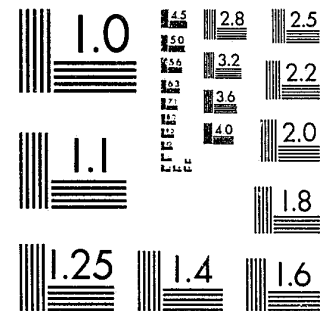


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**EARLY RISK FACTORS FOR ADOLESCENT SUBSTANCE ABUSE:
A REVIEW OF ETIOLOGY AND THEORY**

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ABSTRACT

Research on the etiology of adolescent substance use and abuse indicates that risk factors include early variety and frequency of antisocial problems in the elementary grades, poor and inconsistent parental family management practices, school adjustment problems such as poor academic performance and a low degree of commitment to education, association with deviance-prone peers, a low degree of social bonding to prosocial others, positive beliefs regarding the acceptability of substance use, and early onset of substance use. It is hypothesized that these risk factors interact developmentally. However the dynamics of these interactions are not well understood. A theory is presented, the Social Development Model, which integrates the existing research knowledge regarding risk factors and predictors of substance use and abuse into a causal model, and which identifies points of intervention which should be addressed in prevention and treatment efforts.

Early Risk Factors for Adolescent Substance Abuse:

A Review of Etiology and Theory

While a great deal of research has been conducted on the predictors of adolescent drug involvement, gaps exist in the etiological research which hinder efforts to develop effective prevention strategies which target etiological risk factors for drug involvement. This article reviews the research on the etiology of drug use and abuse among adolescents, provides a theoretical framework which integrates knowledge of childhood predictors and which can serve as a basis for early preventive efforts, and suggests areas for further research.

In designing prevention strategies, it is essential to decide what is to be prevented before determining with whom it is important to intervene, when it is most appropriate to intervene, and what intervention strategy should be used. Defining the outcome variable for prevention is key to the development of appropriate prevention interventions. It is likely that prevention strategies will vary according to the outcome of concern.

There are at least five broad definitions of the outcome variable in adolescent drug focused prevention. The first definition is that what should be prevented are drug using patterns which interfere with acceptable functioning in the family, at school, or in a work setting. Related to this is the view that what should be prevented is compulsive drug use associated with dysfunction in performing age appropriate roles in the society. In sum, the object of attention using this definition is drug abuse.

A second outcome that might be prevented is the regular use of psychoactive substances, whether or not this use can be shown to affect personal, social, educational or economic functioning in a particular case.

Patterns of use of substances such as tobacco may be considered dangerous even if they have not become abusive as defined above. The position here is that regular substance use should be prevented if associated with negative health consequences.

A third goal might be to prevent any use of psychoactive substances, regardless of whether patterns of use are regular or are accompanied by "problems." There are mixed views regarding this prevention goal. Some argue that any drug use in adolescence is undesirable and should be prevented (Durrell and Bukowski, 1982; McAlister et al., 1980). From this perspective, the desired outcome is abstinence. Others contend that some drug experimentation by adolescents is to be expected and reflects a transition in which major tasks include individual separation and identity formation. From this perspective, some risk taking or "experimentation" with drug use is statistically normative (Baumrind, 1984; Kandel, 1982; Penning and Barnes, 1982; Jalali et al., 1981). This view would suggest that the goal of prevention efforts should be to prevent experimentation from becoming abuse, (Gersick et al., 1981). On the other hand, those who assert that any drug use by adolescents should be prevented, seek to prevent experimental drug use.

A fourth prevention goal might be to delay the age at which individuals begin to use psychoactive substances. This goal may appear to be modest,

but it has both empirical and practical significance. Etiological studies have shown that early onset of alcohol and drug use predicts subsequent misuse of drugs. The earlier the onset of use of any drugs, the greater the involvement in use of other drugs (Kandel, 1982) and the greater the frequency of use (Fleming et al., 1982). Rachal and associates (1982) report that "misusers" of alcohol appear to begin drinking at an earlier age than do "users." Further, the earlier the initiation into drug use, the greater the probability of extensive and persistent involvement in the use of more dangerous drugs (Kandel, 1982), and the greater the involvement in deviant activities such as crime and selling drugs (Brunswick and Boyle, 1979; Kleinman, 1978; O'Donnell and Clayton, 1979). In their analysis of the Epidemiological Catchment Area Study data, Robins and Przybeck (1984) found that the onset of drug use prior to the age 15 was the only consistent predictor of later drug abuse in the samples they studied. A later age of onset of drug use is usually associated with lesser involvement as well as a greater likelihood of discontinuation of use (Kandel, 1976). Thus, a fourth possible outcome of concern in prevention is the "age of onset of use."

A final outcome which may be sought is the prevention of use of particular categories of substances, such as tobacco, marijuana, alcohol, or opiates. Certain substances are considered to be especially dangerous or undesirable. Moreover, different stages of drug use have been demonstrated in association with particular substances (Kandel, et al., 1978), and somewhat different predictors appear salient in the initiation of the use of different types of drugs. The use of alcohol generally precedes the use of marijuana while the use of marijuana appears to serve as a gateway to the use of other illicit drugs (Kandel, 1978). Thus, there may be important etiological

reasons for focusing on the prevention of a particular substance as the object of prevention attention, whether the objective is to delay onset, to prevent experimentation, to prevent regular use, or to prevent drug abuse.

If etiological research and theory are to guide prevention intervention, the clarification of the outcome variable for prevention intervention may be essential. There is evidence that different patterns of drug use at different developmental stages have different etiological origins (Kandel, 1982). Occasional use of drugs (i.e., experimentation) does not appear to be associated with antisocial personality (Robins, 1980). In contrast, drug abuse (using the first definition above), especially when it occurs in early and midadolescence, appears to be part of a general pattern of involvement in rebelliousness and non-conforming behaviors (Johnston, et al., 1978; Segal et al., 1979; Jessor and Jessor, 1978; Elliott, Huizinga and Ageton, 1982; Hindelang and Weis, 1972; Robins, 1980).

Epidemiological studies also suggest the possibility that the experimental use of drugs by most adolescents is a different phenomenon from the drug abuse which is associated with a deviance syndrome, conduct disorder, or antisocial personality. Johnston et al.'s (1982) annual surveys of high school seniors have shown that a majority of the class of 1981 (66 percent) had tried marijuana and 43 percent had tried other illicit drugs. These rates of lifetime prevalence of illicit drug use among high school seniors are far greater than the estimated rate of conduct disorders among boys, which ranges from 4 percent to 15 percent depending on the age of the subjects and the type of behaviors included (Loeber, 1982; Robins, 1979; Rutter, et al., 1970) The rates of drug experimentation also are far greater than the

prevalence of daily use of marijuana of 6.3 percent found by Johnston in the class of 1982. It appears reasonable to hypothesize that behaviors with such different rates in the population may arise from different etiological roots.

These considerations suggest that different strategies may be required depending on whether the goal is the prevention of drug abuse among adolescents or the prevention of experimentation with drugs. Strategies designed to prevent experimentation among those at low risk of developing serious antisocial personalities may be ineffectual in preventing initiation and use by those who exhibit a "deviance syndrome" (Jessor and Jessor, 1978). On the other hand, well founded strategies for preventing drug abuse among those at highest risk for this behavior may be inappropriate for those at risk only of becoming experimental users.

The following section seeks to distinguish etiological risk factors and theories of drug involvement as they relate to different interpretations of the outcome of interest, especially as they appear related to adolescent drug experimentation as opposed to adolescent drug abuse.

II. EARLY RISK FACTORS AND THE ETIOLOGY OF DRUG INVOLVEMENT

In this section, current knowledge regarding the childhood risk factors for adolescent drug use and abuse is reviewed.

A. Conduct Disorders And Antisocial Behavior

A number of studies have shown that problematic conduct which occurs early in childhood continues for certain groups of children (Loeber and Dishion, 1983; Gersten, Langner, Eisenberg, Simcha-Fagan, and McCarthy, 1976; Ghodsian, Fogelman, Lambert and Tibbenham, 1980; Patterson, 1982; Langner, Gersten, Wills and Simcha-Fagan, 1983; Robins, 1966; Werner and Smith, 1977; West and Farrington, 1973). As part of a constellation of antisocial behavior problems, drug abuse is predicted by previous patterns of antisocial behaviors.

Robins (1978) has found that the greater the variety, frequency, and seriousness of childhood antisocial behavior, the more likely it is that behavior will persist into adulthood. Proneness to problem-behavior and a deviance syndrome have been posited to explain drug use (Jessor and Jessor, 1978). The Jessors (1978) found that one could predict transitions of school aged children into drinking, loss of virginity, marijuana use and delinquency about equally well from whichever behavior appeared first, and concluded that similar antecedents foster a wide range of problem behaviors.

Early antisocial behavior has been found to predict adolescent substance use (Robins, 1978; Johnston, et al., 1978; Kandel, et al., 1978; Wechsler and Thum, 1973). In their sample of 1242 urban, black first grade students, Kellam and Brown (1982), found a positive correlation between first grade male aggressiveness, especially when coupled with shyness, and the frequency of substance use ten years later. Rebelliousness in children also is correlated with initiation of drug use (Smith and Fogg, 1978).

While not focused specifically on drug use, Spivack's (1983) longitudinal study of high risk early signs of delinquency similarly revealed that conduct disturbances in adolescence could be predicted from kindergarten and first grade signs of acting out, overinvolvement in socially disturbing behaviors, impatience, impulsivity, and acting defiant and negative.

Illicit drug use is related positively to other illegal behaviors (Johnston et al., 1978; Jessor et al., 1980). Delinquency has generally been found to occur prior to drug use (Johnston et al., 1978; Elliott et al., 1982). Frequent drug use is associated with lower personal controls against involvement in problem behavior, greater involvement in other forms of problem behavior, and lesser involvement in conventional behaviors (Jessor et al., 1980). Clausen has summarized the evidence: "One surmises that the identification of those who will be precocious in drug behavior might well be possible in terms of early signs of rebelliousness or precocity" (1978: 247).

The results of Loeber's (in press) review of patterns and development of antisocial behavior are consistent with our earlier suggestion that different etiological paths may be associated with early versus late initiation of drug use and with drug use as contrasted with drug abuse. Antisocial behavior is associated with early initiation of drinking. Those youths who begin drinking late in adolescence are less likely to engage in antisocial behavior. During adolescence, far more youths use psychoactive substances than engage in antisocial acts. Thus, substance use in late adolescence is probably not connected with antisocial behavior for a large majority of youths, and may reflect socially "acceptable" behavior given existing norms. In contrast, substance use in early adolescence is associated more frequently with

antisocial acts (Wechsler and Thum, 1973). As we have noted, early initiation of substance use is linked with a higher risk for substance abuse.

In summary, the evidence of a positive relationship between childhood antisocial behavior and subsequent drug abuse is relatively consistent. However, there are several caveats which should be noted. First, the earliest age at which childhood conduct disorders can be reliably identified as predictive of drug use or abuse is not clear. Typically, stable predictions of behavior have been found from the age of school entry, but not before (Rutter and Giller, 1983; Robins 1979). In this regard, it also should be noted that conduct disorders in the pre-school years do not appear predictive of adolescent conduct disorders in a normal population sample (Kagan and Moss, 1962). This may reflect the normal developmental aspects of very early behaviors such as temper outbursts during the pre-school years (Rutter and Giller, 1983; Macfarlane et al., 1954; Loeber in press).

Secondly childhood antisocial behavior appears to be less powerful as a predictor of either adult alcoholism (McCord, 1981) or self reported delinquency at age 18 (Farrington 1982; cited in Loeber, in press) than is antisocial behavior in early adolescence (Loeber, in press). In this regard, while serious conduct disorder in childhood appears to be virtually a prerequisite for serious antisocial personality problems (including drug abuse) in later life, less than half those with serious behavior problems in childhood will manifest serious antisocial behavior problems later (Robins, 1978). Loeber and Dishion (1983) report that 30-43 percent of children engaging in maladaptive behavior at ages 4 through 11 continue the same behavior 4 to 9 years later (Farrington, 1978, 1979; Ghodsian et al., 1980;

Glavin, 1972; Janes et al., 1979; Werner and Smith, 1977.) Thus, there is a considerable risk of false positives in identifying future drug abusers based on earlier conduct disorders. Finally, it should be emphasized that the childhood antisocial behaviors we are discussing here appear most strongly related to serious behavior problems (including subsequent drug abuse) later in life and appear to be much less strongly related to occasional or experimental use of drugs or alcohol in late adolescence.

If the goal is to prevent serious maladaptive behavior associated with drug abuse in adolescence, then it may be desirable from an etiological perspective to focus prevention efforts on those youth who manifest conduct disorders including aggressive and other antisocial behaviors during the elementary grades. On the other hand, if the goal is to prevent experimentation with drugs or to delay the age of experimentation in the general population, such highly focused efforts likely will be ineffectual.

The finding that serious antisocial behavior in the elementary grades predicts subsequent drug abuse hardly seems to trace the problem to its ultimate etiological roots. What are the origins of the antisocial behavior? Several possible sources appear to have been ruled out. Though ecological relationships may exist, socioeconomic status and ethnicity do not appear to be major sources of severe antisocial behavior (Robins, 1978). The literature on the effects on substance use of race/ethnicity, SES, and family structure is generally unresponsive, contradictory, or inconclusive (Gersick et al., 1981; Penning and Barnes, 1982; Loeber and Dishion, 1983; Kandel, 1982). Kandel (1978) concludes that sociodemographic factors have little predictive power. Gersick and associates (1981) suggest that the research

evidence supports a move away from a focus on sociodemographic factors to more integrative theories of social contexts and issues.

B. Family Factors

Family factors are strongly implicated in the etiology of adolescent drug abuse. To the extent that adolescent drug abuse is part of a constellation of deviant behaviors including delinquency, the literature on the prediction of delinquency appears salient. Among the most important childhood predictors of delinquency are composite measures of family functioning (Loeber and Dishion, 1983), parental family management techniques (West and Farrington, 1973; Baumrind, 1983), and parental criminality or antisocial behavior (Langner, et al., 1983; Loeber and Dishion, 1983; Osborn and West, 1979). Disruptions in family behavior management are a major mediating variable for antisocial behavior in children (Patterson, 1982). Variables associated with antisocial problems include disorganized households and those with poorly defined rules and inconsistent, ineffective family management techniques. Loeber and Schmaling (in press) found in a sample of 195 boys, that boys who engaged in both overt antisocial behaviors (fighting) and covert antisocial behaviors (e.g., stealing and drug use) came from families with the greatest disturbance in child rearing practices.

Looking more specifically at adolescent drug use, positive family relationships, involvement and attachment appear to discourage youths' initiation into drug use (Adler and Lutecka, 1973; Wechsler and Thum, 1973; Shibuya, 1974; Jessor and Jessor, 1977; Kim, 1979). Kandel (1982) found that

parental influence varies with the stages of drug use she identified. Parental role modeling of alcohol use is positively associated with adolescent use of alcohol, while the quality of the family relationship is inversely related to the use of illicit drugs other than marijuana. According to Kandel (1982) three parental factors help to predict initiation into drug use: parent drug using behaviors (see also Kim, 1979); parental attitudes about drugs; and parent-child interactions, notably, lack of closeness (see also Mercer et al., 1976; Kandel et al., 1978; Kim, 1979; Brooks et al., 1980), lack of maternal involvement in activities with children, lack of or inconsistent parental discipline (see also Braucht et al. 1973; Blum et al., 1972; Baumrind, 1983; Penning and Barnes, 1982), and low parental educational aspirations for their children. Stanton and Todd (1979) and Ziegler-Driscoll (1979) suggest that familial risk factors include a pattern of overinvolvement by one parent and distance or permissiveness by the other. Kaufman and Kaufman (1979) similarly describe families with drug abusing children as ones in which fathers are "disengaged" and mothers are "enmeshed."

Baumrind (1983) classified parenting styles as authoritative, authoritarian, or permissive, and found that children who are highly prosocial and assertive generally come from authoritative families. She suggested that family antecedents which discriminate types of drug users include conventionality, family disruption, and parent non-directiveness. Reilly (1979) found that common characteristics of families with adolescent drug abusers include negative communication patterns (criticism, blaming, lack of praise), inconsistent and unclear behavioral limits, denial of the child's drug use,

unrealistic parental expectations, family-self medication, and miscarried expressions of anger.

Some researchers have associated parental substance use with drug use by adolescents (Stanton and Todd, 1979; Ziegler - Driscoll, 1979). While Kandel notes that marijuana use by peers is a better predictor of subsequent involvement with drugs than parents' use (Kandel, 1973, 1974, 1975), she found parental self-reports of substance use related to initiation of use by their adolescent children (Kandel, et al., 1978). Similar findings have been reported for adolescent drinking habits (Rachal, et al., 1980, 1982; Zucker, 1976). A consistent correlation between adolescent drug abuse and parents' use of alcohol and other legal drugs has also been shown (Bushing and Bromley, 1975; Lawrence and Velleman, 1974). A review by Stanton (1979) showed that a disproportionate number of heroin addicts have fathers with a drinking problem (Cannon, 1976; Ellinwood et al., 1966), that marijuana users frequently have fathers who use alcohol and tobacco and mothers who use tranquilizers (McGlothlin, 1975), and that parents of marijuana users have elevated rates of use of tranquilizers, barbiturates and stimulants (Smart and Fejer, 1972). Importantly, Tec (1974) found that parental drug use in a rewarding family structure only slightly promotes extensive marijuana use, while in an unrewarding context there is a clearer association between drug use by parents and their children.

Little research has been conducted on the effects of familial violence and abuse on adolescent drug involvement. Several studies have suggested a relationship between child abuse and delinquency (Timberlake, 1981; Steele, 1976; Pfouts et al., 1981; Garbarino, 1981). When case records of abused

and neglected children were checked over twelve years later, 30 percent were discovered to be delinquent or in need of supervision (Alfara, 1976). Excessively severe, physically threatening, and physically violent parental discipline have been associated with aggressive and destructive acts of delinquency (Deykin, 1971; Shore, 1971; Haskell and Yablonsky, 1974). However, to our knowledge there have been no longitudinal studies assessing the impact of child abuse on subsequent drug use and abuse.

While some researchers have found that non-intact families predict subsequent drug use (Robins, 1980; Baumrind, 1983; Penning and Barnes, 1982), there is disagreement on this point. Family structure appears to be less important as a predictor of delinquency than attachment to parents (Nye, 1958; Sederstrom, 1978; Wilkinson, 1974; Weis et al., 1980).

The findings are consistent regarding the effects of the quality and consistency of family management, family communication and parent role modeling on children's substance use (Baumrind, 1983; Patterson, 1982; Stanton, 1982; Mercer et al., 1976; Kandel et al., 1978; Penning and Barnes, 1982). Given the consistency of these findings, family management, communication and role modeling represent risk factors which should not be ignored in developing theories of the etiology of adolescent drug initiation and abuse.

There is disagreement as to the relative strength of the early childhood predictors we have discussed so far. From their review, Loeber and Dishion (1983) assert that, on the whole, composite measures of family management techniques appear to be stronger early age predictors of subsequent

delinquency, while Robins (1980) asserts that prior misconduct is a stronger predictor of antisocial behavior than family disorders. It should be noted, however, that Robins did not have access to independent prospective measures of families' functioning and management. Langner and associates (1983) argue that prior antisocial behavior is a better predictor of later behavior, but that family environment variables are better predictors of later adverse outcomes in school or with the police. These differences in findings across studies may reflect different measurement approaches. Alternately, it is possible that early behavior is a more proximate variable to later behavior which mediates between family characteristics and the later behavior. Regardless, it would appear that interventions seeking to prevent either early onset of substance use or substance abuse by adolescents should include a focus on family factors prior to adolescence.

C. School Factors

The research on the relationship between school experiences in childhood and adolescent drug use has produced mixed results. Several researchers have attributed an independent effect to school failure as a predictor of drug abuse (Robins, 1980; Anhalt and Klein, 1975; Jessor, 1976; Brook et al., 1977; Galli and Stone, 1975). There is considerable evidence that male drug abuse and delinquency are related to academic performance in junior and senior high school (Linden, 1974; Noblit, 1976; Polk and Shafer, 1972; Elliott and Voss, 1974; Jensen, 1976; Johnson, 1979; Kelly and Balch, 1971; Brook et al., 1977). Poor school performance is a common antecedent of initiation into drugs (Jessor and Jessor, 1977; Kandel et al., 1978; Johnston, 1973), and has been found to predict subsequent use and levels of use of illicit drugs

(Smith and Fogg, 1978). Drug users and juvenile delinquents appear to perform more poorly in junior and senior school than do non-users and non-delinquents (Kelly and Balch, 1971; Polk et al., 1974; Frease, 1973; Senna et al., 1974; Simon, 1974; Anhalt and Klein, 1976; Jessor, 1976), although this relationship has not been found for marijuana use among college students (Miranne, 1979). Robins (1980) characterizes drug users as underachievers with high I.Q. test scores.

What is not clear from the existing research is when, developmentally, school achievement becomes salient as a possible predictor of drug use. While underachievement and school failure have been positively linked to adolescent substance use and delinquency, Fleming et al., (1982) found that children who scored high on first-grade readiness and I.Q. tests exhibited earlier and more frequent use of alcohol and marijuana as adolescents. These students were more than twice as likely to become frequent users. Teacher-rated learning problems in first grade were not related to future substance use when shyness and aggressiveness were controlled. Aggressiveness in the Woodlawn sample of first graders was invariably accompanied by learning problems, but learning problems frequently occurred without aggressiveness and did not alone predict subsequent drug use (Kellam and Brown, 1982). Similarly, Spivack et al. (1978; Spivack, 1983) determined that initial signs of academic achievement in the first-grade were not predictive of subsequent conduct or delinquent disturbances. Other studies indicate that by the end of elementary school, low achievement, low vocabulary, and poor verbal reasoning are predictors of delinquency (Farrington, 1979; Rutter et al., 1979). Kandel (1981) suggests that low school performance does not itself lead to drug use, but that the

factors leading to poor school performance are related to drug involvement. We have already noted that first grade teacher ratings of antisocial behaviors are good predictors of later drug abuse and delinquency. These findings suggest that social, as contrasted to academic, adjustment is more important in the first grade as a predictor of later serious drug abuse. Academic performance appears to emerge in importance as a predictor sometime after the first grade. It is possible that early antisocial behavior in school predicts both academic underachievement in later grades and later drug abuse.

This suggestion is consistent with Spivack's (1983) results regarding the role of school failure in the prediction of delinquency. While early academic failure (in first grade) did not predict delinquency in Spivack's study, academic failure beginning in grade 5 did predict subsequent community delinquency among males. Spivack found that antisocial and maladaptive coping behaviors in earlier school grades contributed to academic failure in late elementary grades, which in turn, contributed to subsequent misconduct and delinquency. With regard to delinquency, Spivack (1983) concluded that academic failure in the late elementary grades exacerbates the effects of poor self-regulation among youths who are unsuccessful in adapting to the socialization demands in the early school grades.

Theorists have interpreted the association between school failure and drug use and delinquency as a function of dislike of school and consequent rejection of authority (Hirschi, 1969), and as a search for reinforcements from drug using peers resulting from school failure and low self-esteem (Kaplan et al., 1982, Catalano, 1982; Gold, 1978; Cohen and Short, 1961).

There is evidence that a low degree of commitment to education also is related to drug use and delinquency. Students who are not committed to educational pursuits are more likely to engage in drug use and delinquent behavior (Hirschi, 1969; Elliott and Voss, 1974; Kim, 1979; Friedman, 1983; Galli and Stone, 1975; Robins, 1980; Brook et al., 1977). Csikszentmihalyi and Larson (1978) suggest that when opportunities for challenge in the schools do not match students' skills, antisocial behavior may provide a relief from boredom and an alternative framework for experiencing challenge and rewards. Johnston's annual surveys of high school seniors (Johnston et al., 1981, 1982) show that the use of hallucinogens, cocaine, heroin, stimulants, sedatives or nonmedically prescribed tranquilizers is significantly lower among those students who expect to attend college than among those who do not plan to go on to college. Drug users are more likely to be absent from school, cut classes, and perform poorly than non-users (Brook et al., 1977; Kandel, 1982; Kim, 1979). Greater drug use has been demonstrated among dropouts (Annis and Watson, 1975). Factors such as how much students like school (Kelly and Balch, 1971), time spent on homework, and perception of the relevance of coursework are also related to levels of drug use (Friedman, 1983), confirming a negative relationship between commitment to education and drug use at least in junior and senior high school grade levels.

D. Peer Factors

Association with drug using peers during adolescence is among the strongest predictors of adolescent drug use (Akers, 1977; Akers et al., 1979; Elliott et al., 1982; Hirschi, 1969; Jensen, 1972; Jessor et al., 1980; Kandel and Adler,

1982; O'Donnell and Clayton, 1979; Kandel, 1982; Catalano, 1982; Huba et al., 1979; Winfree et al., 1981; Meier and Johnson, 1977; Ginsberg and Greenley, 1978; Orcutt, 1978; Smart et al., 1978; Jessor and Jessor, 1977; Goldstein, 1975; O'Donnell, et al., 1976; Kaplan et al., 1982). Drug behavior and drug-related attitudes of peers are among the most potent predictors of the early stages of drug involvement (Kandel, 1978). Peer influences are particularly important for initiation into the use of marijuana (Kandel et al., 1978). Perceived use of substances by others is also a strong predictor of use (Jessor and Jessor, 1978; Robins et al., 1979; Kandel, Kessler and Margulies, 1978). It has been reported that frequent users of marijuana have a greater orientation towards friends than parents, and greater perceived support and models for use (Jessor et al., 1978). Use of marijuana is strongly associated with use by closest friends and perceived support for use (Penning and Barnes, 1982). Social settings favorable to substance use reinforce and increase any predisposition to use (Kandel, 1978). Jessor et al. (1980) found that perceived environmental predictors (such as friends as models for use) accounted for twice as much of the variance in use as did personality factors.

In their longitudinal study of the National Youth Panel, Elliott et al., (1982) found only indirect effects on drug use of social bonds to family and school. Strong bonds to family and school decrease the likelihood of involvement with drug-using and delinquent peers (1982: 142). They found no direct effects of family and school bonding on drug use or delinquency, and suggest that this reflects the time ordering of youths' experiences in the social contexts they encounter. The strength of bonding to family and school is determined prior to exposure to drug using peers in adolescence. However,

the extent to which youths have become bonded to family and school is likely to be a factor in the selection of prosocial or drug using companions in early adolescence (Kandel et al., 1976, 1978; Elliott et al., 1982).

Elliott's suggestion raises an important question regarding the role of peers in the etiology of adolescent drug abuse which has been addressed little in existing studies. At what point do peers become important in predicting adolescent substance use? Researchers have begun to study childhood peer associations longitudinally into adolescence (Coie and Dodge, 1983). However little research has focused on preadolescent peer associations as possible predictors of subsequent drug initiation or abuse. There is little empirical data by which to assess the promise of peer focused interventions prior to the middle or junior high school years, although the strength of the relationship between peer factors and adolescent drug use clearly supports the need for further research on the nature and etiology of peer influences prior to adolescence as these relate to drug initiation, use, and abuse.

Questions regarding the possible role of childhood peers in predicting adolescent drug use also relate to the question of the desired outcome of prevention efforts. Adolescent drug experimentation can be seen as a peer supported phenomenon reflecting the increasing importance of peers during adolescence. On the other hand, adolescent drug abuse appears to be embedded in a history of family conflict, school failure, and antisocial behavior. How childhood associations with antisocial peers or childhood isolation may figure as possible predictors of drug abuse is not clear. Further research is needed on the relationship between peer associations prior to adolescence and subsequent drug use and abuse.

E. Attitudes, Beliefs, and Personality Traits

Individual personality traits, attitudes and beliefs are variously related to substance use. Generally, a constellation of attitudes and beliefs indicating a 'social bond' between the individual and conventional society has been shown to inhibit both delinquency and drug use (Hirschi, 1969; Hindelang, 1973). The elements of this affective bond which have been shown to be most consistently inversely related to drug use are attachment to parents (Wohlford and Giammona, 1969; Chassin et al., 1981; Krohn, Massey, Skinner and Lauer, 1983; Adler and Lutecka, 1973; Wechsler and Thum, 1973; Shibuya, 1974; Jessor and Jessor, 1977; Kim, 1979); commitment to school and education (Krohn, Massey, Skinner and Lauer, 1983, Hirschi, 1979; Elliott and Voss, 1974; Kim, 1979; Friedman, 1983; Johnston et al., 1981), and belief in the generalized expectations, norms and values of society (Hindelang, 1973; Akers et al., 1979; Krohn, Massey, Skinner and Lauer, 1983). Conversely, alienation from the dominant values of society (Jessor and Jessor, 1978; Smith and Fogg, 1978; Kandel, Kessler and Margulies, 1978; Kandel, 1982; Penning and Barnes, 1982) and low religiosity (Kandel, 1982; Jessor et al., 1980; Gersick et al., 1981; Robins, 1980) have been shown to be positively related to drug use.

Research has also shown a relationship between specific attitudes and beliefs regarding drugs and drug use initiation. Initiation into use of any substance is preceded by values favorable to its use (Kandel, Kessler, and Margulies, 1978; Smith and Fogg, 1978; Krosnick and Judd, 1982; Palmer, 1978).

A wide array of personality factors have been linked with early or frequent substance use. These include rebelliousness (Kandel, 1982; Bachman et al., 1981; Goldstein and Sappington, 1977; Smith and Fogg, 1978; Green, 1979) and nonconformity to traditional values (Gorsuch and Butler, 1976; Jessor and Jessor, 1977). Similarly, high tolerance of deviance (Brook et al., 1977; Jessor and Jessor, 1975), resistance to traditional authority (Goldstein and Sappington, 1977), high need for independence (Jessor, 1976; Segal, 1977); and normlessness (Paton and Kandel, 1978) have all been linked with use. All these qualities would appear to characterize youths who are not socially bonded to society.

Smith and Fogg (1978) reported that non-users scored highest and early users lowest on personal competence and social responsibility measures such as obedience, diligence, and achievement orientation. The authors argued that personality characteristics discriminated between nonusers, early users, and later users of marijuana. Contradictory findings or weak correlations have been found for self esteem (Ferguson et al., 1977; Ahlgren and Norem-Heibesin, 1979; Paton and Kandel, 1978; Jessor and Jessor, 1978; Smith and Fogg, 1978; Kaplan, 1978), locus of control, sensation seeking, and other personality dimensions. Wexler (1975) indicated that frequent users score lower on well-being, responsibility, socialization, self control, tolerance, achievement, and intellectual efficacy. Penning and Barnes (1982) suggested an association between marijuana use and alienation, lower motivation, and sensation seeking. No evidence of psychopathology has been found for users of marijuana as opposed to nonusers, except when users are very young (Anhalt and Klein, 1976). Gersick et al., (1981) suggested that the personality characteristics of those with an early onset of use may differ

from those who initiate use later since use becomes normative with increasing age, again emphasizing the importance of defining the outcome of concern. Generally, however, with the exception of rebelliousness and alienation, personality factors have been found to be less predictive of substance use than behavioral or interpersonal factors (Kandel, 1978; Jessor et al, 1980).

III THEORETICAL INTEGRATION OF THE ETIOLOGICAL RESEARCH

To give coherence to the various predictors of adolescent substance use and abuse and to effectively use the etiological research in designing prevention interventions, the existing knowledge should be integrated into a theory with explicit assumptions and hypotheses. Moreover, the theory should be a theory of intervention, by which we mean that the theory should identify systems of intervention and points at which prevention efforts should be targeted, given the empirical foundations, assumptions and hypotheses of the theory.

Few researchers have attempted to integrate early predictors and correlates of substance use into a comprehensive theoretical framework (Kandel 1978, 1980). Robins (1979) asserts that results of longitudinal etiological studies predict the initial occurrence of problems, but not the course of problems once they occur, and adds that these results can rarely be translated into suggestions for intervention. Currently, we do not have a generally accepted theoretical perspective which integrates knowledge of childhood predictors and which can serve as a basis for selecting strategies for

intervention to prevent onset, experimental use, regular use, or abuse of drugs.

A number of theories have been advanced to explain adolescent substance use (Lettieri et al., 1980). Kandel's developmental perspective (1982) suggests three stages of drug involvement, with different antecedents and influences associated with each stage. The key factors associated with drug use are parental influences, peer influences, beliefs and values, and involvement in certain activities. Interaction between individual characteristics and the matrix of social influences is emphasized, with responses to social influences viewed as functions of personal characteristics and situational factors. From this perspective, prevention strategies would vary according to the stage of drug involvement and the prevention goal.

Robins (1980) proposed that drug misuse can be viewed as a manifestation of a deviance syndrome. Closely related is Jessor and Jessor's (1978) notion of problem-behavior proneness. The Jessors associated attributes within each of three systems (personality, perceived environment, and behavior systems) with the occurrence and levels of problem behavior. Similar antecedents foster a wide range of problem behaviors. According to their model, the greater the degree of problem behavior proneness, the greater the likelihood of drug use.

Kaplan and associates (1982) regarded deviant responses, including drug abuse, as motivated by the development of self rejecting attitudes in the course of normative interactions. Deviant patterns are seen as alternatives to conventional means of achieving self esteem and avoiding self devaluing experiences. The adoption of particular deviant patterns is viewed as a function of the individual's history of experience, exposure, availability and opportunity (Kaplan et al., 1982).

It appears reasonable from the evidence on childhood predictors of early initiation and abuse reviewed earlier to view adolescent drug abuse from a developmental perspective. Early initiation as well as patterns of abuse can be considered responses to or results of experiences during development from birth through adolescence. Early antisocial behaviors, early experiences in the family, later experiences in school, and finally, interaction with peers all appear to be implicated in the etiology of drug use and abuse. From a developmental perspective, it can be argued that early experiences in the family are likely to influence social bonding to the family (Hirschi, 1969), social and self-control, (Reckless, 1961) and subsequent experiences in school, as well as the likelihood that social bonds of attachment to school and commitment to education will develop (Bahr, 1979). Similarly, after school entry, school experiences themselves are likely to influence the extent to which a youth will develop social bonds of attachment and commitment to prosocial activities and prosocial others (Schafer and Polk, 1967; Hirschi, 1969). At a minimum, the social influence of peers clearly is salient during adolescence itself. If the process of developing a social bond to prosocial others and prosocial activities has been interrupted by uncaring or inconsistent parents, by poor school performance,

or by inconsistent teachers, youths are more likely to come under the influence of peers who are in the same situation and are also more likely to be influenced by such peers to engage in drug use (Elliott et al., 1982; Weis and Hawkins, 1981; Kaplan et al., 1982).

A developmental perspective on drug use suggests that prevention interventions which seek to address only the peer/drug use linkage and which wait to intervene until adolescence may be misspecified. If the outcome of concern is drug abuse as opposed to experimental use, intervention at this stage in the development of drug using behavior may be too late to reverse a process which has already been set in motion as a result of prior experiences in family and school. On the other hand, if the concern is experimental use by a large proportion of adolescents, then interventions with pre-adolescents focusing on social pressures of the adolescent peer group may hold promise.

This development perspective has been integrated into a theory of antisocial behavior and its prevention, the social development model (Hawkins and Weis, in press; Weis and Hawkins, 1981) which guides the prevention research we have been conducting. The theory integrates social control (Nye, 1958; Reiss, 1951; Briar and Piliavin, 1965; Matza, 1964; Hirschi, 1969) and social learning theories (Bandura, 1973, 1977; Burgess and Akers, 1966; Akers, 1977; Akers et al., 1979; Krohn et al., 1981) as has the work of others (Meade and Marsden, 1981; Braukman et al., 1980; Johnstone, 1981; Conger, 1976, 1980; Linden and Hackler, 1973; Johnson, 1979; Elliott et al., 1982). In contrast to others, this theoretical model seeks explicitly to serve as a basis for prevention interventions. The theory describes stages of development and identifies intervention approaches which would appear appropriate at

each stage. Propositions from control theory are used to identify elements in the etiology of drug use and delinquency, as well as in the etiology of conforming behavior. Propositions from social learning theory are used to identify processes by which these patterns of behavior are extinguished or maintained.

In this theoretical synthesis, a social bond to conventional society is viewed as necessary to prevent drug abuse (as opposed to experimentation). According to control theory, deviance is produced by a weak, broken, or absent bond to the conventional order. As operationalized by Hirschi (1969), the bond consists of attachment to conventional others, commitment to conventional lines of action, involvement in conventional activities, and belief in the legitimacy of the moral order. According to control theory, the stronger the components of the bond, the less likely it is that an individual will be free to engage in deviant behavior such as drug use. We have seen that the elements of this social bond are negatively related to drug use in empirical studies. From this perspective, an intermediate goal of prevention efforts should be to establish elements of the social bond between a youth and his/her environment in order to prevent the young person from engaging in drug abuse.

This theoretical synthesis extends control theory by suggesting that one's patterns of behavior will be more or less deviant depending on the types of opportunities and social influences to which one is exposed, the skillfulness with which one performs in various activities and interactions, and the rewards one receives from participation in these activities (Hawkins and Weis, in press; Hawkins and Catalano, 1980; Weis and Hawkins, 1981;

Catalano, 1982; Catalano, Hawkins, and Hall, 1983). The rewards one experiences for prosocial versus deviant behavior directly affect the likelihood that one will continue that behavior (Bandura, 1973, 1977). The social development model suggests that these rewards are themselves conditioned by the opportunities one has for participation in prosocial groups and activities as well as the skills one applies in one's activities and interactions. Prosocial behavior is predicted when youngsters perform skillfully in conventional settings and skillfully avoid unconventional settings. We hypothesize that prevention interventions which seek to increase youths' opportunities for involvement in prosocial activities, to increase youths' skills for participation in positive activities and social interactions, to increase youths' skills to avoid participating in illicit interactions and activities, to increase the skills of parents to effectively communicate with and set limits for their children, and to increase parents' perceived support during their child's adolescence will inhibit youths' early initiation and subsequent abuse of drugs and alcohol.

Based in the etiological research reviewed earlier, the social development approach identifies three general contexts in which the formation of the social bond occurs (family, school, and peer group). When youths develop opportunities for involvement in the family, when they develop the requisite social, cognitive and behavioral skills to perform as expected in family interactions and when they are rewarded consistently for adequate performance in the family, they will develop a bond of attachment, commitment and belief in the family. When parental family management practices are inconsistent, punitive, or ineffective and when parents are inconsistent in their involvement and interaction with their children, these three conditions

are not likely to be present in the family, and a bond to family is not likely to develop.

Bonding to school is conditioned by the extent to which social bonds to the family have developed by the time the child enters school as well as by the extent to which the child experiences opportunities for involvement, develops skills, and is rewarded for skillful performance at school. Thus, both social and academic success at school appear to be prerequisites for bonding to school. Similarly, social bonds to peers, whether prosocial or delinquent, will develop to the extent that youths have opportunities for involvement with those peers, the skills to perform as expected by those peers and the rewards that are forthcoming from interaction with those peers. We do not suggest that strong bonds of attachment to family and school will preclude the development of strong bonds of attachment to peers as long as the norms of family members, school personnel, and peers regarding appropriate behavior do not conflict. However, like Kandel et al., (1978) and Elliott et al., (1982), we suggest that the formation of social bonds to family and school will decrease the likelihood that youths will develop early attachments to drug abusing peers in early adolescence, since we postulate that the behaviors rewarded in family and school and those likely to be rewarded by drug abusing youths are not compatible.

This theoretical synthesis would be incomplete if it ignored the fact that experimentation with tobacco, alcohol and marijuana has become widespread and, in at least a statistical sense, normative among older adolescents (Kandel, 1982; Baumrind, 1983). Drug experimentation is, to some degree, supported by attitudes and beliefs about the acceptability of the

consumption of alcohol and marijuana under a variety of circumstances. Jalali and his colleagues (1981) have noted that many adolescents who use these gateway drugs are experimental or situational users influenced to use by their peers. It is apparent that adolescent peer influences can exert strong independent influences on adolescent use of the gateway drugs in spite of earlier family and school related experiences related to social bonding. In fact, in Hirschi's (1969) study of junior and senior high school students, even those with strong bonds to the social order were more likely to commit delinquent acts if they had delinquent friends. There appears to be an independent influence of peers on behavior during adolescence.

It is at this point that reconsideration of our original question regarding the outcome of concern in prevention is important. An hypothesis consistent with the etiological data is that experimentation with alcohol and drugs may be a form of adolescent individuation that is separate from drug abuse. Thus, relatively widespread experimentation and approval of experimentation among adolescents may be expected, within the existing broad cultural boundaries in the larger society (Baumrind, 1983). The social development perspective accounts for the "normative" experimental drug use typical of otherwise conventional high school students. These students have strong attachments to other conventional students. However, when drug use is normative, (in late adolescence), the risk of loss of affection or approval from these peers because of drug use is low. While parents may disapprove of drug using behavior, the peer group is the major mediator of rewards for high school aged youth. When low perceived risks or costs are coupled with the rewards for associating with drug using but otherwise conforming peers, with the perceived rewards of use, and with a lack of

skills to resist peer pressure to use while still maintaining peer approval, experimental drug use appears as a likely outcome. At the same time, strong bonds to family and school may delay the age at which this experimentation takes place and the extent of involvement in other illicit drugs, thereby reducing the risk that the experimentation will become drug abuse. Further, the bonds may themselves limit the use of drugs in amounts, frequencies or situations in which the social bond would be compromised by use and the individuals' position in conventional society jeopardized. In other words, these bonds may inhibit the development of drug abuse as defined earlier in the paper. These speculations on the dynamics of social bonding and peer influence suggest that even socially bonded youths may come under some peer pressure to use drugs during adolescence. Thus, strategies which teach youngsters to successfully deal with these social pressures should delay initiation and reduce the likelihood of proceeding beyond experimentation.

On the other hand, it is likely that youths who have not become socially bonded to family and school as a result of childhood conduct problems, family conflict, and school failure will be particularly easily influenced by drug prone peers and will find little reason to resist pressures to initiate drug use early in adolescence. Nor will these youths have much reason to avoid associating with drug using peers or to resist using drugs more frequently when encouraged to do so by peers. These are the youths who will likely use drugs to cope with stress, loneliness, boredom, school failure or other personal or social problems. In this group, drug use itself is likely to compound previous personal and social problems with problems related to chemical dependency, legal difficulties, and drug related deterioration in

performance of school, work and family roles. It is in the case of these youths at highest risk of drug abuse that prevention interventions focused on creating the conditions for social bonding would appear beneficial. Enhancing opportunities, skills and rewards for prosocial involvement within the family, school or peer group should increase the likelihood that such youths become socially bonded to conventional others and to conventional lines of action. It is hypothesized that such social bonds should provide a stake in conformity which would reduce the likelihood of drug abuse.

As a foundation for prevention activities, the social developmental model implies that families, schools, and peer groups are appropriate objects for intervention, depending on the developmental stage of the child. Interventions which seek to increase the likelihood of social bonding to the family through alterations in the opportunity and reward structures available to children within families are appropriate from early childhood through early adolescence. Interventions which seek to increase the likelihood of social bonding to school through alterations in the opportunity and reward structures of classrooms and schools as well as by alterations which seek to increase the successful development of both cognitive and interpersonal skills are appropriate beginning at some point during the years of school attendance. Interventions which seek to increase social bonding to prosocial peers by increasing opportunities and rewards for positive peer interaction and by insuring the development of interpersonal skills are appropriate as youths approach and enter adolescence. The promise of peer focused strategies delivered earlier in development is less clear.

This developmentally focused prevention model is consistent with the existing empirical evidence reviewed earlier regarding the preadolescent etiology of drug use and abuse. The preponderance of prevention efforts have not been grounded in a clear and consistent theoretical base (Schaps et al., 1981). Thus, the model provides one framework for assessing interventions which seek to delay the onset of drug use and/or to prevent continued use or and abuse after initial experimentation. It also pinpoints the system of intervention appropriate at various steps of development.

IV. DIRECTIONS FOR ETIOLOGICAL RESEARCH

While the social development model provides a theoretical framework for drug abuse prevention which seeks to integrate the existing knowledge regarding risk factors for adolescent drug use and drug abuse, it is clear that a great deal remains to be learned regarding the etiology of these behaviors. In order to fill in the gaps on early high risk factors for substance use and abuse, prospective longitudinal studies of childhood development through adolescence continue to be needed. While it is evident that composite measures of family management and family communication in early childhood predict subsequent drug abuse and that early conduct disorders predict subsequent drug abuse, the relationship between family management and early conduct disorders as early predictors is less clear. To what extent do conduct disorders reflect constitutional differences among children which are not amenable to intervention and to what extent do they reflect poor family management practices, inconsistent disciplining, or low levels of communication between parents and children? Longitudinal studies with frequent data collection points can help to answer such questions.

With regard to family factors, the pressing research questions have to do with how and at what developmental stage to target interventions. Since family influences are potent early in childhood, a question arises as to whether family focused prevention strategies can be implemented successfully before serious problems arise and before a crisis is recognized by family members.

With regard to peer influences, more etiological study on the evolution of peer associations and peer influence prior to adolescence is needed. It is not clear from the literature how elementary school peer influences and interactions affect subsequent peer interactions and drug abuse. Why are children drawn to deviant peer groups in the first place? It is possible from the data to hypothesize a social skills deficit model in which young children are rejected by teachers and other children for either aggressive, shy or other antisocial behaviors indicating a lack of skills to interact with others (cf., Asher et al., 1980; Ladd and Mize, 1982; Richard and Dodge, 1982). An alternative hypothesis which is also consistent with the existing data is that young aggressive children begin to associate with each other early on in deviance prone peer groups (cf. Ladd, 1983). Both hypotheses may be supported. With regard to adolescent peer associations, while it is evident that drug users associate with drug using peers, less is known about the degree of attachment in these relationships. Kandel has suggested that there are differences between the peer associations which encourage marijuana initiation and the peer involvements of youngsters who have moved beyond marijuana experimentation into the use of other illegal drugs. More information is needed about these differences, especially concerning the degree of role modeling, respect and emulation found in interactions in the latter group.

With regard to schooling, it remains unclear at what point school performance becomes important as a correlate of drug abuse. First grade readiness is not a predictor, but by adolescence, both early drug users and drug abusers are children who are not performing up to their ability level in school. How is academic performance during elementary school related to subsequent drug abuse? Spivack's (1983) research suggests a complex developmental set of interactions between early socialization, school performance, and later delinquent behavior. How do such processes work in the etiology of drug use and abuse?

Competing models or theories of adolescent substance use and abuse remain tenable in the absence of etiological studies which trace the developmental sequencing among the risk factors for drug initiation, experimentation and abuse. What appears to be needed at this point is prospective longitudinal research which includes repeated measures of the most strongly supported risk factors every year or two years during childhood through at least the age of fifteen. This research should be cognizant of the existing theories of drug abuse which have attempted to synthesize knowledge regarding drug abuse risk factors. Measurement points should be timed to allow assessment of the causal linkages implied in these developmental theories. Such research will provide further guidance regarding the development of prevention strategies which address the associated risk factors and therefore hold promise for prevention. Equally importantly, this research will inform decisions regarding the developmental point at which interventions should be targeted to achieve desired drug prevention outcomes.

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