number, age, and gender), and about their
parents (occupation, education, family structure, and marital status).

Substance use. The measures of substance use were similar to those used by other researchers (e.g. Newcomb et al., 1987; Kandel, 1980). Substance use, operationalized in this early adolescent sample as lifetime use, was assessed across the following licit and illicit substances: beer/alcohol, tobacco, inhalants, marijuana, hallucinogens, cocaine/crack, and amphetamines. Subjects rated lifetime substance use by checking one of the following categories: "1 = never", "2 = 1-2 times", "3 = 3-9 times", "4 = 10-39 times", and "5 = 40 or more." A lifetime substance use score consisted of the sum of the rated categories across all seven substances. For example, an individual who reported no substance use at all obtained a lifetime use score of 7, while the individual who reported the highest possible use across all substances obtained a score of 35.

Self efficacy. Early adolescent self efficacy was assessed using an 18-item measure adapted from Wheeler and Ladd (1982). The questionnaire assessed prosocial persuasive skills by evaluating a child's ability to perform a persuasive task in the presence of peers. Items described social situations followed by an incomplete statement. Subjects responded to questions such as "Some kids want to play a game. Asking them if you can play is ___ for you."
Ratings were on a 4 point Likert scale ("1 = hard"; "2 = sort of hard"; "3 = sort of easy"; and "4 = easy"). Global self-efficacy scores were obtained by summing scores across items, which yielded total scores ranging from 18 to 88, with high scores representing a greater sense of self efficacy. This instrument was chosen because of its age appropriateness and high reliability. Test-retest reliabilities range from .80 for girls and .90 for boys (Wheeler & Ladd, 1982). Reliability analyses demonstrated high consistency of this measure (alpha = .89).

**Susceptibility to peer pressure.** Early adolescent susceptibility to peer pressure was assessed using a 6-item measure of peer conformity. Four core items were adapted from the misconduct scale of the Peer Pressure Inventory (PPI) developed by Brown, Clasen, and Eicher (1986). Two additional items were added for content validity (items 5 and 6 of the measure; see Appendix B, p. 109). Subjects had to rate a set of six hypothetical situations in which friends urge the adolescent to participate in an antisocial act. Possible answers, on a 4-point scale, were "definitely would", "probably would", "probably would not", and "definitely would not." One summary score was computed where a low score was low susceptibility and a high score was conforming behavior (alpha = .87).
Peer substance use. Peer substance use has been found to be one of the most reliable predictors of adolescent substance use (e.g. Coombs, Paulson, & Richardson, 1992). Including a question assessing peer substance use behaviors may independently predict use for such cases. Research has also shown that adolescents may not accurately report their own level of substance use (Huba et al, 1979). One item asking "How often do your close friends drink beverage alcohol" was included. Subjects rated the question on a 4-point scale: "1 = often", "2 = occasionally", "3 = rarely", and "4 = never."

Parental monitoring/disciplinary practices. An 8-item measure of parental supervision and family disciplinary practices was included. Four core items assessing parental supervision were adapted from Patterson and Dishion (1985) and four items were added. Questions about supervision or rules, on a 4-point scale, included "Does your parent or guardian make you come home at night" and "Do your parents punish you if you break the rules?" Parental monitoring practices were operationalized as a summary score of all eight items (alpha = .79).

Parent-child involvement. In order to assess the relative closeness of the parent-child relationship, seven items were included in this study. Each item asked the child about his/her relationships with both the mother or
father (e.g., "When you have a problem, how often do you go to your mother" or "How often do your parents help you with your homework"). Responses were given on a 5-point scale from "never" to "often." Item scores were summed to obtain a measure of involvement in the parent-child relationship. Reliability estimates showed that these items were moderately consistent (alpha = .75).

**Academic performance and school adjustment.** Academic performance was assessed by having each subject report an overall grade point average. Subjects responded to the question "What grades do you usually get on your report card." Eight grade categories were listed as possible responses. For computational purposes, the grade checked was transformed into a numeric grade ranging from A = 4.0 to F = 0.

Five items assessed an adolescent's school adjustment and motivation to succeed. For example, subject's responded to questions like "How important is it to you to get good grades in school?" or "I disobey at school." Items were answered on a three-point scale, generally ranging from either "none" to "a lot" or "not true" to "very true." One summary score was computed, with high scores indicating high academic adjustment. The coefficient alpha for these items showed that they were moderately consistent (alpha = .63).
Impulsivity. A 5-item scale assessing sensation seeking behaviors was included. The items were derived from Zuckerman's work on sensation seeking (see Zuckerman, Kolin, Price, & Zoob, 1964; Zuckerman, & Link, 1968). Over 20 years ago, he reported findings that closely linked sensation seeking behaviors to alcohol and drug use (Zuckerman, Neary, & Brustman, 1970). These findings have since been replicated (e.g. Newcomb et al., 1986). Subjects were asked to rate statements such as "I think planning takes the fun out of things" or "I enjoy new and exciting experiences if they are a little frightening or unusual" on a 5-point scale. Responses ranged from "strongly disagree" to "strongly agree" with a neutral response at midpoint. Scores were summed across all five items to obtain an index of impulsivity. Reliability estimates have demonstrated that the scale shows adequate internal consistency (alpha = .71).

Personality dimensions. Aggression, depression, withdrawal, somatization, and delinquency were assessed using the Youth Self Report (YSR) developed by Achenbach (Achenbach, 1991). All items that comprised the internalizing and externalizing behavior syndromes were used. The YSR was specifically designed to obtain self reports from adolescents, ages 11 to 18, about their behavioral competencies and problems. It is an instrument
widely used by both clinicians and researchers due to its unique ability to accurately assess multiaxial syndromes and problems. Its utility is further strengthened by its validity in assessing clinical populations and moderately distressed normative populations. Achenbach has recently revised the YSR to correspond to an updated factor structure (Achenbach, 1991) composed of nine behavioral dimensions (depression, somatization, withdrawal, aggression, delinquency, social problems, thought problems, attention problems, and self-destructive/identity problems) grouped into three behavior syndromes (internalizing, externalizing, neither internalizing not externalizing).

The format of the YSR requires subjects to rate statements regarding their behavior or emotional state within the past six months. Adolescents circled one of three responses for each statement: "Not true", "Somewhat or Sometimes true", and "Very true or Often true."

One week test-retest reliabilities on a normative sample indicate the following correlations: depression (.81), somatization (.65), withdrawal (.70), aggression (.79), and delinquency (.79). Alpha coefficients ranged from .59 (withdrawn) to .86 (aggressive) for both boys and girls (Achenbach, 1991). Reliability analyses on this sample of the subscale items provided similar findings.
(coefficient alphas): depression (.85), somatization (.80), withdrawal (.67), aggression (.88), and delinquency (.82).

Proposed Analyses and Hypotheses

Preliminary analyses. This study explored the frequency of reported substance use in this early adolescent sample. Results were evaluated by comparing obtained frequencies to other recent empirical findings.

The following four hypotheses and analytical strategies were completed for the 7 intrapersonal variables (self efficacy, impulsivity, withdrawal, depression, somatization, delinquency, and aggression) and 6 interpersonal variables (peer pressure, peer substance use, parental monitoring, parent-child involvement, academic achievement, and school adjustment) predicting early adolescent substance use:

Hypothesis 1. Significant differences in total lifetime, lifetime licit, and lifetime illicit substance use will exist across gender and grade level, while no differences will exist across ethnicity (Caucasians and Hispanics).

In general, males will report higher levels of substance use. Early adolescents in grade 7 will report higher levels of substance use than adolescents in grade 6. Finally, Caucasian and Hispanic adolescents will report similar levels of use. One way ANOVA’s will determine whether there exist mean level differences across groups.
In a second step, in order to assess process similarity or difference between both sixth and seventh graders and between Hispanics and Caucasians, a "model-free" comparative approach will be used. For this purpose, entire covariance matrices of predictor variables from each "sub-group" will be simultaneously compared. The software package LISREL VII will be employed to complete these analyses. Results will be evaluated via significance tests and comparisons of goodness of fit indices (Bentler & Bonett, 1980). Good fit of matrices will be considered sufficient evidence to pool the information provided by each sub-group and to complete subsequent analyses on the total sample.

Finally, correlational analyses will explore the relationships between the 7 intrapersonal and the 6 interpersonal variables and substance use. Pearson correlation analyses will also be used to examine their relationships with lifetime licit use, lifetime illicit use, and each of the individual substances.

After inspecting correlations among predictors, shared common variance analyses will also be completed. This will be done in an effort to determine multicollinearity among variables predicting early adolescent substance use. Variables demonstrating redundancy within a domain will be collapsed into a single predictor. This procedure retains the information of predictors that might otherwise be lost.
when placing variables in direct competition in later regression analyses.

**Hypothesis 2.** Lifetime substance use will be best predicted by a composite of intrapersonal and interpersonal variables.

Initial omnibus regression analyses will be employed to examine whether intrapersonal and interpersonal variable domains independently predict total lifetime, lifetime licit, and lifetime illicit substance use. Lifetime substance use will be computed by summing reported use across all substances: alcohol, tobacco, inhalants, marijuana, hallucinogens, crack/cocaine, and amphetamines. Lifetime licit use will be computed by summing alcohol and tobacco, while lifetime illicit use will be computed by summing use across the remaining substances (Kandel, 1975). All predictor variables within each domain will be entered into the equation for the purpose of these initial regression analyses (two variable domains by three types of substance use). For example, lifetime licit use will be regressed on peer pressure, peer substance use, parental monitoring, parent-child involvement, academic achievement, and school adjustment.

Two additional regression analyses will be employed to examine the predictive capacity of each variable. First, separate stepwise regressions will be employed to examine
the relationships between 1) intrapersonal variables and lifetime substance use; and 2) interpersonal variables and lifetime substance use. For example, total lifetime use will be regressed on self efficacy, impulsivity, withdrawal, depression, somatization, delinquency, and aggression. Second, individual variables that predicted lifetime substance use from each domain will be retained. The retained variables will then be entered into a single composite model. A simultaneous regression analysis will then be employed to determine the best predictors from each domain.

Hypothesis 3. Peer substance use will be the best predictor in the interpersonal domain, while in the intrapersonal domain, delinquency will most consistently predict early adolescent substance use.

Using the results of regression analyses by domain from the previous step, the unique predictive capacity of each variable entered will be examined. Inspecting standardized regression coefficients, it will be determined whether peer use and delinquency are the strongest predictors in each domain.

Hypothesis 4: Adding weighted independent predictors of drug use will better predict early adolescent substance use than the unweighted sum of predictors.
This study will explore the linear relationship of adding weighted predictors to account for substance use. Specifically, by employing a more sensitive weighting scheme of the individual predictors, the linear association between percentage reporting use and "quantity" of risk factors is more accurately assessed. Compared to earlier research, assigning weights based on the relative importance of a risk factor is a more robust approach and retains meaningful information when defining risk.

To evaluate the efficiency of the proposed weighting scheme, the total sample will be split into two equal halves: a model half and a validation half. The procedure of differential weighting will entail standardizing each variable score from the validation half for each subject. Standardization will be achieved by subtracting the mean from the variable score and dividing that by the standard deviation \((z = \frac{Sc-x}{sd})\). The standardized scores will then be multiplied by standardized regression weights obtained from the model half to produce an overall risk score. Finally, directly comparing substance use risk scores of unweighted and weighted sums in the validation half will examine the utility of weighting predictors. Furthermore, employing correlational analyses will also determine whether the weighting scheme adds any meaningful information to the prediction of early adolescent substance use.
RESULTS

Frequency of Drug Use

In order to examine early adolescent drug use, frequencies were computed for total lifetime use. Only Caucasian and Hispanic youth were used (N = 1021) for this and subsequent analyses. In general, reported drug use for licit substances (alcohol and tobacco) was high, while reported illicit use was low. For example, reported lifetime alcohol use was 49.4%, while lifetime tobacco use was 18.4%. Reported lifetime illicit use was 4.9%, on average. Table 2 contains reported frequencies by each of the seven substances (alcohol, beer, marijuana, inhalants, hallucinogens, cocaine, and amphetamines). Findings are consistent with previous research which has demonstrated that early adolescence is a time when many youth experiment with licit substances; youth who use illicit substances are in the minority.

The high prevalence of licit drug use at such an early age warrants further investigation of the pattern and process of early adolescent substance use. Studies examining patterns of drug use have found that experimenters always start out with licit substances and then progress to illicit substances. Using socially acceptable drugs at the age of twelve has to be a source for concern.
Table 2

Frequencies of reported Lifetime Substance Use

<table>
<thead>
<tr>
<th>Individual Substance</th>
<th>Reported Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Licit Substances</strong></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>49.4%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>17.4%</td>
</tr>
<tr>
<td><strong>Illicit Substances</strong></td>
<td></td>
</tr>
<tr>
<td>Inhalants</td>
<td>11.6%</td>
</tr>
<tr>
<td>Marijuana</td>
<td>4.6%</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>2.2%</td>
</tr>
<tr>
<td>Cocaine</td>
<td>1.0%</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

Note: Frequencies by category correspond to number of children that reported at least one incidence of use; N = 1021.

Although not every licit substance user progresses to hard drug use, a small number invariably will. One purpose of this study was to examine whether there existed a particular process or pattern of variables that better predicted early adolescent risk for lifetime substance use.
Research focusing on clinical prevention has consistently identified a large number of variables that predict substance use for high risk users (see e.g. Newcomb & Bentler, 1986); however, little work has been completed in this age group that assessed the robustness of predictors across different levels of risk. In addition, this study also sought to compare substance use and its predictors for different age groups, gender, and ethnicity.

**Hypothesis 1: Grade level, gender, and ethnic differences**

ANOVARAS. In a first step, one way ANOVAs were employed to determine whether mean differences existed in overall lifetime use, lifetime licit use, and lifetime illicit use across grade level, gender, and ethnic groups. Significant mean level differences of substance use were found between 6th and 7th graders across all three substance use categories (total lifetime use: $F(1, 1016) = 39.09$; lifetime licit use: $F(1, 1016) = 53.00$; and lifetime illicit use: $F(1, 1014) = 11.62$; Table 3). All mean level differences were significant at $p < .001$. Specifically, from sixth to seventh grade reported frequencies of total lifetime use (from nonusers to users) increased by almost 16%, lifetime licit use by 17%, and reported illicit substance use increased by 8%. These changes represent large increases in one year, particularly in the case of lifetime licit use. Such findings are consistent with
Kandel’s model of developmental process, in which 1) older children are either more likely to initiate use; or 2) if they already use drugs, were more likely to progress to hard drug use after initial experimentation with alcohol and tobacco.

Table 3

Oneway ANOVAS on early adolescent substance use by class standing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime Use</td>
<td>8.0</td>
<td>1.7</td>
<td>8.9</td>
<td>3.0</td>
<td>39.09</td>
<td>.001</td>
</tr>
<tr>
<td>Licit Use</td>
<td>2.8</td>
<td>1.2</td>
<td>3.5</td>
<td>1.9</td>
<td>52.99</td>
<td>.001</td>
</tr>
<tr>
<td>Illicit Use</td>
<td>5.2</td>
<td>.7</td>
<td>5.4</td>
<td>1.6</td>
<td>11.62</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note: df = (1, 1016). Response ranges for each substance use category in order presented were 7-35, 2-10, and 5-25. In each case, the low number represents no reported use.
Next, one-way ANOVA's were completed for gender and ethnicity. Consistent with findings on older adolescents (e.g., Newcomb et al., 1986), results indicated that there were no significant mean level differences when comparing male and female levels of lifetime substance use in this age group (Table 4).

Table 4
One-way ANOVAS on early adolescent substance use by gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Lifetime Use</td>
<td>8.5</td>
<td>2.4</td>
<td>8.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Licit Use</td>
<td>3.3</td>
<td>1.7</td>
<td>3.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Illicit Use</td>
<td>5.3</td>
<td>1.0</td>
<td>5.4</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Note: df = (1, 1009). Response ranges for each substance use category in order presented were 7-35, 2-10, and 5-25. In each case, the low number represents no reported use.
In addition, as expected no differences in levels of use between Caucasian and Hispanic early adolescents emerged (see e.g., Coombs et al., 1991; Table 5).

Table 5.

Oneway ANOVAS on early adolescent substance use by ethnicity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Caucasians</th>
<th>Hispanics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=743)</td>
<td>(N=278)</td>
</tr>
<tr>
<td>Lifetime Use</td>
<td>8.4</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>2.4</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.18</td>
</tr>
<tr>
<td>Licit Use</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>.6</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.36</td>
</tr>
<tr>
<td>Illicit Use</td>
<td>5.3</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.10</td>
</tr>
</tbody>
</table>

Note: df = (1, 1016). Response ranges for each substance use category in order presented were 7-35, 2-10, and 5-25. In each case, the low number represents no reported use.
LISREL analyses. In order to examine underlying process in different population subdivisions, separate covariance matrices were compared across grade levels and ethnic groups employing the software package LISREL VII (Jöreskog & Sörbom, 1989). For this purpose, all thirteen initial predictor variables were entered into two sets of covariance matrices. This was done in order to examine a broader pattern of similarity or difference across all initial predictors. In a first step, separate covariance matrices were obtained using all thirteen variables for 6th (N = 490) and 7th graders (N = 531).

The goodness of fit index (GFI) indicated a consistent pattern for 6th and 7th graders (GFI = .96 and GFI = .97). The slight difference in magnitude between the two indices may be due to different sample sizes. The LISREL estimation of a common covariance matrix will favor the covariance matrix of the larger sample; therefore, the group with a larger sample size consistently produces a higher fit index. The chi square test of statistical independence $X^2 = 274.1$ (df = 91) was significant at $p < .001$. Despite a very good fit of both matrices, the statistical test rarely produces non-significant chi square values in large samples. Conversely, when employing standardized correlation matrices, the same data often produces a smaller chi square value, thereby reaching non-significance (for similar
findings, see Rowe, Vazsonyi, & Flannery, 1993). For example, a comparison of matrices for 6th and 7th graders resulted in a greatly reduced chi square, 119.3 (vs. 274.1; \( p < .03 \)), without affecting the GFI's.

In a second step, separate covariance matrices were obtained for Caucasian (\( N = 743 \)) and Hispanic (\( N = 278 \)) youth. Similar findings emerged, where the GFI was consistently high for both groups (GFI = .99 and GFI = .95; \( \chi^2 = 142.1; \text{df} = 91; p < .01 \)), but larger for Caucasians due to their greater sample size. Even though the chi square test reached significance in both comparisons, consistently large fit indices indicated an impressive similarity of underlying process between groups. Subsequent analyses were completed on the entire sample, since results supported similar process across grade level and ethnicity. In order to examine the question of underlying patterns of predictors or process, correlations among predictors in the pooled sample were examined.

**Correlational analyses.** Correlational analyses were employed to examine the relationship between total lifetime, lifetime licit, and lifetime illicit substance use and 1) interpersonal variables; 2) intrapersonal variables; and 3) specific substances (alcohol, tobacco, marijuana, inhalants, hallucinogens, cocaine, amphetamines). As expected, all six interpersonal variables (susceptibility to
peer pressure, peer alcohol use, academic achievement, school adjustment, parent-child involvement, and parental disciplinary practices) were significantly related to overall lifetime (average $r = .37$), lifetime licit (average $r = .37$), and lifetime illicit substance use (average $r = .25$; Table 6). Furthermore, the correlational patterns across each substance were very similar; patterns for total lifetime use and lifetime licit use were almost identical across each variable, while lifetime illicit use was similar, but smaller in magnitude.

Six of 7 intrapersonal variables (impulsivity, delinquency, aggression, depression, withdrawal, and somatization) showed a moderate relationship to the substance use categories (average $r = .29$). Self efficacy was not significantly related to lifetime illicit use and only weakly correlated to overall lifetime use ($r = .07$; Table 7). Once again, patterns across the intrapersonal variables by substance use category were remarkably congruous. Total lifetime and lifetime licit use were practically identical; lifetime illicit use demonstrated a similar relationship pattern, although smaller in magnitude. While delinquency showed the largest correlation with total lifetime substance use in the intrapersonal domain ($r = .55$), susceptibility to peer pressure demonstrated the best relationship in the interpersonal domain ($r = .56$).
Table 6

*Correlations of Interpersonal Variables with Substance Use*

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<td>8. Par-Child inv.</td>
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<td>9. Discipline</td>
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</tr>
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</table>

Note: * significant at p < .05; all other correlations significant at p < .01.
Table 7

**Correlations of Intrapersonal Variables with Substance Use**

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<tr>
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<tr>
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<td>.84</td>
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<td>.55</td>
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<td>.22</td>
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<td>2. Licit use</td>
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<td>3. Illicit use</td>
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<td>.17</td>
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<td>4. Impulsivity</td>
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<td>8. Somatization</td>
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<td>9. Depression</td>
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<td>10. Self-efficacy</td>
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</table>

*Note: * significant at $p < .05$; all other correlations significant at $p < .01$.  

Similar patterns emerged between individual substances and the predictor variables. Among the intrapersonal variables, self efficacy was significantly related to alcohol and tobacco use only. Also, anxiety/withdrawal was only weakly correlated with both hallucinogens and cocaine ($r = .06$). Conversely, with the exception of academic achievement, all interpersonal variables demonstrated a significant relationship with all seven individual substances. In general, the strongest correlations in both domains emerged with alcohol and tobacco (see Appendix A for correlational analyses of individual substances by domain).

Table 8 contains correlations between all 6 interpersonal and 7 intrapersonal variables; with the exception of self efficacy, all thirteen variables were significantly correlated. In particular, susceptibility to peer pressure and school adjustment showed strong relationships with aggression ($r = .51; r = .42$, respectively) and with delinquency ($r = .66; r = .44$, respectively). School achievement, parent-child involvement, and parental disciplinary practices showed consistent but moderate relationships with the intrapersonal variables (average $r = -.23$). The average correlation of these three predictors with delinquency was $r = -.35$. On the other hand, very weak and inconsistent relationships
emerged between self efficacy and all interpersonal variables (see Table 8).

**Shared common variance analyses.** In the intrapersonal domain, aggression and delinquency as well as depression and withdrawal had correlations that were greater than $r = .7$. In order to assess multicollinearity between predictors and to determine whether these constructs were measuring a common factor, shared common variance analyses correcting for attenuation were employed (Nunnally, 1978). Shared common variance (SCV) equals $SCV = r^2/r11*r22$, where $r11$ and $r22$ are reliability estimates of each measure. A conservative cut-off criterion for combining variables was selected; common shared variance exceeding $SCV = .8$ was considered sufficient evidence of a common underlying construct. Analyses examining aggression and delinquency indicated that most true variance was held in common between these two variables ($SCV = .85$). A similar finding was obtained for depression and withdrawal, $SCV = .94$. These results argued for and were consistent with Achenbach’s (1991) recently obtained factor structures for adolescent externalizing and internalizing behaviors. Therefore, for analytical and conceptual reasons, the aggression and delinquency scores were summed into a single **externalizing** score; similarly, the depression and withdrawal scores were combined into an **internalizing** score. Both composites were
used in all subsequent analyses. Summing individual predictors that were highly related retained the information provided by each predictor; it also ensured that no information was lost in subsequent regression analyses, particularly when comparing individual predictors with each other by domain (see Appendix A: Additional Tables).

Table 8

Correlations between Intra- and Interpersonal Variables

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Note: * significant at p < .05; all others are significant at p < .01.

(table continues)
Table 8 (continued)

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<td>.15</td>
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<td>-.12</td>
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<td>-.06*</td>
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<td>Discipline</td>
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<td>15.</td>
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</tbody>
</table>

Note: * significant at $p < .05$; all others are significant at $p < .01$.

Additional shared variance computations were completed in order to determine whether a similar procedure was necessary for any other intrapersonal or interpersonal
variables. None of the other variables examined exceeded the $\text{SCV} = .8$ cut-off criterium. Table 8 also contains the correlations of externalizing and internalizing variables with all inter- and intrapersonal predictors.

Hypothesis 2: Composite Model

**Stepwise regression analyses.** Consistent with the correlational analyses, preliminary omnibus regressions analyses indicated that each domain (inter- and intrapersonal variables) independently predicted total lifetime substance use for early adolescents. Specifically, the interpersonal variables, as a set, consistently predicted substance use by accounting for 39% of the variance, while intrapersonal predictors accounted for 25% of the total variance explained.

Predictor models were first derived from intrapersonal and interpersonal domains, respectively. Stepwise regressions were employed for this purpose. This procedure was selected, since it is a commonly used method and also because it provides a more conservative approach to determining the composite model versus backward elimination or forward selection procedures.

Stepwise regression analysis is a combination of forward selection and backward elimination regressions. In a first step, the initial variable was selected based upon its largest positive or negative correlation with the
dependent variable, in this case, total lifetime substance use. Next, the $F$ test for the hypothesis that the coefficient equals zero was calculated; the minimum $F$ value used as the criterion for entry was the default value supplied by the statistical software package SPSS ($F > 3.84$). The other criterion for entry is the probability associated with the $F$ statistic; in order for a variable to be included, $p$ must have been less than or equal to a certain value. Again, the default value of $p < .05$ supplied by the software package was used. If this variable selected for entry met these critical values, it was included in the regression equation.

The second component of a stepwise regression is backward elimination. In effect, after the variable met entry criteria and was added into the equation, it is tested again, this time for removal; this procedure makes stepwise regressions more conservative compared to either forward or backward elimination individually. Backward elimination also has "exit" criteria which by default are more lenient than entry criteria. Once again, the default values of $F > 2.71$ and $p < .1$ were used. After the first variable passed the removal test, the second variable was added based on its correlation with the dependent variable. This process of selecting and attempting to remove variables in the equation was repeated until none of the remaining
variables met the initial entry requirements into the equation.

Stepwise regressions within each domain yielded the following predictors for the total sample: 1) In the interpersonal domain, susceptibility to peer pressure, friend alcohol use, school adjustment, and the parent-child involvement variables reached significance ($p < .01$). These variables accounted for 39% of the variance in predicting early adolescent substance use; 2) In the intrapersonal domain, externalizing behaviors and impulsivity explained 25% of the variance ($p < .01$). Table 9 contains the results of these stepwise regressions. Results indicated that there was a large significant difference in the total amount of variance explained in total lifetime substance use by each domain ($F (5, 1009) = 46.31; p < .01$). As pointed out previously, both domains demonstrated strong correlations with each substance use category; yet, the interpersonal domain accounted for 60% more variance than the intrapersonal domain. Intrapersonal variables are manifestations of underlying personality constructs; in many cases, each construct may give rise to multiple personality traits. These individual traits may therefore be overlapping. When these variables are placed "in direct competition" with each other in a regression analysis, some of them will cancel
each other out due to redundancy (measuring the same construct).

Table 9

**Stepwise Regressions by Domain on Lifetime Substance Use**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>F</th>
<th>R²</th>
<th>Change R²</th>
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<td>.307</td>
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<tr>
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<td>.076</td>
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<td>.007</td>
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<tr>
<td>Model R²</td>
<td>.39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Intrapersonal Domain** |      |     |      |           |
| Externalizing     | .456 | 214.3 | .247 |           |
| Impulsivity       | .086 | 7.7  | .253* | .006      |
| Model R²          | .25  |      |      |           |

Note: * significant at p < .01; all other variables entered into the stepwise regression significant at p < .001; N = 1021.
Simultaneous regression analysis. In the next step, significant predictors from each domain were used to obtain a single predictor model. For this purpose, each significant predictor from the previous stepwise regressions was entered into a single simultaneous regression. Table 10 contains the results of the regression analysis. Four variables emerged: (1) susceptibility to peer pressure, (2) peer substance use, (3) externalizing behaviors, and (4) parent-child involvement (Table 10). They accounted for 42% of the variance in early adolescent substance use. These findings suggest that both the number and predictive capacity of individual interpersonal variables exceeds intrapersonal variables as a domain. Although the parent-child involvement variable reached significance in this regression analysis (p < .04), it was able to account for a very small increment in $R^2$. In fact, it only accounted for an additional .4% of the variance explained in total lifetime substance use.

Conceptually, the composite model seeks to parsimoniously maximize prediction of substance use on the entire sample. Since the parent-child involvement variable did not meaningfully add to the composite model, it was excluded from further analyses.
Hypothesis 3: Best Inter- and Intrapersonal Predictors

As hypothesized, delinquency (externalizing behaviors) best predicted early adolescent lifetime substance use from the intrapersonal domain. Consistent with expectations, in the interpersonal domain susceptibility to peer pressure and peer substance use best predicted total lifetime substance use (see table 9).

Table 10

Regression Analysis for Composite Model on Lifetime Use

Total sample (N = 1021)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
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<td>.001</td>
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<td>Impulsivity</td>
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<td>.72</td>
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</table>

Note: Model $R^2 = .42$. 
Hypothesis 4: Weighted Independent Predictors

The final set of analyses focused on examining the utility of employing a more sensitive weighting scheme of individual variables to predict early adolescent substance use. For this purpose, the composite model obtained in the previous step was used (susceptibility to peer pressure, peer alcohol use, and externalizing behaviors). In order to test this hypothesis empirically, the total sample was split into two random halves for cross validation, a model half and a validation half. Frequencies on grade level, gender, and ethnicity from each random half were compared to confirm whether the groups were similar on these variables. Results indicated that the halves were essentially equal on the above mentioned variables (see Table 11). The obtained percentages differed for number of Caucasians and Hispanics by group, but since LISREL analyses established process similarity for these groups, no additional tests comparing groups were employed.

In an initial step, a simultaneous regression analysis on total lifetime use was completed for the model half; this was done in an effort to obtain standardized regression coefficients that would be used for subsequent cross validation on the validation half. Consistent with expectations, the composite model accounted for 45% of the variance in early adolescent substance use on the model half
(as compared to 42% on the total sample). Table 12 presents the results of this initial simultaneous regression analysis on total lifetime substance use.

In order to test the utility of the proposed weighting scheme and to use the information provided by each variable individually, each variable of the composite model was then standardized in the validation half. Standardization of each predictor was achieved by subtracting the mean from the variable score and dividing that by the standard deviation \((z = \frac{x - \mu}{\sigma})\). Subsequently, a risk score was computed by adding each of the three standardized predictors into an unweighted sum \((Y = z_1 + z_2 + z_3)\). Finally, a correlational analysis of this unweighted sum with total lifetime, lifetime licit and lifetime illicit substance use was computed. All three substance use categories were strongly correlated with the risk score \((r = .67 \text{ and } r = .66, \text{ and } r = .47, \text{ respectively}; p < .0001)\). Table 13 contains the results of this analysis.

In a final step to obtain a weighted risk index, a weighted sum was computed employing standardized individual predictors \((z_1, z_2, \text{ and } z_3)\) from the validation half. Each standardized individual score was multiplied by the standardized regression weights obtained from the simultaneous regression analysis on total lifetime use in the first step \((Y = \beta_1 z_1 + \beta_2 z_2 + \beta_3 z_3)\). For example, the
Table 11

Frequencies on Model and Verification Halves

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model Half (N = 511)</th>
<th>Verification half (N = 510)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52.7%</td>
<td>51.3%</td>
</tr>
<tr>
<td>Female</td>
<td>47.3%</td>
<td>48.7%</td>
</tr>
<tr>
<td>Grade level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixth</td>
<td>48.1%</td>
<td>48.0%</td>
</tr>
<tr>
<td>Seventh</td>
<td>51.9%</td>
<td>52.0%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>70.1%</td>
<td>75.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>29.9%</td>
<td>24.6%</td>
</tr>
</tbody>
</table>

Note: Mean ages were 12.74 and 12.78 years, respectively.
Table 12
Regressions on Model Half by Substance Use Category

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifetime use</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Use</td>
<td>.347</td>
<td>8.92</td>
<td>.0001</td>
</tr>
<tr>
<td>Externalizing</td>
<td>.238</td>
<td>5.54</td>
<td>.0001</td>
</tr>
<tr>
<td>Pressure</td>
<td>.233</td>
<td>5.12</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifetime licit use</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Use</td>
<td>.334</td>
<td>10.55</td>
<td>.0001</td>
</tr>
<tr>
<td>Pressure</td>
<td>.329</td>
<td>9.21</td>
<td>.0001</td>
</tr>
<tr>
<td>Externalizing</td>
<td>.158</td>
<td>4.59</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifetime illicit use</strong>&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Use</td>
<td>.247</td>
<td>5.33</td>
<td>.0001</td>
</tr>
<tr>
<td>Externalizing</td>
<td>.183</td>
<td>3.58</td>
<td>.0057</td>
</tr>
<tr>
<td>Pressure</td>
<td>.150</td>
<td>2.78</td>
<td>.0004</td>
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</table>

**Note:** Model <sup>a</sup>\(R^2 = .45; \) \(bR^2 = .43; \) \(cR^2 = .23.\)
standardized score of externalizing behaviors in the validation half was multiplied by the beta obtained from regressing the composite model on total lifetime substance use in the model development half. Finally, a weighted sum risk score was computed by summing these individually weighted predictors into a risk index.

In an effort to determine the utility of employing beta weights, the weighted risk index was correlated with overall lifetime, lifetime licit, and lifetime illicit substance use in the validation half (see table 13).

Contrary to expectations, although the weighting scheme produced correlations of almost equal magnitude with the three substance use categories from the model half, the unweighted sum also generated correlations that were identical to the weighted sum (with the exception of lifetime illicit substance use). For example, total lifetime substance use in the model development half correlated $r = .67$ with the composite risk index; in the validation half, it correlated $r = .62$ both with the unweighted and weighted sums. Similar patterns emerged for the other two substance use categories, although the loss of explanatory power from the model half to the validation half by substance use category was smaller in magnitude. Lifetime licit substance use correlated $r = .66$ in the model half and $r = .65$ in the validation half (for both weighted
Table 13
Correlational Analyses on Model and Validation Halves by Substance Use Category

<table>
<thead>
<tr>
<th>Substance Use Category</th>
<th>Model Half</th>
<th>Validation Half</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 511)</td>
<td>(N = 512)</td>
</tr>
<tr>
<td>Total lifetime use</td>
<td>.67</td>
<td>.62</td>
</tr>
<tr>
<td>Lifetime licit use</td>
<td>.66</td>
<td>.65</td>
</tr>
<tr>
<td>Lifetime illicit use</td>
<td>.47</td>
<td>.47</td>
</tr>
</tbody>
</table>

Note: All correlations presented are significant at $p < .0001$. 
and unweighted sums). Put in other terms, while the composite model accounted for 45% of the variance explained in early adolescent total lifetime substance use, both the unweighted and weighted sums accounted for 38% in the validation half; similarly, both weighted and unweighted sums accounted for 42% compared to 44% in lifetime licit use, and 21.5% compared to 22% in lifetime illicit use.
DISCUSSION

This investigation examined early adolescent risk for total lifetime, lifetime licit, and lifetime illicit substance use. Specifically, risk was assessed by examining the relationship of 6 interpersonal and 7 intrapersonal variables to reported substance use. The study also examined the question of ethnic group mean level and process similarity or difference. Important findings can be summarized in the following manner: 1) variables from the interpersonal domain were better predictors of early adolescent substance use than variables from the intrapersonal domain; 2) within the interpersonal domain, peer group influence emerged as the best predictor of substance use in this age group; 3) no mean level differences of reported substance use or process differences among thirteen predictor variables were found between Hispanic and Caucasian youth; and 4) the employed weighting scheme did not meaningfully add to predicting early adolescent substance use.

Multicausality

Findings from this study clearly support the multicausal approach of assessing adolescent risk for engaging in substance use behaviors. All three sub-domains identified by Brook et al. (1990) were also found to predict substance use in this early adolescent sample.
Specifically, **peer orientation** best predicted early adolescent substance use. Both the desire to conform to the demands of the peer group and drug using peers contributed to increased drug use in this age group. Research has found that in an effort to both detach from parental controls and also to develop self identity, children in early adolescence shift their focus from parental orientation to a peer orientation (Steinberg, 1986; 1987a; 1987b; 1989). In early adolescence, children are most likely to comply with the perceived demands placed upon them by their age mates. Such demands include engaging in substance using behaviors to gain acceptance among peers.

A second mechanism found to operate in this age group responsible for increased substance use is "experimentation" (Kandel, 1975). Children are exposed to substance use behaviors by peers; consequently, they may engage in alcohol or tobacco use as part of normative development. Experimentation can also simply be the result of a persistent desire to experiment with something non-conventional, something parents wouldn’t allow. Non-conventional behaviors which greatly increase in frequency during early adolescence, have also been called autonomy seeking behaviors (Steinberg & Silverberg, 1986); others have termed it detachment (Ryan & Lynch, 1989). In any case, findings from this study support the increased
importance for early adolescents of conforming to friends rather than parents (see also Berndt, 1979).

The second important area within the interpersonal domain was the influence of parenting. Parent factors were also identified by Brook et al. (1990) as important predictors of early adolescent substance use. A more positive parent-child relationship may serve to buffer a child from engaging in health compromising behaviors. Specifically, parents who encourage school achievement, for example, may provide more consistent expectations for and be more concerned with the child; this in turn may reduce the likelihood that the child will engage in substance use behaviors. Similarly, parents who are willing to openly discuss problems with their child foster a close parent-child relationship and increased trust. An affectively positive relationship may reduce the adverse effects of peers (Brook et al., 1990). However, a child may still use drugs despite a trusting relationship with his/her parents. Again, this may occur due to the increased importance of the peer group in early adolescence. Such findings are consistent with research on protective factors of risk for health compromising behaviors (e.g., Garmezy & Masten, 1986; Masten et. al., 1988).

Brooks et. al.’s (1990) third sub-domain, personality factors (intrapersonal domain), also emerged as important
predictors for substance use in early adolescence. Regardless of parenting practices or peer orientation, a child may have basic constitutional factors (e.g., aggressive or delinquent) which may predispose him/her to substance use behaviors. The latter argument has been supported for many years, most notably by Jessors’ (1977; see also Jessor, 1993) problem behavior theory. An aggressive child who engages in socially non-conforming behaviors, such as truancy or stealing, is also more likely to engage in substance use behavior without regard to its consequences.

Hirshi’s (1967) theory of social control makes a similar argument. Impulsive children that lack appropriate socialization also lack social skills. A child that is unable to distinguish between socially acceptable and socially unacceptable behaviors is much more likely to be unable to delay gratification. Such an individual seeks to satisfy immediate wants or needs without any regard for future consequences. This may include engaging in health compromising behaviors such as substance use. Such behaviors ultimately affect the user and the community he/she lives in. In sum, this study confirmed the widespread empirical support of intrapersonal variables for predicting substance use behaviors (e.g. Friedman et al., 1991; Newcomb et al., 1986).
Contrary to expectations, parental disciplinary practices (see e.g., Patterson & Dishion, 1985) and school grades (e.g., Paulson et al., 1990) did not significantly predict early adolescent substance use in this study. This might have occurred for two reasons: 1) redundant information and multicollinearity among variables within each domain might have reduced the significance of individual predictors; variables may have assessed a common sub-domain (parenting and school) that was already represented among the variables that reached significance; or 2) parental monitoring practices and grades were of lesser importance in this age group. Considering the evidence provided by other researchers, the former explanation seems to apply.

In the intrapersonal domain, internalizing variables (see e.g., Pandina & Schuele, 1980) and impulsivity (see e.g., Newcomb et al., 1986) were not found to be significant predictors of substance use in this study. Although impulsivity was a significant predictor within the intrapersonal domain, it was not significant in the composite model, when it was forced to compete with interpersonal variables. Internalizing behaviors were neither significant predictors in the composite model nor in the intrapersonal domain per se. This finding is consistent with at least one other recent study which failed to link
internalizing variables to substance use in early adolescence (Ralph & Morgan, 1991).

**Process Similarity**

As expected, seventh graders reported a significantly greater mean level of substance use than sixth graders across all three substance use categories. This finding is consistent with previous research which has found that frequencies of reported substance use increase with age during adolescence (e.g., Coombs, Fawzy, & Gerber, 1986; Bloch, Crockett, & Vicary, 1991). It also supports the notion that early adolescence is a time when children are very likely to engage in experimentation with drugs (e.g., Kandel, 1975).

Despite mean level differences (outcome) in 6th and 7th graders, findings from LISREL analyses indicate that the same causal process underlies substance use in both grades. To further illustrate this finding, consider the following example. If a regression-by-class-level approach had been used with the three variables from the composite model, findings might have indicated that for 6th graders susceptibility to peer pressure had the largest standardized regression coefficient, followed by peer substance use and externalizing behaviors. Examining the same three variables in a regression analysis on seventh graders, we might have found that peer substance use emerged as the best predictor,
followed by externalizing behaviors and susceptibility to peer pressure. What can we infer from this? Can we argue that there is a different causal process underlying substance use because of slightly different betas by grade level? LISREL findings from this study would not support such a causal process difference. Rather, a different order of predictor variables might indicate that 7th graders have greater access to resources in order to obtain substances; it would not mean that 7th graders report higher frequencies of use due to some novel causal mechanism not present for 6th graders. Finally, a different order may simply be the result of sampling variation.

Other researchers have found different levels of use across ethnic groups and thus have attempted to determine ethnically unique causal processes (separate regression analyses by ethnicity; e.g., Coombs et al., 1991). The findings of this study support an invariant process underlying substance use for both Hispanic and Caucasian early adolescents. Recent work on other samples supports the presence of process similarity across ethnic groups. For example, Lillie-Blanton, Anthony, and Schuster (1993) examined this question in a sample of crack-cocaine smokers (adolescents and young adults) across ethnicity. They found that after controlling for drug availability (neighborhood
differences), no ethnic group differences were present in crack-cocaine use.

A recent study examined ethnic process similarity in an economically diverse sample of over 16,000 children and adolescents from across the United States. Rowe, Vazsonyi, and Flannery (1993) concluded that process was invariant across ethnic groups (Caucasians, Blacks, Hispanics, and Asians) for a number of outcome variables, including substance use. Clearly, such findings underscore the importance of examining behavioral processes and outcomes free of ethnic group membership. Furthermore, such findings also highlight the importance of distinguishing between mean level differences and process differences. Inferring process difference from mean level comparisons may be inappropriate.

Previous research has implied that mean level differences by ethnic group must be due to different causal processes (e.g. Bettes et al., 1990; Maddahian, Newcomb, & Bentler, 1985). However, most findings of level differences were for older adolescents. Furthermore, they were also for samples in specific geographic locations. Recent national surveys indicate that level of substance use consistently differs by age group, population density, and geographic location (NIDA, 1989).
For example, some research has found that Whites smoke the most in New York (Welte & Barnes, 1988) while Blacks smoke the most in California (Maddahian et al., 1985). As a result, a number of scientists have speculated that there exist fundamental ethnic differences in substance use behaviors. Some have suggested that ethnic groups are different due to fundamentally different psychosocial constructs. For example, self-esteem may differ as a function of sub-group differences in SES (Young & Shorr, 1986). Others have indicated that "Afrocentrism" may be a self determinant of Black adolescents' self-esteem (Belgrave, Johnson, & Carey, 1985). Still other researchers have indicated that the amount of "acculturation" may be predictive of level of substance use (Gilbert & Alcocer, 1988). Many researchers have concluded that due to different levels of outcome, different causal pathways must underlie substance use for different ethnic groups. As a result, they have suggested that specific programs tailored to each ethnic group must be designed for intervention. Results from this study and other research suggest that developmental process is different from mean levels (e.g., Rowe et al., 1993).

Weighting Scheme

One final goal of this study was to assess the relative utility of employing a more sensitive weighting scheme to
individual variables to predict early adolescent substance use. In an epidemiological approach variables are dichotomized into zero for no risk and one for risk, using specific cut off scores (see e.g. Newcomb et al., 1986). Although this approach is very useful in predicting risk, it does not use all available information on a variable; an individual reporting just below the cut off on three predictors may be at-risk just as much as the individual reporting just above the cut off on two variables. For this reason, the usefulness of a more sensitive weighting scheme was examined employing continuous data. A direct comparison with the traditional approach described above was not completed, however, and will have to be attempted in future analyses.

Findings can be summarized in the following important ways: 1) the weighted risk index was validated on the independent subsample; it predicted early adolescent risk equally well across samples for lifetime licit and lifetime illicit substance use. 2) The weighted sum risk index was unable to account for a greater amount of total variance explained than the unweighted sum in the validation half. In effect, the weighted risk factor approach did equally well as standardized predictors by themselves; regression weights from the model half did not meaningfully add any information for predicting early adolescent substance use in
the validation half. Standardizing the dependent variable did not change the obtained results.

Other recent studies have also been unable to improve on the traditional risk factor approach (e.g., Moncher, Holden, & Trimble 1990). It is difficult to draw any conclusions about the utility of this weighting scheme without having a direct comparison; however, so far, this approach has provided little improvement to identifying early adolescents at-risk beyond simply using unweighted predictors. This present study did illustrate the robustness of a core set of variables (the composite model) for predicting early adolescent substance use across two large samples. Future investigations may be able to further elaborate upon the utility of employing these three core variables in predicting early adolescent risk for substance use.

Limitations and Future Research

This study sought to maximally predict early adolescent substance use risk by including variables from both the interpersonal and intrapersonal domains. Although conceptually useful, including such a large number of variables created some analytical problems. For example, variables within each domain and variables across domains were intercorrelated. Despite attempts to retain the information of analytically redundant variables, regression
analyses resulted in a reduction of both number of variables and information. For example, while the intrapersonal domain contained 2 of 5 significant predictors, the interpersonal domain had 4 of 7 significant predictors. Internalizing and externalizing variables were highly intercorrelated. Although distinct constructs, these two dimensions have reliably been found to be highly intercorrelated (Achenbach, 1991). Perhaps more carefully selecting variables within the intrapersonal domain in future studies may reduce the problem of redundancy. Regardless of domain, future research examining a large number of continuous variables must take the multicollinearity issue into account.

Finally, placing variables in either the intra- or interpersonal domains based on previous research created some inherent conceptual problems. For example, although susceptibility to antisocial peer pressure has traditionally been associated with social learning theory and interpersonal behaviors (see e.g., Brown, Clasen, & Eicher, 1986), this variable could also have been included in the intrapersonal domain. Because it is a measure of perceived susceptibility to peer pressure, this variable also measures intrapersonal qualities. A child with a low sense of self esteem is more likely to be susceptible to peer pressure.
In sum, although conceptually useful, assigning variables to specific domains is at best an imperfect heuristic.

Risk factor approaches have commonly dichotomized risk variables, thereby reducing the problem of strong intercorrelations among continuous variables. Recent evidence suggests that dichotomizing predictors instead of using the continuous information provided may lead to spurious findings (type I errors: false significance); furthermore, it may also overestimate the "true" strength of relationships (Maxwell & Delaney, 1993). Therefore, future studies should consider employing continuous instead of dichotomized risk variables.

Another problem with this study is a monomethod bias. All data were collected from early adolescents using a self-report survey methodology. Employing a multi-method or multi-reporter design may reduce the chances of obtaining biased information. Although clear relationships emerged, future studies should include either teacher report and/or parent report to further strengthen findings and make them more generalizable. For example, teachers can report on school behaviors and academic adjustment, while parents can supplement child reports by self-reporting on their own level of involvement or disciplinary practices. Finally, peer reports of adolescents' behaviors can also be used to validate or as a comparison to adolescent self-reports. Any
multi-report methodology would also conceptually improve upon categorization of variables by domain (intra- versus interpersonal).

Critics of survey methodology have argued that respondents may under-report their actual levels of substance use due to fears of community sanctions; conversely, they may also overestimate and over-report their actual use simply due to being prompted by researchers for this information. Research evaluating survey methodology has compared self report of substance use with urine samples taken from respondents; findings indicate that using self report does not compromise the quality of the data (Oetting & Beauvais, 1990).

Although the sample size of this survey was over 1,000 early adolescents, some researchers have argued that "local" surveys are useful indices for local trends; therefore, larger national samples need to be considered to develop an adequate understanding of recent global changes in frequencies of reported early adolescent substance use (Oetting & Beauvais, 1990).

As with many other large surveys, this study was cross sectional in nature. Future research should employ longitudinal designs. Cross sectional studies adequately assess relationships at the time of inquiry; however, they cannot adequately reveal antecedent developmental conditions
or causal relationships among predictors. For example, although the parent-child involvement variable had little explanatory power in early adolescent substance use, research has demonstrated differential effects of parenting variables on outcomes depending on age of the subjects (e.g. Steinberg 1986; 1987b). Following children longitudinally will allow researchers to evaluate more accurately the differential effects of relationship variables.

In order to explore the effects of parenting on substance use, for example, it would be useful to follow children over a time period of five years, starting as early as fourth or fifth grade. Results from sixth and seventh graders in this study indicate that over 50% of participants had at least one incidence of licit substance use. Antecedent conditions for using substances have already been passed by this age group; therefore, children should be surveyed at an earlier age. Also, the time period from ages 10 to 15 has consistently been identified as a time of much cognitive, emotional, and physical change (see e.g., Steinberg, 1987b; 1989).

Finally, researchers have identified a number of other influential predictors for early adolescent substance use that should be considered in subsequent studies. These include family income (Maddahian et al., 1986), major life events and stressors (Rhodes & Jason, 1990), religiosity
(Newcomb et al., 1986), and measures assessing cognitive functioning such as coping mechanisms (Garmezy et al., 1984).

Process similarity findings between ethnic groups and grade levels illustrate the importance of conceptualizing human behavior free of sub-group membership. When researchers find intricate group differences, this may merely be the result of measurement error, monomethod bias or simply an analytical artifact. This, in turn, may lead researchers down both the wrong analytical and conceptual paths. Clearly, more research needs to be completed on the question of process similarity or difference in ethnic groups, since very few investigations have adequately addressed this issue. Lack of process differences in ethnic groups has profound implications socially, politically (policy issues), and theoretically. In the end, rather than expending large amounts of energy and resources on establishing sub-group differences, we may find ourselves attempting to promote a greater understanding of human behavior regardless of race or national origin.
APPENDIX A: Additional Tables
Table: Correlations of Interpersonal Variables and Individual Substances

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>Beer</td>
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<td>.39</td>
<td>.29</td>
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<td>-.17</td>
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<td>.51</td>
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<td>-.13</td>
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<tr>
<td>Hallucinogens</td>
<td>.75</td>
<td>.67</td>
<td>.29</td>
<td>.29</td>
<td>-.08*</td>
<td>.15</td>
<td>-.11</td>
<td>-.16</td>
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<td>Cocaine</td>
<td></td>
<td>.65</td>
<td>.24</td>
<td>.20</td>
<td>-.08*</td>
<td>.09</td>
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<td>Amphetamines</td>
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<td>.11</td>
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<td>Pressure</td>
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Note: * significant at $p < .05$; all other correlations significant at $p < .01$.


(table continues)
### Table (continued)

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<td>9.  Peer use</td>
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<td>-.22</td>
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<td>-.24</td>
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<tr>
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<td></td>
<td></td>
<td>.43</td>
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<tr>
<td>13. Discipline</td>
<td></td>
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</table>

**Note**: * significant at p < .05; all other correlations significant at p < .01.
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<tbody>
<tr>
<td>1. Beer</td>
<td>.51</td>
<td>.35</td>
<td>.39</td>
<td>.29</td>
<td>.21</td>
<td>.25</td>
<td>.33</td>
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<td>.51</td>
<td>.18</td>
<td>.23</td>
<td>.24</td>
<td>.08*</td>
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<tr>
<td>2. Tobacco</td>
<td>.52</td>
<td>.34</td>
<td>.39</td>
<td>.30</td>
<td>.37</td>
<td>.21</td>
<td>.29</td>
<td>.42</td>
<td>.10</td>
<td>.14</td>
<td>.11</td>
<td>.09</td>
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<td></td>
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<tr>
<td>3. Marijuana</td>
<td>.31</td>
<td>.54</td>
<td>.51</td>
<td>.57</td>
<td>.13</td>
<td>.24</td>
<td>.34</td>
<td>.09</td>
<td>.13</td>
<td>.12</td>
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<tr>
<td>4. Inhalants</td>
<td>.38</td>
<td>.33</td>
<td>.31</td>
<td>.16</td>
<td>.27</td>
<td>.34</td>
<td>.12</td>
<td>.13</td>
<td>.17</td>
<td>ns</td>
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<tr>
<td>5. Hallucinogens</td>
<td>.75</td>
<td>.67</td>
<td>.16</td>
<td>.18</td>
<td>.31</td>
<td>.06*</td>
<td>.15</td>
<td>.09</td>
<td>ns</td>
<td></td>
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</tr>
<tr>
<td>6. Cocaine</td>
<td>.65</td>
<td>.13</td>
<td>.17</td>
<td>.30</td>
<td>.06*</td>
<td>.15</td>
<td>.10</td>
<td>ns</td>
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</tr>
<tr>
<td>8. Impulsivity</td>
<td>.45</td>
<td>.43</td>
<td>.17</td>
<td>.24</td>
<td>.19</td>
<td>.14</td>
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</table>

**Note:** * significant at p < .05; all other correlations are significant at p < .01; variables 9: aggression; 10: delinquency; 11: withdrawal; 12: somatization; 13: depression; 14: self-efficacy.

(table continues)
Table (continued)

<table>
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<tr>
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<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
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<tbody>
<tr>
<td>9. Aggression</td>
<td>.72</td>
<td>.43</td>
<td>.48</td>
<td>.55</td>
<td>ns</td>
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<tr>
<td>10. Delinquency</td>
<td>.33</td>
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<td>12. Somatization</td>
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<td>.59</td>
<td>-.12</td>
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<tr>
<td>13. Depression</td>
<td></td>
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<td>-.30</td>
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<tr>
<td>14. Self-efficacy</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: * significant at p < .05; all other correlations are significant at p < .01.
APPENDIX B: Questionnaire
Demographic Information

1. Your birthdate: month: ______ day: ______ year: ______

2. Your grade in school: 8th 7th

3. Do you have brothers and sisters who live with you, and how old are they?

   Brothers:
<table>
<thead>
<tr>
<th>age?</th>
<th>live at home?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Y</td>
</tr>
<tr>
<td>2.</td>
<td>Y</td>
</tr>
<tr>
<td>3.</td>
<td>Y</td>
</tr>
<tr>
<td>4.</td>
<td>Y</td>
</tr>
<tr>
<td>5.</td>
<td>Y</td>
</tr>
</tbody>
</table>

   Sisters:
<table>
<thead>
<tr>
<th>age?</th>
<th>live at home?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Y</td>
</tr>
<tr>
<td>2.</td>
<td>Y</td>
</tr>
<tr>
<td>3.</td>
<td>Y</td>
</tr>
<tr>
<td>4.</td>
<td>Y</td>
</tr>
<tr>
<td>5.</td>
<td>Y</td>
</tr>
</tbody>
</table>

4. Half-siblings have the same natural mother but different natural fathers. Do you have a half-sibling?
   ___ Yes   ___ No

5. a) FIRST, put a check mark next to the adults you live with most of the time.
   b) SECOND, circle whether they work outside the home.
   c) THIRD, write the highest level of education each person has (for example, some high school, high school graduate, some college, more than college degree).
   d) LAST, write the job each person has.

<table>
<thead>
<tr>
<th>Adult: Work Outside the home:</th>
<th>Education:</th>
<th>Job/Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>mom</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>dad</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>stepmom</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>stepdad</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>mom's boyfriend</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>dad's girlfriend</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>grandma</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>grandpa</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>other (who:</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

6. Are you a twin? ___yes ___no

7. Are you adopted? ___yes ___no
8. What is your ethnic background? (you may check all that apply):
   ___Hispanic  ___Native American
   ___White, non-Hispanic (tribe:_______)
   ___African American (Black)
   ___Asian

9. Did either of your parents come to the United States from another country?  Y  N

10. Do your parent(s) speak a language other than English?  Y  N

11. Are you new this year to Amphitheater school district?  Y  N

12. Are you new this year to your present school?  Y  N

13. What elementary school(s) did you go to, and for which grade(s)?
   1. __________________________ grade(s):__________
   2. __________________________ grade(s):__________
   3. __________________________ grade(s):__________

14. Have you ever a) heard of or b) participated in any of the following programs?

   Heard of:  Participated in:
   1. DARE  Y  N  Y  N
   2. CHAMPS Y  N  Y  N
   3. PEPS  Y  N  Y  N

15. Have the adult(s) you live with ever talked to you about Project Pride?  Y  N

16. Did your teacher(s) in elementary school ever talk to you about the harmful effects of drugs on your body?
   No  One or a few teachers talked about effects of drugs on my body  Many of my teachers talked about
effects of drugs on my body

17. Did your teacher(s) in elementary school ever talk to you about feeling good about yourself without using drugs?
   No  One or a few teachers talked about feeling good about myself without drugs  Many of my teachers talked about
feeling good about myself without drugs

18. Did your teacher(s) in elementary school ever talk to you about how to make friends?
   No  One or a few teachers talked about making friends  Many of my teachers talked about making friends

19. Did your teacher(s) in elementary school ever talk about Project Pride?
   No  One or a few teachers talked about Project Pride  Many of my teachers talked about Project Pride
20. What do you usually or most often do after school? (check one)
   ___ go home (alone)
   ___ go home and an adult is there
   ___ go home and brothers/sisters are there (no adult)
   ___ friend(s) come to my house (no parent home)
   ___ friend(s) come to my house (parent is home)
   ___ go to a friend's house (no parent home)
   ___ go to a friend's house (parent is home)
   ___ hang out with friends (not at home)
   ___ go to the mall
   ___ participate in a school activity such as a sport or band

21. Teams or organizations you belong to this year:

   1. ______________________  4. ______________________
   2. ______________________  5. ______________________
   3. ______________________  6. ______________________

22. What grades do you usually get on your report card?

   A   ___ A/B   ___ B   ___ B/C   ___ C   ___ C/D   ___ D   ___ F   ___

23. How often do you get in trouble at school?

   never   once or more than once
   twice ever   about twice ever
   a month   a week or more

24. How many times have you been absent from school this year?

   less than 5 times   5-10 times   11-15 times   More than 15 times

We would like to know more about teenagers and their friends. For each of the following questions, circle the response that best describes you.

1. Some kids are teasing your friend. Telling them to stop is ______ for you.
   Hard   Sort of hard   Sort of easy   Easy

2. Some kids want to play a game. Asking them if you can play is ______ for you.
   Hard   Sort of hard   Sort of easy   Easy

3. A kid tries to take your turn during a game. Telling the kid it's your turn is ______ for you.
   Hard   Sort of hard   Sort of easy   Easy
4. Some kids are going to lunch. Asking if you can sit with them is ___ for you.
   Hard Sort of hard Sort of easy Easy
5. A kid cuts in front of you in line. Telling the kid not to cut in is ___ for you.
   Hard Sort of hard Sort of easy Easy
6. A kid wants to do something that will get you into trouble. Asking the kid to do something else is ___ for you.
   Hard Sort of hard Sort of easy Easy
7. Some kids are making fun of someone in your classroom. Telling them to stop is ___ for you.
   Hard Sort of hard Sort of easy Easy
8. Some kids need more people to be on their teams. Asking to be on a team is ___ for you.
   Hard Sort of hard Sort of easy Easy
9. You have to carry some things home after school. Asking another kid to help you is ___ for you.
   Hard Sort of hard Sort of easy Easy
10. A kid always wants to be first when you play a game. Telling the kid you are going first is ___ for you.
   Hard Sort of hard Sort of easy Easy
11. Your class is going on a trip and everyone needs a partner. Asking someone to be your partner is ___ for you.
    Hard Sort of hard Sort of easy Easy
12. A kid does not like your friend. Telling the kid to be nice to your friend is ___ for you.
    Hard Sort of hard Sort of easy Easy
13. You are working on a project. Asking another kid to help is ___ for you.
    Hard Sort of hard Sort of easy Easy
14. Some kids are using your play area. Asking them to move is ___ for you.
    Hard Sort of hard Sort of easy Easy
15. Some kids are deciding what to do after school. Telling them what you want to do is ___ for you.
    Hard Sort of hard Sort of easy Easy
16. A group of kids wants to play a game that you don't like. Asking them to play a game you like is ____ for you.
   - Hard
   - Sort of hard
   - Sort of easy
   - Easy

17. Some kids are planning a party. Asking them to invite your friend is ____ for you.
   - Hard
   - Sort of hard
   - Sort of easy
   - Easy

18. A kid is yelling at you. Telling the kid to stop is ____ for you.
   - Hard
   - Sort of hard
   - Sort of easy
   - Easy

Substance Use Survey

1. What do you call stopping drug abuse before it starts?
   a. Prevention
   b. Treatment
   c. Tolerance
   d. Intervention

2. Which of these drugs have no known side effects?
   a. Aspirin
   b. Codeine
   c. Marijuana
   d. Alcohol
   e. All of these have side effects
   f. None of these have side effects

3. Have you had any serious problems because of your use of alcohol or drugs?
   a. Yes
   b. No
   c. I don't use alcohol or drugs

4. Have you ever come to school high on drugs or alcohol?
   a. Yes, frequently
   b. Yes, occasionally
   c. Yes, once or twice
   d. Never

5. How often do your close friends drink beverage alcohol?
   a. Often
   b. Occasionally
   c. Rarely
   d. Never

6. Have you ever used alcohol or drugs during school?
   a. Yes, frequently
   b. Yes, occasionally
   c. Yes, once or twice
   d. No

7. The first time most people try illegal drugs is usually with:
   a. Drug dealers
   b. Family
   c. Friends
   d. Alone

8. Have you ever been intoxicated (buzzed, drunk, high) on alcohol?
   Y  N
9. Have you ever taken sips of beer or wine with your parents' consent?  Y  N

10. How many times in your life have you used each of the following drugs?

<table>
<thead>
<tr>
<th>Drug</th>
<th>Never</th>
<th>1-2 times</th>
<th>3-9 times</th>
<th>10-39 times</th>
<th>40 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer/Alcohol</td>
<td></td>
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<tr>
<td>Tobacco</td>
<td></td>
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<tr>
<td>Inhalants (glue, gas, rush, paralyzing)</td>
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<tr>
<td>(inappropriately used)</td>
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<tr>
<td>Marijuana</td>
<td></td>
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<tr>
<td>Hallucinogens</td>
<td></td>
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<tr>
<td>(LSD, PCP, acid, angel dust, mushrooms)</td>
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<tr>
<td>Cocaine/Crack</td>
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<tr>
<td>Amphetamines (speed, crank, crystal, ice)</td>
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</table>

11. Please indicate how often you use each of the following drugs:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Never</th>
<th>Once a year</th>
<th>1-2 times a month</th>
<th>1-2 times a week</th>
<th>Daily</th>
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<tbody>
<tr>
<td>Alcohol</td>
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<td>Tobacco</td>
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<tr>
<td>Inhalants</td>
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<tr>
<td>Marijuana</td>
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<td></td>
<td></td>
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<tr>
<td>Hallucinogens</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td></td>
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<tr>
<td>Amphetamines</td>
<td></td>
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</tbody>
</table>

12. If you had enough money and wanted to buy the following drugs, could you?

<table>
<thead>
<tr>
<th>Drug</th>
<th>Yes, easily</th>
<th>Yes, with Difficulty</th>
<th>Maybe</th>
<th>No</th>
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<tr>
<td>Cigarettes</td>
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<tr>
<td>Marijuana</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Beer/Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crack/Cocaine</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
The following are some situations you might find yourself in with your close friends. What would you really do in each situation?

1. Some of your close friends want you to have a party this weekend because your parents won’t be home. If your parents found out, you’d be in big trouble, but your friends want you to have the party anyway. Would you have the party?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

2. You’re out shopping with some of your close friends and they decide to take some clothing without paying for it. You don’t think it’s a good idea, but they say you should take one too. Would you take clothing without paying for it?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

3. You and your close friends find a sheet with the answers to a test you’re having tomorrow. They decide to study from it, but you don’t think it’s a good idea. Would you study from the sheet with your friends?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

4. You and some of your close friends find a car with the keys in the door, and they decide to take it for a ride. You don’t think it’s a good idea, but they tell you to hop in or they will leave you. Would you go in the car with your friends?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

5. Some of your close friends have some beer and they want you to drink it with them. You don’t think it’s a good idea, but they say you probably won’t get caught. Would you drink beer with your friends?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

6. You and a couple of your best friends meet at the school one day after supper. No one is around and your friends decide that you should all write on the walls of the school. You don’t think it’s a good idea, but your friends tell you to do it anyway. Would you write on the walls with your friends?
   - Definitely would
   - Probably would
   - Probably would not
   - Definitely would not

Circle the answer that best describes you for each of the following questions:

1. How often do you wear clothing with your school name or mascot on it?
   - Never
   - Sometimes
   - Often

2. How much ‘school spirit’ do you have?
   - None
   - A little
   - A lot

3. How often do you attend school events, such as football games, dances, or concerts?
   - Never
   - Sometimes
   - Often
4. How important is it to you to get good grades in school?
   a. Not important  b. Somewhat important  c. Very important

5. What is the most school you plan to complete?
   a. 9th grade  b. Vocational School  c. 10th grade  d. Two year college degree  e. 11th grade  f. Four year college degree  g. 12th grade  h. More than four years college

6. How often do your parent(s) help you with your homework?
   a. Never  b. Sometimes  c. Often  d. Always

7. How often do your parent(s) attend school events, such as football games, dances, or concerts?
   a. Never  b. Sometimes  c. Often  d. Always

8. How important is it to your parent(s) that you get good grades in school?
   a. Not important  b. Somewhat important  c. Very important

9. Do you have an older brother or sister who helps you with your homework?
   a. Don't have older brother or sister  b. Brother or Sister doesn't help  c. Brother or Sister helps a little  d. Brother or Sister helps a lot

For each of the following questions, circle the response that best describes you:

1. I think planning takes the fun out of things.
   a. Strongly agree  b. Agree  c. Neither agree or disagree  d. Disagree  e. Strongly disagree

2. I have to use a lot of self-control to keep out of trouble.
   a. Strongly agree  b. Agree  c. Neither agree or disagree  d. Disagree  e. Strongly disagree

3. I enjoy taking risks.
   a. Strongly agree  b. Agree  c. Neither agree or disagree  d. Disagree  e. Strongly disagree

4. Life with no danger in it would be too dull for me.
   a. Strongly agree  b. Agree  c. Neither agree or disagree  d. Disagree  e. Strongly disagree

5. I enjoy new and exciting experiences if they are a little frightening or unusual.
   a. Strongly agree  b. Agree  c. Neither agree or disagree  d. Disagree  e. Strongly disagree
Below is a list of items that describe kids. For each item that describes you now or within the past 6 months, please circle the 2 if the item is very true or often very true of you. Circle the 1 if the item is somewhat true of you. If the item is not true of you, circle the 0.

- 0 = Not true  
- 1 = Somewhat or Sometimes True  
- 2 = Very True or Often True

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>I argue a lot</td>
<td>2</td>
</tr>
<tr>
<td>I brag</td>
<td>2</td>
</tr>
<tr>
<td>I feel lonely</td>
<td>2</td>
</tr>
<tr>
<td>I cry a lot</td>
<td>2</td>
</tr>
<tr>
<td>I am mean to others</td>
<td></td>
</tr>
<tr>
<td>I deliberately try to hurt or kill myself</td>
<td>2</td>
</tr>
<tr>
<td>I try to get a lot of attention</td>
<td>2</td>
</tr>
<tr>
<td>I destroy my own things</td>
<td>2</td>
</tr>
<tr>
<td>I destroy things belonging to others</td>
<td></td>
</tr>
<tr>
<td>I disobey at school</td>
<td></td>
</tr>
<tr>
<td>I don't feel guilty after doing something I shouldn't</td>
<td>2</td>
</tr>
<tr>
<td>I am jealous of others</td>
<td>2</td>
</tr>
<tr>
<td>I am afraid I might think or do something bad</td>
<td>2</td>
</tr>
<tr>
<td>I feel that I have to be perfect</td>
<td>2</td>
</tr>
<tr>
<td>I feel that no one loves me</td>
<td>2</td>
</tr>
<tr>
<td>I feel that others are out to get me</td>
<td>2</td>
</tr>
<tr>
<td>I feel worthless or inferior</td>
<td>2</td>
</tr>
<tr>
<td>I get in many fights</td>
<td>2</td>
</tr>
<tr>
<td>I hang around with kids who get into trouble</td>
<td>2</td>
</tr>
<tr>
<td>I like to be alone</td>
<td>2</td>
</tr>
<tr>
<td>I lie or cheat</td>
<td></td>
</tr>
<tr>
<td>I am nervous or tense</td>
<td>2</td>
</tr>
<tr>
<td>I am too fearful or anxious</td>
<td>2</td>
</tr>
<tr>
<td>I feel dizzy</td>
<td>2</td>
</tr>
<tr>
<td>I feel too guilty</td>
<td>2</td>
</tr>
<tr>
<td>I eat too much</td>
<td>2</td>
</tr>
<tr>
<td>I feel over tired</td>
<td>2</td>
</tr>
</tbody>
</table>

Physical problems without known medical cause:

- Aches or pains
- Headaches
- Nausea, feel sick
- Problems with eyes
- Rashes or other skin problems
- Stomachaches or cramps
- Vomiting, throwing up
<table>
<thead>
<tr>
<th>Item</th>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: Not true</td>
<td>1: Somewhat or Sometimes True</td>
<td>2: Very True or Often True</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I physically attack people</td>
<td>I would rather be with older kids than with kids my own age</td>
<td>I refuse to talk</td>
</tr>
<tr>
<td>I run away from home</td>
<td>I scream a lot</td>
<td>I am secretive or keep things to myself</td>
</tr>
<tr>
<td>I am self-conscious or easily embarrassed</td>
<td>I set fires</td>
<td>I show off or clown</td>
</tr>
<tr>
<td>I am shy</td>
<td>I steal things at home</td>
<td>I steal things from places other than home</td>
</tr>
<tr>
<td>I am stubborn</td>
<td>My moods or feelings change suddenly</td>
<td>I am suspicious</td>
</tr>
<tr>
<td>I swear or use dirty language</td>
<td>I think about killing myself</td>
<td>I tease others a lot</td>
</tr>
<tr>
<td>I have a hot temper</td>
<td>I threaten to hurt people</td>
<td>I cut classes or skip school</td>
</tr>
<tr>
<td>I don’t have much energy</td>
<td>I am unhappy, sad, or depressed</td>
<td>I am louder than other kids</td>
</tr>
<tr>
<td>I am self-conscious or easily embarrassed</td>
<td>I use alcohol or drugs for nonmedical purposes</td>
<td>I keep from getting involved with others</td>
</tr>
<tr>
<td>I worry a lot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We would like to learn more about teenagers and their parents. For each question below, circle the response that best describes you and your parents.

1. How often do your parents know where you are when you are not in school?

Never  Sometimes  Usually  Always

2. Is it important for your parents to know where you are all the time?

Not  A little  Pretty  Very
Important  Important  Important  Important

3. How important is it for your parents to know who your friends are?

Not  A little  Pretty  Very
Important  Important  Important  Important
4. Does your parent or guardian make you come home at a certain time at night?
   Never  Sometimes  Usually  Always

5. Do your parents expect you to call home if you are going to be late or if you are going to be someplace different than you had planned?
   Never  Sometimes  Usually  Always

6. How often do you share your thoughts and feelings with your:
   a. Mother?
      Never  Sometimes  Often  Always  N/A
   b. Father?
      Never  Sometimes  Often  Always  N/A

7. How often do you really go to the place or activity that you tell your parents you are?
   Never  Sometimes  Most of the time  Always

8. When you have a problem, how often do you go to your:
   a. Mother?
      Never  Sometimes  Often  Always  N/A
   b. Father?
      Never  Sometimes  Often  Always  N/A

9. Do you and your parents discuss your family's rules?
   Never  Sometimes  Often  Always

10. Do your parents punish you if you break the rules?
     Never  Sometimes  Often  Always
APPENDIX C: Human Subjects Approval
December 5, 1991

Daniel J. Flannery, Ph.D.
Department of Family Studies
School of Family & Consumer Resources (221C)
Main Campus

RE: HSC 491.111 EVALUATION OF A SUBSTANCE ABUSE PREVENTION PROGRAM

Dear Dr. Flannery:

We received your 27 November 1991 letter and accompanying parental consent form for your above referenced project. The procedures to be followed in this study pose no more than minimal risk to participating subjects. Regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)] authorize approval of this type project through the expedited review procedures, with the condition(s) that subjects' anonymity be maintained. Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved effective 5 December 1991 for a period of one year.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

William F. Denny, M.D.
Chairman
Human Subjects Committee

cc: Departmental/College Review Committee
REFERENCES


