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RISK FACTORS AND DRUG USE IN SUBURBAN
ADOLESCENTS

by

ELAINE C. ZUCCHI

A dissertation submitted to the Graduate Faculty in
Educational Psychology in partial fulfillment of the
requirements for the degree of Doctor of Philosophy,
the City University of New York

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Abstract

RISK FACTORS AND DRUG USE IN SUBURBAN
ADOLESCENTS

by

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Early researchers examined individual or clusters of risk factors to explain adolescent drug use because they believed there is a single pathway for early drug use. Problems arose in integrating findings into one theory (Flay & Petraitis, 1980).

Four theories predominate.

(1) Problem behavior theory (Jessor & Jessor, 1977) conceptualizes adolescent drug use as a manifestation of unconventionality involving delinquent behavior.

(2) Social learning theory (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979) explains drug use by exposure to models using drugs, neutral or positive attitudes toward drug use, and the reinforcing effects of the drug itself.

(3) Stage theory (Kandel, 1975) predicts a progression from

alcohol and cigarette to marijuana and illicit drug use.

(4) Multiple pathway theory explains adolescent drug use by the total number of risk factors (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish, & Howard, 1992).

The present study investigated how Farrell et al.'s work would generalize from urban and rural adolescents to suburban adolescents from three schools. Hypothesis 1, as the total number of risk factors for suburban seventh graders increase, prevalence of drug use will increase, was supported. The multiple pathway theory generalized to suburban seventh graders. Hypothesis 2, that prevalence of drug use would be the same for each of the three schools, was supported. Hypothesis 3, that average number of risk factors would be the same for each school, was not supported. School 1 had significantly fewer risk factors than School 2 ($p < .05$). However, School 1 also had significantly more nonusers than School 2 ($p < .05$). Approximately 10% of the students used potentially lethal inhalants. Approximately 11% of the seventh graders were frequent drug users. Educationally, drug prevention programs need to be individualized for schools, introduced prior to seventh grade, and educate on inhalants. Intervention programs for frequent users is indicated. Longitudinal studies are needed to examine whether the multiple pathway theory predicts adolescent drug use and which risk factors are correlates, predictors, and/or consequences of drug use.

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I. Introduction

Drug use among adolescents in the United States has emerged as a national problem in the last 25 years. Experimentation with drugs is almost considered a normal rite of passage. In fact, drug use among American youth is the highest in the industrialized world (Johnston, Bachman, & O'Malley, 1988). Use of illegal drugs such as marijuana and cocaine began with college students in the late 1960's and early 1970's and escalated dramatically among adolescents and young adults in almost epidemic proportions (Johnston et al., 1988). By the 1980's a majority of teenagers who reached twelfth grade had tried some illegal drug (Johnston et al., 1988). Drug use declined in the 1980's, except for cocaine, which has significantly increased since this same period (Drug use continues, 1989). More recently, drug use has shown increases in both junior high and high school students (Johnston et al., 1994). A recent nation-wide survey shows 67% of eighth graders have tried alcohol, 8% smoke cigarettes daily, and 9% have used marijuana in the last year. The spread downward to preadolescents has also been quite dramatic. Current findings show some drug use as early as fourth and fifth grade and considerable increases from the sixth to the ninth grades (Oetting & Beauvais, 1987).

Many youth experiment with drugs for a brief period of time. However, for some youth experimentation leads to regular

compulsive patterns of use characterized by psychological and physical dependence. Because of regular drug use these youth typically experience health problems, lowered academic aspirations, social and emotional problems, impaired relations with family and parents, and interrupted employment patterns (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990; Farrow, Rees, & Worthington-Roberts, 1987; Huba, Newcomb, & Bentler, 1986; Kandel, Davies, Karus, & Yamaguchi, 1986; Newcomb & Bentler, 1986a).

Because of the increasing use of drugs by youth, researchers have shifted their attention from the study of drug abuse in clinical populations to the study of adolescent drug use in normal populations. Johnston (1991) has been a leader in this regard. For the past 25 years he and his colleagues have surveyed national samples of high school seniors, and more recently, eighth grade students. Johnston's Monitoring the Future Studies (1991) have provided information about many current social indicators against which existing theory may be tested, as well as new problems such as increased use of marijuana among high school seniors in the 1990's. Johnston (1985) has mainly reported trends over the years, rather than espousing a particular theory to explain drug use in adolescents.

Recently, researchers have begun to shift their attention to drug use of even younger adolescents in seventh grade (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992), before experimentation leads to more serious use. More

recent efforts to develop a single comprehensive theory have led to the formulation of the multiple pathway theory to explain early adolescent drug use. The current study examines whether the multiple pathway theory can explain the drug use of suburban seventh graders by their number of risk factors rather than specific ones.

Many researchers have conducted studies to determine which characteristics, antecedents, and risk factors best explain adolescents' early drug exploration (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Baumrind, 1985; Donovan & Jessor, 1983; Jessor & Jessor, 1977; Kandel, 1980, 1982; Kaplan, Martin, & Robbins, 1984; Newcomb & Bentler, 1981).

Numerous factors have been implicated in the initiation and maintenance of adolescent drug use including early use of alcohol (Robins & Przybeck, 1985); expectations to use drugs (Newcomb & Bentler, 1986); low self esteem (Kaplan, Martin & Robbins, 1982, 1984); unconventionality and tolerance for deviance (Jessor & Jessor, 1977); low law abidance (Windle, 1990); peer drug use (Halebsky, 1987; Huba, & Bentler, 1980; Kandel, 1973); parental drug use (Barnes, 1981; Kandel, Treiman, Faust, & Single, 1976; Newcomb, Huba, & Bentler, 1983), and the degree of risk perceived to be associated with a drug (Johnston, 1991). However, there is disagreement over which variable or sets of variables best significantly relate to drug use in adolescents.

Conclusions of literature reviews reveal that peer influences (modeling use, provision of drugs, and encouraging use) are the most consistent and strongest of all factors in initial involvement in substance use in adolescence (Gorsuch & Butler, 1976; Newcomb & Bentler, 1989). However, Baumrind (1985) found that adults (usually parents and family friends) tend to be the introducing agent for alcohol for early and late elementary and junior high years, and that adult influence precedes the influence of peers. Since most children use alcohol as their initial drug, the adult role appears important.

In a longitudinal study Kaplan et al. (1982) found low self-esteem to be the best predictor of early drug use among adolescents. By contrast, other researchers found no significant relationship between low self-esteem and the drug use of adolescents in longitudinal and cross-sectional studies (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish & Howard, 1992; Jessor & Jessor, 1977).

Several researchers found that initial drug use among adolescents is associated with degree of deviance, nontraditionality, lack of social conformity or low law-abidance (Jessor & Jessor, 1977; Newcomb & Bentler, 1988; Windle, 1990). In contrast, Baumrind (1985) considers such behavior to be normal adolescent risk-taking and the characteristics of a competent adolescent.

To date, research efforts to pinpoint a single group of variables to drug use have been unsuccessful. Problems have also arisen in integrating research findings into a unified conceptual framework to understand early adolescent drug use. Instead, a proliferation of theories have emerged that emphasize different clusters of variables and tend to identify small subgroups of adolescents at risk for drug use (Flay & Petraitis, 1980).

Major Theories

Three main theories of adolescent drug use can be identified in the research literature:

(1) Problem behavior theory (Jessor & Jessor, 1977) conceptualizes adolescent drug use, delinquency, and a variety of other problem behaviors as manifestations of an underlying construct of unconventionality that predicts the initiation or increasing involvement of drug use.

(2) Social learning theory (Akers et al., 1979) explains drug use by an adolescent's exposure to an environment that reinforces drug use through models using drugs, neutral or positive attitudes of peers and adults toward drug use, and the reinforcing effects of the drug itself.

(3) Stage theory (Kandel, 1975) suggests a predictable but not inevitable developmental pattern of progression from the use of alcohol and cigarettes to marijuana and other illicit drugs. She

postulates that different antecedents and influences are associated with each stage of drug use.

The confusion generated by conflicting sets of diverse variables and several theoretical formulations have lead other researchers to advocate for a multiple pathway theory of drug use. (Bry, McKeon, & Pandina, 1982; Farrell, Anchor, Danish, & Howard, 1992, Farrell, Danish, & Howard, 1992; Newcomb, Mahhadian, & Bentler, 1986). Advocates for a multiple pathway theory argue that this model solves the difficulty of integrating various theories and research findings into a coherent framework. This fourth theory postulates that there is no single pathway for drug use, but rather multiple pathways through which adolescents initiate or increase their involvement with drugs. It proposes that involvement in drug use is associated with an adolescent's total number of risk factors, rather than a specific combination of them (Farrell, Danish, & Howard, 1992).

Multiple pathway advocates tested this theory by using a risk factor approach from epidemiological research (Bry, McKeon, & Pandina, 1982; Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish, & Howard, 1992; Newcomb, Mahhadian, & Bentler, 1986). This approach examines the association between adolescent drug use and the total number of risk factors, selected from major theories and recent studies. The risk factor model is used to understand susceptibility to infectious and other types of diseases with multiple

causes and has been widely used by epidemiologists (Jenkins, 1976; Kraus, Borhani, & Franti, 1980). It provides an important technique and conceptual tool to understand multiple risk factors of drug use in adolescence. In this way, drug use research can include diverse and even conflicting results to determine the magnitude of risk for becoming involved with drugs. This approach suggests it is how much an adolescent has to cope with, rather than exactly what they have to cope with, that is associated with their initiation into drug use (Bry, McKeon, & Pandina, 1982).

Risk Factor Studies

To date, studies of risk factors have been conducted with urban and suburban high school students (Bry, McKeon, & Pandina, 1982; Newcomb, Maddahian, & Bentler, 1986) and more recently with seventh graders (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992), where the early use of drugs has shown a considerable increase between the sixth and ninth grades (Oetting & Beauvais, 1987). Studying this younger age group enabled the researchers to examine risk factors that emerge during an important transition period.

In all these studies risk factors were selected because they were significantly associated with drug use in research from a major theory of adolescent drug use, or related to drug use in recent

studies. Bry, McKeon and Pandina (1982) investigated six risk factors, while Newcomb, Maddahian and Bentler (1986) examined ten risk factors related to drug use in high school adolescents.

Farrell and his colleagues increased the number of risk factors previously studied in the high school samples. They examined 26 risk factors related to family structure, economic status, adult supervision, delinquency, history of cigarette and alcohol use, coping style, future expectations, peer and adult factors, and emotional adjustment.

Findings from all of these studies showed that the simple sum of diverse risk factors was significantly associated with an adolescent's use of five categories of drugs: cigarettes, beer/wine, liquor, marijuana, and other illicit drugs (cocaine, crack, inhalants, psychedelics, hallucinogens, and depressants) (Bry, McKeon, & Pandina, 1982; Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992; Newcomb, Mahhadian, & Bentler, 1986).

The research design in the present proposal is modeled on the study of risk factors and drug use of adolescents by Farrell and his colleagues' studies. In their first study they used a sample of seventh graders from an urban setting with Black students in the majority (90%). Farrell et al. found that 15 of the 26 risk factors were significantly associated with adolescent drug use. They also found that as the number of risk factors increased for an individual, the

likelihood and degree of involvement in drug use increased in an accelerating fashion.

The second study used a sample of rural seventh graders that was about evenly split between black (44.8%) and white (52.8%) students. Farrell and his colleagues used the 15 risk factors that were significantly related to drug use in their previous study. Even with fewer risk factors, validity remained high. Their findings with rural seventh graders were similar to the findings of the previous study with urban seventh graders: As number of risk factors increased, prevalence of drug use increased dramatically for the group. (Prevalence is defined as the percent of students who report any use of the five drugs: cigarettes, beer/wine, liquor, marijuana, and other illicit drugs.)

Farrell and his colleagues reasoned that the number and diversity of the risk factors supported a multiple pathway theory of drug use with each risk factor making a unique contribution providing further support for a model that allows for multiple pathways. In addition there was considerable overlap in the risk factors for the urban and rural samples.

Statement of the Problem

Evidence to support the multiple pathway theory of drug use is growing. Most recently Farrell et al.'s (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish, & Howard, 1992)

important studies examined how large numbers of diverse risk factors associated with drug use in urban and rural seventh graders with a high percentage of Black students. With these studies, they reduced the number of risk factors from 26 to 15 to 11 that significantly associated with drug use for seventh graders. These 11 risk factors related to future expectations, delinquent behavior, peer and adult drug use, previous alcohol and cigarette use, and low adult supervision. They found that as number of risk factors increased, regardless of their combination, drug use increased in a linear relationship. A problem expressed by Farrell and his researchers is that it is not yet clear how their findings will generalize to other samples.

The current study addresses this problem by investigating how nine of Farrell's et al.'s most discriminating risk factors relate to the drug use of 188 suburban seventh graders, a sample not previously examined. The seventh grade students are from three different school districts in a New York suburban county. In addition, the sample is different from Farrell et al.'s in ethnic and racial composition. It is predominantly White (61.5% versus 10% in Farrell et al.'s urban sample and 52.8% in their rural sample), and includes other ethnic groups as well (Hispanic and Asian). Two versions of Farrell et al.'s questionnaire were used: One eight pages long (Expectations and Activity Questionnaire, Appendix B); and

one, five pages long (Expectations and Activity Questionnaire - Shortened Form, Appendix C).

Risk Factors in the Current Study

Nine risk factors were selected from Farrell et al's best ones for this study. One of the risk factors relates to future expectations, Expect to use drugs, and significantly associates with adolescent drug use in recent studies (Farrell, Anchor, Danish, & Howard, 1992, Farrell, Danish, & Howard, 1992; Newcomb & Bentler, 1986). A second risk factor relates to educational aspirations, Do not expect to graduate from high school, and significantly associates with adolescent drug use in both recent studies (Farrell, Anchor, Danish, & Howard, 1992, Farrell, Danish, & Howard, 1992; Farrow, Rees, Worthington-Roberts, 1987; Newcomb, Maddahian, & Bentler, 1986) and in problem behavior theory (Jessor & Jessor, 1977). Two other risk factors relate to delinquent behavior, History of trouble with the police, and Expect to get in trouble with the police or courts, and represent risk factors found in the Jessors' (1977) problem behavior theory. This theory conceptualizes drug use, delinquency, low educational aspirations, and a variety of other problem behaviors as manifestations of an underlying construct of unconventionality.

Two additional risk factors relate to reinforcing models for substance use, Friends use drugs, and Know adults who use drugs,

and are consistent with findings from several theories. First they are both consistent with social learning theory of Akers et al. (1979). This theory of adolescent drug use applies the basic principles of differential reinforcement and operant conditioning to the development of adolescent drug use. In this framework drug use is likely to occur when it is differentially reinforced, and considered desirable by influential others (peers and significant adults). Secondly, both risk factors are psychosocial correlates associated with drug use in stage theory (Kandel, 1973, 1982). In addition, the risk factor, Friends use drugs, is a social environmental variable that is associated with drug use in problem behavior theory (Jessor & Jessor, 1977).

Further, two risk factors relate to the effect of previous drug use, History of alcohol use and History of cigarette use, and are consistent with Kandel's stage theory that identifies sequential drug use stages beginning with alcohol and cigarette use. Stage theory of adolescent drug use (Kandel, 1975) postulates that adolescents who use many different drugs do so in an ordered fashion, systematically moving through a series of stages of drug use. This theory predicts a progression from the use of alcohol and cigarettes, to marijuana and other illegal drugs. Progression from one stage to the next is not inevitable. However, the younger the age at which an adolescent uses alcohol and cigarettes, the more likely the progression will occur. In

addition, use of marijuana and other illegal drugs rarely occurs without prior use of alcohol and cigarettes.

One final risk factor relates to an environmental variable, Home alone after school, and is identified in studies that show lack of adult supervision significantly associated with adolescent drug use (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992; Richardson, Dwyer, McGuigan, Hansen, Dent, Johnson, Sussman, Brannon, & Flay, 1989).

In summary, these nine risk factors are drawn from recent studies and all four theories: problem behavior theory, social learning theory, stage theory of drug use, and the multiple pathway theory. They have been selected for their diversity, number, and significant association with adolescent drug use.

Drug Use Categories in the Current Study

The drug use categories are use of: cigarettes; beer/wine; liquor; marijuana; other illicit drugs [inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, and other drugs (non-prescription drugs)]; and gateway drugs (cigarettes, beer, wine, liquor, marijuana, and getting drunk).

This study examined the extent to which drug use among suburban seventh graders is a function of the number of diverse risk factors. The hypotheses are that the prevalence rates for cigarettes, beer/wine, liquor, marijuana, and other illicit drugs would increase

as numbers of risk factors increased in any combination; that prevalence rates for drug use would be the same for the three school samples, and that average number of risk factors would be the same for the three school samples.

II. Review of the Literature

This chapter is divided into two parts. The first part is a description of four major theories of adolescent drug use represented in this study. They are: problem behavior theory, social learning theory, stage theory of drug use, and the multiple pathway theory. The first three theories are contributors to the formulation of the multiple pathway theory. All four theories have been used to identify significant risk factors in the current study. Part one also includes research related to each theory including research that used the risk factors model to test the multiple pathway theory of drug use in adolescents. Further, a section describes research related to a risk factor in the present study but not found in major theories. The second part of the review is a summary of the research and theoretical literature.

Four Theories of Drug Use in Adolescence

(1) Problem Behavior Theory

Jessor and Jessor (1977) have presented a model to explain adolescent drug use which places drug use in the context of other problem behaviors such as delinquency, tolerance of deviance, and having friends who use drugs. The Jessors (1977) suggest that both individual differences and environmental factors contribute to the

development of problem behavior. They conceptualize three major systems of predictor variables: (1) personality, (2) perceived social environment, and (3) behaviors.

Personality System

The personality system includes motivational, personal belief, and personal control variables. Motivational variables relate to the direction towards which an adolescent is striving. Motivational variables are goals related to academic aspirations, and personal independence. Adolescents who place low value on goals related to academic achievement and high value on independence are more likely to engage in problem behavior.

Personal belief variables are the cognitive controls that inhibit problem behavior. Personal belief variables are distal variables or indirectly related to problem behavior. They include: social criticism, alienation, self-esteem, and internal/external locus of control. Adolescents more likely to engage in problem behavior are those who question or reject societal norms and practices, feel isolated from involvement with others, have low self worth, and an external locus of control that leads to nonconformity. Their beliefs do not provide the necessary cognitive constraints that inhibit problem behavior.

Personal control variables are more directly linked to problem behaviors. These variables are : attitudinal tolerance of

deviance, religiosity, and positive versus negative functions of problem behaviors. Adolescents who don't think it's wrong to engage in problem behaviors (are tolerant of deviance); do not attend church or have religious beliefs, and attribute positive functions to problem behavior are more likely to engage in problem behaviors.

To summarize, the main personality characteristics of proneness to problem behavior are: Lower value on academic achievement, higher value on independence, greater social criticism and alienation, lower self-esteem, external locus of control, greater attitudinal tolerance of deviance, lesser religiosity; more importance attached to the positive functions of problem behavior, and lower expectations for academic achievement. This last characteristic relates to the risk factor that measures Do not expect to graduate from high school in the present study. Adolescents who have lower expectations of graduating are considered more likely to engage in drug use.

Perceived Social Environment

The social environment is separated into distal and proximal variables related to problem behavior. The distal environmental variables are indirectly related to problem behaviors. They serve mainly to characterize whether the social context in which a youth is located is one that is more parent and family oriented than friends or

peer oriented. Distal environmental variables are the degree of parental support and encouragement and confiding in peers versus parents on important decisions. Adolescents who have low parental support and confide in peers versus parents are theoretically more prone to problem behavior.

The proximal environmental variables are directly related to problem behavior and are more powerful associated with early drug use. They include parent and peer approval for problem behavior and peer models for drug use. It is expected that adolescents whose parents do not disapprove of problem behavior, and whose friends use drugs, are more likely to engage in problem behavior. Thus, one of the risk factor in the current study - Friends use drugs represents this peer variable from problem behavior theory. The Jessor's theorize that this variable is one of their more powerful risk factors. This risk factor consistently associates with drug use in adolescence and represents an important dimension of an adolescent's perceived social environment .

In summary, distal (indirect) and proximal (direct and more powerful) variables represent a patterned social environment that is more conducive to drug use when adolescents do not feel supported or encouraged by parents, confide in friends rather than parents, have parents who do not disapprove of problem behavior, and have friends who engage in problem behavior.

The Behavioral System

The third system of variables is the behavior system that is divided into problem behavior and conventional behavior. According to the Jessor (1977) problem behaviors are those in which society disapproves adolescents engaging, and which predict drug use in adolescents. Problem behaviors include the following: Political activism, marijuana use, sexual activity, drinking, problem drinking, and general deviant behavior. General deviant behaviors are: truant from school, shoplifting, damaging property, threatening a teacher, stealing something from another person, being on school suspension, threatening someone with a gun or weapon, beating up another student, etc. In the current study two risk factors relate to general deviant behavior - History of trouble with the police or courts and Expect to get in trouble with the police or courts . These were selected because they are related to engaging in deviant behavior of a serious nature.

Conventional behavior is behavior approved by society that, when engaged in by adolescents, reduces the likelihood of drug use. Conventional behaviors are: involvement with a church or formalized religious activity and academic achievement. An adolescent highly involved in church activities or participating in academic activities theoretically is less likely to engage in drug use, or problem drinking, or other problem behaviors.

The authors identified demographic factors, but assigned them a very minor role relative to the personality, perceived environment, and behavioral systems. In fact, Jessor (1977) observed that the relationships between the many postulated factors and problem behaviors held rather well across ethnic groups and geographic regions.

Functions Served by Problem Behavior

The Jessors state that problem behavior can function in a variety of ways. It may represent an effort to attain goals that seem otherwise unattainable. (The youth who is unable to secure autonomy from parental supervision may gain a sense of independence through the use of drugs.). Its purpose may be to express opposition to conventional society, whose norms and values have been rejected. It may represent an affirmation of maturity or a negotiation for transformation of status from adolescent to adult. It can function to enable access to youth subgroups. Finally, it can serve as a way to cope with frustration and anticipated failure (drowning one's sorrows in alcohol).

The Jessors have helped focus attention on the social environment rather than solely on dysfunctional personality states. They also have directed attention to the functionality of drug use for adolescents. In particular, they have helped establish the concept of

a behavioral syndrome that can be predicted and maintained over time.

Research Related to Problem Behavior Theory

A Four Year Longitudinal Study Beginning with seventh - ninth graders

Jessor and Jessor (1977) conducted a four year longitudinal study, the High School Study (1969-1972), of mainly White middle - upper middle class Protestant students in a university town in the Rocky Mountains. The sample for the study consisted of randomly selected students from every grade in three junior high schools (grades 7-9). The junior high sample numbered 408 in the first year. At the beginning of the study the core sample was in grades 7, 8, and 9, and at the end of the study, four years later, in grades 10,11, and 12.

The data for the High School Study were collected in the spring of each year by means of a questionnaire consisting largely of theoretically derived and psychometrically developed scales or indexes assessing the variety of personality, social, and behavioral concepts in the problem behavior theory. For example, general deviant behavior assessed if a respondent had engaged in socially disapproved behaviors of shoplifting, vandalism, lying, truancy, fighting, parental defiance, etc. Conforming or conventional

behaviors were measured by church attendance frequency in the past year, and school performance, a self-report of Grade Point Average for the previous semester.

The main drinking criteria was whether a respondent was a drinker or an abstainer. The measurement of drinker-abstainer status depended on two questions with positive answers to both indicating drinker status: "Have you ever had a drink of beer, wine, or liquor-not just a sip or taste?" and "Have you had a drink of beer, wine, or liquor more than two or three times in your life?".

To examine the relation between the time of onset of drinking and its relation to variables from problem behavior theory, the authors established five different groups:

- Group I (N = 89): abstainers in 1969 and no onset of drinking during the four years of the study.
- Group II (N = 38): abstainers in the first three years and onset of drinking by the fourth year.
- Group III (N = 46): abstainers in the first two years, and onset of drinking by the third year
- Group IV (N = 45): abstainers in the first year and onset of drinking by the second year
- Group V (N = 190): drinkers in the first year

The groups include males and females, since findings were very similar for both groups.

Four Representative Findings of the Jessor's Longitudinal Study

(1) General deviant behavior:

Group I, the group that did not make the transition from abstainer to drinker, was low in generally deviant behavior in the first year, and remained low throughout. Group V, the group that was already drinking when the study began, was significantly higher than all other groups in general and remained at that level throughout.

Groups II, III, and IV, the groups that make the transition from abstainer to drinker, show substantial increases in deviant behavior during the three years of the study. Initially these three groups are low on deviant behavior and close to the mean of Group I (abstainers for all four years) on deviant behavior; however, as onset of drinking occurs for each group, deviant behavior increases correspondingly. At the end of the study, these three groups are significantly higher on deviant behavior than Group I and equal to deviant behavior for Group V.

The development of deviant behavior in the course of adolescent development is clearly related to becoming a drinker and to whether that happens earlier or later. This finding supports the use of two risk factors in the current study relating to deviant behavior - History of trouble with the police or courts and Expect to get in trouble with the police or courts.

(2) Value on academic achievement

The same kind of patterning was shown to hold across a variety of measures of personality and perceived environment as well. For example, value of academic achievement of all five groups show a significant decline over the four year period. The three transition groups tend toward convergence on the already drinking group V, and all are significantly different from the mean of group I by the fourth year of the study, a divergence linked to the onset of drinking. This evidence supports the use of the risk factor Do not expect to graduate from high school in the current study. It is likely that adolescents who do not expect to graduate from high school were using drugs.

(3) Attitudinal intolerance of deviance

Similar convergence on the already-drinking group and divergence from the abstaining group is evident for another personality attribute, attitudinal intolerance of deviance. The decline on this variable of the three onset groups over the years is about twice the magnitude of the decline for the group that continues to abstain.

(4) Friends model for drinking

A perceived environment measure related to onset of drinking among high school youth is their perceived number of friends who

drink . At the beginning of the study, group I (abstainers for four years) had the fewest drinking models among its friends, group V (drinkers for all four years) had the most, and the three transition groups were intermediate but closer to group I. With time and development, all five groups show a significant increase in friends drinking models, but the increase of the three onset groups is about twice that of group I, and by year 4, all diverged from group I and converged on group V. This finding supports the use of the risk factor related to a peer variable (Friends use drugs) in the current study.

Based on these representative findings, onset of adolescent drinking covaries with engaging in deviant behavior, tolerance for deviant behavior, not valuing education, and having friends who drink.

Other findings related to the perceived environment system indicate they make a more powerful contribution in the explanation of variation in problem behavior than that of the personality system. Adolescents who are likely to engage in problem behavior acknowledge greater influence of friends relative to parents, and receive greater support for problem behavior among their friends.

Findings relating to the personality system show that the adolescent less likely to engage in problem-behavior is not much concerned with independence, maintains a religious involvement, and

sees little attraction in problem behavior relative to its anticipated negative consequences.

Not all variables in the problem behavior theory were significant. For example, four personality variables did not covary with problem behavior: self-esteem, alienation, internal-external locus of control and value on independence which increases significantly with time, but equally for all groups. In the behavior system, academic achievement and activism did not covary with problem behavior.

The authors, in a review of their findings, concluded that the pattern of covariation among the diverse problem behaviors indicate a problem behavior syndrome.

A Four Year Longitudinal Study Beginning with 14-15 Year Olds

Windle (1990) examined how delinquent behavior for a sample of men and women in early adolescence (ages 14-15) covaries with late adolescent alcohol and drug use four years later (when adolescents were 18-19). Windle (1990) used 2400 students aged 14 and 15 from the National Longitudinal Survey of Youth (NLSY). Fifty-two percent were male and 48% were female; 57% were White, 25% were Black, and 18% were Hispanic.

Six categories of substance use were the dependent variables: Alcohol consumption, cigarette use, marijuana use, other illicit substances use (e.g. amphetamines, psychedelics, cocaine, inhalants,

barbiturates or sedatives, tranquilizers, heroin, and nonprescribed narcotics), alcohol-related aggressive behaviors, and dependency symptoms (inability to reduce drinking, fear of becoming an alcoholic, having blackouts, drinking first thing in the morning, etc.)

There were six independent variables. The first one was a delinquency scale with behaviors similar to behaviors in Jessor's (1977) general deviant scale. The delinquency scale was also divided into three subscales and used for independent variables: e.g. Status offenses (running away, truancy); property offenses (vandalism, shoplifting, theft, car theft, broke into building, sold stolen goods); person offenses (physical fight at school, used "strong arm" to get money from people, hit or threatened to hit someone; intentionally lied); a fifth scale, substance involvement, represented dependency symptoms (inability to reduce drinking, fear of becoming an alcoholic, having blackouts, drinking first thing in the morning, etc.); and a sixth scale, delinquency scale of 20 items, included 15 delinquent behaviors and five substance involvement items

Pearson correlations were computed between all six subscales and substance use variables. None of the six correlations with late adolescent substance use was significant for early adolescent person offenses (fighting). Only two of six are significant for early adolescent status offenses such as truancy or running away. However, all of the correlations with late adolescent substance-use is

significant for early-adolescent property offenses such as vandalism, shoplifting, and/or car theft. For the current study, Windle's results (1990) also support the use of two risk factors related to delinquent behavior, History of trouble with the police or courts, and Expect to get in trouble with the police or courts.

Early adolescent substance involvement also correlated with all of the variables for early adolescent substance use for both boys and girls. The current study uses a risk factor supported by this evidence, History of alcohol use.

Results also revealed for male adolescents that the correlations between all six subscales and drug use were statistically significant ($p < .01$) in 23 out of 24 instances; for female adolescents, only 14 of 24 correlations were statistically significant. Tests for gender differences confirm, that overall, the delinquent behavior of early adolescent boys is more highly associated with late adolescent substance use than is the delinquent behaviors of early adolescent girls. This finding supports the hypothesis in the current study that as risk factors increase, drug use increases also. This finding suggests that gender differences in drug use are more likely due to numbers of risk factors for each group rather than anything inherent in gender itself.

A hierarchical multiple regression model was used to assess the influence of early-adolescent delinquent behavior (similar to Jessor & Jessor's general deviant scale) on late adolescent substance

use, over and above the influence of early adolescent substance involvement. Delinquent behavior significantly predicted variations in alcohol use, alcohol related aggressive behaviors, dependency symptoms, and marijuana use. Again, this supports the inclusion in the current study of two risk factors, History of trouble with the police or courts, and Expect to get in trouble with the police or courts

Early adolescent substance involvement significantly predicted all six dependent variables with greater consistency and relatively higher beta weight values than even delinquent behavior. This adds further support for the importance of the risk factor History of alcohol use in the present study.

Male gender was a significant predictor of alcohol use, alcohol-related aggression, and alcohol dependency symptoms. This finding was related to the much greater number of significant correlations incurred by boys than girls and provides independent evidence for the hypothesis in the current study that as risk factors increase, drug use increases as well.

To summarize, these findings show that the general pattern of covariation among problem behaviors was consistent with Jessor and Jessor's (1977) problem behavior theory. The higher level of substance use in late adolescence among those reporting higher levels of delinquent behavior in early adolescence is also consistent with the Jessors' problem behavior theory (1977). In addition, delinquent

behavior for boys is more highly associated with later substance use than for girls.

Windle (1990), by examining specific clusters of general deviant behavior, also determined that early adolescent property offenses (vandalism, shoplifting, money theft, car theft, etc.) were the most consistently predictive of later substance use for both boys and girls. Status offenses such as truancy and running away and person offenses such as physical aggression did not predict later adolescent drug use. Basically, property offenses contributed disproportionately to the finding that early general delinquency predicts later substance use in adolescence. Since property offenses can attract the attention of police and lead to court action, this may explain why two risk factor variables in Farrell and his colleagues' studies (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992), History of trouble with the police or courts, and Expect to get in trouble with police or the courts - significantly relate to drug use. These risk factors are included in the present study as well.

An Eight Year Longitudinal Study Beginning with Five - Ten Year Olds

Brook, Gordon, Whitman, and Cohen (1986) in a longitudinal study examined the extent to which unconventional behaviors in childhood (ages 5 to 10) relate to later adolescent drug use (ages 13-

18). The unconventional behaviors were some of the behaviors found in problem behavior theory of the Jessor (1977). Specifically, the researchers in a longitudinal study examined self-esteem, church attendance, nonachievement, predelinquency, intolerance of deviance, physical aggression, and educational aspirations.

The dependent variable was based on the adolescent's affirmative responses to use of legal drugs (alcohol and hard liquor), marijuana, and other illicit drugs.

Subjects were 356 predominantly White youngsters whose mothers were interviewed when the child was 5 to 10 years of age (Time 1) and eight years later when the children were 13 to 18 years of age (Time 2) - at which time the youngsters were also interviewed and drug use responses were obtained.

Results indicated that only one of the unconventional behaviors in childhood (predelinquency - mother reports child takes things that don't belong to him or her) predicted drug use in adolescence. This finding is similar to that of Windle (1990)'s who found that property offenses such as stealing were a significant predictor of drug use in older adolescents. Both findings support the use of the risk factors in the current study, History of trouble with the police or courts, and Expect to get in trouble with the police or courts .

The following childhood unconventional behaviors assessed at Time 1 were not related to later drug use at Time 2: self-esteem,

nonachievement, aggression against peers, church attendance, intolerance of deviance, and educational aspirations.

At Time 2 several of the unconventional behaviors correlated with drug use at Time 2: Tolerance of deviance (scale based on adolescent perception) correlated .60; delinquency (scale based on maternal perceptions) correlated .25; lesser church attendance correlated .23, and low educational aspirations correlated .21. Low self-esteem did not correlate with drug use.

These results suggest that, on the whole, unconventional behaviors in early childhood do not predict drug use in later adolescence, except for children who engage in predelinquent activities such as stealing. However, during adolescence, unconventional behaviors of tolerance for deviance, delinquency (such as stealing), lesser church attendance, and low educational aspirations predict drug use. These results provide support for these variables in Jessor's problem behavior theory. The finding that low educational aspirations predict drug use also supports the inclusion in the current study of the risk factor Do not expect to graduate from high school. It is expected that students who do not expect to graduate from high school will be more likely to use drugs.

Criticism of Problem Behavior Theory

Baumrind (1985) challenges the notion of adolescent deviance as used by the Jessors (1977) to describe adolescent behavior she

views as appropriate and normal. She stresses that adolescent risk-taking behavior which may include experimenting with drugs may be troublesome and deviant from an adult perspective, but is characteristic of competent adolescents.

Baumrind describes adolescence as a period during which accelerated physical changes occur along with identity formation as the outcome of adolescent crisis. Baumrind refers to this conflictual period as one during which adolescents question the up - to - now accepted values of their parents and adult authorities in order to arrive at principles that reconcile disparities between their own and their parent's generation points of view.

Baumrind argues that from a developmental perspective, an individual's pattern of behavior is legitimately characterized as "deviant" only when it diverges from the norms of individuals at that developmental stage. She believes that in the Jessor's study (1977), the vast majority of the changes that took place in the students from the ninth to twelfth grade define normal transition behaviors and are nonpathological: lowered academic achievement values; higher value on independence; increased friend's support relative to parent's support; increased tolerance for transgressions from adult standards; increased social activism and political activism; decreased religiosity; and increased reported drinking.

She concludes that to use a construct such as deviance to apply to adolescent alcohol or marijuana use may have harmful

consequences, such as setting into motion a self-fulfilling prophecy, thereby shaping the users into the deviant image.

To support this view, Baumrind's findings in her longitudinal study (1985) indicate that personal antecedents of substance use in adolescents are uniformly positive, indicating that the more socially mature and competent children are more likely to be involved in illicit marijuana use. For girls, in particular, experimentation with marijuana is associated with personal agency (capable of being agents of change for themselves) and self-assertiveness.

(2) Social Learning Theory

Akers et al. (1979) applied basic learning principles to explain adolescent use of alcohol and marijuana, which he describes as deviant behavior, in the same vein as Jessor and Jessor's (1977) view of adolescent drug use. Social learning theory incorporates the principle that adolescents acquire drug use behavior through the process of imitation or modeling of drug using behavior of friends, parents, and other adults in their social environment, including the home, school, and church. This concept is similar to the variable of 'friends using drugs' in Jessor's problem behavior theory. However, Akers also included adults as a model for drug use which the Jessors do not. In the current study risk factors Friends use drugs, and Know adults who use drugs are included to provide a more

comprehensive account of an adolescent's exposure to drug using behavior.

In social learning theory another important principle is how differential reinforcement can strengthen or weaken whether drug use behavior is acquired or if acquired whether it persists based on the kind of reinforcement friends and parents attach to the behavior. Adolescents with friends and parents who encourage the adolescent not to use, with parents who administer mild punishment for use, and who try to avoid parental punishment are less likely to use or continue use. Through differential reinforcement behavior is shaped and conditioned .

In addition, adolescents learn through friends and parents how to evaluate and define behavior as good or bad. These definitions are themselves verbal and cognitive behavior which can be directly reinforced. Adolescents who have a tolerant or positive attitude toward violating laws are more likely to use drugs. Furthermore the more adolescents define drug use as good (positive definition) or at least justified (neutralizing definition) rather than as undesirable (negative definition), the more likely they are to engage in it. This concept is similar to two variables in problem behavior theory: attitudinal tolerance of deviance, and attitude toward use of drugs. Similarly, in problem behavior theory when adolescents are tolerant of people engaging in deviant behavior and have a positive attitude toward drugs, they are also more likely to use drugs.

In social learning theory deviant behavior can be expected to the extent that it has been differentially reinforced over alternative behavior (conforming or other deviant behavior) and is defined as desirable or justified. Progression into more frequent or sustained use and into abuse is also determined by the extent to which a given pattern is sustained by the combination of the reinforcing effects of the substance with social reinforcement, exposure to models, definitions through association with using peers, and by the degree to which it is not deterred through bad effects of the substance, and/or the negative sanctions from peers, parents, and the law.

Social groups provide the social environments in which exposure to definitions, imitation of models, and social reinforcement for use of or abstinence from any particular substance take place. The definitions are learned through imitation, and social reinforcement of them by members of the group with whom one is associated, and once learned, these definitions serve as discriminative stimuli for use or abstinence.

After the initial use, imitation becomes less important while the effects of definitions should continue (themselves affected by the experience of use). It is at this point in the process that the actual consequences (social and nonsocial reinforcers and punishers) of the specific behavior come into play to determine the probability that use will continue and at what level. These consequences include the actual effects of the substance at first and subsequent use (the

perception which may be modified by what effects the person has previously learned to expect) and the actual reactions of others present at the time or who find out about it later, as well as the anticipated reactions of others not present or knowing about the use.

Based on this theory Akers et al. (1979) expected that for both alcohol and marijuana use, the probability of abstinence would decrease, when there is greater exposure to using rather than to abstinent models, when there is more association with using than with abstinent peers and adults, when use is differentially reinforced (more rewards, fewer punishers) over abstinence, and when there are more positive or neutralizing than negative definitions of use. Similarly, among users the probability of abuse would increase with more exposure to abusing rather than moderate or abstinent models, more association with high frequency users or abusers, greater potential reinforcement for abuse over moderate use, and more positive and neutralizing rather than negative definitions of use.

Research Related to Social Learning Theory

A Cross-Sectional Study of 7-12th Graders

To test the social learning theory these authors collected data by administering a self report questionnaire to 3,065 male and female adolescents attending grades 7 through 12 in seven communities in three midwestern states. Their dependent variables

measured the use of alcohol (reported frequency of use of beer) and marijuana on a six-point frequency of use scale ranging from nearly every day to never. Abuse among users was measured by combining responses to the frequency questions with responses to a question asking the respondents to check whether or not they had experienced on more than one occasion any of a list of problems while or soon after using alcohol or marijuana (e.g. "had an accident," "couldn't remember later what I had done," "used more than I had planned"). This combination produced a four-point scale ranging from heavy abuse to no abuse.

For independent variables the authors operationalized five main concepts in the theory:

(1) Index of Imitation:

(a) Total of the "admired" models (parents, friends, other adults, etc.) whom the respondent reports having observed using the substance.

(2) Definitions Favorable or Unfavorable to Use:

(a) A scale of items measuring obedient or violating attitudes toward the law in general and alcohol and drug laws in particular; also respondent's own approval or disapproval of use.

(3) Differential Association

- (a) Respondents' perception of the approving-disapproving attitudes toward use held by significant adults.
- (b) Differential peer association scale measuring how many of respondent's friends use alcohol or marijuana.

(4) Differential Reinforcement: Social

- (a) Respondents' report as to whether or not friends, parents, or both encouraged them not to use.
- (b) Respondents' report of anticipated or actual positive or negative sanctions of parents for respondents' use of the substance, ranging from encouraging their use to turning them in to the authorities.
- (c) Respondents' perceived probability that their parents would catch them if they used the substance.
- (d) Respondent's perceived probability that the police would catch them if they used the substance.
- (e) Respondents' perception of the extent to which using the substance would interfere with their participation in activities (i.e., school work, athletics, etc.) important to them.

(5) Differential Reinforcement: Combined Social/Nonsocial

- (a) The total good things from a list of positive drug effects and social outcomes which the using respondent checked.
- (b) User's assessment of whether mostly good things or mostly bad things would happen.

(c) Respondents' report of the effects the substance usually has on them (from no effect, to mostly good, to mostly bad effects).

Using multiple regression techniques, the authors' findings strongly supported the social learning theory of adolescent alcohol and drug theory. When all the independent variables were incorporated into the full regression equation, the model explained 55% of the variance in drinking behavior, and 68% of the variance in marijuana behavior.

Analyses to determine the relative predictive values of the five subsets of variables and single variables showed that with the exception of imitation, each subset explained a substantial proportion of variance in both alcohol and marijuana use. The authors concluded that the theory as a whole was supported: its power was not dependent on any single component.

The analyses also showed that some subsets of variables were more important than others. In explaining variance in alcohol and marijuana use, the differential association subset explained the highest proportion of variance, but the differential peer association variable (how many friends use drugs) was the most important single variable. This powerful variable corresponds to the risk factor related to peer behavior in the current study- Friends use drugs.

The finding that it was the most important single variable in explaining variance strongly supports its use in the present study.

The authors note that the mechanisms by which peer group association is so important is explained by their theory: friends provide social reinforcement or punishment for abstinence or use, provide normative definitions of use and abstinence, and to a lesser extent, serve as admired models to imitate.

The authors comment that since modeling is an important part of the process in social learning theory, the lower levels of variance explained by the imitation measure may mean that imitation has its greatest effect in the first acquisition or initial stages of behavior while the associational, reinforcement, and definitional variables are more important in the maintenance of the behavior. The researchers stated that imitation is more important in first starting to use drugs than in explaining frequency of use.

Analyses to explain abusive patterns of use of alcohol and marijuana obtained results that parallel those of abstinence. The proportion of variance explained in abuse is substantial - 32% and 39% of the variance in alcohol and marijuana abuse, respectively. The differential association subset which measures the number of friends who use drugs again explained the greatest proportion of variance. This provides additional evidence for the importance of the risk factor Friends use drugs in the current study.

The variable measuring the effects obtained from smoking marijuana or drinking alcohol ranks second for marijuana and third for alcohol. Use-abuse is also positively related to parents reacting leniently (encourage use or do nothing) or very harshly (kicking youngster out of house, reporting to police). In contrast the highest probability of abstinence and lowest levels of use were found among adolescents who report that their parents have or would respond with a moderate negative reaction such as a scolding. The authors' interpretation of these findings is that anticipated parental punishment is a deterrent to use and sustains abstinence. Even after use has begun a reasonable amount of parental punishment holds down the chances of increasing frequency of use or moving into abuse. However, once adolescents have gotten into heavy use or abuse, parental reaction has lost its effect and the increasing abuse of the substances by their children may produce ever harsher reactions by parents in increasingly desperate attempts to do something about it.

A One Year Longitudinal Study Beginning with sixth - eighth Graders

Bailey and Hubbard (1990) examined the initiation of marijuana use in a one-year longitudinal study of 3,454 urban and rural students, who were in grades six, seven, or eight at baseline and in Grades seven, eight, or nine at follow-up. The authors

included measures representing social learning concepts (Akers et al., 1979). The concepts are: significant adult's attitudes toward drug use (Perceived level of disapproval of adolescent's using alcohol or marijuana, etc.), significant peer's attitudes (e.g. Friends opinions about adolescents using alcohol or marijuana; and perceived level of disapproval), and differential peer association (i.e. the number of friends who use drugs). The differential peer variable is equivalent to the risk factor in the current study Friends use drugs.

Students included in the study were those who reported no lifetime use of marijuana at baseline and any level of lifetime use at follow-up; and those who reported no lifetime use at both baseline and follow-up. Students who reported any level of use at baseline were excluded.

Results related to social learning theory showed that for the seventh/eighth grade adolescents measures of peer attachment and attitudes had a significant effect on the likelihood of initiation among these older students. This means that a greater perceived disapproval of alcohol and drug use among friends means a decreased likelihood of initiation, and greater perceived approval means students in this age group were more likely to try marijuana.

Results also show students in the seventh/eighth grades with higher levels of attachment to their parents are less likely to try marijuana. The initiation model for the eighth/ninth grade students shows that parental attachment measures have no significant effect

on initiation of drug use. Most of the influence on initiation was from significant peers attitudes (having friends who approve of drugs), and differential peer association (having friends who use drugs).

A summary of these significant relationships suggest that among these oldest adolescents, those who spend a large amount of time with friends whom they perceive both to approve of and to use marijuana and alcohol are most likely to try marijuana. This provides evidence for constructs in social learning theory of differential association, and differential reinforcement as measured by friends approval or disapproval of drug use.

The oldest group is distinguished from the younger group by a nearly total shift in influence from parents to peers. Gender effects are only marginally significant in the two older groups with boys slightly more likely to initiate use of marijuana. The authors conclude this shift of influence is part of a developmental process that influences the context of marijuana initiation.

Only 10% of the sixth/seventh grade students tried marijuana. The authors emphasize this age group is at the youngest age range found in other studies exploring drug use in adolescents. The authors were not able to find any significance between this youngest group's marijuana use and peer variables. The authors felt that it was the lack of peer models that explained this for this age group, and that additional prospective studies involving these youngest adolescents

are an important goal for future research. The current study uses a suburban sample of seventh graders that may help identify the important variables that are associated with drug use in a younger age group.

In social learning theory the environment takes on special importance as the source of cues, rewards, and punishments to explain drug use behavior. It also recognizes that the child is capable of imagining or anticipating behaviors and of placing a value on the behavior or its consequences (Bush & Iannotti, 1985). This recognizes that the child can transform his or her environment as well as be transformed by it.

A Cross-Sectional Study of Seventh-Twelfth Graders

Barnes (1981) conducted a study that relates to the social learning theory concepts of differential association (Knowing adults and peers who use drugs) and differential reinforcement or rewards or punishments for the behavior. She wants to know whether adolescent drinking patterns are a reflection of adult society or mainly mirror behaviors unique to the adolescent subculture.

Using a sample of 1,048 students in grades seven through twelve in a rural/semi-suburban community in Central New York State, she collected detailed information on current drinking behaviors, contexts of drinking, and attitudes toward alcohol use. A slightly modified version of the questionnaire was developed and

administered to a random sample of 338 adults who reported that they had children in the school system. Both samples allowed Barnes to compare similarities and differences between alcohol use behavioral and attitudinal patterns of adults who are parents with youth in the same community.

In her findings Barnes found substantial evidence that prevalence of alcohol use for adolescents was remarkably similar to the prevalence rates for the adults in her study. For example, 30% of the students versus 32% of the adults report drinking beer less than once a year. Approximately 24% of the student versus 26% of the adults report frequent beer usage. Eight percent of the students versus 10% of the adults drink wine once a week. Thirty-three percent of the students versus 37% of the adults say they never drink wine

Only the patterns of liquor usage exhibit greater differences between students and adults -e.g., 36% of the students versus 21% of the adults abstain from liquor. Barnes attribute this to its higher cost and reduced availability.

The author also found parallel sex differences in drinking behavior. Thirty-nine percent of the male students fell into the moderate/heavy and heavy drinking categories compared to 43% of the adult males; whereas 25% of the female students versus 28% of the female adults are in these upper drinking classifications.

The author concluded that adolescents have already developed patterns of alcohol consumption which conform to those of adult members of the same society. These findings provide additional evidence that the risk factor Know adults who use drugs in the proposed study is strongly associated with an adolescent's drug use.

Reasons for drinking (findings which relate to differential reinforcement) in social learning theory were "It tastes good" (55%) and those associated with sociability such as "just to have a good time" (52%) and "It's a good way to celebrate" (51%). These same three reasons were the same for adults. Of note is that psychological, coping types of reasons (e.g. When there are too many pressures on me) played a minor part in determining drinking behavior. However, 25% of students and 15% of adults responded that "personal effects" were important reasons for drinking. This is evidence supporting the differential reinforcement of the effects of the drug itself.

Patterns in reasons for not drinking were also similar between groups. The three reasons provided as being important by the largest number of students and adults are those reasons related to getting involved with police, losing one's self control, and having difficulties in getting jobs or going to college. The two groups appear to think in about the same way with regard to the negative aspects of alcohol use.

The author concludes that certain social factors such as fear of the law or fear of alcohol interfering with school and jobs, along with concern about losing control over one's behavior, are rather important deterrents to drinking for some people. This evidence supports the concept of differential reinforcement and negative reinforcers of the social environment that relate to use of drugs.

(3) Stage Theory of Drug Use:

Several researchers have suggested that adolescents who use many different drugs do so in an ordered fashion, systematically moving through a series of stages of drug use (Murray & Perry, 1985). Hamburg, Kraemer, and Jahnke (1975) observed that students generally experimented first with coffee and tea. This was followed sequentially by wine and beer; tobacco; hard liquor; marijuana; hallucinogens; stimulants; depressants; and narcotics. The onset points for these drugs were separate in time. Very few students involved with one drug had not moved sequentially through each of the preceding drug groups. Kandel (1975) reported similar results on a much larger sample. She observed four stages: (1) Beer or wine, (2) hard liquor and/or cigarettes, (3) marijuana, and (4) other illegal drugs.

Kandel, Treiman, Faust, and Single (1976) observed that social psychological factors differentially predicted transition to each of these four stages. Alcohol use was best predicted by involvement

in minor delinquent activities, and peer activities, and greater exposure to peer and parent models for drinking. Parental models appeared important for onset of alcohol use. Onset of marijuana use was best predicted by exposure to peers who use marijuana, participate in minor delinquent activities, and adoption of values and attitudes favorable to marijuana use and unfavorable to traditional institutions. Onset for use of other illegal drugs was best predicted by poor relationships with parents; by exposure to peer and parent models for drug use, both legal and illegal; by psychological distress; by heavy use of marijuana; and by more unconventional and nonconforming attitudes and values.

Both Kandel (1975) and Hamburg et al. (1975) have been careful to point out that involvement at one stage does not necessarily lead to the next stage; however, involvement at one stage was very unlikely without the involvement at the previous stage.

Kandel (1980, 1982) views drug use as one of many behaviors that results from interactions involving parents, peers, and adolescents. She describes drug use as one of the possible outcomes of adolescent socialization, a process which balances peer and parental influences. Finally, two processes are central to adolescent socialization: Imitation, whereby adolescents learn behavior through observing others, in this case peers and parents; and social reinforcement, whereby adolescents display behavior more often when it is approved by significant others, including parents. These

two processes are also central to social learning theory (Aker's et al, 1979) and problem behavior theory (Jessor & Jessor, 1975).

Research Related to Stage Theory

A One Year Longitudinal Study with 14 - 18 year Olds

Kandel (1982) based her findings on data from a longitudinal study of random samples of high school students 14 to 18 years of age in New York State. Data of sequences over time were derived from two longitudinal cohorts of adolescents and surveyed in the fall and spring of one academic year. The results indicated that the patterns of all the drugs ever used (beer/wine, hard liquor, cigarettes, marijuana, and other illegal drugs, e.g. amphetamines, barbiturates, tranquilizers, LSD, psychedelics, cocaine and heroin) could be arranged according to a well-defined cumulative and one-dimensional hierarchical order with seven steps: (1) nonuse; (2) legal drugs only (beer, wine, cigarettes, or hard liquor); (3) marijuana and hashish, (4) pills (uppers, downers, tranquilizers); (5) psychedelics (LSD, other psychedelics); (6) cocaine; and (7) heroin.

Kandel noted that drug use starts with legal drugs, which are a necessary stage between nonuse and illegal drug use. A direct progression from nonuse to illegal drug use practically never occurs. Of those in the high school sample who were nonusers in the fall (Time 1), 36% progressed to legal drugs during the subsequent

five months and 1% started to use legal drugs and marijuana. Only 1% of the nonusers went directly to illegal drugs without prior experience with a legal drug. The trends in regression are similar. Illegal drug users do not regress directly to nonuse, but only to lower categories of illegal drugs or to legal drugs. These findings support the use of two risk factors that relate to previous use of alcohol and cigarettes in the current study - History of cigarette use and History of alcohol use. Kandel and her colleagues emphasize on the importance of cigarettes as a drug predicting other drug use differentiates their stage theory from problem behavior theory and social learning theory, which are mainly concerned with the use of alcohol and marijuana.

Kandel maintains that marijuana use is a crucial step in the induction into the use of other illegal drugs such as LSD, pills or heroin. Only 2 or 3% of the legal drug users in each cohort progressed directly to these other illegal drugs without first trying marijuana. By contrast, the further progression from marijuana to other illegal drugs is not rare: 26% in a 5-6 month period among the high school students; 16% among the graduated seniors.

Kandel emphasizes that legal drugs play a crucial role. She notes that the majority of nonusers who start using a legal drug start with beer or wine. Two to three times as many beer and wine users progress to cigarettes. Furthermore, while more than half the cigarette smokers subsequently start to drink hard liquor, a few of

the adolescents who start hard liquor right after beer and wine subsequently start to smoke. In her study no youths in either cohort progressed from beer and wine to illegal drugs without also taking up hard liquor or cigarettes on the way. Kandel points out that progression to marijuana appears predominantly among adolescents who have already used tobacco or hard liquor; the effects of the two being independent and additive. Kandel also notes that the types of changes and sequences in patterns of change were found in all grades in high school, in both sexes, and were independent of family educational background and race.

Kandel et al. (1976) have also observed that correlates for drug use could differentially predict transition to each of the four stages. They found that the strongest factor associated with an adolescents alcohol use was his or her overall level of sociability as measured by greater involvement with peer activities; the next strongest factor was best friend's use of alcohol and the third strongest factor was parent's use of alcohol. Relevant to the current study these findings support the use of two risk factors - Friends use drugs, and Know adults who use drugs.

A gender difference emerged as the fourth strongest factor with boys heavier users than girls. School performance and church attendance showed virtually no association with alcohol use when other factors were controlled.

Onset of marijuana use was best predicted by exposure to peers who use marijuana as measured by best friend's frequency of use. This peer variable accounted for 25% of the variance in adolescent's use of marijuana. This provides additional evidence that the risk factor Friends use drugs were related to an adolescent's drug use in the current study.

Kandel and her colleagues note that the causal relationship between adolescent and friend's marijuana use is ambiguous due to the possibility that some individual's get pressured into using drugs because their friends are doing so, and alternatively, users may seek fellow users as friends. However, it is clear that there is a strong positive association between adolescent and best friend's use of marijuana which is relatively independent of social, personal, life style and family factors.

Accounting for 8% of the variability was participation in minor delinquent activities , adoption of values and attitudes favorable to marijuana use and unfavorable to traditional institutions (church and school). Participation in minor delinquent activities supports the inclusion of two risk factors in the current study - Expect to get in trouble with the police or courts and History of trouble with the police or courts. Adoption of attitudes unfavorable to institutions such as school supports the use of the risk factor Do not expect to graduate from high school, in the present study.

Onset of use of illegal drugs other than marijuana such as LSD, pills, or heroin was best predicted by peer drug use. However, other variables show almost as strong an effect and include lack of closeness to either parent, doing badly in school, and feeling depressed. This latter finding suggests that emotional factors become more significant as drug use progresses. Kandel comments on the increased importance of depression and noted that these variables other than peer drug use may be consequences rather than causes of the drug use pattern.

Kandel et al (1976) note that the evidence strongly supports well-defined sequences of drug use in adolescents with alcohol and tobacco preceding marijuana; and marijuana in turn preceding other illicit drugs. To further illustrate this point Kandel states that the mean age for first experience with smoking is 12.0 years, for alcohol 12.6 years, and for marijuana, 14.4 years. Furthermore, she notes the fact that different factors correlate with each of the steps in the sequence which supports the notion that adolescent drug behavior consists of well-defined stages.

In a review of the patterns of use of legal and illegal drugs among adolescents, Kandel and Yamaguchi (1985) provide additional evidence that supports the stage theory notion that tobacco use precedes marijuana use. They note that among youth 12 to 17 years old in a general population survey, those who smoke are more than three times as likely to have experimented with marijuana than

nonsmokers. In addition increased use of drugs is accompanied by a decrease in age of onset in drug use. Thus the successive cohorts of high school seniors surveyed report increasingly earlier ages at first experimentation with marijuana. Johnston et al. (1983) reported that twice as many users among high school seniors in 1981 as in 1975 (27% as compared to 13%) reported their first experience with marijuana at the eighth grade or below.

Earlier onset of use of any drug is associated with greater involvement in use of all other drugs (Kandel & Yamaguchi, 1985). Thus the earlier the introduction to legal drugs, the greater the probability that the adolescent will also experiment with illegal drugs. The earlier the experimentation with marijuana, the greater the involvement and the greater the likelihood of progressing to more serious drug use. This is evidence of the importance of studying younger age groups such as the seventh graders in the current study. The greater our understanding of younger age groups, the more effective early intervention in the course of experimentation with drugs can become.

Retrospective Study with 12th graders

Additional evidence to support the stage theory of drug use was obtained in a retrospective study with twelfth graders by Kandel and Yamaguchi (1993). This study focused on patterns of drug involvement in adolescence and on the position of crack in these

patterns. The analyses was based on 1108 twelfth graders attending New York State public and private schools. The students were asked about beer, wine, hard liquor, cigarettes, marijuana, stimulants, inhalants, cocaine and crack, psychedelics, sedatives, tranquilizers, and heroin. Age of first use was asked with regard to these five classes of drugs. Because of strong age-related patterns of drug use (Kandel & Logan, 1984), the analyses were restricted to seniors who have had more opportunities than any other grade to experiment with various classes of drugs. Among the total sample 95.7% of students reported using at least one of the drugs. In the absence of longitudinal data, analyses of self-reported ages of onset into these drugs were relied on to infer potential sequential patterns.

Kandel and Yamaguchi (1993) found striking patterns emerge from the data . For the great majority of students, alcoholic beverages and cigarettes were initiated prior to the use of any illegal drugs. This finding offers additional evidence that risk factors in the current study - History of cigarette use and History of alcohol use, are relevant and useful.

Of the illegal drugs, marijuana was initiated first; only 1% of the students used cocaine before marijuana. More than 40% initiated both drugs at the same age; of those who did not, more than three times as many tried crack after having experimented first with other forms of cocaine. The overwhelming majority of crack users had used marijuana before.

Further, the authors found that for males, cigarette smoking was a more important precursor to the use of illicit drugs. The best-fitting model for males is : (1) alcohol precedes marijuana; (2) marijuana and cigarettes precede cocaine and crack; and (3) cocaine precedes crack. The best-fitting model for females is : (1) alcohol *and* cigarettes precede marijuana; (2) marijuana precedes cocaine and crack; and (3) cocaine precedes crack.

In addition this study showed the importance of the age of onset for drug use. Students were classified into five mutually exclusive hierarchical groups according to their lifetime pattern of drug use: (1) never used any drugs, (2) used only alcohol and/or cigarettes, (3) used marijuana but not cocaine, (4) used cocaine but not crack, and (5) used crack. Adolescents who progressed to using cocaine, and especially crack began smoking cigarettes, drinking alcohol, or smoking marijuana 2 years earlier, on average, than those who did not go on to use cocaine. The mean age of onset for cigarette use was 11.5 years (SD = 2.1) for cocaine users who did not use crack and 11.1 years (SD = 2.1) for crack users, compared with 13.1 years (SD = 2.7) for adolescents who only used alcohol or cigarettes, or 12.6 years (SD = 2.3) for those who went on to use marijuana. Similarly, cocaine and crack users started using marijuana almost 2 years earlier (mean age 13.5) than those who remained exclusively marijuana users (mean age 15.2). In a similar vein, Kaplan Martin, and Robbins (1984) found that the later one

tries marijuana, the less likely one is to continue use. Crack users initiated the use of cocaine almost a year earlier (mean age 15.2) than those who used cocaine but no crack (mean age 16.0).

The authors concluded that although the study was cross-sectional and retrospective, a definite limitation, the data nevertheless provided strong evidence for a sequential pattern of drug involvement in adolescence. The earliest stage involves the use of at least one legal drug - alcohol and/or cigarettes. Subsequent stages involve marijuana and other illicit drugs such as cocaine. In the overwhelming majority of cases crack is initiated after experience with marijuana.

The more important role played by cigarettes use early in the drug involvement sequence among females replicates a finding that they observed 20 years ago from earlier classes of New York high school students (Kandel & Faust, 1975).

They conclude that the regularity of the observed sequences at different historical periods, in different populations and in different cultures is striking. Adolescents are very unlikely to experiment with marijuana without prior experimentation with alcohol or cigarettes; very few try illicit drugs other than marijuana without prior use of marijuana (Kandel, 1975). This pattern has been observed not only in the United States, but in France and Israel as well (Kandel, Adler, & Sudit, 1981).

A Five Year Longitudinal Study Beginning with Seventh - Ninth Graders

Newcomb and Bentler (1986) conducted a five year longitudinal study with 847 students in the seventh, eighth, and ninth grades in the first year of the study. Data collected in the first, fourth, and fifth years were used in the study. This study investigated the stage theory of drug use, and the social and psychological correlates of cocaine use in a normal adolescent population. The authors also examined how intention to use cocaine related to concurrent and later cocaine use. Intentions to use cocaine were measured by the subject indicating whether they plan to use cocaine in the future. This variable is very similar to the risk factor in the current study that measures Expect to use drugs in the future (including cocaine).

Over the five year period significant increases in cocaine use were evident with 15% of the 17-19 year olds reporting they had been "super high" or "stoned" on cocaine at least once. Intention to use cocaine was significantly correlated ($p < .001$) with current use of cocaine and was significantly predictive of later reported use. This finding supports the importance of the risk factor in the current study Expect to use drugs (including cocaine) in the future.

Intent to use cocaine in year one also predicted likelihood of associating with peers and adults who use cocaine in year four. The importance of associating with peers and adults who use drugs

justifies the risk factor related to Friends use drugs, and Know adults who use drugs.

Three personality traits significantly predicted intention to use cocaine (multiple $R = .23$, $F = 17.58$, $p < .001$) and related to variables in problem behavior theory. These traits were: Less law abidance, more liberalism, and less religious commitment. The finding that less law abidance is associated with intention to use cocaine supports the use of risk factors in the current study that measure History of trouble with the police or courts and Expect to get in trouble with the police or courts in the future.

To test the idea that initiation into cocaine use may occur in a stage sequence of stage theory, the authors examined alcohol, marijuana, and cocaine use at year four and year five. The results showed that use of a particular substance at year four (alcohol, marijuana, and cocaine) significantly predicted use of the same substance at year five.

Analysis of paths between different substances revealed that alcohol use at year four significantly impacted on use of marijuana at year five. After controlling for initial levels of use, marijuana use significantly lead to more alcohol and cocaine use over a one year period. The authors concluded that these results strongly supported the stage theory of drug use (Yamaguchi & Kandel, 1984) with alcohol predicting alcohol and marijuana use, and marijuana use and cocaine use predicting cocaine use. The authors pointed out that

marijuana use also predicted alcohol use, contrary to stage theory expectations. The authors emphasized the point that marijuana use seemed to be a portent for initiation into all types of other drug use.

After controlling for initial levels of cocaine use and psychopathology, depression at year four significantly ($p < .05$) increased cocaine use at year five. No other significant psychopathological antecedents of cocaine use were found. This is additional evidence that depression, possibly from the effects of the drug, is more in evidence in the later stages of drug use.

Newcomb and Bentler concluded that the social context variables of peer and adult use of cocaine were the most significant factors that predicted cocaine use in adolescents. This supports the use of risk factors Friends use drugs and Knowing adults who use drugs in the current study. Intentions to use cocaine was the most significant psychological variable. This supports the use of the risk factor Expect to use drugs in the current study. Depression was found to be a significant but less powerful antecedent for increased cocaine use. Subjects who planned to use cocaine in the future were also less law abidance compared to those with no intentions to use cocaine. This finding supports the use of risk factors Expect to get in trouble with the police or courts, and History of trouble with the police or courts in the proposed study.

An Eight Year Longitudinal Study Beginning with Seventh - Ninth Graders

Newcomb and Bentler (1986b) again examined stage theory by studying the changes and sequencing of drug involvement of 654 adolescents in a longitudinal study from early adolescence (seventh, eighth, and ninth grades) to young adulthood (ages 21-24). Newcomb and Bentler note that the virtually all of the research literature has focused on the development of substance using behaviors during early to middle adolescence (Jessor & Jessor, 1977; Kandel, 1980; Kandel & Logan, 1984). They stated it was unclear in what way stage theory will characterize drug use at other points in life. Do the same or different patterns occur at young adulthood, the time of life immediately following adolescence.

In Newcomb and Bentler's longitudinal study they found that as young teenagers (age 12 to 14), 88% of the sample had tried some type of alcohol at least once in their life, 62% had tried cigarettes at least once, 24% had tried marijuana at least once, and 11% had tried illicit drugs (psychedelics, hypnotics, and stimulants).

Cigarette use significantly decreased from early to later adolescence (four years later) from 62 to 41% reporting use, and no real increase in cigarette use to young adulthood, where 38% reported use. This indicated that there was a large number of early experimental users of cigarettes.

Alcohol use significantly decreased from early to later adolescence from 88 to 82%. However alcohol use significantly increased from later adolescence to young adulthood where 90% reported use. Marijuana use increased significantly from early to late adolescence, going from 24 to 49% reporting use and then decreased significantly to an intermediate level in young adulthood where 42% reported use.

Liquor, stimulants, and nonprescription medications increased steadily over the eight year period; hypnotic and psychedelic use increased through late adolescence and remained stable through young adulthood.

For the earlier period of adolescence, cigarette use significantly predicted later use of cigarettes, marijuana use, and illicit drugs. Alcohol did not influence any of these three drug substances over time. Early marijuana use lead to increases in later cigarette and illicit drug use. Finally, illicit drug use was significantly associated with increased cigarette use over the same four year period.

Looking next at the young adult drug use patterns, both cigarette and alcohol use were extremely stable over the eight-year period. Cigarette use in young adulthood was significantly influenced by cigarette use at both year one and year five. A similar pattern was evident for alcohol use. As in the earlier period,

marijuana use significantly predicted increases in both cigarettes and illicit drug use.

Newcomb and Bentler noted that patterns of drug usage differed considerably over the eight-year period depending upon the specific drug. Cigarette use decreased into late adolescence, with only committed users remaining. Use of liquor increased steadily over the eight years, whereas beer and wine dipped during middle adolescence and rose again into young adulthood. All marijuana use peaked in trial use during late adolescence and decreased into young adulthood. Nonprescription medication increased steadily over the eight-year period, as did the use of stimulants.

The authors point out alcohol, stimulants, and nonprescription drugs continue to attract new users into adulthood. Cigarettes and marijuana use however, were established at younger ages in the adolescent period.

Tests to determine how one drug predicts the use of another over time showed from early to late adolescence that cigarettes use was the significant predictor of late marijuana and hard drug use. Alcohol use did not predict either of these drug use behaviors but instead predicted later use of itself. Marijuana use significantly predicted illicit drug use at this earlier time period. Similarly, there was a reciprocal influence of early marijuana and illicit drug use predicting a significant increase in later cigarettes use.

The researchers also found that in the older age period, from late adolescence to young adulthood, alcohol does not predict marijuana nor illicit drug use, but becomes fairly well established as an independent behavior. This finding is similar to Newcomb and Bentler's study (1986) that examined stage theory and correlates of cocaine use in a five year longitudinal study with a similar age group. Marijuana use, however, continued to predict increased hard drug use.

These researchers concluded that alcohol use is not the major gateway drug that was supposed, but rather, seems to become a stable behavior unto itself, with little cross-influence on other drugs. Secondly they conclude that cigarettes play a crucial role in the reciprocally influential progression into marijuana and hard drug use. They emphasize that cigarettes are the true gateway drug facilitating increased involvement in use of marijuana and harder drugs without the direct impact of alcohol. This is particularly true at the earlier age period in adolescence.

The importance of the risk factor History of cigarette use as predictive of later drug involvement in stage theory establishes its value in the current study. Though this study shows that alcohol use predicts more alcohol use rather than other drugs, it shows that early use of alcohol is a threat in its own right. That it predicts itself does not make it any less important as a risk factor.

A Ten Year Longitudinal Study Beginning with Four Year Olds

Baumrind (1985) has also explored the stage theory of drug use and role of antecedents of drug use in adolescents from longitudinal studies with White middle-class parents and pre-school children which she followed from ages four to 14. She obtained data through direct observations in a naturalistic setting and intensive structured interviews and observations.

In the adolescent phase of her study the author identified precursors in early development that related to substance use in early adolescence. Baumrind found that legal drugs such as cigarettes did not precede illegal drugs such as marijuana. Baumrind remarks that the low level of tobacco use relative to marijuana was due to the fact that Berkeley had mounted a successful vigorous anti-smoking campaign directed towards high school students at the time her data was collected. She comments, by contrast, adult attitudes toward marijuana use were complacent, if not actually permissive. She interpreted her findings to support the idea that use by adolescents of substance acceptable to the community precedes their use of substances that are strongly negatively sanctioned by the community. Her finding relates to the differential association concept in social learning theory. Baumrind's interpretation of her findings were corroborated in Barnes study (1981) that showed the similarities of drinking patterns with beer, wine, and hard liquor for adults and high school students.

Criticism of Stage Theory of Drug Use

Oetting and Beauvais (1987), in a review of theories of drug use criticize the stage model. They argue that whatever orderly progression does exist in the use of drugs is probably highly related to availability and general attitudes toward drugs, especially attitudes of peers. Since beer is most readily available for example, it is easy to understand how it would be chosen as one of the first drugs an adolescent would use. The same logic would follow with cigarettes. Since marijuana is a bit more difficult and heroin very difficult to obtain, these drugs would not be later drugs an adolescent would try, if at all. They concede that taking drugs does influence future drug use probably through their psychoactive properties that lead to sensations that are rewarding. However, these authors believe that physiological factors are far less important than psychosocial variables in determining youth drug involvement.

4. Multiple Pathway Theory

All of these theories (e.g. problem behavior theory, social learning theory, and stage theory) explain much about early adolescent drug use. There is much overlap in their constructs especially in the social area, and agreement that early alcohol use is especially detrimental. Though these theories are not exhaustive in their scope, they have been major contributors to our understanding

of the precursors and reasons why young adolescents initiate drug use.

Researchers, however, believe that each theory only explains a part of the picture and that there are many diverse paths that lead to early drug use in adolescents (Newcomb, Mahhadian, & Bentler, 1986; Farrell, Anchor, Danish, & Howard 1992; Farrell, Danish, & Howard, 1992). They are supporters of a multiple pathway theory of drug use that postulates that the extent of drug use is an increasing function of the number of diverse variables instead of any particular set of them; that is, the greater the number of risk factors associated with an adolescent, the greater the likelihood the adolescent is using drugs. This risk factor approach has the advantage of letting the researcher simultaneously test a diversity of factors to measure their influence. This approach suggests that although certain factors such as peer influence are important for an adolescent, it is how many of the salient factors he or she is associated with that really matters. This shift in perspective is considerable because it suggests that the number of factors an adolescent must cope with is more important than exactly what those factors are.

Research Related to the Multiple Pathway Theory

A Cross-Sectional Study of 9th - 12th Graders

Earlier research related to the multiple pathway theory for drug use was conducted by Bry, McKeon, and Pandina (1982) who examined the effect of six risk factors on drug use for 1,960 high school students evenly divided between grades 9 through 12. The students were from a New Jersey working-class community. Data was collected via a self-report anonymous questionnaire. Drug and alcohol measures included the use of seven specific drug categories: Hallucinogens, amphetamines, opiates, barbiturates, inhalants, cocaine, marijuana/hashish, a catch-all "other drugs" category, and three categories of alcohol (beer, wine, hard liquor). The dimensions of use included number of times tried, age at first use, source of first use, how often currently used, and when used most recently.

The risk factors they selected were: (a) grades, (b) affiliation with a religion, (c) age of first independent (outside of family) use of alcohol, (d) psychological distress, (e) self-esteem and, (f) perception of parental love. The first three variables were derived directly from self-report items in the survey. They used the Global Symptom Index from the John Symptom Checklist to measure psychological distress (Derogatis, Rickels, & Rock, 1976). The Piers-Harris Behavior Scale was chosen to reflect self-esteem, and an

Overall Parental Love Index, using items from both the original Love and Control scales of the Streit-Schaefer Family Perception Inventory, was selected as a measure of parental love.

Using criteria taken from the literature the authors converted the first three variables into risk factors. Since D's and F's are the grades that have been shown to precede heavy drug use (Gossett et al., 1972); a self-report of "no religion" shown to relate to problematic drug use (Jessor & Jessor, 1977), and the use of alcohol before 13 years of age associated with problematic drug use (Tennant & Detels, 1976), the authors determined that each survey response that met one of these criteria was counted as one risk factor.

The authors found that the range of risk factors ranged from zero to four with the majority of the students not having any risk factors. A one-way analysis of variance revealed a highly significant relation between number of risk factors and extent of drug use. Furthermore, no specific combination of risk factors accounted for the relation. Subjects who exhibited four risk factors were four and a half times more likely to report very heavy drug use than would be expected from the base rate of very heavy drug use in the hypothesis-testing sample. They concluded their results supported a general rather than a specific coping model of drug abuse.

A Four Year Longitudinal Study Beginning with Seventh - Ninth Graders

Newcomb, Maddahian, and Bentler (1986) examined how risk factors relate to drug use for high school students in a four year longitudinal study. Data was obtained in Years one, two, and four of the study. In the first year of the study the students were in grades seven, eight, and nine. By the fourth year they were in grades 10, 11, and 12.

Drug use was measured by frequency of use during the past six months for 26 different drug substances. Five substance use categories were derived including cigarettes, alcohol (the average of beer, wine, and liquor categories), cannabis (the average of marijuana and hashish frequencies), illicit drugs (the average of 14 substances including sedatives, barbiturates, amphetamines, LSD, cocaine, heroin, and PCP), and nonprescription medication (the average of the over-the-counter sleeping pills, stimulants, cough medicine, and cold/allergy medicine). These drug use categories were used as dependent variables.

Ten risk factors were used. Six of their risk factors were similar to Bry, McKeon, and Pandina (1982) and included: low grade point average, lack of religiosity, early alcohol use, low self-esteem, psychopathology, and poor relationship with parents. The four remaining risk factors were selected based on a review of the literature and included: lack of social conformity (deviance) (Jessor

& Jessor, 1977); sensation seeking (Huba, Newcomb & Bentler, 1986), perceived peer drug use, and perceived adult drug use (Barnes, 1981; Newcomb, Huba, & Bentler, 1983).

The authors found results similar to Bry, McKeon, and Pandina (1982); namely, all substances increased in frequency of use by increasing number of risk factors up to six. For example, those with zero risk factors were one fifth less likely to use marijuana on a daily basis than the total sample; whereas, those with seven or more risk factors were almost seven times more likely to be heavy users of marijuana compared to the sample in general. They determined that there is clearly an increasing magnitude of risk for each increasing number of risk factors. Further, they found that those with three or fewer risk factors were less likely to be heavy illicit drug users, whereas those with five or more risk factors were more likely to be weekly or more users of illicit drugs. In addition they tested whether risk factors actually predict changes in later drug use. They found that year four risk factors were clearly related to increased use of all substances between years four and five when controlling for earlier use of the same substance and all or other types of substance. However, the magnitude of variance was relatively small, ranging from less than 1% to slightly higher than 7%.

Finally, the authors explored if certain risk factors were more important than others. They correlated each risk factor with the five substance use scales. For each risk factor, these five

correlations were averaged. Peer drug use (.41) had the highest correlation. This finding strongly supports the inclusion of the risk factor Friends use drugs in the current study. In descending order, the following additional correlation were found: deviance (.31), adult drug use (.30), early alcohol use (.22), sensation seeking (.16), religiosity (.13), poor academic achievement (.11), psychological distress (psychopathology) (.09), and poor self-esteem (.07). In the current study two risk factors - Know adults who use drugs and History of alcohol use are supported by these results.

The authors concluded that the risk factor approach is useful in understanding vulnerability to substance use. Their findings that number of risk factors was linearly associated with increased percentage of drug users and, conversely, few risk factors were associated with less substance use suggest that a risk factor model of substance use is not unlike other epidemiological studies that follow patterns of vulnerability and susceptibility due to increased exposure to risk.

Cross-Sectional Studies with Seventh Graders

Recent studies undertaken by Farrell and his associates (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992) examined the relationship between 26 risk factors and prevalence rates of five drugs for urban adolescents, and the relationship between 15 risk factors and prevalence rates of five

drugs for rural adolescents. This was a major increase in the number of epidemiological variables studied. Farrell and his associates included seven risk factors studied by Bry et al. (1982) and Newcomb, Mahhadian, and Bentler, (1986) relating to grades, affiliation with religion, psychological distress, self-esteem, lack of social conformity (deviance), perceived peer drug use, and perceived adult drug use; and excluded three relating to age of first use of alcohol (outside of family), perception of parental love and sensation seeking. Farrell and his associates also added risk factors related to family structure, economic status, adult supervision, delinquency, history of cigarette use, coping skills, and future expectations.

In addition to increasing the number of risk factors included in their studies, Farrell and his colleagues studied seventh graders, a younger sample than previously studied. Research by Oetting and Beauvais (1990) shows that a significant increase in drug use occurs between the sixth and ninth grades. The onset of drug use prior to fifteen is a consistent predictor of later drug abuse (Tenant & Detels, 1976).

Urban Study

Farrell and his associates examined the relationship between risk factors and drug use of seventh graders in two major studies. The first study was undertaken in 1988 with a sample of 1,352 urban seventh graders, 87% of whom were African American

(Farrell, Danish, & Howard, 1992). These youth also came from neighborhoods with a high rate of crime and drug use. More than half of the students lived in single-parent female-headed households.

Risk Factors for Urban Study:

Farrell and his associates administered a questionnaire battery that assessed the presence of 26 specific risk factors.

1. Family structure: not living with both parents (based on school records).
2. Low income family: Eligible for federal free or reduced lunch program (based on school records).
3. Home alone after school: Reported that they were home without adult supervision 20 or more times in the past 30 days.
4. Friends don't disapprove of drug use: Reported that their friends either didn't care or approved of seventh graders using alcohol and/or drugs.
5. Perceive high student drug use: Reported that half or more of the students at their school used alcohol or drugs at least once a month.
6. Friends use drugs: Reported that any of their friends had an alcohol problem, a drug problem, or used drugs at least once a month.
7. Know adults who use drugs: Reported that half or more of the adults they know have a drug problem, have an alcohol problem, or use drugs at least once a month.

8. Feel pressure to use drugs: Reported that they felt pressured by their friends to drink or use drugs during the past 30 days.
9. Do not attend church: Reported that they did not attend church or church activities during the past 30 days.
10. Poor academic performance: Grade point average of less than 1.5 on a 4-point scale (based on school records).
11. Poor school attendance: Absent more than 25% of the time (based on school records).
12. History of trouble with the police: Reported that they had been in trouble with the police.
13. History of alcohol use: Reported that they had been drunk.
14. History of cigarette use: Reported that they had used cigarettes.
15. High delinquent behavior: Scored in the upper quartile on a delinquent behavior scale.
16. High social behavior: Scored in the upper quartile on a social behavior scale.
17. Frequent use of ventilating feelings as a way of coping with problems: Scored in the upper quartile on the A-COPE (Patterson & McCubbin, 1987) Ventilating Feelings scale.
18. Infrequent use of family members as a way coping with problems: Scored in the lower quartile on the A-COPE Solving Family Problems Scale.

19. Infrequent use of demanding behavior as a way of coping with problems: Scored in the lower quartile on the A-COPE Engage in Demanding Activity scale.
20. High emotional distress: Scored in the upper quartile on the Weinberger Adjustment Inventory (WAI: Weinberger, Feldman, Ford, & Chastain, 1987) Distress scale.
21. Low emotional restraint: Scored in the upper quartile on the WAI Emotional Restraint scale.
22. Low self-esteem: Scored in the upper quartile on the WAI Self-Esteem scale.
23. Do not expect to graduate from high school: did not report *definitely will* when asked if they expected to graduate from high school.
24. Expect to get in trouble with the police: Did not report *No* when asked if they expected to get in trouble with the police or courts.
25. Expect to use drugs: Did not report *No* when asked if they expected to use marijuana, cocaine or crack, injected drugs, or other drugs.
26. Expect to be unemployed: Did not report *No* when asked if they expected to be unemployed.

Farrell et al. (1992) used two drug use measures:

Problem Behavior History: This measure contained 15 items related to substance use (e.g. "Drank wine or wine coolers.", "Used marijuana (pot, hash).") Students were asked whether they had ever used each drug.

Behavioral Frequency Scales: Students were asked to indicate how frequently they used 15 specific drugs or categories of drugs during the past 30 days. These items were used to calculate two scales: (a) gateway drug use, the mean reported frequency of using cigarettes, beer, wine, liquor, and marijuana, and getting drunk; and (b) illicit Drug Use, the mean reported frequency of using inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, and other drugs.

Farrell et al. (1992) found girls and boys did not differ in their prevalence of use of cigarettes, beer/wine, liquor, or other drugs. However, girls showed a lower prevalence of use of marijuana, and frequent use of beer than boys.

Farrell et al. (1992) examined the relationship between the total number of risk factors and prevalence of use for each of the five drug categories and found that prevalence increased dramatically as the number of risk factors increased: e.g., 12.7% of the students with no risk factors smoked, in comparison to 52.2% of those with four risk factors, and 100% of those with seven or more risk factors. This finding supported the main tenet of the multiple

pathway theory of drug use: As risk factors increased, the prevalence of drug use increased in a linear relationship.

The relationship between the 26 risk factors and prevalence of each of the five drugs was examined using chi-square tests. The authors found that five risk factors did not relate to prevalence rates for any drug. These risk factors were: Single parent family, does not attend church, low self-esteem, and high social behavior. Gender as a risk factor was not a significant variable.

Eleven risk factors were identified that were the most significantly associated with drug use. They were (1) a history of alcohol use, (2) history of cigarette use, (3) high involvement in "delinquent" behavior, (4) friends use drugs, (5) friends don't disapprove of drugs, (6) home alone after school, (7) know adults who use drugs, (8) feel pressure to use drugs, (9) expect to use drugs in the future, (10) history of trouble with the police, and (11) low use of demanding activity as a coping strategy.

In general, risk factors associated with a history of alcohol use, history of cigarette use, and involvement in "delinquent" behavior resulted in the highest risk ratios. Risk factors associated with peer factors also resulted in high risk ratios. For example, students with friends who used drugs were over eight times more likely to have used marijuana. Risk factor ratios associated with use of hard liquor and marijuana were in general higher than those associated with the other drugs. These results were similar to

previous findings (Bry, McKeon & Pandina 1982; Newcomb, Maddahian, & Bentler, 1986).

Through regression analyses, eight risk factors for urban adolescents accounted for 37% of the variance in gateway drug use (mean reported frequency of using beer, wine, liquor, getting drunk, and marijuana) in the past 30 days. The risk factors were: (a) Home alone after school, (b) friends don't disapprove of drugs, (c) friends use drugs, (d) know adults who use drugs, (e) feel pressure to use drugs, (f) high involvement in delinquent behavior, (g) low use of demanding activity, (e.g. try to improve yourself, get body in shape, get better grades, etc.) and (h) expect to use drugs in the future.

Based on these results the authors eliminated redundant factors. They reduced the list of risk factors to 11 without much loss in validity. They claimed that the diversity of the 11 risk factors supports a multiple theory of drug use.

Farrell et al. explained how risk factors relate to different theories and previous research studies: Three of the risk factors -Friends don't disapprove of drugs, Friends use drugs, and Feel pressure to use drugs are consistent with social learning theory and problem behavior theory that emphasize the importance of peer factors (Akers et al., 1979; Jessor & Jessor, 1977). In addition three other risk factors that relate to "delinquency"- Expect to get in trouble with the police or courts, History of trouble with the police, and High delinquent behavior are consistent with Jessor and

Jessor's (1977) problem behavior theory. Further, the set also includes two risk factors that relate to prior use of other cigarettes and alcohol - History of cigarette use and History of alcohol use. The strong influence of alcohol and cigarettes to marijuana is consistent with Kandel's (1975) stage theory that predicts a pattern of progression from the use of alcohol and cigarettes to marijuana and other illegal drugs. The risk factor Know adults who use drugs is a psychosocial correlate that relates to drug use, especially alcohol, in stage theory (Kandel, 1982). Finally, other risk factors have been related to drug use in other studies. These are Home alone after school and Expect to use drugs. The authors make the point that each of these risk factors made a unique contribution which provides further support for the multiple pathway theory of drug use.

Rural Study

In a second study Farrell and his associates (Farrell, Anchor, Danish, & Howard, 1992) compared the prevalence of drug use and risk factor ratios in a rural sample of seventh graders to the prevalence of drug use and risk factor ratios found for the urban sample studied in 1988. In the rural sample students were Black (44.8%) and White (52.8%). A total of 15 of the 20 risk factors that were significantly related to drug use in the urban study were included in the rural questionnaire.

Risk Factors for Rural Seventh Graders:

1. Home alone after school: Reported that they were home without adult supervision 20 or more times in the past 30 days.
2. Friends don't disapprove of drug use: Reported that their friends either didn't care or approved of seventh graders using alcohol and/or drugs.
3. Perceive high student drug use: Reported that half or more of the students at their school used alcohol or drugs at least once a month.
4. Friends use drugs: Reported that any of their friends had an alcohol problem, a drug problem, or used drugs at least once a month.
5. Know adults who use drugs: Reported that half or more of the adults they know have a drug problem, have an alcohol problem, or use drugs at least once a month.
6. Feel pressure to use drugs: Reported that they felt pressured by their friends to drink or use drugs during the past 30 days.
7. History of trouble with the police: Reported that they had been in trouble with the police.
8. History of alcohol use: Reported that they had been drunk.
9. History of cigarette use: Reported that they had used cigarettes.
10. High delinquent behavior: Scored in the upper quartile on a delinquent behavior scale.

11. High emotional distress: Scored in the upper quartile on the Weinberger Adjustment Inventory (WAI) (Weinberger, Feldman, Ford, & Chastain, 1987) Distress scale.
12. Low emotional restraint: Scored in the upper quartile on the WAI Emotional Restraint scale.
13. Do not expect to graduate from high school: Did not report *definitely will* when asked if they expected to graduate from high school.
14. Expect to get in trouble with the police: Did not report *No* when asked if they expected to get in trouble with the police or courts.
15. Expect to use drugs: Did not report *No* when asked if they expected to use specific drugs.

Results indicated that for each drug, prevalence for rural adolescents also increased dramatically as the number of risk factors increased. Farrell et al. (Farrell, Anchor, Danish, & Howard, 1992) concluded that as the number of risk factors increase, the likelihood and degree of involvement in drugs increases in an accelerating curvilinear fashion. This is consistent with the findings of previous research and supported the theory that there are multiple rather than single pathways to involvement in drugs for youth. Furthermore, there is a degree of similarity in the factors associated with drug use among adolescents in a variety of settings.

In the rural sample risk factors that resulted in the highest risk factor ratios were the same as those found for the urban sample; namely, a history of alcohol use, history of cigarette use, and involvement in delinquent behavior. Boys showed a significantly greater prevalence of both use and frequent use of hard liquor than girls. Boys showed a slightly higher frequency of gateway drug use than girls. No significant ethnic differences were found. Only high emotional distress was not significantly related to prevalence rates for at least one drug.

Compared to the urban sample, those in the rural sample reported a higher prevalence of use for hard liquor, and a higher prevalence of frequent use for all of the drugs except marijuana. Moreover, the prevalence of frequent use was more than twice as great for the rural sample for five of the seven drugs. These findings indicate that rural youth rather than urban youth are at greatest risk for drug problems. It also supports the social learning concept that different settings can differentially reinforce drug use.

In summation, Farrell et al. (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish, & Howard, 1992) conducted studies relating diverse risk factors to drug use with seventh graders. In their first study with urban adolescents, they used 26 risk factors in the analysis. In a following study the authors selected a rural sample and used 15 of the original 26 factors. The results of both studies supported the hypothesis that adolescent involvement in

drug use is related to the total number of risk factors present for a given individual rather than any specific combination of factors. These results added to the growing empirical evidence for the validity of the multiple pathway theory of adolescent drug use.

Research related to Risk Factor Home Alone After School

Cross-sectional Study of Eighth Graders

Richardson et al. (1989) conducted an investigation with over 4,000 eighth-grade students and over 2,000 parents that focused on drug use among children who regularly care for themselves after school. The students were from a wide range of racial and ethnic backgrounds: White (31.9%), Black (13.6%), Hispanic (35.3%), and Other (19.2%). The study examined the relationship between the amount of time in self-care among adolescents and substance use. The study controlled for sociodemographic variables, extracurricular activities, social influences to smoke or drink alcohol, academic achievement, and family stressors. A self-care measure asked the student to report the number of days and number of hours they took care of themselves after school. Drug use was measured by the lifetime use of cigarettes, alcohol, and marijuana. Parents were asked to respond to a short questionnaire that included the self-care items.

The findings showed that adolescents in self-care were least likely to be Hispanic, and most likely to be White. They were less likely to live in two-parent homes. In addition, they were more likely to live in high-income areas. Students in self-care were also more likely to have parents who smoke and drink alcohol.

The risk of drug use among eighth grade students in self-care for > 11 hours per week as compared to those in self-care 0 hours per week was 2.0 for alcohol use, 2.1 for cigarette use, and 1.7 for marijuana use. This finding indicated that children who regularly care for themselves unsupervised are at significantly higher risk to use alcohol, cigarettes, and marijuana. This study controlled for social influences to smoke or drink alcohol, family stresses, and academic achievement. In Farrell et al.'s studies with rural and urban seventh graders, the risk factor, Home alone after school, was also significantly associated with gateway drug use

Summary of the Literature

Based on the research studies reviewed for each major theory, selected risk factor variables were identified for further study.

(1) Problem-Behavior Theory

Problem behavior theory of Jessor and Jessor (1977) explained adolescent drug use in the context of personality variables, social variables, and other problem behaviors such as

drinking alcohol, shoplifting, truancy, fighting, and vandalism. The personality variables that predicted drug use were: greater attitudinal tolerance of deviance; lesser religiosity; and lower expectations for academic achievement. This last characteristic relates to the risk factor that measures Do not expect to graduate from high school in the present study.

Social variables that theoretically and actually predicted adolescent drug use were: Having friends who use drugs, parents who do not disapprove of problem behavior, confiding in friends rather than parents, and having parents who are not encouraging or supportive.

Behavioral variables that theoretically and actually predicted drug use were: General deviant behavior (truancy, shoplifting, damaging property, stealing, fighting, etc.), and early use of alcohol and marijuana (Jessor & Jessor, 1977; Windle, 1990). In the current study two risk factors relate to general deviant behavior - History of trouble with the police or courts and Expect to get in trouble with the police or courts. One risk factor relates to early use of alcohol, History of alcohol use.

The Jessors' problem behavior theory focused attention on the social environment rather than solely on dysfunctional personality states. They helped establish the concept of a behavioral syndrome that could be predicted and maintained over time. However, Baumrind (1985) challenged the Jessor's interpretation of adolescent

behavior. She pointed out that normal adolescent development involves experimenting with drugs, and healthy questioning of the status quo.

(2) Social Learning Theory

Social learning theory of Akers et al. (1979) explained adolescent drug use through the learning principles of imitation, definitions, differential association, and differential reinforcement both social and nonsocial.

Research showed that for both alcohol and marijuana use, the frequency of use increased when there was greater exposure to using rather than to abstinent models, when there was more association with using than with abstinent peers and adults, when use was differentially reinforced (more rewards, fewer) over abstinence, and when there was more positive or neutralizing than negative definitions of use (Akers et al., 1979).

Differential peer association variable (how many friends use drugs) was the most important single variable which corresponds to the risk factor in the current study- Friends use drugs.

Other research (Bailey & Hubbard, 1990) showed that for seventh/eighth grade adolescents most of the influence on initiation of drug use was also from significant peer attitudes (having friends who approve of drugs), and differential peer association (having friends who use drugs). Additional research related to differential

association (Barnes, 1981) found substantial evidence that prevalence of alcohol use for adolescents was remarkably similar to the prevalence rates for the adults in the same community. This supported the use of the risk factor Know adults who use drugs in the proposed study.

(3) Stage Theory of Drug Use

The stage theory of drug use (Kandel, 1975) proposed that adolescents who use many different drugs do so in an ordered fashion, systematically moving through a series of stages: (1) nonuse; (2) legal drugs only (beer, wine, cigarettes, or hard liquor); (3) marijuana and hashish, (4) pills (uppers, downers, tranquilizers); (5) psychedelics (LSD, other psychedelics); (6) cocaine; and (7) heroin. Use of two risk factors in the current study, History of cigarette use and History of alcohol use are based on the premise that they precede marijuana and other drug use.

Kandel et al.'s (1976) studies also showed alcohol use was best predicted by involvement in minor delinquent activities, greater involvement with peer activities, and greater exposure to peer and parent models for drinking.

In the current study two risk factors, Expect to get in trouble with the police or courts, and History of trouble with the police or courts relate to the stage theory correlate 'involvement in minor delinquent activities.' Two other risk factors, Friends use drugs and

Know adults who use drugs relate to the stage theory correlates associated with peer and parent models for drinking.

(4) The Multiple Pathway Theory

The multiple pathway theory has recently emerged as a result of the confusion generated by conflicting sets of diverse variables and numerous theoretical formulations. Advocates for the multiple pathway theory postulate that the extent of drug use is an increasing function of the number of diverse etiological variables instead of any particular set of them.

Studies with high school students, and more recently, urban and rural seventh graders (Bry, McKeon, & Pandina, 1982; Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992; Newcomb, Mahhadian, & Bentler, 1986) have consistently found that as risk factors increase prevalence of drug use increases in a linear relationship. There is clearly an increasing magnitude of risk for drug use with each increasing risk factor.

Recent studies undertaken by Farrell and his associates with seventh graders found that, in general, risk factors associated with a history of alcohol use, history of cigarette use, peer factors, and involvement in "delinquent " behavior resulted in the highest risk ratios. In general, psychological and emotional factors have seemed to play a secondary role in explaining early drug use including low self-esteem (Farrell, Anchor, Danish, & Howard, 1992; Farrell,

Danish, & Howard, 1992; Newcomb, Maddahian & Bentler, 1986). However, one psychological attribute that consistently correlates with early drug use is the intention or expectation to use drugs (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992; Newcomb & Bentler, 1986).

In conclusion, the four theories and the associated research studies lead to the identification of nine diverse risk factors and six drug use categories in the current study to determine if the multiple pathway theory would generalize to 188 suburban seventh graders, a sample not previously studied. Seventh graders from three New York suburban schools were identified for the study. The nine risk factors are:

1. Expect to use drugs,
2. Do not expect to graduate from high school,
3. Expect to get in trouble with the police,
4. Friends use drugs,
5. Know adults who use drugs,
6. History of alcohol use,
7. History of cigarette use,
8. History of trouble with the police,
9. Home alone after school,

The six drug use categories are use of:

1. cigarettes
2. beer/wine
3. liquor
4. marijuana
5. illicit drugs (use of inhalants, depressants, hallucinogens, stimulants, cocaine, or crack, narcotics, injected drugs, and other drugs)
6. gateway drugs (use of cigarettes, drinking beer, wine, liquor, marijuana, and getting drunk)

III. Statement of the Problem

The multiple pathway theory of drug use has been supported with evidence from studies with high school students in combined suburban/urban populations (Bry & McKeon, 1982) and more recently with younger populations of urban and rural seventh graders, predominantly Black (Farrell, Danish, & Howard, 1992; Farrell, Anchors, Danish, & Howard, 1992). The proposed study investigates whether Farrell and his colleagues' work will generalize to a population of predominantly White suburban seventh graders from three suburban schools. The research problem in this study addresses three questions: first, using nine risk factors from Farrell and his colleagues' studies, what is the relationship between number of risk factors and prevalence of drug use for suburban adolescents? Specifically, Hypothesis 1 states that drug use for suburban seventh graders will increase, as total number of risk factors increase, in any combination. Second, how does prevalence of use for cigarettes, beer/wine, liquor, marijuana, and illicit drugs compare for suburban seventh graders from three different suburban schools? Hypothesis 2 states that prevalence of drug use will be the same for suburban seventh graders from School 1, School 2, and School 3. Third, are there any differences in average number of risk factors between students from three different suburban schools? Hypothesis 3 states that the average number of risk factors will be the same for

suburban seventh graders from School 1, School 2, and School 3. Based on the multiple pathway theory, if prevalence rates of drug use are the same for the three schools, average numbers of risk factors would also be the same (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992).

Hypotheses

To summarize, the study examines three hypotheses:

H1: The prevalence of drug use for suburban seventh graders will increase as the total number of risk factors increase in any combination.

H2: The prevalence of drug use will be the same for suburban seventh graders from School 1, School 2, and School 3.

H3: The average number of risk factors total will be the same for suburban seventh graders from School 1, School 2, and School 3.

IV. Method

Sample

The total suburban sample in this study consisted of 188 seventh grade students from three New York public suburban middle schools in mid-Westchester county (School 1, School 2, and School 3). School 1 and School 2 are approximately 30 miles north of New York City and approximately 8 miles from each other. School 3 is approximately 50 miles north of New York City.

Sixty-two percent of the total sample was male and 38% female. The total sample was 61.5% White, 9.5% Black, 8.4% Hispanic, 2.8% Asian, and 17.8% Other. Students who responded Other were observed to be mainly White.

School 1 Sample

The School 1 sample was comprised of 33 White students. School 1 is a small public school whose total student body numbers approximately 1,000 students. The socio-economic background of this student body ranged from middle-to upper middle class. The students in this sample were from two health classes.

The middle school Principal agreed to have the questionnaire administered by the health class teacher to two health classes of seventh grade students during class time. The principal determined

that the questionnaire related to the health class curriculum and did not need parental permission for administration.

School 2 Sample

The School 2 sample was comprised of 86 students, 30% White, 19.5% Black, 15.9% Hispanic, 4.9% Asian, and 29.3% Other. This school is the largest of the three schools with a total student body of approximately 2500 students. The socio-economic background of these students ranged from middle to upper-middle class, with a small portion of the students from a low socio-economic or disadvantaged background. The students in this sample were from four health classes. The President of the Board of Education and the middle school building Principal agreed to have the questionnaire administered in four health classes of seventh graders by the health class teacher during class time. The administrators determined that parental permission was not required because the administration of the questionnaire was a curriculum related activity.

School 3 Sample

The School 3 sample was comprised of 69 students, 81.3% White, 1.6 % Black, 3.1% Hispanic, 1.6% Asian, and 12.5% Other. This school has a total student body of approximately 1100 students. The socio-economic background of the students range from middle

to upper middle class, with a small percentage of students from a low socio-economic background.

The superintendent of schools requested that a letter (Appendix D) explaining the study be mailed to the parents; parents who did not wish their children to take the questionnaire were asked to contact a the health class teacher. Two parents requested that their children not take the questionnaire. Identifying information was deleted from the letter in the appendix.

Design

This study analyzed the relationship between the number of risk factors, the independent variable, and six drug use categories, the dependent variables, for a group of 188 suburban seventh graders. It was expected as risk factors increased, drug use would increase for the suburban seventh graders. To test this relationship a questionnaire was administered to the seventh graders in their respective health classes. The questionnaire contained nine dichotomous risk factors:

1. Expect to use drugs: Did not report *No* when asked if they expected to use one or more of the following: Marijuana, cocaine, injected drugs, and /or other drugs.
2. Do not expect to graduate from high school: Did not report *definitely will* when asked if they expected to graduate from high school.

3. Expect to get in trouble with the police: Did not report *No* when asked if they expected to get in trouble with the police or courts.
4. Friends use drugs: Reported that one or more of their friends had an alcohol problem, a drug problem, or used one or more of a list of four drugs at least once a month.
5. Know adults who use drugs: Reported that half or more of the adults they know have a drug problem, an alcohol problem, or used drugs at least once per month.
6. History of alcohol use: Reported that they had been drunk.
7. History of cigarette use: Reported that they had used cigarettes.
8. History of trouble with the police: Reported that they had been in trouble with the police.
9. Home alone after school: Reported that they were home without adult supervision 20 or more times in the past 30 days.

The questionnaire also contained 14 drug use items classified into use of six drug categories:

1. cigarettes
2. beer/wine
3. liquor
4. marijuana

5. illicit drugs (use of inhalants, depressants, hallucinogens, stimulants, cocaine, or crack, narcotics, injected drugs, and other drugs)
6. gateway drug use scale (use of cigarettes, drinking beer, wine, liquor, marijuana, and getting drunk)

Responses were used to classify students as users, non-users, and frequent users for cigarettes, beer/wine, hard liquor, marijuana and illicit drug use. Students who either responded *yes* when asked if they had ever used a particular drug or who reported any frequency of use during the past 30 days were classified as users for that drug. Students who reported use of *3-5 times or more* during the past 30 days were classified as frequent users for that drug. Comprehensive scoring information can be found in the Description of the Expectations and Activity Questionnaire (Appendix A).

Instrument

This section provides background information and an overview of the Expectations and Activity Questionnaire including the full length and shortened form used in this study. Appendix A provides a comprehensive description of the questionnaire that delineates scoring criteria for each risk factor, and non-users, users, and frequent users of the drug use variables: cigarettes, beer/wine, liquor, marijuana, and illicit drug use . It also describes scoring for the gateway drug use scale. Finally, it provides

reliability and validity data for the risk factors, drug use variables, and the Primary Prevention Awareness, Attitude and Usage scale (PPAUS) (Swisher, Shute, & Bibeau, 1984). Other scales on the questionnaire, General Deviant Behavior Scale (Jessor & Jessor, 1977); Emotional Restraint Subscale from the Weinberger Adjustment Inventory (WAI) (Weinberger, Feldman, Ford & Chastain, 1987); and the Adolescent Coping Orientation for Problem Experiences (A-COPE) (Patterson & McCubbin, 1987) were briefly described. They did not contain risk factors used in this study.

Overview

The questionnaire in this study is entitled the Expectations and Activity Questionnaire and is a shortened version of Farrell et al.'s (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992) questionnaire used in their studies with urban and rural seventh graders. Two forms of the Expectations and Activity Questionnaire were used in this study, a full-length form (Appendix B) and a shortened form (Appendix C). The full length form was used with 146 students. The shortened form was used with 42 students from School 2 due to time constraints.

The full length Expectations and Activity Questionnaire (Appendix B) is nine pages long, contains eight questions, and a total of 124 items. The eight questions range from 7 to 46 items. Each question contains a scale or scales that have been validated by

research studies. Question 2, 6, and 7 did not measure risk factors or drug use, but were included to create a diverse and interesting questionnaire.

The shortened form of the Expectations and Activity Questionnaire (Appendix C) is four and a half pages long, contains 97 items, and questions 1,3,4,5, and 8 from the full length Expectations and Activity Questionnaire. These were renumbered 1 - 5, respectively. Questions 2, 6, and 7 from the full length questionnaire were omitted because they did not contain risk factor or drug use variables.

Following is a list of the questions on the full length questionnaire, number of items each contains, and the risk factor and drug use variables each measures.

<u>Question</u>	<u>No. of items</u>	<u>Risk factors and Drug Use Variables</u>
1	16	<u>Expect to use drugs</u> <u>Do not expect to graduate</u> <u>Expect to get in trouble with the police</u>
2	7	No risk factors or drug use variables measured. (Assessed student models of problem behavior).
3	7	<u>Friends use drugs.</u>

<u>Question</u>	<u>No. of items</u>	<u>Risk factors and Drug Use Variables</u>
4	7	<u>Know adults who use drugs.</u>
5	46	<u>History of cigarette use</u> <u>History of alcohol use</u> <u>Home alone after school</u> <u>History of trouble with the police.</u> cigarette use beer/wine use liquor use marijuana use inhalant use depressant use hallucinogen use stimulant use cocaine or crack use narcotics use injected drug use other drug use getting drunk
6	13	No risk factors or drug use variables measured.(Assessed self-restraint).

<u>Question</u>	<u>No. of items</u>	<u>Risk factors and Drug Use Variables</u>
7	7	No risk factors or drug use variables measured. (Assessed adolescent coping skills).
8	21	<u>History of alcohol use</u> <u>History of cigarette use</u> <u>History of trouble with the police</u> cigarette use beer/wine use liquor use marijuana use inhalant use depressant use hallucinogen use stimulant use cocaine or crack use narcotics use injected drug use other drug use

Procedure

Data were collected using both the full length and shortened forms of the self-administered Expectations and Activity Questionnaire. A total of 188 students were involved in the study. Data collection was completed in the spring of 1995.

In School 1, 33 students in two regularly scheduled health classes were given the full length Expectations and Activity Questionnaire by the health teacher. The questionnaire took approximately one class period to complete.

In School 2, 44 students (Group A) in two regularly scheduled health classes were given the full length Expectations and Activity Questionnaire by their health teacher. The questionnaire took approximately one class period to complete. Because of time constraints, the Expectations and Activity Questionnaire-Shortened Form (Appendix C) was given to 42 students (Group B), in two other health classes in School 2 by their health teacher. It took 20 minutes to complete. A t-test was performed to compare the responses of Group A to Group B. There were no significance differences for average number of risk factors between the 44 students (Group A) who took the full-length questionnaire versus the 42 students (Group B) who took the shortened form. In addition six t-tests were performed that compared Group A and Group B on prevalence of drug use. Group A and Group B were not significantly different on prevalence for cigarettes, beer, wine, liquor, illicit

drugs, and gateway drugs. Because there were no differences between the groups on these measures, Group A and Group B were combined and treated as one sample from that school. This resulted in a sample size of 86 students from School 2.

In School 3, 68 students in four regularly scheduled health classes were given the full-length Expectations and Activity Questionnaire. This writer administered the questionnaire in two classes, and the school psychologist for School 3 administered the questionnaire in the other two classes. The students took one class period to complete the questionnaire. At the request of the superintendent of School 3, a letter (Appendix D) was also sent home to the parents explaining the purpose of the study, a brief description of the questionnaire, and a school telephone number to call if the parent did not wish their child to take the questionnaire. Two parents requested that their children not take the questionnaire.

In each school the students were told the purpose of the study is to better understand the interests, values, and activities of students in the United States. They were also told that taking the questionnaire was voluntary and they could do independent seat work if they chose not to complete the questionnaire, or decided to complete part of it. Students were assured that their responses were confidential and anonymous. They were instructed not to write their name on the questionnaire. The instructions for the initial questions were read aloud by the respective adult giving the questionnaire.

Questions concerning the study were answered at the end of the administration.

Responses were used to classify students as nonusers, users, and frequent users of cigarettes, beer and wine, liquor, marijuana, illicit drugs (inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, and other drugs) as dichotomous variables, and gateway drug users on a continuous scale. A total of nine risk factors were assessed in the questionnaire. Each risk factor was coded as Present or Absent based on specific criteria. Appendix A describes scoring procedures.

Statistical Procedures Used

Percentages were used to examine consistency of responses for three risk factors and drug use variables measured on two questions on the full-length and shortened form of the questionnaire. To test hypothesis 1, logistic regression was used to examine the relationship between the total number of risk factors, the independent variable, and the prevalence for five individual drug categories, the dependent variables, for the total sample. Logistic regression was used because it is the preferred method of analysis when multiple dichotomous independent and dependent variables are involved in a research design (Hosmer & Lemeshow, 1989). The tests for hypothesis 1 are based on the significance

level of the Wald statistic, which indicates whether the regression coefficients are significantly different from 0, using a significance level of 0.05. In addition, the log odds of the regression coefficients tell the amount of change in the dependent variables (e.g. cigarette smoking) for a one-unit change in the independent variable (e.g. number of risk factors). The log odds in the logistic model is rewritten in terms of odds and expressed by the $\text{Exp}(B)$ statistic where the *odds* of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not (SPSS-X Advanced Statistics Guide, 1994, pp. 49). In this study the values of $\text{Exp}(B)$ estimates the change in the odds of drug use with each unit increase in the number of risk factors. Cross tabs were used to examine how percentage of drug use varies with numbers of risk factors. Using this data, a line graph was constructed that shows as risk factors increase, drug use increases in a generally linear relationship.

Next, to test hypothesis 2, chi-squares were used to examine and compare the prevalence rates of drug use in the three schools. To test hypothesis 3, an analysis of variance was used to examine and compare the average number of total risk factors for each school. A Tukey-B test was performed for post hoc analysis.

For additional analyses, logistic regression was used to determine if the risk factors, as a set, significantly associated with drug use in the total sample, and then in each of the three schools. In

previous studies, Farrell and his researchers (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish, & Howard, 1992) used multiple chi-squares to analyze the individual relationships between each risk factor and drug use category. With logistic regression, dichotomous risk factors are entered as a set for each drug use category, which greatly reduces the number of analyses as well as the possibility of inflated results. Further, results are more likely to reflect how risk factors related to drug use are experienced in real life, as a set in any combination, rather than one at a time. The logistic regression method also permits an analysis of any interactions between variables.

Multiple regression analysis was conducted to determine if the risk factors, as a set, significantly associated with the frequency of gateway drug use, a continuous variable, for the total sample. A t-test was used to compare the average number of risk factors for frequent drug users (i.e. 3 - 5 times in the past month) versus infrequent users (non-users and 1-2 times in the past month users). Chi-square analyses were performed to compare the frequencies of risk factors for frequent users versus infrequent users. Last, frequency distributions were used to examine the range of responses in percents for the risk factors: Expect to use drugs, Friends use drugs, Know adults who use drugs; and two drug use variables, illicit drugs and gateway drugs.

V. Results

This chapter is divided into three parts. The first part describes results for three preliminary analyses and the three main hypotheses:

- (1) Consistency of drug use and risk factor responses
- (2) Prevalence of use and frequent use of drugs for the total suburban sample
- (3) Total number of risk factors for the total suburban sample
- (4) Hypothesis 1: analyses of total number of risk factors and relationship with drug use prevalence
- (5) Hypothesis 2: analysis of school comparisons for prevalence rates of drug use
- (6) Hypothesis 3: analyses of school comparisons for the average number of total risk factors

The second part is comprised of five additional analyses:

- (1) Identification of significant risk factors relating to drug use for the total suburban sample
- (2) Identification of significant risk factors relating to drug use for each of the three school samples
- (3) Multiple regression analysis of gateway drug use

- (4) Analyses of frequent users (i.e. 3-5 times or more use a month)
- (5) Range of responses in percents for selected risk factors, gateway drug use, and illicit drug use

The third part is a summary of the research findings.

Consistency of Drug Use and Risk Factor Responses

A percentage of agreement was calculated for 12 drug use items and three risk factors, History of alcohol use, History of cigarette use, and History of trouble with the police that were contained on the Problem Behavior History measure and the Behavioral Frequency Scale. This procedure was to determine if the students responded in a consistent manner to questions; for example, it was expected that students who reported *Yes* to smoking on the Problem Behavior History measure, would report smoking one or more times in the past month on the Behavioral Frequency Scale. A perfect percentage of agreement between the two responses would be 100% and indicate high internal consistency of responses.

A percentage of agreement for the three risk factors was as follows: History of alcohol use, 93%; History of cigarette use, 87%; and History of trouble with the police, 95%. A percentage of agreement for the drug use items was as follows: beer use, 89%; wine use, 94%; liquor use, 96%; marijuana use, 98%; inhalant use,

97%; depressant use, 100%; hallucinogen use, 100%; stimulant use, 100%; cocaine use, 100%; narcotics use, 100%; injected drug use, 100%, and other drug use, 99%. These findings indicated that students were highly consistent in their responses.

Prevalence of Drug Use for the Total Suburban Sample

Prevalence is defined as the percent of students who report any use of drugs in each drug category. Prevalence was calculated by determining what percent of students in the total suburban sample of seventh graders were users and/or frequent users (i.e. 3 - 5 times or more during the past month) of cigarettes, beer/wine, liquor, marijuana, and other illicit drugs (inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, and other drugs). These results are reported in Table 1.

The rank order for both use and frequent use was:

(1) beer/wine, (2) cigarettes, (3) illicit drugs, (4) liquor, and (5) marijuana. Beer/wine and cigarette use are consistent with the rank order of drugs for urban and rural seventh graders. However, illicit drugs rank third for suburban students versus fourth for urban and rural students, and liquor use fourth versus third. A visual inspection of the data reveals that suburban rates for cigarette, beer/wine, liquor, and marijuana use are generally lower than Farrell's urban and rural rates. However, the prevalence rates for suburban illicit drug use is the same as rural rates (both with rates of

12.8%) and similar to urban rates (14.4% versus 12.8% respectively).

Table 2 shows the percent of each drug reported for the illicit drug use variable for suburban adolescents. Inhalants rank number one with almost 10% of the students reporting any use. Inhalants refer to household and commercial products that can be sniffed or "huffed" (inhaled through the mouth) to get high. Abused inhalants include volatile solvents (such as gasoline, glue, paint, and polishes) and aerosols. These substances are legal, inexpensive, and difficult to detect. They are also very dangerous and use can lead to brain damage, intoxication, liver and kidney damage, and potential sudden death (Inhalants, *The Silent Epidemic*, 1995).

Total Number of Risk Factors

For each student in the total sample, the total number of risk factors was calculated, based on the nine risk factors used in the study. Scores on the risk factor index ranged from zero to nine. The frequency distribution for the total sample is reported in Table 3. This shows what percent of the students in these groups had 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9 risk factors.

Approximately 17% of the students had zero risk factors. Almost 15% of the students had five or more risk factors. Based on

the first hypothesis in the study, these students have the highest risk for drug use based on their number of risk factors.

The average number of risk factors for the total sample was 2.38 (SD = 1.97). This is similar to Farrell et al.'s findings. In Farrell et al.'s (Farrell, Anchor, Danish, & Howard, 1992) rural study, the average number of risk factors was 2.4 (SD = 2.2) and in his urban study (Farrell, Danish, & Howard, 1992), 2.5 (SD = 2.0).

Hypothesis 1

Hypothesis I states that the prevalence of drug use for suburban seventh graders will increase as the total number of risk factors increase in any combination. To test hypothesis 1, logistic regression was used to analyze how the prevalence of each of the five drug categories related to the student's score on the number of risk factors.

Five separate logistic regression analyses were performed. To prevent the confounding of risk factors with drug use categories the risk factor, History of cigarette use, was not included in the analysis of cigarette use; the risk factor, History of alcohol use, was not included in the analyses of beer/wine and liquor use; and the risk factor, Expect to use drugs, was not included in the analyses of marijuana and illicit drugs.

Tables 4, 5, 6, 7, and 8 list the risk factors, logistic regression coefficients, the Wald statistics, significance levels, and Exp(B) for

cigarette, beer/wine, liquor, marijuana, and illicit drug use respectively for the total suburban sample.

Results for Hypothesis 1

The relationship between the prevalence of drug use and number of risk factors was significant for all drug categories. Table 4, 5, 6, and 8 show the significance level for the Wald statistic was $p < .001$ for cigarette, beer/wine, liquor, and illicit drug use, and Table 7, $p < .0005$ for marijuana use. These results supported hypothesis one: that as the number of risk factors increased drug use increased significantly as well.

The value of $\text{Exp}(B)$ estimates the change in the odds of drug use with each unit increase in the number of risk factors. Tables 4, 5, and 8 show that the odds increase by a factor of approximately two for cigarette, beer/wine, and illicit drug use with each additional risk factor. Table 6 shows that the odds of liquor use increase by a factor of approximately two and a half. Table 7 shows the odds of marijuana use increase by a factor of approximately five.

Line Graph

A series of five cross-tabs were calculated to show the percentage of students reporting use by number of risk factors. These percentages further illustrate the positive relationship between prevalence of the five drug use categories and number of risk

factors. To prevent the confounding of risk factors with drug use categories the risk factor, History of cigarette use, was not included in the cross-tab analysis of cigarette use; the risk factor, History of alcohol use, was not included in the analyses of beer/wine and liquor use; the risk factor, Expect to use drugs, was not included in the analyses of marijuana and illicit drugs. This data is contained in Table 9 and illustrated in Figure 1 by a line graph that shows the prevalence of drug use as a function of risk factors.

The data in Table 9 shows that prevalence of drug use for all categories increases dramatically as the number of risk factors increase. For example, 0% of the students with no risk factor drank liquor, in comparison to 44.4% of those with five risk factors, and 100% with seven or more risk factors. Six percent of students with zero risk factors smoked, compared to 39% with three factors, 66.7% with six risk factors, and 100% with eight risk factors. In the most striking result, none of the students with zero to four risk factors smoked marijuana in comparison to 21% of those with five risk factors, 67% with seven risk factors, and 100% with eight risk factors. Sixteen percent of the students with zero risk factors drank beer or wine, compared to 70% with four risk factors, and 100% with eight risk factors. Approximately 10% of the students with zero risk factors used illicit drugs, compared with approximately 25% with four risk factors, 40% with six risk factors, and 100% with seven to eight risk factors.

Figure 1 is a line graph, drawn by using the data from the cross-tabs. It illustrates the linear relationship between the drug use categories and numbers of risk factors. The X axis of the line graph is the number of risk factors from zero to eight. (Although nine risk factors were used in the study, with the removal of the confounding risk factor variables, each drug use category ended up with a total of eight risk factors). The Y axis is drug use prevalence expressed in percentages. The line graphs for the drug use categories visually represent and also confirm hypothesis 1; prevalence of drug use increased, as risk factors increased, in a generally linear relationship.

Hypothesis 2

Hypothesis 2 states that the prevalence of drug use will be the same for suburban seventh graders in School 1, School 2, and School 3. Prevalence for the three suburban schools was calculated by determining what percent of students in each school were users and/or frequent users (i.e. 3 - 5 times or more during the past month) of cigarettes, beer and wine, liquor, marijuana, and illicit drugs (inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, and other drugs).

A series of five chi-square tests were conducted to determine if prevalence of use for cigarettes, beer/wine, liquor, marijuana, and

other illicit drugs significantly differed across schools at the .05 level of confidence. These results are reported in Table 10.

Prevalence rates for gateway drugs were also compared across schools using analysis of variance.

Results for Hypothesis 2

There were no significant differences between the schools at the .05 level of significance for all drug categories. Therefore, results supported hypothesis 2. These results justified treating the three schools as one sample.

Hypothesis 3

Hypothesis 3 states that the average number of risk factors will be the same for School 1, School 2, and School 3. First, the average number of risk factors was calculated for each school. To test hypothesis 3 comparisons of the average number of total risk factors between School 1, School 2, and School 3 were examined using an analysis of variance.

Results for Hypothesis 3

The average number of risk factors for School 1 (N = 33) was 1.54 (SD = 1.60); School 2 (N = 86), 2.67 (SD = 2.08); and School 3 (N = 69), 2.40 (SD = 1.89). The analysis of variance comparing the average number of risk factors between schools yielded a

significant result ($F(2,187) = 4.05, p < .018$). A post hoc analysis using a Tukey-B test with a significance level of .05 was carried out. These results showed a significant difference between School 2 ($N = 86$) and School 1 ($N = 33$). The number of risk factors ranged from 0 to 5 for School 1; and from 0 to 9 for School 2. Because there is a significant difference between School 1 and School 2 in number of risk factors, the results did not support hypothesis 3.

To further understand the meaning of this result, a comparison was made between the three schools for students reporting no drug use. Newcomb, Maddahian, and Bentler (1986) showed that fewer risk factors were associated with less drug use in their longitudinal study. Table 10 shows that School 1 had approximately 73% reporting no drug use versus School 2 with 48%, and School 3 with 61%. A chi-square test indicated a significant difference existed between the three schools [$\chi^2(2) = 6.8, p < .03$]. Post hoc testing indicated there was a significant difference between School 1 and School 2 ($p < .05$) with significantly more nonusers of drugs in School 1 than School 2. This finding shows that suburban seventh graders with fewer than 2 risk factors were less likely to use drugs than students with significantly more risk factors. This supports the risk factor model. To provide further support for this notion, a logistic regression analysis was conducted using School and number of risk factors as the independent variables and no drug use as the dependent variable. Only number of risk

factors was significantly associated with no drug use ($p < .04$). School was not a significant risk factor associated with no drug use. In conclusion, although a significantly lower average number of risk factors for School 1 versus School 2 did not result in a significantly lower prevalence of use for a *specific* drug, having a lower average number of risk factors correlated with a higher prevalence of *no drug use* for School 1 versus School 2. In addition it was determined that the number of risk factors and not the school one attended was associated with a student not using drugs. This finding supports the notion that number of risk factors is the important variable associated with both drug use and non drug use.

Additional Analyses

Identification of Significant Risk Factors for the Total Sample

Logistic regression tests were used to identify which of the risk factors entered as a set significantly related to prevalence rates for cigarettes, beer/wine, liquor, marijuana, and illicit drugs. To prevent the confounding of risk factors with drug use categories, History of alcohol use was not used for analyses with beer/wine and liquor users; History of cigarette use was not used for the analysis with cigarette users; and Expect to use drugs was not used for analyses with marijuana and illicit drug users. This resulted in each drug use category having eight risk factors.

Results for Cigarette Use for Total Sample

To identify significant risk factors associated with smoking for all the seventh graders, cigarette users were entered as the dependent variable, and the eight risk factors as set (excluding History of cigarette use) were entered as the independent variable and searched for main effects. Table 11 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s to explain cigarette use.

Three significant risk factors related to cigarette use were identified: Expect to use drugs, ($p < .006$); Expect to get in trouble with the police ($p < .05$); and History of alcohol use ($p < .03$). The second stage, again using logistic regression, was to enter these risk factors as interactions. There were no significant interactions related to smoking. The value of Exp(B) in Table 11 estimates that the odds of suburban students smoking increase by a factor of approximately four if students expect to use drugs; by a factor of two and a half if they expect to get in trouble with the police, and a factor of approximately three if they have been drunk.

Results for Beer/wine Use for Total Sample

To identify significant risk factors related to beer/wine use, beer/wine users were entered as the dependent variable, and eight risk factors (excluding History of alcohol use) entered as a set and searched for main effects. Table 12 lists the risk factors, logistic

regression coefficients (B), Wald statistics, significance levels, and Exp(B)s for beer/wine use.

One significant risk factor related to beer/wine use was identified: History of cigarette use ($p < .0001$). Since only one significant risk factor was found, there was no search for interactions. In Table 12 the value of Exp(B) estimates that the odds of seventh grade students drinking beer/wine increase by a factor of approximately six if they have smoked cigarettes.

Results for Liquor Use for Total Sample

To identify significant risk factors related to liquor use, liquor users were entered as the dependent variable and eight risk factors (excluding History of alcohol use) entered as a set and searched for main effects. Table 13 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for liquor use.

Three significant risk factors were identified: Expect to use drugs ($p < .0007$), Don't expect to graduate ($p < .02$), and History of trouble with the police ($p < .0008$). These risk factors were entered to search for interactions. No significant interactions were obtained. In Table 13 the value of Exp(B) estimates the odds of seventh graders drinking liquor increase by a factor of approximately twenty four if they expect to use drugs, by a factor of almost seven if they have the risk factor, Do not expect to graduate

from high school, and by a factor of almost sixteen if they have a history of trouble with the police.

Results for Marijuana Use for Total Sample

To identify significant risk factors related to smoking marijuana, marijuana users were entered as the dependent variable and eight risk factors (excluding Expect to use drugs) as a set, and searched for main effects. Table 14 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for marijuana use. No main effects were found. Since the sample of marijuana users is small ($N = 7$), this may account for this result.

Results for Illicit Drug Use for Total Sample

To identify significant risk factors related to using illicit drugs, illicit drug users were entered as the dependent variable and eight risk factors (excluding Expect to use drugs) entered as a set, and searched for main effects. Table 15 list the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for illicit drug use.

Two significant risk factors were identified: Don't expect to graduate ($p < .003$) and History of alcohol use ($p < .007$). No significant interactions were found. In Table 15 the value of Exp(B) estimates that the odds of seventh graders using illicit drugs increase

by a factor of seven if they have the risk factor Do not expect to graduate, and by a factor of five if they have been drunk.

Identification of Significant Risk factors for School Samples

Next the relationship between the nine risk factors and prevalence of use for cigarettes, beer/wine, hard liquor, marijuana, inhalants, and other illicit drugs was examined by the logistic regression method for School 1, School 2, and School 3. The purpose of these tests was to identify which risk factors significantly associated with prevalence rates for cigarettes, beer/wine, liquor, marijuana, and other illicit drugs for each school sample.

Results for Cigarette Use for School Samples

Using logistic regression, separate analyses were performed for School 1, School 2, and School 3 to identify significant risk factors related to cigarette smoking. For each analysis, cigarette users were entered as the dependent variable, and the eight risk factors entered as a set (excluding History of cigarette use) and searched for main effects.

No significant risk factors related to cigarette smoking were identified in each of the three schools. Data for individual schools is limited (N's of 33, 86, and 69) and results suggest that the small sample sizes in some cases reduce the likelihood of significant results.

Results for Beer/Wine Use for School Samples

Next, using logistic regression, separate analyses were performed for School 1, School 2, and School 3 to identify significant risk factors related to drinking beer and wine. For each analysis, beer/wine users were entered as the dependent variable, and eight risk factors (excluding History of alcohol use) entered as a set and searched for main effects. No significant risk factors were found for School 1 (N = 33) and School 3 (N = 69). Table 16 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for beer/wine use in School 2.

Three risk factors significantly related to beer/wine use in School 2 (N = 88): Expect to use drugs ($p < .03$), History of trouble with the police ($p < .03$), and History of cigarette use ($p < .006$). A second stage of analysis was performed to search for interactions. No significant interactions were obtained. In Table 16 the value of Exp(B) estimates the odds of seventh grade students in School 2 drinking beer/wine increase by a factor nine if they have a history of trouble with the police, by a factor of five and a half if they expect to use drugs, and by a factor of six and a half if they have a history of smoking.

Results for Liquor use for School Samples

Using the logistic regression method, separate analyses were performed for School 1, School 2, and School 3 to identify

significant risk factors related to drinking liquor. In each analysis liquor users were entered as the dependent variable and eight risk factors (excluding History of alcohol use) entered as a set and searched for main effects. No significant risk factors were found for School 1 (N = 33) and School 3 (N = 69). Table 17 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for liquor use in School 2.

School 2 has three significant risk factors related to drinking liquor: Expect to use drugs ($p < .004$), Don't expect to graduate ($p < .05$), and History of trouble with the police ($p < .02$). A logistic regression analysis was performed to search for interactions. No significant interactions were obtained. In Table 17 the value of Exp(B) estimates the odds of seventh graders in School 3 drinking liquor increase by a factor of fifty-seven if they expect to use drugs, by a factor of approximately nine if they have the risk factor Do not expect to graduate from high school, and by a factor of forty-seven if they have a history of trouble with the police.

Results for Marijuana Use for School Samples

Next, separate logistic analyses were performed for School 2 and School 3 to identify significant risk factors related to smoking marijuana. No analysis was performed for School 1 (N = 33), because students reported no marijuana use. In each analysis marijuana users were entered as the dependent variable and eight

risk factors (excluding Expect to use drugs) entered as a set, and searched for main effects. No main effects were found. Since the sample of marijuana users is small, this may account for this result. No main effects were found for the total sample as well.

Results for Illicit Drug Use for School Samples

Finally, separate analyses were performed for the three schools to identify significant risk factors related to using illicit drugs. For each analysis the illicit drug users of each school were entered as the dependent variable and eight risk factors (excluding expect to use drugs) entered as a set and searched for main effects. There were no significant risk factors for School 1 (N=33).

Table 18 lists the significant risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for illicit drug use in School 2. There was one significant risk factor for School 2: Don't expect to graduate ($p < .008$).

Table 19 lists the risk factors, logistic regression coefficients, Wald statistics, significance levels, and Exp(B)s for illicit drug use in School 3. There were two significant risk factors for School 3: Don't expect to graduate ($p < .03$) and History of alcohol use ($p < .01$). Two logistic regression analyses were performed (one each for School 2 and School 3) to search for interactions. No significant interactions were found. In Table 18 the value of Exp(B) estimates that the odds of seventh graders using illicit drugs in School 2

increase by a factor of almost twelve if they have the risk factor Do not expect to graduate. The value of $\text{Exp}(B)$ estimates the odds of seventh graders using illicit drugs in School 3 increases by twenty-five if they have the risk factor Do not expect to graduate, and by a factor of forty-seven and a half if they have been drunk.

Gateway Drug Use Analysis for Total Sample

The gateway drug use scale (frequency of smoking cigarettes, drinking beer, drinking wine, drinking liquor, getting drunk, and using marijuana) was used as the dependent variable in a multiple regression analysis to identify the strongest risk factors related to gateway drug use and eliminate redundant risk factors. To prevent the confounding of risk factors with drug use variables, three risk factors were not included in the analysis: Expect to use drugs, History of cigarette smoking, and History of alcohol use.

Six of the nine risk factors were entered into the multiple regression equation: Expect to get in trouble with the police, Don't expect to graduate, Friends use drugs, Know adults who use drugs, History of trouble with the police, and Home alone after school. Three significantly predicted gateway drug use: Don't expect to graduate ($p < .0001$); Friends use drugs ($p < .006$); and History of trouble with the police ($p < .0001$). These three risk factors accounted for 37% of the variance ($R^2 = .368$) in gateway drug use ($F = 17.54$, $df 6$, $p < .0001$).

Responses in Percents for Risk Factors and Gateway drug use

Table 20 shows the range of responses in percents for the risk factor, Expect to use drugs for the total sample. Overall 25% of the students reported some probability of expecting to use drugs other than cigarettes and alcohol. Marijuana ranked first, followed by other drugs, with minimal interest in cocaine, and injected drugs. This risk factor was a strong correlate relating to cigarette and liquor use for the total suburban sample.

Table 21 shows the range of responses in percents for responses for the risk factor, Friends use drugs. Approximately 35% of the students reported they thought a few or more of their friends drink at least once a month, almost 4% who thought a few or more of their friends use cocaine, and about 12% who thought their friends used other drugs at least once a month. Alcohol is accurately perceived as the drug most used by one's friends. Students perceived, however, that three times as many of their friends use marijuana as was actually reported in the study (13% versus 3.8%). This discrepancy may be due to students' misperceiving actual marijuana use, or students not truthfully reporting marijuana use.

Approximately 8% of the students thought that a few or more of their friends had either a drug or drinking problem. This is consistent with the proportion of students who report frequent use of alcohol and drugs and are therefore more likely to have a problem: (Approximately 7.7% of the students reported frequent

use of beer, wine and liquor combined, and 6.4% reported frequent use of marijuana and illicit drugs combined).

Table 22 shows the range of responses in percents for the risk factor, Know adults who use drugs. Almost 48% of the students thought that half or more of the adults they know drink at least once a month, followed by 4% who thought half or more adults use marijuana at least once a month, 5% who thought other drug use, 3% who thought cocaine use, and 1.5% who thought use of injecting drugs. Once again alcohol appears by far to be the most common drugs used, in this case, by adults.

Eight percent of the students thought half or more of the adults they know have a drinking problem, compared to 3.2% who thought adults have a drug problem. Longitudinal research by Newcomb and Bentler (1986b) confirmed the likelihood that marijuana and other illicit drug use declines with age, whereas alcohol use remains at a high rate.

Table 23 shows range of responses in percents for gateway drug use. Wine, beer, and cigarettes appear to be used proportionately by seventh graders with very low prevalence of marijuana use reported.

Analyses of Risk factors and Frequent Users

Eleven percent of the 188 seventh graders in the total sample reported frequent use of one or more drugs. Five percent reported

frequent use of cigarettes, 5.8% reported frequent use of beer/wine, 2.1% reported frequent use of liquor, 1.5% reported frequent use of marijuana, and 4.7% reported frequent use of illicit drugs. A chi-square analysis indicated that there was no significant difference between the three schools on number of frequent users.

The average number of risk factors for frequent users was 5.15 (SD = 2.2). The average number of risk factors for non-frequent users (nonusers and 1-2 times users) was 2.05 (SD = 1.7). A t-test determined that the means between the groups were significantly different ($t = 6.08, p < .001$). Frequent users had significantly more risk factors than non-users and 1-2 times users. This supports hypothesis 1 of the study: as risk factors increase, drug use increases.

Nine chi-square analyses were performed to compare whether frequent users and non-frequent users differed on the frequencies for each risk factor. There were no significant differences between frequent users and non-frequent users on two risk factors: Know adults who use drugs, and Home alone after school. These risk factors were also not significantly related to drug use variables for the total sample. They clearly were not discriminating factors in this study.

Significant differences were found for seven of the risk factors: 40% of the frequent users expect to use drugs compared to 12% of the non-frequent users ($X^2(1) = 11.129, p < .0009$); 75% of

the frequent users expect to get in trouble with the police compared to 42% of the non-frequent users ($X^2(1)=8.016$, $p < .005$); 50% of the frequent users have the risk factor Do not expect to graduate compared to 5% of the non-frequent users ($X^2(1) = 42.245$, $p < .0001$); 70% of frequent users reported having friends who use drugs compared to 35% of non-frequent users ($X^2(1)= 9.154$, $p < .0025$). Finally 60% of the frequent users report having been drunk compared to 11% of the non-frequent users ($X^2(1)= 30.769$, $p < .0001$), 70% of the frequent users reported a history of smoking compared to 16% of the non-frequent users ($X^2(1) = 31.72$, $p < .0001$); 60% of the frequent users reported a history of trouble with the police compared to 5% of the non-frequent users ($X^2(1) = 57.36$, $p < .0001$).

Summary of Research Findings

Percentages of agreement between two responses for three risk factors and twelve drug use variables ranged from 87 - 100% and indicated that students responded on the questionnaire in a consistent manner. The rank order for prevalence of drug use for suburban seventh graders was as follows: (1) beer/wine, (2) cigarettes, (3) illicit drugs, (4) liquor, and (5) marijuana. The rank order of beer/wine and cigarettes was consistent with findings for urban and rural seventh graders except for liquor and illicit drugs which were ranked in reverse. Suburban students used more illicit

drugs than liquor versus urban and rural students who used more liquor than illicit drugs. Overall, suburban students' prevalence rates for cigarettes, beer/wine, liquor, and marijuana were generally lower than the rates of urban and rural seventh graders' except for illicit drug use which was equivalent to the rates of urban and rural seventh graders. Based on an analysis of the illicit drugs used by suburban seventh graders, inhalants ranked number one with 10% reporting use. The average number of risk factors for suburban students was 2.38 (SD = 1.97) and was similar to findings for urban and rural students' in Farrell et al.'s studies.

Hypothesis one was supported. As number of risk factors increased, prevalence of drug use increased significantly. A line graph (Figure 1) shows the linear trend of the data. In addition, Hypothesis 2 was supported. There was no significant differences between prevalence of drug use for the three suburban schools. In contrast, Hypothesis 3 was not supported; there was a significant difference between School 1 and School 2 in average number of risk factors. The risk factors for School 1 (N = 33) were significantly lower than School 2 (N = 86). The range of risk factors was also quite attenuated: from 1 - 5 for School 1 versus 1 - 9 for School 2. Further analysis showed, however, that School 1 had significantly more nondrug users than School 2, which supports the multiple pathway theory.

Additional analyses showed how risk factors and drug use categories significantly related for the total suburban seventh grade sample: Expect to use drugs, History of alcohol use, and Expect to get in trouble with the police significantly related to cigarette use; History of cigarette use significantly related to beer/wine use; Expect to use drugs, History of trouble with the police and Don't expect to graduate significantly related to liquor use; History of alcohol use, and Don't expect to graduate significantly related to illicit drug use; no risk factors significantly related to marijuana use, possibly due to the small sample size of this category. Do not expect to graduate, Friends use drugs, and History of trouble with the police significantly related to gateway drug use.

Analyses of each of the three suburban school samples revealed no risk factors significantly related for each of the three schools for cigarette and marijuana use; and no risk factors significantly related for any drug use categories for School 1 (N = 33). However, for School 2, Expect to use drugs, History of trouble with the police, and History of cigarette use significantly related to beer/wine use; Expect to use drugs, Don't expect to graduate, and History of trouble with the police significantly related to liquor use; and Don't expect to graduate significantly related to illicit drug use; for School 3, Don't expect to graduate and History of alcohol use significantly related to illicit drug use. Two risk factors, Know

adults who use drugs and Home alone after school, did not significantly relate to any drug use.

Overall, 25% of the suburban seventh graders reported some probability of expecting to use marijuana, cocaine or crack, injected drugs, and/or other drugs in the future. Slightly over a third of the students reported they thought a few or more of their friends drank at least once a month; 4% thought a few or more of their friends used cocaine, and 12% thought a few or more of their friends used other drugs. Almost half of the students thought that half or more of the adults they know drink at least once a month, and 8% thought that half or more of the adults they know have a drinking problem. Approximately 11% of the suburban seventh graders reported frequent use of one or more drugs and had a significantly higher number of risk factors than nonusers and 1-2 time users.

VI. Discussion

In this study empirical evidence to support the multiple pathway theory of drug use was provided by the finding that the simple sum of nine risk factors significantly correlated with the increase of drug use for a sample of suburban seventh graders selected from three different schools. The findings provided evidence of the generalizability of the multiple pathway theory to a different demographic group; namely, suburban seventh graders. In addition, suburban students in this study were predominantly White, which further distinguished them from the predominantly Black students in Farrell and his colleagues' urban sample. Finally, the suburban seventh graders were from more affluent backgrounds than their urban and rural counterparts. Even with these differences, drug use increased for the suburban seventh graders, as risk factors increased. Educationally, this implies that the multiple pathway theory can be used for research with urban, rural, and suburban samples of seventh graders.

Of the nine risk factors, seven were significantly related to the use of at least one drug. These risk factors represented a range of diverse variables that include attitudes, (expectations about drug use, education, and problem behavior); peer models (Friends use drugs); delinquent behavior (History of trouble with the police), and previous use of cigarettes and alcohol. The diversity of these

significant variables supports the multiple pathway theory of drug use that assumes there are many, rather than single pathways, to involvement in drugs.

Two risk factors not significantly related to drug use were, Know adults who use drugs, and Home alone after school. For the risk factor, Know adults who use drugs, almost 50% of the students in the study reported that half or more of the adults they know use drugs. Given this fairly high percent reporting this risk factor, it is not surprising that this variable was not an effective discriminator of drug use within this sample. One risk factor, Home alone after school, was not a useful correlate. Twenty eight percent of the students reported this risk factor, yet it did not discriminate in any analysis. The students in this study appear to be more influenced by their expectations, problem behavior, and previous use of alcohol and cigarettes than being home alone unsupervised.

Additional findings in this study showed there were no significant differences between schools for prevalence rates of drugs. Since prevalence rates were not significantly different between the schools, it was expected that average number of risk factors would not be different as well. However, School 1 had a significantly lower number of risk factors than School 2 (1.54 versus 2.67). School 1 was the smallest sample ($N = 33$). Furthermore the range of risk factors for School 1 was skewed. Risk factors ranged from zero to five for School 1; whereas they ranged from zero to nine for

School 2. However, when Schools were compared on nondrug use, School 1 was significantly lower than School 2. Oetting and Beauvais (1990) found that communities in close proximity can be significantly different in prevalence drug rates. Conversely, this study showed that two suburban schools in close proximity were significantly different in nondrug rates, a notion supported in a previous study (Newcomb, Maddahian & Bentler, 1986). Furthermore, additional analyses showed that it was the number of risk factors and not the school that associated with nondrug use, evidence supporting the risk factor model.

Approximately 11% of the suburban seventh graders were frequent users of drugs and had a significantly higher number of risk factors than nonusers and infrequent users. This is evidence that abuse begins at an early age, and that data from a questionnaire administered in the classroom can identify students whose drug use already suggests an abusive pattern. Newcomb and Bentler (1989) define abuse as any regular use of a drug by a child.

Approximately 10% of the students in this study reported use of inhalants. Inhalants are a highly dangerous drug easily obtained in stores or one's own home. They pose an immediate threat to the health of students using them. In this study more students used inhalants than hard liquor or marijuana.

Terminology used in this study bears discussion. The word *pathway* in the multiple pathway theory connotes a course taken by

someone over time and implies causation and prediction. The term *risk factor* also may connote prediction. However, this is a cross-sectional study that measures data at one point in time. Therefore, risk factors are correlates of adolescent drug use in this study and do not show causation or prediction. Longitudinal data is required to determine whether risk factors actually predict drug use over time.

Several of the risk factors selected for this study have validation in both cross-sectional studies as correlates and longitudinal studies as predictors; e.g., Expect to use drugs (Farrell, Danish & Howard, 1992; Newcomb & Bentler, 1986), History of alcohol use (Farrell, Anchor, Danish & Howard, 1992; Kandel, 1982), History of cigarette use (Farrell, Anchor, Danish, & Howard, 1992; Newcomb & Bentler, 1986b), and History of trouble with the police (Farrell, Anchor, Danish, & Howard; Windle, 1990). However, other risk factors were validated in cross-sectional studies only and are correlates; e.g., Expect trouble with the police (Farrell, Anchor, Danish & Howard, 1992) and Home alone after school (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish & Howard, 1992; Richardson et al., 1989). Further, the risk factor Don't expect to graduate is associated with drug use in cross-sectional studies as a correlate (Farrell, Danish, & Howard, 1992; Farrell, Anchor, Danish & Howard, 1992), but inconsistently associates with drug use in longitudinal studies as a predictor (Brook et al., 1986; Jessor & Jessor, 1977). In addition suburban seventh

graders who report this risk factor may be experiencing a consequence of drug use stemming from the depressing effect drugs can have on adolescents (Kandel et al., 1976). Therefore, the possibility exists that the risk factor, Don't Expect to Graduate could be a correlate, predictor, and/or consequence of drug use. Finally, the risk factor, Friends use drugs, has both cross-sectional and longitudinal data (Farrell, Danish, & Howard, 1992; Akers et al, 1979), but Kandel et al.(1976) raised the possibility that it may also be a consequence of drug use due to peers seeking out others who engage in similar behaviors. Longitudinal studies are needed to show which risk factors are correlates, predictors, and/or consequences of adolescent drug use.

A limitation of this study is the heavy reliance on self-report measures. Students may underestimate drug use on self-report questionnaires. To test for the truthfulness of students' responses, a fake drug item is sometimes inserted on the questionnaire and used as a control (Farrell, Danish, & Howard, 1991). However, this questionnaire did not contain one. A review of the literature suggests that youth tend to be reasonably truthful in reporting rates of drug use (Oetting & Beauvais, 1990). During the administration of the questionnaire the students' anonymity was emphasized as well as the confidentiality of the name of their school to encourage honest reporting for valid results.

Educational Implications

These results suggest the need to individualize drug prevention programs for different school systems rather than rely on generic models. This can be accomplished by administering a questionnaire such as the one used in this study and designing a program based on the average number of risk factors, drug prevalence rates, and significant risk factors. For example, in this study a drug prevention program for School 1 might focus on reducing prevalence rates for specific drugs and publicizing to parents and students the importance of the low risk factor average found for this group; a program for School 2 might focus on reducing both specific risk factors and prevalence rates. These programs can be provided for students who are experimenting with drug use (one-time users) or nonusers, and evaluated in terms of reducing or leveling off adolescent drug use in longitudinal studies. Furthermore, the frequent drug use already evident by seventh grade suggests that drug prevention programs need to be in place well before seventh grade to reduce experimentation that can lead to abuse by the seventh grade..

Frequent drug users (almost 11% in this study) also need to be identified. School personnel need to work closely with parents to advise them and provide intervention options such as outside referrals for drug evaluations. Prevention programs are not

designed for students whose drug use already suggests an abusive pattern.

Educating students, parents, and the communities on what inhalants are, the prevalence of their use, and the dangers associated with them is indicated by the finding that almost 10% of the seventh graders in this study reported inhalant use, a potentially life-threatening substance.

Logistic regression is a valuable methodological tool and is suggested for use with the risk factor model in future studies. It is especially valuable in entering numbers of risk factors as a set to examine which ones significantly associate with drug use. However, logistic regression is not suited to small sample sizes, a limitation.

Future Research

Future research with young adolescents is a productive direction based on the findings of this study. Studies that test the multiple pathway theory with middle school students are few in number. Longitudinal studies for the multiple pathway theory are especially needed to clarify which risk factors are correlates, predictors, and/or consequences of drug use for young adolescents. Data may show, for example, that drug use leads to rather than stems from the expectation of not graduating from high school. Having accurate information about the characteristics of risk factors can aid in the development of effective prevention programs.

Future research involving longitudinal studies is needed to determine whether the multiple pathway theory can predict drug use in early adolescence over time. Thus far only one longitudinal study with older high school students addresses this and with weak results (Newcomb, Maddahian, & Bentler, 1986). If empirical evidence provides predictive validity with young adolescents, this theory becomes a useful tool in the war against drugs.

Appendix A

Description of and Scoring for the Expectations and Activity Questionnaire

This appendix describes the eight questions on the full length questionnaire, identifies the five questions on the shortened form, and how they were renumbered. It also describes the scale(s) the questions contain, the source of the scales, and the scale format. In addition, the document identifies the risk factors and drug use items contained on the scales as well as the scoring for each risk factor. Further, it describes the scoring for non-users, users, and frequent users of the dichotomous drug use variables: cigarettes, beer/wine, liquor, marijuana, and illicit drug use. It also describes the scoring for the continuous variable, gateway drug use. The appendix also provides reliability and validity data for the risk factors and drug use variables. Finally, it provides reliability and validity data for the scale: Primary Prevention Awareness, Attitude and Usage scale (PPAUS) (Swisher et al., 1984) that contains drug use variables used in the study. Three scales did not contain research variables in this study: General Deviant Behavior Scale (Jessor & Jessor, 1977); Emotional Restraint Subscale from the Weinberger Adjustment Inventory (WAI) (Weinberger, Feldman, Ford &

Chastain, 1987); and the Adolescent Coping Orientation for Problem Experiences (A-COPE) (Patterson and McCubbin, 1987). Therefore, reliability and validity data was not provided.

Question 1

Question 1 is the same for the full length questionnaire and shortened form and consists of 16 items from the Future Expectations Scale derived from the Monitoring the Future Survey (Johnson, Bachman, & O'Malley, 1984). This scale assessed the subject's expectations about their future life, success, drug use, educational plans, and employment. The scale format consists of the following; All items are preceded by the stem: In the future, do you think you will. The following 4-point scale is used: 1 = no, 2 = probably not, 3 = probably will, 4 = definitely will.

Three risk factors were selected and used on this scale:

a. Expect to Use Drugs

Scoring: The risk factor was coded as present if the respondent did not report *No* when asked if they expect to use one or more of the following 4 items:

1. Use marijuana
2. Use cocaine or crack
3. Use drugs injected by a needle
4. Use other drugs (not including medicines)

To avoid being confounded with the drug use category, this risk factor was not used in the analyses of marijuana use, and other illicit drugs.

b. Expect to get in trouble with the police

Scoring: This risk factor was coded as present if the respondent did not report *No* when asked in the future if they plan to:

1. Get in trouble with the police or courts.

c. Do not expect to graduate from high school

Scoring: This risk factor was coded as present if the respondent did not report *Definitely will* when asked in the future if they plan to:

1. Graduate from high school

Reliability and Validity for the Risk Factor Expect to Use Drugs

Reliability data was provided by Farrell and his colleagues (Farrell, Danish, & Howard, 1992) from approximately 1300 urban seventh graders who were administered the original questionnaire in the fall of 1988 and 1989 respectively. The reliability of the risk factor Expect to use drugs was .74.

Validity for the risk factor Expect to use drugs was determined by individually examining whether risk factors significantly associated with the prevalence of five drugs through chi-square tests. In the urban study, Expect to use drugs

significantly related to cigarettes, beer/wine, liquor, marijuana, and illicit drugs ($p < .0008$). In addition a relative risk ratio was calculated. Relative risk was defined as the prevalence among those for whom a specific risk factor was present, divided by the prevalence among those who did not have the risk factor. For example, a risk factor with the relative risk of 2.0 for alcohol use means that those with the risk factor present were twice as likely to have tried alcohol than those without that risk factor.

A relative risk ratio indicated that urban seventh graders who expected to use drugs were twice as likely to smoke, and drink beer/wine than students without that risk factor, and were 4.5 times more likely to drink liquor.

In the rural study, Expect to use drugs, when examined individually with chi-square tests, significantly related to liquor ($p < .0033$). It was not significant for cigarette use, and beer/wine. A relative risk ratio indicated that rural seventh graders who expected to use drugs were 2.5 times more likely to drink liquor.

Reliability and Validity for the Risk Factor Do not Expect to Graduate from High School

Reliability data was provided by Farrell and his colleagues (Farrell, Danish, & Howard, 1992) in their study with urban seventh graders. The reliability of the risk factor Do not expect to graduate from high school was .60.

Validity for the risk factor Do not expect to graduate from high school was determined by individually examining whether risk factors significantly associated with the prevalence of five drugs through chi-square tests. In Farrell et al.'s urban and rural studies (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992) Do not expect to graduate from high school significantly related to cigarettes, marijuana, and illicit drugs ($p < .0008$ and $p < .0033$ respectively). A relative risk ratio indicated that urban seventh graders who do not expect to graduate were 1.4 times as likely to smoke, twice as likely to use marijuana, and twice as likely to use illicit drugs than seventh graders without that risk factor. Rural seventh graders with the risk factor were twice as likely to smoke cigarettes, three times as likely to use marijuana, and three times as likely to use illicit drugs.

Reliability and Validity for the Risk Factor Expect to Get in Trouble with the Police

Reliability for the risk factor Expect to get in trouble with the police was .48. Validity was determined by individually examining whether Expect to get in trouble with the police significantly associated with the prevalence of five drugs through chi-square tests. In Farrell et al.'s urban study, Expect to get in trouble with the police significantly associated with all five drugs ($p < .0008$). A relative risk ratio indicated that urban seventh graders who expected

to get in trouble with the police were approximately twice as likely to smoke, 1.5 times as likely to drink beer/wine, 2.5 times as likely to drink liquor, approximately four times as likely to use marijuana, and twice as likely to use illicit drugs compared to students without that risk factor.

In the rural study, the relative risk of Expect to get in trouble with the police was significantly associated with liquor and marijuana ($p < .0033$). A relative risk ratio indicated that rural seventh graders who expected to get in trouble with the police were twice as likely to use liquor, and six times as likely to use marijuana.

Question 2

Question two on the full length form was not included on the shortened form. No risk factor was selected from this question. Question two consists of 7 items from scales based on Jessor and Jessor's (1977) Drinking Questionnaire Social Support scale that assessed the student's perception of the use of alcohol and other drugs by other students. Students were asked about how many students they know used specific drugs at least once a month, had a drinking problem, and/or had a drug problem. The scale format consists of the following: All items are preceded by the stem: About how many students in your grade at your school do you think do

each of the following: The following 5-point scale is used: 1 = none, 2 = a few, 3 = half, 4 = more than half, 5 = all.

Question 3

Question three on the full length form was included on the shortened form and renamed Question 2. This question consists of 7 items from scales based on Jessor and Jessor's (1977) Drinking Questionnaire Social Support that assessed the student's perception of the use of alcohol and other drugs by friends. Subjects were asked about how many friends they know used specific drugs at least once a month, had a drinking problem, and/or had a drug problem. All items are preceded by the stem: About how many friends do you think do each of the following: The following 5-point scale is used: 1 = none, 2 = a few, 3 = half, 4 = more than half, 5 = all.

One risk factor was selected and used on this scale:

a. Friends use drugs

Scoring: The risk factor was coded as present if the subject reported **a few or more** of their friends engaged in one or more of the following 7 items:

1. Drink alcohol at least once a month
2. Have a drinking problem
3. Use marijuana at least once a month
4. Use cocaine or crack once a month
5. Use drugs injected by a needle at least once a month

6. Use other drugs (not including medicines) at least once a month
7. Have a drug problem

Reliability and Validity for the Risk Factor Friends Use Drugs

Reliability data was provided by Jessor and Jessor (1977) from their High School Study for the risk factor Friends use drugs. In their study reliability as measured by Cronbach's Alpha, was .71. Reliability data From Farrell et al.'s urban and rural studies for the risk factors Friends use drugs was .91.

In Jessor and Jessor's study (1977) with high school students, validity was determined by whether the risk factor Friends use drugs significantly associated with drug related behaviors. Pearson correlations between this risk factor and the following behaviors were significant at the .001 level: Times drunk past year - based on drinkers only, marijuana use, deviant behavior, and the multiple problem behavior index.

In Farrell et al.'s rural and urban studies (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992) with seventh graders validity was determined by individually examining whether the risk factor Friends use drugs significantly associated with the prevalence of cigarettes, beer/wine, liquor, marijuana, and illicit drugs through chi-square tests. In Farrell et al.'s urban and

rural studies Friends use drugs significantly related to all five drugs ($p < .0008$ and $p < .0033$ respectively).

A relative risk ratio showed that urban seventh graders with the risk factor Friends use drugs were twice as likely to have smoked cigarettes, approximately twice as likely to have drunk beer/wine, four times as likely to have drunk liquor, eight times as likely to have used marijuana, and three times as likely to have used illicit drugs.

Rural seventh graders with this risk factor were twice as likely to have smoked cigarettes, twice as likely to have drunk beer/wine, twice as likely to have drunk liquor, six times as likely to have used marijuana, and approximately four times as likely to have used illicit drugs than those without that risk factor.

Question 4

Question four on the full length form was also included on the shortened form and renamed Question 3. This question consists of 7 items from scales based on Jessor and Jessor's (1977) Drinking Questionnaire Social Support that assessed the student's perception of the use of alcohol and other drugs by adults. Students were asked about how many adults they know used specific drugs at least once a month, had a drinking problem, and/or had a drug problem. All items are preceded by the stem: About how many adults that you know do you think do each of the following: The following 5-point

scale is used: 1 = none, 2 = a few, 3 = half, 4 = more than half, 5 = all.

One risk factors was selected and used on this scale:

a. Know adults who use drugs

Scoring: The risk factor was coded as present if the subject reported **half or more** of the adults engage in one or more of the following 7 items:

1. Drink alcohol at least once a month
2. Have a drinking problem
3. Use marijuana at least once a month
4. Use cocaine or crack once a month
5. Use drugs injected by a needle at least once a month
6. Use other drugs (not including medicines) at least once a month
7. Have a drug problem

Reliability and Validity for the Risk Factor Know Adults Who Use Drugs

Reliability data From Farrell et al. studies for the risk factors Know adults who use drugs was .91. Validity was established by determining whether Know adults who use drugs was significantly associated with the prevalence of cigarettes, beer/wine, liquor, marijuana, and illicit drugs. In the urban study this risk factor significantly associated with all five drugs ($p < .0008$). A relative

risk ratio indicated that urban seventh graders with the risk factor Know adults who use drugs were approximately twice as likely to have smoked cigarettes, 1.6 times as likely to have drunk beer/wine, three times as likely to have drunk liquor, approximately three times as likely to have used marijuana, and 2.5 times as likely to have used illicit drugs than those without that risk factor.

In the rural study this risk factor significantly associated with two drugs: marijuana and illicit drugs ($p < .0033$). A relative risk ratio indicated that rural seventh graders with this risk factor were three times as likely to have used marijuana, and approximately three times as likely to have used illicit drugs.

Question 5

Question five on the full length questionnaire was included on the shortened form and renamed Question 4. This question consists of 47 items and contains a Behavioral Frequency Scale to indicate the frequency of behaviors during the past month related to drug use based on Swisher's (1985) Primary Prevention Awareness, Attitude, and Usage scale (PPAUS), problem behaviors based on Jessor and Jessor's General Deviant Behavior scale (1977), and positive behaviors. All items are preceded by the stem: About how many times have you done the following in the past month. The following 6-point scale is used: 0 = never, 1 = 1-2 times, 2 = 3-5 times, 3 = 6-9 times, 4 = 10-19 times, and 5 = 20 times or more.

Four risk factors were selected and used on this scale:

a. History of cigarette use

Scoring: This risk factor was coded as Present if a student reported 1-2 times a month or more when asked if they:

1. Smoked cigarettes

To avoid being confounded with the drug use category, this risk factor was not used in the analyses of cigarette use and gateway drug use.

b. History of alcohol use

Scoring: This risk factor was coded as Present if a student reported 1-2 times or more in the past month when asked if they had:

1. Been drunk

To avoid being confounded with the drug use category, this risk factor was not used in the analyses of beer/wine, liquor use, and gateway drug use.

c. Home alone after school

Scoring: This risk factor was coded as Present if a student reported 20 times or more in the past month when asked if they had:

1. Been home alone without an adult in the house after school.

d. History of trouble with the police

Scoring: This risk factor was coded as Present if a student reported 1-2 times a month or more in the past month when asked if they had

1. Been in trouble with the police

Reliability and Validity for the Risk Factor History of Cigarette Use

Reliability for the risk factor History of cigarette use was indicated by a coefficient Alpha of .79 in Farrell et al.'s (Farrell, Danish, & Howard, 1992) urban study with seventh graders. In the same study validity was determined by whether History of cigarette use significantly associated with alcohol, marijuana, illicit drugs, and other problem behaviors. They found that for seventh graders the risk factor History of cigarette use significantly correlated with alcohol use, marijuana use, illicit drug use, and problem behaviors.

In Farrell et al.'s (Farrell, Anchor, Danish, & Howard, 1992; Farrell, Danish, & Howard, 1992) studies with urban and rural seventh graders validity was also established by a highly significant relationship between History of cigarette use and the prevalence of alcohol, marijuana, and illicit drugs ($p < .0008$ and $P < .0033$ respectively).

In Farrell et al.'s study with urban seventh graders, a relative risk ratio indicated those with the risk factor History of cigarette use were twice as likely to have drunk beer and wine,

approximately six times as likely to have used liquor, almost eight times as likely to have used marijuana, and three and a half times as likely to have used illicit drugs than those without that risk factor. In the rural study those seventh graders with this risk factor were twice as likely to have drunk beer and wine, three times as likely to have used liquor, and almost ten times as likely to have used marijuana.

Reliability and Validity for the Risk Factor History of Alcohol Use

Reliability for the risk factor History of alcohol use in Jessor and Jessor's (1977) Multiple Problem Behavior Index was indicated by a coefficient Alpha of .67 in the High School study. In a study by Farrell, Danish, and Howard (1991) validity was determined by whether History of alcohol use significantly associated with other cigarettes, marijuana and illicit drugs, and other problem behaviors. They found that for seventh graders the risk factor History of alcohol use significantly correlated with cigarette smoking, marijuana use, illicit drug use, sexual intercourse, and delinquent behavior.

In Farrell et al.'s studies with urban and rural seventh graders validity was also established by a highly significant relationship between History of alcohol use and the prevalence of cigarettes, marijuana, and illicit drugs using a series of chi-square tests ($p < .0008$ and $P. < .0033$ respectively).

A relative risk ratio indicated that urban seventh graders with the risk factor of History of alcohol use were three times as likely to have smoked cigarettes, approximately seven times as likely to have used marijuana, and three times as likely to have used illicit drugs than those without that risk factor. In the rural study those seventh graders with this risk factor were three times as likely to have smoked cigarettes, 20 times as likely to have used marijuana, and nine times as likely to have used illicit drugs.

Reliability and Validity for the Risk Factor Home Alone after School

A coefficient alpha for Home alone after school was .65 indicating a moderate level of internal consistency in Farrell et al.'s urban study with seventh graders. Validity was demonstrated by Home alone after school significantly associated with gateway drug use in Farrell et al.'s study with urban seventh graders (Farrell, Danish, & Howard, 1992). Validity was also established by a significant relationship between Home alone after school and the prevalence of cigarettes, beer/wine, and liquor ($p < .0008$) using a series of chi-square tests in the urban study with seventh graders. This risk factor in the rural study significantly associated with cigarettes and liquor ($P < .0033$)

A relative risk ratio showed that urban seventh graders with the risk factor Home alone after school were 1.4 times as likely to have smoked cigarettes, and 1.2 times as likely to have drunk

beer/wine. In the rural study seventh grade students with this risk factor were 1.6 times as likely to have used cigarettes and twice as likely to have drunk liquor than those without that risk factor.

Validity for the risk factor History of Trouble with the Police

Validity was established by a significant relationship between History of trouble with the police and the prevalence of cigarettes, beer/wine, and liquor using a series of chi-square tests and a per-test significance level of .0008. A relative risk ratio was also calculated. This showed that those students in the urban study with the risk factor of History of trouble with the police were 2.2 times as likely to have smoked cigarettes, 1.6 times as likely to have drunk beer/wine, 3.4 times as likely to have drunk liquor, 5.2 times as likely to have used marijuana, and 2.1 times as likely to have used other drugs than those without that risk factor. Respondents in the rural study with the risk factor of History of trouble with the police were 2. times as likely to have smoked cigarettes, 2.5 times as likely to have drunk liquor, 11.0 times as likely to have used marijuana, and 4.5 times as likely to have used other drugs than those without that risk factor.

Fourteen drug use variables were selected and used on this question.

1. cigarettes
2. beer

3. wine
4. hard liquor
5. marijuana
6. inhalants
7. depressants
8. hallucinogens
9. stimulants
10. cocaine or crack
11. narcotics
12. injected drugs
13. other drugs (not including medicines).
14. been drunk

Six drug use variables listed below were developed from the 14 drug use items.

- a. cigarette use
- b. beer/wine use
- c. liquor use
- d. marijuana use
- e. illicit drug use (use of inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, or other drugs (not including medicines)).
- f. gateway drug use scale (average frequency of use for cigarettes, beer, wine, liquor, getting drunk, or marijuana).

Scoring for Nonusers of Cigarettes, Beer/wine, Liquor, and Marijuana

Students who reported "**never**" in the past month to any frequency of drug use in each category were classified as nonusers of that drug.

Scoring for Users of Cigarettes, Beer/wine, Liquor, and Marijuana

Students who reported **1-2 times or more in the past month** of drug use in each category were classified as users of that drug.

Scoring for Frequent Users of Cigarettes, Beer/wine, Liquor and Marijuana

Students who reported **3 - 5 times or more in the past month** of drug use in each category were classified as frequent users of that drug.

Scoring for the Illicit Drug Use

Students who responded to **1-2 times or more in the past month** of any of the following drugs were classified as an illicit drug user.

1. sniffed something to get high (glue, laughing gas)

2. depressants (downers, barbs, ludes, sleeping pills, tranquilizers)
3. hallucinogens (LSD, PCP, Acid, mushrooms, ecstasy)
4. stimulants (pep pills, uppers, speed)
5. cocaine or crack
6. narcotics (heroin, codeine, methadone, smack)
7. drugs injected with a needle
8. other drugs (not including medicines)).

Scoring for Frequent Illicit Drug Use

Students who responded to frequent use (i.e. **3-5 times or more in the past month**) of any of the eight illicit drugs were classified as a frequent illicit drug user.

Scoring for the Gateway Drug Use Scale:

This scale is a continuous variable with scores calculated as follows: Students who reported use **0 times in the past month** were scored 0; reporting use **1-2 times in the past month** were scored 2; **3-5 times** were scored 3; **5-9 times** were scored 4, **10-19 times** were scored 5, and **20 times or more** were scored 6 for any of the following six drug items

1. cigarettes
2. beer

3. wine
4. liquor
5. getting drunk
6. marijuana.

Each score for the drug use items was summed, divided by six, and recoded. Scores ranged from one to six..

Reliability and Validity for the Primary Prevention Awareness, Attitude and Usage scale (PPAUS).

Reliability for the drug use variables on the PPAUS was calculated by Swisher et al. (1984) in a study with 22,000 respondents equally distributed from grades seven through twelve. Internal reliability for self-reported use of cigarettes, beer, wine, liquor, marijuana, inhalants, depressants, hallucinogens, stimulants, cocaine and crack. ranged from .80 to .84.

In Swisher's study validity for the drug use categories on his scale was calculated by the use of a regression model in which self-reported use of each drug was the dependent variable and 23 other items from selected scales were the independent variables. Results indicated that based on demographic items, (a) the higher the grade level, the greater the use of drugs, and (b) the lower the grade point average, the greater the use of drugs. Based on school climate items, the more students dislike school and teachers, the greater their use of all drugs. Based on the alternative activity items, (a) the more

students participate in entertainment activities, the greater their use of all drugs; (b) the less time students spend in academic activities, the greater their use of drugs; (c) the less time students spend in sports, the greater their use of most drugs (the exception is the more time students spend in sports, the greater their use of beer); and (d) the more time students spend in vocational activities, the greater their use of drugs. Based on decision-making items, (a) the less important information was in making decisions about use of drugs, the greater the use of various drugs; (b) the less important self-concept was in making decisions about the use of drugs, the greater the use of various drugs; (c) acceptance by others was indicative of greater use of "harder" drugs; and (d) the more important it was to see adults practice what they preach, the greater the self-reported use of drugs.

Furthermore, a greater willingness to use drugs was highly correlated with self-reported use ($r = .90, p < .0001$). Similarly, the negative behavior subscales (e.g. being sent out of the classroom) correlated highly with use of alcohol and drugs. This is consistent with other research (Jessor & Jessor, 1977, Kandel, 1980), indicating that the use of various drugs is one component of a negative behavior pattern.

Validity was also established by comparing the rank order of self-reported use on their questionnaire with self-reported use from a national survey. The rank order of drugs (where comparable) with

the Johnson (1985) national survey is identical for the major substances. The rank order from both surveys for monthly or more often use was: (1) alcohol, (2) cigarettes, (3) marijuana, (4) stimulants, and (5) depressants.

Additional Reliability and Validity for the 14 Drug Use Items Including Illicit Drugs

Reliability was also calculated by Farrell, Danish, and Howard (1992) in an urban study for all 14 drug use variables. A coefficient alpha of .80 was obtained with urban seventh graders. Reliability for other illicit drugs was .78 in the same studies.

Validity was established by a regression analysis to determine if reported drug use could be significantly associated with other student data. The risk factors included data obtained directly from the school system: gender, ethnic background, living situation, school attendance, economic indicators, special education status, gifted status, and grade point average as well as data from all the scales in the questionnaire battery (excluding measures of drug use). The dependent variable was total drug use calculated by summing the frequency of use for all 14 drugs: cigarettes, beer, wine, liquor, marijuana, inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, other drugs, and been drunk. Results of this analysis indicated that over one half of the variance in

total drug use was significantly associated with these variables: $R^2 = .52$, $F(31, 1011) = 35.30$, $p < .0001$.

Reliability and Validity for the Gateway Drug Use Scale

In Farrell, Danish, and Howard's (1992) urban study with seventh graders, the gateway drug use scale was found to have an internal consistency (alpha coefficient) of .82. In Farrell et al.'s urban study of seventh graders a stepwise regression analysis was conducted using the Gateway drug use scale as the dependent variable and 20 dichotomous risk factors identified in a preceding section as the independent variables (excluding history of cigarette use and alcohol use because these drugs were included in the Gateway Drug Use scale). This analysis identified a set of eight risk factors that accounted for 37% of the variance in gateway drug use in the past 30 days [$F(8,1194) = 91.38$, $p < .0001$].

Reliability and Validity for the General Deviant Behavior Scale

Reliability for the General Deviant Behavior Scale was calculated by Jessor and Jessor (1977) in their High School Study. They obtained a reliability of .85 (Cronbach's Alpha). In Farrell et al.'s urban study with seventh and ninth graders a coefficient alpha of .79 was obtained.

In Jessor and Jessor's (1977) High School Study longitudinal data obtained over a four year period showed the developmental

increase in deviant behavior is highly significantly related ($p < .0001$) to a subject's increase in use of alcohol and marijuana. Furthermore as general deviance increases, conventional behavior (church attendance) decreases for high school students.

Farrell, Danish, and Howard (1992a) in their study with seventh and ninth graders found that general deviant behavior significantly correlated with smoking cigarettes, using marijuana, history of alcohol use, use of other drugs, and history of sexual intercourse. However, general deviant behavior did not correlate with positive behaviors or church attendance.

Question 6

Question 6 on the full length questionnaire was not included on the shortened form. No risk factor was selected from this question. This question contains the Emotional Restraint Subscale from the Weinberger Adjustment Inventory (WAI) (Weinberger, Feldman, Ford & Chastain, 1987). It deals with negative affect. The emotional Restraint Scale consists of 13 items related to suppression of aggression, impulse control, responsibility, and consideration of others. All items are preceded by the stem: How often is this true for you ? The following 5-point scale is used: 1 = almost never, 2 = not often, 3 = sometimes, 4 = often, 5 = almost always. Reliability and validity information are provided below.

Question 7

Question seven on the full length questionnaire was not included on the shortened form. No risk factor was selected from these items. This question contains a subscale with four items from the Adolescent Coping orientation for problem Experiences (A-COPE). The subscale looks at behaviors adolescents find helpful to them in managing problems or situations. They rate how often they cope with the situation in a certain way. The subscale on question 7 measures engagement in demanding behavior (e.g. doing a strenuous physical activity, working hard on schoolwork, etc.) to deal with stress. All items on the scale are preceded by the stem: When you face problems or feel upset, how often do you. A 5-point scale is used: 1 = never, 2 = hardly ever, 3 = sometimes, 4 = often, 5 = most of the time.

Question 8

Question 8 on the full length questionnaire was included on the shortened form and renamed Question five. This question contains a Problem Behavior History Scale with 21 items and assessed the history of prior occurrence of individual problem behaviors. It assessed whether the subject has ever engaged in cigarette, alcohol, and other drug use, and specific problem behaviors from Jessor's General Deviant scale. All the items on this scale were selected from Question 5 from the full length

questionnaire (Question 4 on the shortened form). However, this question uses a Yes/No format. All items are preceded by the stem: Have you ever. The following 2-point scale was used 1 = yes, 0 = no.

Three risk factors were selected and used on this scale:

a. History of cigarette use

Scoring: This risk factor was coded as Present if a student reported YES when asked if they had ever:

1. Smoked cigarettes

b. History of alcohol use

Scoring: This risk factor was coded as Present if a student reported YES when asked if they had ever:

1. Been drunk

c. History of trouble with the police

Scoring: This risk factor was coded as Present if a student reported YES when asked if they had ever:

1. Been in trouble with the police

Fourteen drug use items were assessed on this Question.

1. cigarettes
2. beer
3. wine

4. hard liquor
5. marijuana
6. inhalants
7. depressants
8. hallucinogens
9. stimulants
10. cocaine or crack
11. narcotics
12. injected drugs
13. other drugs (not including medicines).
14. been drunk

Using the above-mentioned 14 drug use items, five drug use variables listed below were selected and used in this study:

- a. cigarette use
- b. beer/wine use
- c. liquor use
- d. marijuana use
- e. illicit drug use (use of inhalants, depressants, hallucinogens, stimulants, cocaine or crack, narcotics, injected drugs, or other drugs (not including medicines)).

Scoring for use of Cigarettes, Beer/wine, Liquor, and Marijuana

Students who respond *Yes* when asked if they have ever used a particular drug on the Problem Behavior History scale were scored '1', and classified as users of that drug variable

Scoring for Nonusers of Cigarettes, Beer/wine, Liquor, and Marijuana

Students who respond *No* to ever used for each drug category were scored '0', and classified as nonusers.

The users of beer and wine were combined into one category, beer/wine, corresponding to Farrell et al's drug use category.

Scoring for Illicit Drug Use

Students who responded *Yes* when asked if they have ever used an illicit drug on the Problem Behavior History scale were classified as an illicit drug user.

Appendix B

Expectations and Activity Questionnaire

Dear Student:

This questionnaire is for a study of suburban seventh grade students in New York state. The purpose of the study is to better understand the values, activities, expectations, and interests of New York suburban seventh graders.

Your participation in this study is voluntary. If you do not wish to answer the questions, you do not have to.

This is not a test. There are no right or wrong answers to any of the questions. It is important that you think about each question and answer it truthfully. Truthful answers are important to the results of the study.

Your answers are private, anonymous, and confidential so that you will answer honestly. Do not write your name on this questionnaire.

Follow the directions given on the pages and carefully mark your answers directly in the questionnaire. Try to answer each question the best you can. If you have a lot of trouble answering a question, just write, "don't know."

Thank you for your cooperation.

Please answer all the questions as honestly as possible.
REMEMBER, all of your answers are private and confidential.

PLEASE CHECK: MALE..... FEMALE.....

CAUCASIAN.....AFRO-AMERICAN.....ASIAN.....HISPANIC.....OTHER.....

The following questions ask you about what you expect to do in the future. Which of these things do you think you will do in the future ?

Q-1 IN THE FUTURE, DO YOU THINK YOU WILL:

	NO 1	PROBABLY NOT 2	(circle your answer)	
			PROBABLY WILL 3	DEFINTELY WILL 4
1. Get married... ..	NO	PROB NOT	PROB WILL	DEF WILL
2. Graduate from high school.....	NO	PROB NOT	PROB WILL	DEF WILL
3. Get in trouble with the police or the courts.....	NO	PROB NOT	PROB WILL	DEF WILL
4. Own a house.	NO	PROB NOT	PROB WILL	DEF WILL
5. Make more money than your parents.	NO	PROB NOT	PROB WILL	DEF WILL
6. Smoke cigarettes.....	NO	PROB NOT	PROB WILL	DEF WILL
7. Use chewing tobacco.....	NO	PROB NOT	PROB WILL	DEF WILL
8. Sell drugs.....	NO	PROB NOT	PROB WILL	DEF WILL
9. Graduate from College.....	NO	PROB NOT	PROB WILL	DEF WILL
10. Have children.....	NO	PROB NOT	PROB WILL	DEF WILL
11. Use marijuana (pot, hash, reefer).	NO	PROB NOT	PROB WILL	DEF WILL
12. Use cocaine or crack.....	NO	PROB NOT	PROB WILL	DEF WILL
13. Use drugs injected by needle... ..	NO	PROB NOT	PROB WILL	DEF WILL
14. Use other drugs (not including medicines).....	NO	PROB NOT	PROB WILL	DEF WILL
15. Be unemployed.....	NO	PROB NOT	PROB WILL	DEF WILL
16. Get a full-time job.....	NO	PROB NOT	PROB WILL	DEF WILL

(Circle the letter of your answer)

Q-2

ABOUT HOW MANY STUDENTS IN YOUR GRADE
AT YOUR SCHOOL DO YOU THINK DO
EACH OF THE FOLLOWING ?

	NONE	A FEW	HALF	MORE THAN HALF	ALL
	1	2	3	4	5
1. Drink alcohol at least once a month					
2. Have a drinking problem	a	b	c	d	e
3. Use marijuana at least once a month	a	b	c	d	e
4. Use cocaine or crack once a month.....	a	b	c	d	e
5. Use drugs injected by a needle at least once a month.....	a	b	c	d	e
6. Use other drugs (not including medicines) at least once a month.....	a	b	c	d	e
7. Have a drug problem.....	a	b	c	d	e

NOW WE WANT TO ASK THE SAME QUESTIONS ABOUT YOUR FRIENDS

(Circle the letter of your answer)

Q-3

ABOUT HOW MANY FRIENDS
DO YOU THINK DO
EACH OF THE FOLLOWING:

	NONE	ABOUT A FEW	HALF	MORE THAN HALF	ALL
	1	2	3	4	5
1. Drink alcohol at least once a month.....	a	b	c	d	e
2. Have a drinking problem.....	a	b	c	d	e
3. Use marijuana at least once a month.....	a	b	c	d	e
4. Use cocaine or crack once a month.....	a	b	c	d	e
5. Use drugs injected by a needle at least once a month.....	a	b	c	d	e
6. Use other drugs (not including medicines) at least once a month.....	a	b	c	d	e
7. Have a drug problem.....	a	b	c	d	e

Q-4

ABOUT HOW MANY ADULTS THAT YOU KNOW DO YOU THINK DO EACH OF THE FOLLOWING ?

(Circle the letter of your answer)

	NONE 1	A FEW 2	HALF 3	THAN HALF 4	ABOUT MORE ALL 5
1. Drink alcohol at least once a month.....	a	b	c	d	e
2. Have a drinking problem.....	a	b	c	d	e
3. Use marijuana at least once a month.....	a	b	c	d	e
4. Use cocaine or crack once a month.....	a	b	c	d	e
5. Use drugs injected by a needle at least once a month.....	a	b	c	d	e
6. Use other drugs (not including medicines) at least once a month.....	a	b	c	d	e
7. Have a drug problem.....	a	b	c	d	e

Q-5

Think about how often you have done the following things IN THE PAST MONTH.

Remember, your answers are private.

ABOUT HOW MANY TIMES HAVE YOU DONE THE FOLLOWING IN THE PAST MONTH ?

	NEVER 1	1-2 TIMES 2	3-5 TIMES 3	6-9 TIMES 4	10-19 TIMES 5	20 TIMES OR MORE ? 6
1. Completed all your homework.....	0	1-2	3-5	6-9	10-19	20 or more
2. Played intramural sports	0	1-2	3-5	6-9	10-19	20 or more
3. Played sports at the Recreation Center.....	0	1-2	3-5	6-9	10-19	20 or more
4. Participated in school clubs (like school newspapers, chorus, band)	0	1-2	3-5	6-9	10-19	20 or more.
5. Skipped school.....	0	1-2	3-5	6-9	10-19	20 or more.
6. Gone to Boys or Girls Club	0	1-2	3-5	6-9	10-19	20 or more.
7. Spent time studying for a test...	0	1-2	3-5	6-9	10-19	20 or more.
8. Spent time on hobbies (like musical instruments, sewing).....	0	1-2	3-5	6-9	10-19	20 or more.
9. Helped out around the house.....	0	1-2	3-5	6-9	10-19	20 or more.

ABOUT HOW MANY TIMES HAVE

YOU DONE THE FOLLOWING IN THE PAST MONTH ?	NEVER 1	1-2 TIMES 2	3-5 TIMES 3	6-9 TIMES 4	10-19 TIMES 5	20 TIMES OR MORE 6
10. Beat up another kid.....	0	1-2	3-5	6-9	10-19	20 or more.
11. Gone to Girl Scout or Boy Scout activities.....	0	1-2	3-5	6-9	10-19	20 or more
12. Played Nintendo.....	0	1-2	3-5	6-9	10-19	20 or more
13. Damaged school or property that did not belong to you..	0	1-2	3-5	6-9	10-19	20 or more
14. Read a book or magazine (other than for school).....	0	1-2	3-5	6-9	10-19	20 or more
15. Stolen something from another person.....	0	1-2	3-5	6-9	10-19	20 or more
16. Been home without an adult in the house after school.....	0	1-2	3-5	6-9	10-19	20 or more..
17. Threatened to hurt a teacher..	0	1-2	3-5	6-9	10-19	20 or more..
18. Gone to a movie, dance, concert, or a party with friends...	0	1-2	3-5	6-9	10-19	20 or more..
19. Helped others with their schoolwork.....	0	1-2	3-5	6-9	10-19	20 or more...
20. Cheated on a test.....	0	1-2	3-5	6-9	10-19	20 or more...
21. Done chores or other work to earn money.....	0	1-2	3-5	6-9	10-19	20 or more...
22. Taken something from a store without paying for it (shoplifted)..	0	1-2	3-5	6-9	10-19	20 or more
23. Been offered beer, wine, or liquor by one of your friends....	0	1-2	3-5	6-9	10-19	20 or more
24. Been offered drugs by one of your friends.....	0	1-2	3-5	6-9	10-19	20 or more
25. Gone to classes after school (like dancing, computer, musical instrument, special tutoring).....	0	1-2	3-5	6-9	10-19	20 or more

ABOUT HOW MANY TIMES HAVE

YOU DONE THE FOLLOWING IN THE PAST MONTH	NEVER	1-2	3-5	6-9	10-19	20 TIMES OR MORE
	1	2	3	4	5	6
26. Felt pressured by your friends to drink.....	0	1-2	3-5	6-9	10-19	20 or more
27. Threatened someone with a weapon (gun or knife).....	0	1-23-5		6-9	10-19	20 or more
28. Gone to the public library..	0	1-2	3-5	6-9	10-19	20 or more
29. Been on suspension.....	0	1-2	3-5	6-9	10-19	20 or more.
30. Gone to church or church activities.....	0	1-2	3-5	6-9	10-19	20 or more.
31. Sold drugs.....	0	1-2	3-5	6-9	10-19	20 or more.
32. Been drunk.....	0	1-2	3-5	6-9	10-19	20 or more
33. Smoked cigarettes.....	0	1-2	3-5	6-9	10-19	20 or more
34. Drunk beer..... (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more.
35. Drunk wine or wine coolers... (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more...
36. Drunk liquor (whiskey or gin). (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more..
37. Used marijuana (pot, hash, reefer)	0	1-2	3-5	6-9	10-19	20 or more.
38. Sniffed something to get high (glue, laughing gas).....	0	1-2	3-5	6-9	10-19	20 or more.
39. Used depressants (downers, barbs, ludes, sleeping pills, tranquilizers).....	0	1-2	3-5	6-9	10-19	20 or more.
40. Used hallucinogens (LSD, PCP, Acid, mushrooms, ecstasy).....	0	1-2	3-5	6-9	10-19	20 or more.
41. Used stimulants (pep pills, uppers, speed).....	0	1-2	3-5	6-9	10-19	20 or more.
42. Used cocaine or crack.....	0	1-2	3-5	6-9	10-19	20 or more.
43. Used narcotics (heroin, codeine, methadone, smack).....	0	1-2	3-5	6-9	10-19	20 or more.

ABOUT HOW MANY TIMES HAVE YOU DONE THE FOLLOWING IN THE PAST MONTH	NEVER	1-2 TIMES	3-5 TIMES	6-9 TIMES	10-19 TIMES	20 TIMES OR MORE
	1	2	3	4	5	6
44. Used drugs injected with a needle.....	0	1-2	3-5	6-9	10-19	20 or more.
45. Used other drugs (not including medicines)	0	1-2	3-5	6-9	10-19	20 or more
46. Been in trouble with the police or courts.	0	1-2	3-5	6-9	10-19	20 or more

Q-6

These questions relate to how OFTEN you think, feel, or act a certain way. Again, we want to know what is usual for you even if it hasn't happened in the past couple of days or last few weeks.

HOW OFTEN IS THIS TRUE FOR YOU?

	ALMOST NEVER	NOT OFTEN	SOMETIMES	ALMOST OFTEN	ALWAYS
	1	2	3	4	5
1. I Feel I can do things as well as other people can.....	a	b	c	d	e
2. I think about other people's feelings before I do something they might not like.....	a	b	c	d	e
3. I do things without giving them enough thought.....	a	b	c	d	e
4. When I have the chance, I take things I want that don't really belong to me.....	a	b	c	d	e
5. If someone tries to hurt me, I make sure I get even with them..	a	b	c	d	e
6. I feel very happy.....	a	b	c	d	e
7. I become "wild and crazy" and do things other people might not like.....	a	b	c	d	e
8. I will cheat on something if I know no one will find out....	a	b	c	d	e

**HOW OFTEN IS THIS
TRUE FOR YOU?**

	ALMOST NEVER	NOT OFTEN	SOMETIMES	OFTEN	ALMOST ALWAYS
	1	2	3	4	5
When I'm doing something for fun (partying, acting silly), I tend to get carried away	a	b	c	d	e
10. I feel I am a special or important person.....	a	b	c	d	e
11. Before I do something I think about how it will affect the people around me.....	a	b	c	d	e
12. I lose my temper and "let people have it" when I'm angry...	a	b	c	d	e
13. I do things that I know really aren't right.....	a	b	c	d	e

Q-7

WHEN YOU FACE PROBLEMS OR FEEL UPSET, HOW OFTEN DO YOU....

	NEVER	HARDLY EVER	SOMETIMES	OFTEN	MOST OF THE TIME
	1	2	3	4	5
1. Try to improve yourself (get in shape, improve grades)	a	b	c	d	e
2. Talk to teacher or counselor	a	b	c	d	e
3. get more involved in activities at school.....	a	b	c	d	e
4. Work hard on school work or other school projects.....	a	b	c	d	e
5. Try to see the good things in a difficult situation.....	a	b	c	d	e
6. Say mean things to people, be sarcastic.....	a	b	c	d	e

WHEN YOU FACE PROBLEMS OR FEEL UPSET, HOW OFTEN DO YOU....

	NEVER 1	HARDLY EVER 2	SOMETIMES 3	OFTEN 4	MOST OF THE TIME 5
7. Do a strenuous physical activity (jogging, biking, etc.)	a	b	c	d	e

Q-8

The following are things some kids might do. Please indicate which of the following things YOU have done. (Circle YES or NO for each one).

YES if you have ever done it (even if only one time), and

NO if you have never done it.

HAVE YOU EVER:

| circle your answer |

- | | | |
|--|-----|----|
| 1. Carried a weapon (gun or knife) to school..... | YES | NO |
| 2. sold drugs..... | YES | NO |
| 3. Been in trouble with the police or the courts..... | YES | NO |
| 4. Threatened someone with a weapon (gun or knife)..... | YES | NO |
| 5. Been drunk..... | YES | NO |
| 6. Smoked cigarettes..... | YES | NO |
| 7. Drunk beer, more than a sip or taste..... | YES | NO |
| 8. Drunk wine, or wine coolers, more than a sip or taste..... | YES | NO |
| 9. Drunk liquor, like whiskey or gin. (More than a sip or taste)..... | YES | NO |
| 10. Used marijuana (pot, hash, reefer)..... | YES | NO |
| 11. Sniffed something to get high (glue, laughing gas)..... | YES | NO |
| 12. Used depressants (downers, barbs, ludes, sleeping pills, tranquilizers)..... | YES | NO |
| 13. Used hallucinogens (LSD, PCP, Acid, mushrooms, ecstasy)..... | YES | NO |

YES if you have ever done it (even if only one time), and

NO if you have never done it.

- | | | |
|---|-----|----|
| 14. Used stimulants (pep pills, uppers, speed)..... | YES | NO |
| 15. Used cocaine or crack..... | YES | NO |
| 16. Used narcotics (heroin, codeine, methadone, smack)..... | YES | NO |
| 17. Used drugs injected with a needle..... | YES | NO |
| 18. Used other drugs (not including medicines)..... | YES | NO |
| 19. Felt pressured by your friends to drink..... | YES | NO |
| 20. Felt pressured by your friends to use drugs..... | YES | NO |
| 21. I have answered these questions honestly..... | YES | NO |

THANKS FOR A JOB WELL DONE !

ON A SEPARATE SHEET OF PAPER PLEASE TELL HOW YOU FELT ABOUT THIS SURVEY.

Appendix C

Expectations and Activity Questionnaire
Shortened-Form

Dear Student:

This questionnaire is for a study of suburban seventh grade students in New York state. The purpose of the study is to better understand the values, activities, expectations, and interests of New York suburban seventh graders.

Your participation in this study is voluntary. If you do not wish to answer the questions, you do not have to.

This is not a test. There are no right or wrong answers to any of the questions. It is important that you think about each question and answer it truthfully. Truthful answers are important to the results of the study.

Your answers are private, anonymous, and confidential so that you will answer honestly. Do not write your name on this questionnaire.

Follow the directions given on the pages and carefully mark your answers directly in the questionnaire. Try to answer each question the best you can. If you have a lot of trouble answering a question, just write, "don't know."

Thank you for your cooperation.

Please answer all the questions as honestly as possible.
 REMEMBER, all of your answers are private and confidential.

PLEASE CHECK: MALE..... FEMALE.....

CAUCASIAN.....AFRO-AMERICAN.....ASIAN.....HISPANIC.....OTHER.....

The following questions ask you about what you expect to do in the future. Which of these things do you think you will do in the future ?

Q.1 IN THE FUTURE, DO YOU THINK YOU WILL:

			(circle your answer)	
	NO	PROBABLY NOT	PROBABLY WILL	DEFINITELY WILL
	1	2	3	4
1. Get married.....	NO	PROB NOT	PROB WILL	DEF WILL
2. Graduate from high school.....	NO	PROB NOT	PROB WILL	DEF WILL
3. Get in trouble with the police or the courts.....	NO	PROB NOT	PROB WILL	DEF WILL
4. Own a house.	NO	PROB NOT	PROB WILL	DEF WILL
5. Make more money than your parents.	NO	PROB NOT	PROB WILL	DEF WILL
6. Smoke cigarettes.....	NO	PROB NOT	PROB WILL	DEF WILL
7. Use chewing tobacco.....	NO	PROB NOT	PROB WILL	DEF WILL
8. Sell drugs.....	NO	PROB NOT	PROB WILL	DEF WILL
9. Graduate from College.....	NO	PROB NOT	PROB WILL	DEF WILL
10. Have children.....	NO	PROB NOT	PROB WILL	DEF WILL
11. Use marijuana (pot, hash, reefer).	NO	PROB NOT	PROB WILL	DEF WILL
12. Use cocaine or crack.....	NO	PROB NOT	PROB WILL	DEF WILL
13. Use drugs injected by needle...	NO	PROB NOT	PROB WILL	DEF WILL
14. Use other drugs (not including medicines).....	NO	PROB NOT	PROB WILL	DEF WILL
15. Be unemployed.....	NO	PROB NOT	PROB WILL	DEF WILL
16. Get a full-time job.....	NO	PROB NOT	PROB WILL	DEF WILL

Q-2

(Circle the letter of your answer)

ABOUT HOW MANY FRIENDS
DO YOU THINK DO
EACH OF THE FOLLOWING ?

	NONE	A FEW	HALF	MORE THAN HALF	ALL
	1	2	3	4	5
1. Drink alcohol at least once a month					
2. Have a drinking problem	a	b	c	d	e
3. Use marijuana at least once a month	a	b	c	d	e
4. Use cocaine or crack once a month.....	a	b	c	d	e
5. Use drugs injected by a needle at least once a month.....	a	b	c	d	e
6. Use other drugs (not including medicines) at least once a month.....	a	b	c	d	e
7. Have a drug problem.....	a	b	c	d	e

Q-3

(Circle the letter of your answer)

ABOUT HOW MANY ADULTS THAT
YOU KNOW DO YOU THINK DO EACH
OF THE FOLLOWING ?

	NONE	A FEW	HALF	ABOUT MORE THAN HALF	ALL
	1	2	3	4	5
1. Drink alcohol at least once a month.....	a	b	c	d	e
2. Have a drinking problem.....	a	b	c	d	e
3. Use marijuana at least once a month.....	a	b	c	d	e
4. Use cocaine or crack once a month.....	a	b	c	d	e
5. Use drugs injected by a needle at least once a month.....	a	b	c	d	e
6. Use other drugs (not including medicines) at least once a month.....	a	b	c	d	e
7. Have a drug problem.....	a	b	c	d	e

Q-4

Think about how often you have done the following things **IN THE PAST MONTH.**

Remember, your answers are private.

ABOUT HOW MANY TIMES HAVE

YOU DONE THE FOLLOWING

IN THE PAST MONTH ?

	NEVER	1-2 TIMES	3-5 TIMES	6-9 TIMES	10-19 TIMES	20 TIMES OR MORE ?
	1	2	3	4	5	6
1. Completed all your homework.....	0	1-2	3-5	6-9	10-19	20 or more
2. Played intramural sports	0	1-2	3-5	6-9	10-19	20 or more
3. Played sports at the Recreation Center.....	0	1-2	3-5	6-9	10-19	20 or more
4. Participated in school clubs (like school newspapers, chorus, band)	0	1-2	3-5	6-9	10-19	20 or more.
5. Skipped school.....	0	1-2	3-5	6-9	10-19	20 or more.
6. Gone to Boys or Girls Club	0	1-2	3-5	6-9	10-19	20 or more.
7. Spent time studying for a test...	0	1-2	3-5	6-9	10-19	20 or more.
8. Spent time on hobbies (like musical instruments, sewing).....	0	1-2	3-5	6-9	10-19	20 or more.
9. Helped out around the house.....	0	1-2	3-5	6-9	10-19	20 or more.
10. Beat up another kid.....	0	1-2	3-5	6-9	10-19	20 or more.
11. Gone to Girl Scout or Boy Scout activities.....	0	1-2	3-5	6-9	10-19	20 or more
12. Played Nintendo.....	0	1-2	3-5	6-9	10-19	20 or more
13. Damaged school or property that did not belong to you..	0	1-2	3-5	6-9	10-19	20 or more
14. Read a book or magazine (other than for school).....	0	1-2	3-5	6-9	10-19	20 or more
15. Stolen something from another person.....	0	1-2	3-5	6-9	10-19	20 or more
16. Been home without an adult in the house after school.....	0	1-2	3-5	6-9	10-19	20 or more..
17. Threatened to hurt a teacher..	0	1-2	3-5	6-9	10-19	20 or more..

ABOUT HOW MANY TIMES HAVE YOU DONE THE FOLLOWING IN THE PAST MONTH		1-2	3-5	6-9	10-19	20 TIMES OR MORE
		NEVER	TIMES	TIMES	TIMES	TIMES
		1	2	3	4	5
						6
18. Gone to a movie, dance, concert, or a party with friends...	0	1-2	3-5	6-9	10-19	20 or more..
19. Helped others with their schoolwork.....	0	1-2	3-5	6-9	10-19	20 or more...
20. Cheated on a test.....	0	1-2	3-5	6-9	10-19	20 or more...
21. Done chores or other work to earn money.....	0	1-2	3-5	6-9	10-19	20 or more...
22. Taken something from a store without paying for it (shoplifted)..	0	1-2	3-5	6-9	0-19	20 or more
23. Been offered beer, wine, or liquor by one of your friends....	0	1-2	3-5	6-9	10-19	20 or more
24. Been offered drugs by one of your friends.....	0	1-2	3-5	6-9	10-19	20 or more
25. Gone to classes after school (like dancing, computer, musical instrument, special tutoring).....	0	1-2	3-5	6-9	10-19	20 or more
26. Felt pressured by your friends to drink.....	0	1-2	3-5	6-9	10-19	20 or more
27. Threatened someone with a weapon (gun or knife).....	0	1-23-5		6-9	10-19	20 or more
28. Gone to the public library..	0	1-2	3-5	6-9	10-19	20 or more
29. Been on suspension.....	0	1-2	3-5	6-9	10-19	20 or more.
30. Gone to church or church activities.....	0	1-2	3-5	6-9	10-19	20 or more.
31. Sold drugs.....	0	1-2	3-5	6-9	10-19	20 or more.
32. Been drunk.....	0	1-2	3-5	6-9	10-19	20 or more
33. Smoked cigarettes.....	0	1-2	3-5	6-9	10-19	20 or more
34. Drunk beer..... (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more.

ABOUT HOW MANY TIMES HAVE YOU DONE THE FOLLOWING IN THE PAST MONTH	NEVER	1-2 TIMES	3-5 TIMES	6-9 TIMES	10-19 TIMES	20 TIMES OR MORE
	1	2	3	4	5	6
35. Drunk wine or wine coolers... (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more...
36. Drunk liquor (whiskey or gin). (more than a sip or taste)	0	1-2	3-5	6-9	10-19	20 or more..
37. Used marijuana (pot, hash, reefer)	0	1-2	3-5	6-9	10-19	20 or more.
38. Sniffed something to get high (glue, laughing gas).....	0	1-2	3-5	6-9	10-19	20 or more.
39. Used depressants (downers, barbs, ludes, sleeping pills, tranquilizers).....	0	1-2	3-5	6-9	10-19	20 or more.
40. Used hallucinogens (LSD, PCP, Acid, mushrooms, ecstasy).....	0	1-2	3-5	6-9	10-19	20 or more.
41. Used stimulants (pep pills, uppers, speed).....	0	1-2	3-5	6-9	10-19	20 or more.
42. Used cocaine or crack.....	0	1-2	3-5	6-9	10-19	20 or more.
43. Used narcotics (heroin, codeine, methadone, smack).....	0	1-2	3-5	6-9	10-19	20 or more.
44. Used drugs injected with a needle.....	0	1-2	3-5	6-9	10-19	20 or more.
45. Used other drugs (not including medicines)	0	1-2	3-5	6-9	10-19	20 or more
46. Been in trouble with the police or courts.	0	1-2	3-5	6-9	10-19	20 or more

Q-5

The following are things some kids might do. Please indicate which of the following things YOU have done. (Circle YES or NO for each one).

YES if you have ever done it (even if only one time), and NO if you have never done it.

HAVE YOU EVER:

| circle your answer |

1 Carried a weapon (gun or knife) to school.....

YES NO

2. sold drugs.....	YES	NO
3. Been in trouble with the police or the courts.....	YES	NO
4. Threatened someone with a weapon (gun or knife).....	YES	NO
5. Been drunk.....	YES	NO
6. Smoked cigarettes.....	YES	NO
7. Drunk beer, more than a sip or taste.....	YES	NO
8. Drunk wine, or wine coolers, more than a sip or taste.....	YES	NO
9. Drunk liquor, like whiskey or gin, (More than a sip or taste).....	YES	NO
10. Used marijuana (pot, hash, reefer).....	YES	NO
11. Sniffed something to get high (glue, laughing gas).....	YES	NO
12. Used depressants (downers, barbs, ludes, sleeping pills, tranquilizers).....	YES	NO
13. Used hallucinogens (LSD, PCP, Acid, mushrooms, ecstasy).....	YES	NO
14. Used stimulants (pep pills, uppers, speed).....	YES	NO
15. Used cocaine or crack.....	YES	NO
16. Used narcotics (heroin, codeine, methadone, smack).....	YES	NO
17. Used drugs injected with a needle.....	YES	NO
18. Used other drugs (not including medicines).....	YES	NO
19. Felt pressured by your friends to drink.....	YES	NO
20. Felt pressured by your friends to use drugs.....	YES	NO
21. I have answered these questions honestly.....	YES	NO

THANKS FOR A JOB WELL DONE !

ON A SEPARATE SHEET OF PAPER PLEASE TELL HOW YOU FELT ABOUT THIS SURVEY.

Appendix D

February 12, 1995

Dear Parents,

This letter is to inform you that during health class seventh grade students will be given the opportunity to fill out a questionnaire as part of a study of seventh grade students in Westchester county for my doctoral dissertation. Two types of questions will be asked: first, questions about their future expectations, past behavior, and current interests and activities; and second, questions about cigarette, alcohol, and other drug use. The purpose of the study is to examine the relationship between student responses to these two general areas.

The questionnaire is anonymous. Students will not put their name on the questionnaire. All answers will be kept strictly confidential. The participation of the student is also voluntary. Furthermore, if a student elects to fill out the questionnaire but does not wish to answer a specific question, he or she will be instructed to leave it blank.

When the study is completed a summary of the results will be made available to the _____ school administration. A copy may be obtained from the district office upon your request. In the study your school district will be identified as School 3 only and not identified by name for purposes of anonymity. Only group results (not individual results) will be reported.

If you do not wish your son or daughter to participate in the study please leave a message indicating this for _____, the health teacher, at _____ by **March 8**. If you have any questions or concerns, you may ask _____, school psychologist, at _____ or call me at _____. Thank you for your cooperation.

Sincerely,

Elaine C. Zucchi, M.S.
New York State Certified School Psychologist

Table 1 Prevalence of drug use and frequent use.

Drug	% reporting use	% reporting frequent use
Cigarettes	21.3	5.3
Beer/wine	33.5	5.6
Liquor	9.0	2.1
Marijuana	3.7	1.6
Illicit drugs	12.8	4.8

Note. N = 188. Values indicate percentage who reported any use of each drug and percentage reporting frequent use (i.e., 3-5 times or more in the past 30 days).

Table 2 Responses in percents for drugs included in the illicit drug scale.

Drug item	% reporting any use
Inhalants	9.6
Depressants	3.7
Other drugs	2.1
Hallucinogens	1.6
Stimulants	1.1
Injected drugs	1.1
Cocaine/crack	.5
Narcotics	.5

Note: N = 188. Drug use categories are arranged in decreasing order of importance based on the percentage of use.

Table 3 Frequency distribution for number of risk factors.

Value	Frequency	Percent	Cumulative
0	31	16.5	16.5
1	44	23.4	39.9
2	41	21.8	61.7
3	22	11.7	73.4
4	22	11.7	85.1
5	13	6.9	92.0
6	7	3.7	95.7
7	5	2.7	98.4
8	2	1.1	99.5
9	1	.5	100.0

Note. N = 188.

Table 4 Logistic regression model explaining cigarette use by number of risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Number of Risk Factors*****	.6873	.125929	.7919	1	.0001	1.9884
Constant	-2.0946	.3228	42.0947	1	.0000	

Note. N = 188. ***** - p. < .0001. The risk factor, History of cigarette use, is not included in the model due to confounding it with the drug use variable.

Table 5 Logistic regression model explaining beer/wine use by number of risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Number of Risk Factors*****	.5868	.1093	28.8406	1	.0001	1.7983
Constant	-2.0946	.3228	42.0947	1	.0000	

Note. N = 188. ***** - p. < .0001. The risk factor, History of alcohol use, is not included in the model due to confounding it with the drug use variable.

Table 6 Logistic regression model explaining liquor use by number of risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Number of Risk Factors*****	.9061	.1862	23.6795	1	.0001	2.4746
Constant	-5.2905	.8158	42.0566	1	.0000	

Note. N = 188. ***** - p. < .0001. The risk factor, History of alcohol use, is not included in the model due to confounding it with the drug use variable.

Table 7 Logistic regression model explaining marijuana use by number of risk factors.*

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Number of Risk Factors	1.5681	.4475	12.2806	1	.001	4.7976
Constant	-10.0021	2.4861	16.1858	1	.0000	

N = 188.

* The risk factor, Expect to use drugs, was not included in the model due to confounding it with the drug use variable.

Table 8 Logistic regression model explaining illicit drug use by number of risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Number of Risk Factors*****	.5999	.1323	20.5524	1	.0001	1.8220
Constant	-3.6604	.5161	50.3121	1	.0000	

Note. N = 188. ***** - $p < .0001$. The risk factor, Expect to use drugs, is not included in the model due to confounding it with the drug use variable.

Table 9 Percentage reporting drug use by number of risk factors.

Number of Risk Factors	Cigarettes	Beer/wine	Liquor	Marijuana	Illicit drugs
0	6.1	16.1	0	0	9.7
1	6.7	18.2	2.3	0	0
2	5.0	21.3	4.3	0	8.9
3	39.4	35.0	5.0	0	8.3
4	47.1	70.4	11.1	0	23.8
5	50.0	66.7	44.4	21.4	28.6
6	66.7	83.3	33.3	20.0	40.0
7	66.7	66.7	100.0	66.7	100.0
8	100.0	100.0	100.0	100.0	100.0

Note. N = 188. Values in the columns reflect the percentage of users among those at each level of the risk factor index. The risk factor, History of cigarette use, was not used in the calculation of the risk factor index for the analysis of cigarette use. The risk factor, History of alcohol use, was not used in the calculation of the risk factor index for the analyses of beer/wine or liquor use. The risk factor, Expect to use drugs, was not used in the calculation of the risk factor index for the analyses of marijuana and illicit drugs.

Table 10 Comparison of prevalence of drug use, no drug use, and frequent use in each school sample.

Drug	% reporting any use or no use				% reporting frequent use			
	School 1	School 2	School 3	X ² (2)	School 1	School 2	School 3	X ² (2)
Cigarettes	15.2	23.3	21.7	.94	3.0	4.7	7.2	.92
Beer/wine	24.2	41.9	27.5	5.06	3.0	8.1	4.3	1.57
Liquor	6.1	11.6	7.2	1.32	0	2.3	2.9	.93
Marijuana	0	2.3	7.2	4.13	0	2.3	1.4	.83
Illicit drugs	6.1	12.8	15.9	1.95	3.0	5.8	4.3	.45
No drug use	72.7**	47.7**	60.9	6.04*				

Note. School 1, N = 33; School 2, N = 86; School 3, N = 69. Values indicate percentage who reported any use of each drug, no use of any drug, and frequent use of any drug (i.e., 3-5 times or more in the past 30 days). * p < .03. ** Significant difference between School 1 and School 2 for no drug use - p < .05

Table 11 Logistic regression model explaining cigarette use by eight risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect to use drugs**	1.4614	.5341	7.4880	1	.0062	4.3120
Expect trouble with police*	.9130	.4700	3.7726	1	.0521	2.4917
Don't expect to graduate	.9770	.6608	2.1857	1	.1393	2.656
Friends use drugs	.2651	.4644	.3257	1	.5682	1.3035
Adults use drugs	.1200	.4443	.0730	1	.7871	1.1275
History of alcohol use*	1.1927	.5386	4.9038	1	.0268	3.2958
History of trouble police	.0431	.6530	.0044	1	.9474	1.0440
Home alone after school	.1875	.4695	.1595	1	.6896	1.2062
Constant	-2.7824	.4605	36.5074	1	.0000	

Note. N = 188. * - $p < .05$. ** - $p < .01$. The risk factor, History of cigarette use, was not included in the model due to confounding it with the drug use variable.

Table 12 Logistic regression model explaining beer/wine use by eight risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect to use drugs	.9334	.5517	2.8619	1	.0907	2.5430
Expect trouble with police	.6210	.3932	2.4938	1	.1143	1.8607
Don't expect to graduate	.3489	.6443	.2932	1	.5882	1.4175
Friends use drugs	-.0934	.4034	.0536	1	.8169	.9108
Adults use drugs	-.0204	.3801	.0029	1	.9571	.9798
History of cigarette use*****	1.8050	.4576	15.5604	1	.0001	6.0800
History of trouble police	.9854	.6335	2.4195	1	.1198	.6789
Home alone after school	.2375	.4018	.3493	1	.5545	1.2680
Constant	-1.7282	.3406	25.7485	1	.0000	

Note. N = 188. ***** - $p < .0001$. The risk factor, History of alcohol use, was not included in the model due to confounding it with the drug use variable.

Table 13 Logistic regression model explaining liquor use by eight risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect to use drugs***	3.1595	.9277	11.5982	1	.0007	23.5585
Expect trouble with police	.7153	.8733	.6709	1	.4217	2.0449
Don't expect to graduate*	1.9263	.83285	.3502	1	.0207	6.8641
Friends use drugs	-.5465	.8689	.3956	1	.5294	.5790
Adults use drugs	-.5547	.7450	.5544	1	.4565	.5742
History of cigarette use	-.5544	.8019	.4781	1	.4893	.5744
History of trouble police***	2.7641	.8222	11.3013	1	.0008	15.8650
Home alone after school	.8701	.72891	.4249	1	.2326	2.3871
Constant	-4.5504	.8861	26.3721	1	.0000	

Note. N = 188. * - p < .05. *** - p < .001. The risk factor, History of alcohol use, was not included in the model due to confounding it with the drug use variable.

Table 14 Logistic regression model explaining marijuana use by eight risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect trouble with police	11.4178	318.1180	.0013	1	.9714	90929.08
Don't expect to graduate	19.5163	187.9553	.0108	1	.9173	2.99E+08
Friends use drugs	9.7384	237.9440	.0017	1	.9674	16956.44
Adults use drugs	48.3124	388.4395	.0155	1	.9010	9.59E+20
History of alcohol use	27.8609	233.5038	.0142	1	.9050	1.26E+12
History of cigarette use	40.2808	329.8000	.0149	1	.9028	3.12E+17
History of trouble police	39.9678	329.8047	.0147	1	.9035	2.28E+17
Home alone after school	-18.1542	187.9640	.0093	1	.9231	.0000
Constant	-138.816	981.7132	.0200	1	.8876	

Note. N = 188. The risk factor, Expect to use drugs, was not included in the model due to confounding it with the drug use variable.

Table 15 Logistic regression model explaining illicit drug use by eight risk factors.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect trouble with police	-.8732	.6327	1.9044	1	.1676	.4176
Don't expect to graduate**	1.9443	.6621	8.6230	1	.0033	6.9887
Friends use drugs	-.0183	.6187	.0009	1	.9764	.9810
Adults use drugs	.8448	.57752	.1403	1	.1435	2.3276
History of alcohol use**	1.6374	.60747	.2662	1	.0070	5.1417
History of cigarette use	.8586	.58612	.1463	1	.1429	2.3598
History of trouble police	1.2058	.69393	.0197	1	.0823	3.3395
Home alone after school	.0894	.5728	.0243	1	.8760	1.0935
Constant	-3.3737	.598331	.7928	1	.0000	

Note. N = 188. ** - $p < .01$. The risk factor, Expect to use drugs, was not included in the model due to confounding it with the drug use variable.

Table 16 Logistic regression model explaining beer/wine use by eight risk factors for School 2.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect to use drugs*	1.7000	.7798	4.7521	1	.0293	5.4738
Expect trouble with police	.8466	.5994	1.9951	1	.1578	2.3317
Don't expect to graduate	-.2465	.8234	.0896	1	.7646	.7815
Friends use drugs	-.7743	.6379	1.4733	1	.2248	.4610
Adults use drugs	.1315	.5631	.0545	1	.8154	1.1405
History of cigarette use**	1.8800	.6836	7.5638	1	.0060	6.5538
History of trouble police*	2.2198	1.0318	4.6282	1	.0315	9.2054
Home alone after school	.5917	.5689	1.0816	1	.2983	1.8071
Constant	-1.5576	.5001	9.7011	1	.0018	

Note. N = 86. * - $p < .05$. ** - $p < .01$. The risk factor, History of alcohol use, was not included in the model due to confounding it with the drug use variable.

Table 17 Logistic regression model explaining liquor use by eight risk factors for School 2.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect to use drugs**	4.0484	1.3944	8.4290	1	.0037	57.3084
Expect trouble with police	.8407	1.3753	.3737	1	.5410	2.3181
Don't expect to graduate*	2.2379	1.1161	4.0200	1	.0450	9.3733
Friends use drugs	-1.3557	1.3185	1.0572	1	.3038	.2578
Adults use drugs	.0317	1.1914	.0007	1	.9788	1.0322
History of cigarette use	-.3481	1.3318	.0683	1	.7938	.7060
History of trouble police*	3.8435	1.6432	5.4708	1	.0193	46.6880
Home alone after school	.8504	1.0445	.6629	1	.4155	2.3406
Constant	-5.1300	1.5057	11.6076	1	.0007	

Note. N = 86. * - p < .05. ** - p < .01. The risk factor, History of alcohol use, was not included in the model due to confounding it with the drug use variable.

Table 18 Logistic regression model explaining illicit drug use by eight risk factors for School 2.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
Expect trouble with police	-.7038	1.0025	.4929	1	.4826	.4947
Don't expect to graduate**	2.4607	.9283	7.0272	1	.0080	11.7136
Friends use drugs	.2226	1.0242	.0472	1	.8279	1.2493
Adults use drugs	.2804	.9286	.0912	1	.7626	1.3237
History of alcohol use	1.3523	.9405	2.0676	1	.1505	3.8664
History of cigarette use	1.1305	.9501	1.4158	1	.2341	3.0972
History of trouble police	1.3599	1.2492	1.1850	1	.2763	3.8957
Home alone after school	-.9987	.9772	1.0445	1	.3068	.3684
Constant	-3.3866	.9194	13.5681	1	.0002	

Note. N = 86. ** - p < .01. The risk factor, Expect to use drugs, was not included in the model due to confounding it with the drug use variable.

Table 19 Logistic regression model explaining illicit drug by eight risk factors for School 3.

Variable	B	S.E.	Wald	df	Sig	Exp(B)
History of alcohol use**	3.8619	1.5072	6.5655	1	.0104	47.5559
Expect trouble with police	-.5061	1.2303	.1692	1	.6808	.6029
Don't expect to graduate*	3.2290	1.4878	4.7102	1	.0300	25.2544
Friends use drugs	.5417	1.3764	.1549	1	.6939	1.74189
Adults use drugs	-.0460	1.1733	.0015	1	.9687	.9550
History of cigarette use	1.1305	.9501	1.4158	1	.2341	3.0972
History of trouble police	-.6591	2.1304	.0957	1	.7571	.5173
Home alone after school	1.5237	1.1180	1.8575	1	.1729	4.5893
Constant	-.34824	1.2731	7.4816	1	.0062	

Note. N = 69. * - $p < .05$. ** - $p < .01$. The risk factor, Expect to use drugs, was not included in the model due to confounding it with the drug use variable.

Table 20 Responses in percents for risk factor Expect to use drugs.

% reporting for each category

Individual item	No	Prob Not	Prob Will	Def Will
Expect to use marijuana	88.3	6.9	4.8	0
Expect to use cocaine/crack	94.7	3.2	1.1	0
Expect to use drugs injected by needle	97.9	1.6	.5	0
Expect to use other drugs (not including medicines)	92.0	4.8	2.1	0

Note. N = 188.

Table 21 Responses in percents for risk factor Friends use drugs.

Individual item	% reporting for each category				
	None	A few or more*	Half	More than half	All
Friends who drink at least once a month	64.9	30.9	.5	2.7	.5
Friends who have a drinking problem	91.0	6.4	1.6	0	0
Friends who use marijuana at least once a month	85.6	10.1	1.1	2.1	0
Friends who use cocaine/crack at least once a month	95.2	3.2	.5	0	0
Friends who use injectable drugs at least once a month	95.7	1.6	1.6	0	0
Friends who use other drugs at least once a month	88.3	9.0	1.6	0	0
Friends who have a drug problem	91.0	6.4	1.1	0	1.1

Note. N = 188.

Table 22 Responses in percents for risk factor Know adults who use drugs.

% reporting for each category

Individual item	None	A few	Half or more	More than half	All
Adults who drink at least once a month	13.8	37.8	18.6	18.1	11.2
Adults who have a drinking problem	55.3	36.2	4.3	2.7	1.1
Adults who use marijuana at least once a month	83.5	11.7	2.7	1.1	.5
Adults who use cocaine/crack at least once a month	93.1	3.2	2.1	.5	.5
Adults who use injectable drugs at least once a month	94.7	3.2	.5	.5	.5
Adults who use other drugs at least once a month	83.5	10.6	4.3	1.1	0
Adults who have a drug problem	85.6	10.6	1.6	1.1	.5

Note: N = 188.

Table 23 Responses in percents for drugs included in the gateway drug use scale.

Drug item	% reporting any use						Total % use
	Never	1-2 times	3-5 times	6-9 times	10-19 times	20 or more times	
Wine	79.3	14.9	2.7	1.1	1.1	1.1	20.9
Beer	84.0	11.7	1.6	1.1	0	1.6	16.0
Cigarettes	85.0	9.6	2.1	.5	.5	2.1	14.8
Been drunk	86.7	8.0	3.7	0	.5	1.1	13.3
Liquor	92.6	5.3	.5	0	.5	1.1	7.4
Marijuana	97.3	1.1	1.1	0	.5	0	2.7

Note. N = 188.

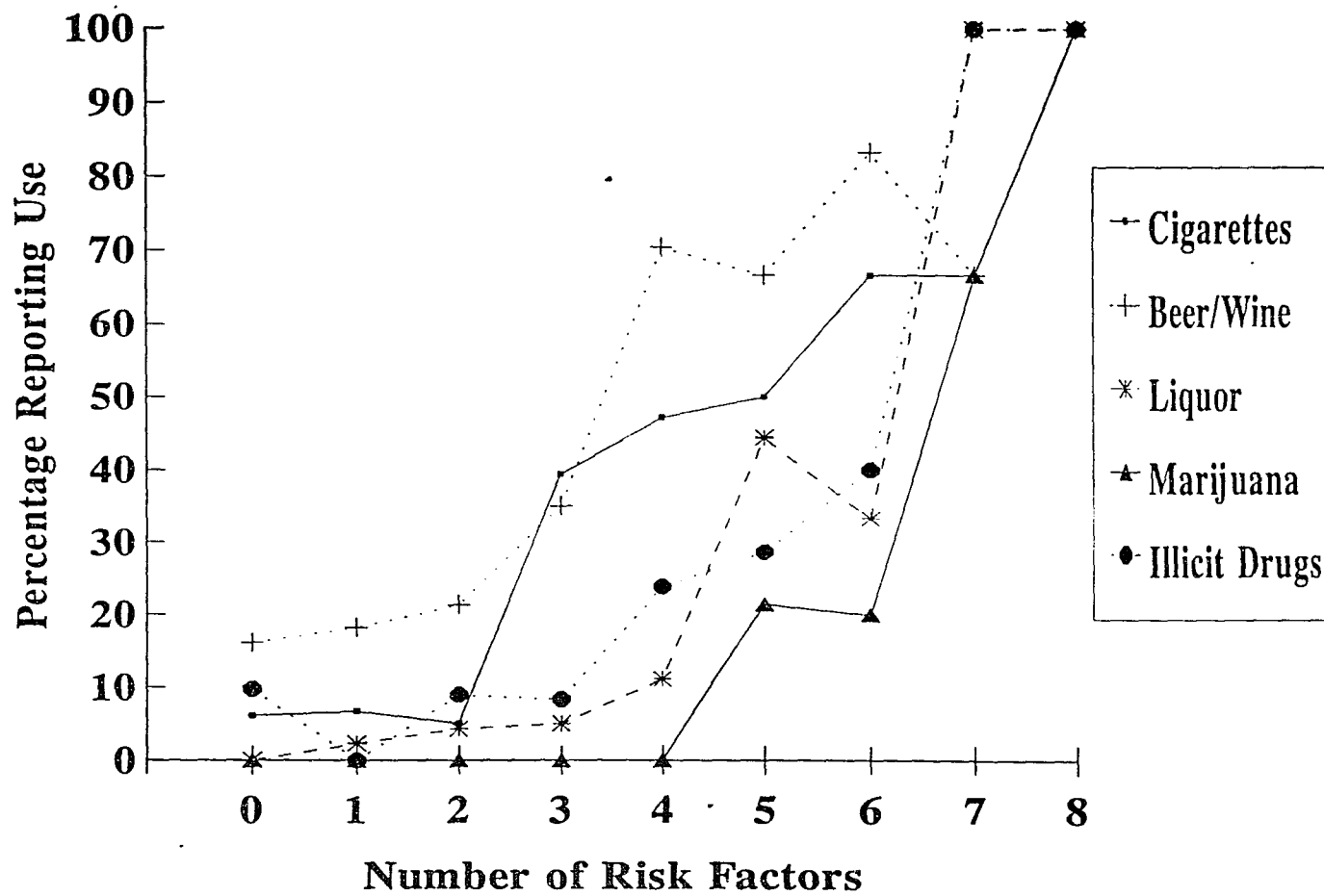


Fig. 1. Prevalence of drug use as a function of the total number of risk factors.

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