Background, psycho-social factors and substance use: their effects on high school seniors’ perceptions of their education

Ronald H. Heck
University of Hawaii at Manoa, Honolulu, Hawaii, USA
Robert C. Voliter
University of Hawaii at Manoa, Honolulu, Hawaii, USA

A structural model was proposed and tested concerning the impact of background and psycho-social variables on high school seniors’ (N = 2,731) reported substance use and educational outcomes. The findings indicated that interpersonal variables (e.g., school adjustment, delinquency, relationships with parents and community) primarily affected reported substance use. Intrapersonal variables (e.g., self-concept, attitudes toward school), however, were unrelated to substance use. Moreover, background, psycho-social variables and substance use were also related to a variety of student perceptions about their educational experiences and future aspirations. The results are discussed in terms of their implications for school personnel working with high school students.

During adolescence, many people initiate behavior that can negatively impact on their future mental, physical, and material well-being (Wallace and Bachman, 1991). Youngsters who abuse drugs and alcohol have been found to have greater marital instability and interpersonal problems later in life, diminished earnings and limited future job prospects, as well as reduced mental and physical health later in life (Dryfoos, 1990; Newcomb and Bentler, 1988). Some previous research suggests that alcohol and other drug (AOD) use, problem behaviors in the high school setting including delinquency and truancy (Oetting and Beauvais, 1987; Rhodes and Jason, 1990), and lower academic achievement (Ashby, 1995; Hahn, 1987; Tobias, 1986), are often interrelated.

A variety of sociological and psycho-social theories have been developed to account for substance use among high school students. These include social control theory (Hirschi, 1969), problem behavior theory (Jessor, 1976), socialization theory (Kandel, 1980) and social stress (Rhodes and Jason, 1990). Similarities exist among the various theoretical models which undergird much of the research on adolescent substance use (Wallace and Bachman, 1991). They tend to focus concern on how various background, social environmental, and personal variables interact with drug use (e.g., successive stages of drug use) and resulting types of problem behavior in school settings.

There is general agreement on the major predictors of AOD use, and reviews of the correlates of AOD use are numerous (Ashby, 1995; Beman, 1995; Capuzzi and Lecoq, 1983; Dielman, 1989; Flay et al., 1983; Halebsky, 1987; Hawkins et al., 1965; 1991; Huba et al., 1980; Kandel, 1980; 1982; Kandel et al., 1978; Kovach and Glickman; 1986; Murray and Perry, 1985).

As Wallace and Bachman (1991) argue, most approaches can be subsumed under the “problem behavior” model posited by Jessor (1976) and Jessor and Jessor (1977).

The literature related to the prediction of AOD use among adolescents is therefore diverse, and has come in the last few years to focus on identifying and examining the risk and protective factors for substance use. From this perspective, AOD use is one of several possible outcomes that result from adolescent socialization, a process that balances a variety of environmental, peer, and parent relationships (Ashby, 1995; Beman, 1995; Kandel, 1982). Previous theoretical models and supporting empirical findings suggest that a comprehensive framework of background variables and psychological-social variables may explain adolescents’ current AOD use. Besides background variables, psycho-social variables include the environmental system, the individual’s personality, and his or her behavioral system. These systems interrelate to produce adolescents who are more or less prone to abuse illegal substances. The purpose of this study is to propose and test a structural model that examines the relative impact of a variety of psycho-social variables on high school seniors’ current levels of AOD use and, in turn, how these sets of variables may affect students’ perceptions of their educational outcomes and future aspirations.

Psycho-social variables and AOD use

Psycho-social theories focus on how the social environment interacts with personal variables to affect drug abuse among adolescents (Ashby, 1995; Beman, 1995; Capuzzi and Lecoq, 1983; Halebsky, 1987; Jessor and Jessor, 1977). Among psycho-social variables that affect problem behavior, researchers have identified social relationships, self-esteem, relative alienation from society, and unconventional views and behavior as associated with drug and alcohol involvement (Beman, 1995; Grimes and Swisher, 1989; Halebsky, 1987; Jessor, 1976; 1977; Newcomb et al., 1987). More specifically, the findings indicate that adolescents who are more involved with peers than parents and family, have low self-esteem, are more alienated from society, and have more unconventional attitudes or views are more likely to become involved with drugs and alcohol. This model has been supported in predicting drug and alcohol use (e.g., Ashby, 1995; Beman, 1995; Halebsky, 1987; Huba and Bentler, 1982; Jessor, 1976; Jessor and Jessor, 1977).
Following previous attempts to model these processes with respect to adolescent substance abuse (e.g., Dielman et al., 1993; Huba and Bentler, 1982; Oetting and Beauvais, 1987), we have grouped these psychosocial variables into several general categories.

Background and other socio-environmental variables
Background variables found to be related to adolescents' AOD use include age (Hayes, 1987; Segal, 1996), ethnic background (Wallace and Bachman, 1991), gender (Bachman et al., 1991), and family socioeconomic status (Furstenburg et al., 1987). Variables forming the adolescent's social environment have also been found to be related to drug and alcohol use. These include religious identification, political beliefs, and employment (Dryfoos, 1990; Johnstone et al., 1989; Oetting and Beauvais, 1987).

Interpersonal factors
The adolescent's level of social adjustment is another broad category that appears to work as a risk or protective factor with respect to substance use (Ashby, 1995; Beman, 1995; Dinges and Oetting, 1993; Huba and Bentler, 1982; Oetting and Beauvais, 1987). This category consists of interpersonal skills (e.g., communication, personal interaction), socialization, relationships with peers and parents, and involvement in societal institutions such as the school and the community. Oetting and Beauvais, for example, found that a lack of cohesion within the family, inadequate conflict resolution skills, and the lack of behavioral management skills were associated with increased substance use.

The development of social skills throughout childhood and adolescence appears to be important in protecting against adolescents' AOD use (e.g., Botvin and Wills, 1985). Manifestations of adolescents' social skills include involvement in school-related activities (e.g., sports, school council, music, after-school clubs), involvement in the community, and relationships with parents. Additionally, adolescents who are more involved in delinquent behavior (i.e., physical fights, vandalism, truancy, trouble at school) are more likely to be using substances than students not involved in these problem behaviors (Devery, 1993; Elliott et al., 1985).

Intrapersonal factors
Over time, the development of strong intrapersonal skills may also serve as a deterrent to AOD use (Botvin and Wills, 1985). Intrapersonal factors include the individual's attitudes, values, and self-concept (Huba and Bentler, 1982). Some of the intrapersonal factors associated with increased alcohol and drug use include placing greater value on independence, lower value on schooling and achievement, holding lower expectations for academic success, greater tolerance for deviant behavior, and greater expectations of failure (Ashby, 1995; Grimes and Swisher, 1989; Milgram and Pandina, 1981; Murray and Perry, 1985). In contrast, positive attitudes about self, school and education are seen as contributing to an adolescent's healthy intrapersonal domain (Grimes and Swisher, 1989).

AOD use and educational outcomes
The relationship between background, psychosocial variables, substance use, and educational outcomes has also drawn researchers' attention, but results have been somewhat more conflicting. Researchers have investigated how AOD use and other types of problem behavior may affect school academic performance and future educational aspirations (Ashby, 1995; Grimes and Swisher, 1989; Hahn, 1987; Jessor, 1976; Kellam and Brown, 1982; Milgram and Pandina, 1981; Mills et al., 1988; Nunn and Parish, 1992; Oetting and Beauvais, 1987; Tobias, 1986). One conclusion drawn is that AOD use over time may diminish high school students' academic performance and future educational aspirations. For example, Tobias (1986) found that 28 percent of non-users achieved an A average in school, while only 8 percent of regular AOD users achieved an A average. In contrast, 2 percent of non-users earned Ds or Fs, compared to 23 percent of students described as extensive users.

Some AOD use has also been noted among successful students, however. In one large-scale study of high school students in a large suburban county, Evans and Skager (1992) found that over 70 percent of the academically successful students reported some type of AOD use. While confirming the initial negative relationship between AOD use and academic success, further analyses indicated that the negative association between AOD use and academic achievement may be moderated by several factors. These factors include high educational aspirations, parents' educational level and support, and students' emotional stability.

It appears, therefore, that adolescents' social adjustment and individual personality characteristics may be crucial in moderating the relationship between AOD use and academic failure (Ashby, 1995; Grimes and...
Background, psycho-social factors and substance use: their effects on high school seniors’ perceptions of their education

Robert C. Voliter
Ronald H. Heck

For example, Nunn and Parish found that at-risk students’ locus of control was more externally oriented, indicating a greater tendency toward believing that behavior had little effect on educational outcomes. Self-concept comparisons revealed lower perception of competency for students who reported higher AOD use. A profile of these students suggested they were less motivated toward achievement and desired a more informal and non-traditional approach to learning.

For students at risk of substance abuse, therefore, experiences appear to be filtered through a personal belief system which includes a marginal sense of personal empowerment for effecting change, coupled with a devaluing sense of personal competence and deflated confidence. These beliefs, then, would be expected to affect achievement negatively. Students at risk of substance abuse may have experienced relative academic failure in school over their educational careers. Over time, academic failure may lead to substance abuse, which may lead to further academic failure. Moreover, these types of students tend to have lower social bonding and involvement with parents, the school, and the community.

From the perspectives of counselors, administrators, teachers, and those school personnel who are involved in developing school policy, emphasis directed toward preventing substance abuse can be placed on intrapersonal and interpersonal characteristics, because socialization and healthy attitudes and values can be taught, role modeled, and encouraged in the school setting. In contrast, socio-environmental factors, for example, are more difficult to influence from the school-based prevention position (Carlson, 1994; Mason and Hodge, 1995).

While previous research has been useful in confirming some of the factors that influence adolescents’ substance abuse, and the relationship among these sets of variables and academic attainment, there are limitations to keep in mind. Although identifying a number of potentially important variables, much of the early research concerning the effects of psycho-social variables on AOD use and educational attainment did not allow the testing of simultaneous effects of variables within a comprehensive framework. This has hindered efforts to identify the effects of various factors (e.g., determining their relative strength). For example, researchers have determined that socio-environmental variables affect AOD use and school outcomes. What is less clear, however, is how various intrapersonal and interpersonal variables may intervene between the social environment and the individual’s resultant behavior.

In some cases, the analytical means used to investigate the relationships implied among these variables in a comprehensive framework did not allow for the modeling of this complexity (e.g., bivariate correlations, analysis of variance, multiple regression). As researchers have concluded (Flay and Petrakis, 1991; Oetting and Beauvais, 1987), most previous research has offered relatively limited strategies for studying these factors in multivariate settings. For example, Oetting and Beauvais confirmed the relationship between socialization characteristics and adolescent substance use using path analysis. They acknowledge several limitations in path analysis, however, as an analytic technique. These include the necessity of using observed variables, the trimming of path models by eliminating weak paths, and the inability to account for potentially important sources of error in the measurement of variables.

Despite some limitations of previous research, theoretical formulations about factors that influence adolescents’ perceptions of their AOD use and their combined effects on educational outcomes provide some solid foundations for proposing a structural model that organizes these various interrelationships. Newer approaches to data analysis, such as structural equation modeling, may add to researchers’ abilities to model and estimate these factors with greater detail and accuracy. More recently, there have been several attempts to develop models of variables that affect AOD use, using structural equation modeling (see, for example, Dielman, 1989; Dielman et al., 1993; Huba and Bentler, 1982; Rhodes and Jason, 1990). A remaining need, however, is to develop an exploratory structural model that examines how background, psychosocial variables, and AOD use may influence students’ views about educational outcomes.

Our proposed model, summarized in Figure 1, posits the existence of several latent, or hypothetical, constructs (e.g., intrapersonal and interpersonal skills) which together comprise a framework of psychosocial factors that is believed to affect students’ reported current AOD use and educational outcomes. More specifically, the model first suggests that socio-environmental (including demographic) factors are associated with intrapersonal and interpersonal factors (Murray and Perry, 1985). We hypothesized that a stronger set of socioenvironmental
variables (e.g., church attendance, student involvement in work, higher parent education, parent support of schooling) would be positively related to students’ perceptions about a variety of interpersonal and intrapersonal variables. In concert, these variables were hypothesized to influence AOD use, as suggested by Murray and Perry (1985) in their research and development of environmental models. We believed that intrapersonal and interpersonal skills would be negatively related to students’ current AOD use (i.e., higher intrapersonal and interpersonal skills will be related with lower reported substance use). Finally, we proposed that the previous set of variables would influence students’ perceptions of their educational outcomes and future aspirations. Here, we hypothesized that AOD use would negatively affect outcomes, while intrapersonal and interpersonal skills will positively affect outcomes.

As we have suggested, developing a structural model can facilitate the investigation of underlying processes thought to be related to psycho-social processes, AOD use, and educational outcomes among high school seniors. Several important limitations should be kept in mind, however. First, although it is easy to hope that most of the complexity of a theory about factors that influence adolescents’ perceived AOD use and educational outcomes can be studied within a single model, in reality this is usually not the case. Since all plausible predictors would be seldom available to be entered into a single model, the problem is reduced to constructing a model so that relevant variables are included (Huba and Bentler, 1982), recognizing that such a procedure is guaranteed to be theoretically incomplete.

Second, students’ use of alcohol and other drugs obviously develops over a period of time. It is not possible to capture all of these interrelationships in a single cross-sectional model. Where doubts about the direction of causality are expressed, cross-sectional data are unable to resolve the ambiguity inherent in correlations and other measures of association (Davies, 1994). We recognize that probable reciprocal relationships (e.g., between AOD use and educational attainment) would become more apparent over time. Thus, longitudinal data would be preferred to answer questions about how these relationships evolve.

Despite this limitation, however, cross-sectional data can be useful in examining psycho-social phenomena, provided that the data are accompanied by strong theory. Structural equation modeling is a useful tool in this regard because it forms a system of relations that serves as an intermediary between our observations of social phenomena and our theoretical abstractions thought to explain these interrelationships. It also provides a means of testing the capacity of alternative substantive models to account for the pattern of covariation among the observed variables in the data (Cuttance and Ecob, 1987).

A final limitation that should be noted concerns the use of self-reported information. In this study, we focus on students’ perceptions of their current AOD use and educational outcomes and future aspirations. Here, we point out that self-reported measures, despite a variety of limitations, are often useful.
Background, psycho-social factors and substance use: their effects on high school seniors' perceptions of their education

Ronald H. Heck and Robert C. Voliter

Method

Participants and instrumentation

The subjects in this study were part of the “Monitoring the Future” project, first developed by the University of Michigan’s Institute for Social Research in 1974. Since then, the project has surveyed seniors in private and public high schools on an annual basis. The “Monitoring the Future” instrument addresses a broad scope of issues related to students’ personal lifestyles, confidence in social institutions, intergroup and interpersonal attitudes, concerns about ecology, behaviors and attitudes related to AOD use, and other social and ethical issues. Students are also asked about their academic performance in school and career aspirations after graduating from high school (Bachman et al., 1991).

Participants are selected through a multistage sampling process. At the first stage geographic clusters are used, developed by the University of Michigan’s Institute for Social Research for use in their nationwide studies. These include the 16 largest metropolitan areas in the USA and 64 other areas from the north-east, north-central, south, and west. At stage two, approximately 120 to 140 high schools are selected within the geographic clusters. Finally, up to 350 individual seniors are randomly selected within schools (where class size is smaller than 350, all students are sampled). Respondents are assigned a sample weight which takes into account variations in the sizes of samples from one school to another, as well as other errors in sampling at previous stages (Bachman et al., 1991).

Over time, the study has achieved very good return rates from students. Usable questionnaires are obtained from approximately 85 percent of the seniors in the sample (Bachman et al., 1991; Wallace and Bachman 1991), with fewer than 1 percent refusing to complete the questionnaire. Six different questionnaire forms are used to collect the data. Each form includes all drug use and demographic variables and a subset of other information. Because six different forms are used in the data collection, each random subsample from the larger study consists of approximately 2,700 high school seniors in public and private schools in USA. The data used for this study were from the 1992 study (survey Form 6), which included the relevant proxy measures of actual educational outcomes (e.g., Leithwood et al., 1993) including grade-point averages, school attendance, and effort.

Variables included in the structural model

Table I provides a description of the survey items and scales that were used to develop each latent construct in the model. Responses are summarized as means. For ethnicity, the mean can be interpreted as the percentage of Caucasians.

Background and environmental variables

Several background variables were investigated during preliminary analyses and deleted (e.g., gender, family structure, rural versus urban community) because they had no impact on the constructs in the model. The six background variables retained for the final model tested are shown in Table I. These were Ethnicity (coded 0 = Caucasian, 1 = minority), Father’s education (coded 1 = grade school or less to 6 = graduate school),
Political beliefs (coded 1 = very conservative to 6 = very liberal), Church attendance (coded 1 = never to 4 = once a week), and Student’s work hours (coded 1 = none to 8 = more than 30 hours per week). Parental support with schoolwork consisted of two items (each coded 1 = never to 4 = always) measuring how often parents checked and became involved in the student’s school homework.

Psycho-social variables
In general, the observed variables were constructed from five-point scales, with responses ranging from “never” (1) to “always” (5) or from “strongly disagree” (1) to “strongly agree” (5). Wherever possible, scales were constructed (see Table I) to improve the reliability and validity of our observed measures of the psycho-social, AOD, and educational outcome variables included in the model. The internal consistency of the scales was judged to be acceptable, with Cronbach’s alpha coefficients ranging from 0.62 to over 0.80. A few items were reverse coded to be consistent with the other items used to measure a particular latent construct (e.g., intrapersonal relationships).

School attitudes (Schatt) comprised six questionnaire items focusing on how often the student failed to complete or turn in assignments, was disciplined for misbehavior, skipped school, misbehaved in class, was suspended, and enjoyed being in school. Coding was such that low scores indicated greater disruptive behavior in school.

Self-concept (Self) consisted of eight items about student feelings of self-worth. These included having a positive attitude about self, a sense of self-worth, practicing personal safety, enjoying life, feeling efficacy in doing activities as well as others, being satisfied with self, being satisfied with life, and being happy to be living. High scores indicated stronger feelings of self-worth.

School activities (Schact) was a six-item scale measuring the student’s involvement in several types of school activities including school newspaper or yearbook, music or performing arts, athletic teams, academic clubs, student council, other school clubs and activities. High scores indicated greater involvement in school activities and, hence, stronger social adjustment to the school setting.

Delinquency (Del) was a four-item scale focusing on how often during the past year the student had damaged school property on purpose, damaged property at work on purpose, experienced trouble with police, or became involved in a serious fight at school or work. This variable was coded such that low scores indicated high delinquency.

Parent arguments (Parent) measured how often in the last 12 months the student argued or had a fight with either of his or her parents. Responses were reverse coded and range

Table I
Descriptive statistics of variables in the structural model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Background</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity (% Caucasian)</td>
<td>0.65</td>
<td>NA</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Father’s education</td>
<td>4.19</td>
<td>1.70</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Church attendance</td>
<td>2.64</td>
<td>1.08</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Student work hours</td>
<td>3.92</td>
<td>2.29</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Parent support with schoolwork</td>
<td>4.82</td>
<td>1.79</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Political beliefs</td>
<td>4.85</td>
<td>2.48</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2. Intrapersonal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-concept</td>
<td>31.46</td>
<td>8.90</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td>School attitudes</td>
<td>23.17</td>
<td>3.44</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>3. Interpersonal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School activities</td>
<td>8.41</td>
<td>3.44</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Delinquency</td>
<td>0.67a</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Parent relationship</td>
<td>1.37</td>
<td>1.50</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Community involvement</td>
<td>2.11</td>
<td>1.11</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4. AOD use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug use</td>
<td>0.15a</td>
<td>0.25</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>Alcohol use (30 days)</td>
<td>1.39</td>
<td>0.49</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>5. Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academics</td>
<td>23.02</td>
<td>4.80</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Attendance</td>
<td>3.32</td>
<td>1.90</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Aspirations</td>
<td>3.83</td>
<td>0.97</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: a log 10 transformation
from five or more arguments (coded 1) to no arguments (coded 5).

Community involvement (Commun) measured how often the student participated in community affairs or volunteer work. Responses ranged from never (coded 1) to almost every day (coded 5).

AOD use
Drug use and experimentation (Drug) was developed from ten categories of types of drugs students might have used during the previous year. These included marijuana, LSD, amphetamines, cocaine, barbiturates, tranquilizers, heroin, and other types of narcotics and inhalants. Responses were recoded to indicate whether students were currently using a particular drug or not. These were sequenced according to Kandel’s (1980) model of stages of drug usage (i.e., nonuse, legal drugs, marijuana, other illicit drugs). Then, the sums of responses for each drug were totaled to produce a range of responses from 0 to 10 (Mean = 1.8, SD = 1.7, not tabled). A score of 0, for example, would indicate no experimentation with drugs, while a score of 3 or 4 would reflect considerable experimentation with illicit drugs (e.g., marijuana, cocaine). This variable was subsequently transformed to improve its skewness and kurtosis.

Alcohol use (Alco) was an interval variable measuring the number of times students had been drunk or high from drinking alcoholic beverages in the past 30 days.

Educational outcomes
Academic achievement (Acad) was constructed from six items that measured the student’s perception of his or her academic ability and intelligence, accumulated grade point average in high school, and effort used in school.

Attendance (Attend) consisted of two items measuring how often the student reported being absent from class and from school during his or her senior year.

Educational aspirations (Asp) was recoded into a five-point ordinal scale (1 = low, 5 = high) from four survey items asking students about their planned activities after graduating from high school. These options included working (i.e., no further education), going into the military, attending a vocational or technical school, attending a two-year college, or attending a four-year college. The mean for this variable (see Table I) suggests that the students in the sample had fairly high educational aspirations.

Specifying and testing a structural model
Many social and behavioral phenomena are conceived of as structural processes operating among unobserved (latent) constructs. Because latent constructs are not observed, however, they cannot be directly measured. Before a proposed theoretical model can be tested with structural equation modeling, a set of empirically operationalized indicators must be defined for each latent construct (Joreskog and Sorbom, 1993). By relating constructs to multiple observed indicators, greater validity and reliability can be achieved, thereby providing a more complete test of theoretical relationships. Moreover, errors of measurement may be estimated for both observed variables and latent constructs in the model, giving a more thorough indication of its construct validity and reliability.

Structural equation models consist of two interrelated mathematical models. The relationship between the observed indicators and their theoretical constructs constitute the measurement model. In a path diagram (see Figure 2), the latent constructs are represented by ovals, while observed variables are indicated by rectangles. Because observed variables are hypothesized to result from their latent constructs, lines with arrows originate from the latent constructs to their associated indicators. The second model (the structural model) summarizes the structural relations among latent constructs, as well as the effects of the background variables in the model (e.g., father’s education, church attendance, ethnicity) on the latent constructs in the model.

Results
The goals of the analysis were to estimate the relative strength of the variables in the model in explaining students’ perceptions of their current AOD use and educational outcomes. Moreover, we attempted to determine how much variance in AOD use and educational outcomes could be accounted for by variables in the model, as opposed to sources outside the model (e.g., random error, other variables not included). Higher variance accounted for in the latent constructs provides another indication of the model’s construct validity.

The model was tested using LISREL 8 (Joreskog and Sorbom, 1993)[1] and a matrix of product-moment correlations, with observations on ordinal or dichotomous variables replaced by nonmal scores determined from the marginal distributions. The maximum likelihood method of estimation was used to test the model. In testing a structural model, one attempts to fit the variance-covariance matrix implied by the theoretical model to the variance-covariance matrix of the
sample data. Because a theoretically-driven model was proposed, our primary interest is the assessment of fit of the hypothesized structural model to the data. Without an adequate model fit, the proposed model would need to be reconceptualized. For example, we would have to redefine the measures of the latent constructs or the hypothesized interrelationships among the latent variables.

Several measures of fit are normally used to assess how well the proposed model fits the data. The indices chosen for their widespread use were the goodness-of-fit index (GFI), the adjusted (for sample size) goodness-of-fit index (AGFI), the comparative-fit index (CFI), the root mean square residual (RMR) and the root mean square error of approximation (RMSEA). For the GFI, AGFI, and CFI, values above 0.9 are generally recognized as indicative of a good model fit to the data (with 1.0 indicating a perfect fit). These indices can be considered as the relative amount of variance and covariance in the data accounted for by the proposed model.

In contrast, the RMR and the RMSEA are measures of the average of the unexplained variances and covariances in the proposed model. These indices should be close to zero if the model fits the data well. Moreover, the RMSEA has a corresponding test based on the chi-square statistic, which provides a statistical test of whether the model can be accepted as plausible or not.

Table II presents a summary of the relevant goodness-of-fit indices. The various indices all suggest a good fit of the proposed model to the data (e.g., GFI = 0.97, AGFI = 0.93, RM = 0.042). Moreover, the RMSEA is 0.057, with the test of fit at p = 0.076, suggesting that the model should not be rejected. Given the variety of tests available to judge the adequacy of the structural model, therefore, it can be seen as a plausible representation of the data.

As Marsh et al. (1988) suggest, improvement in model fit should be motivated by substantive, as opposed to purely statistical, concerns. While we could improve the model’s fit (e.g., by allowing error terms among items to correlate), the model might make little sense substantively. Of course, we investigated several modifications to our model, but following Marsh et al.’s (1988) recommendations, we chose to present our results in terms of the model proposed initially.

Because the model fit the data adequately, we can now assess more thoroughly the significance of the empirical validation of the proposed model. The significant (p < 0.05) parameter estimates for the paths in the measurement and structural models are presented in Figure 2. These estimates represent the simultaneous contribution of the observed and latent variables in explaining AOD use and educational attainment. Direct effects and indirect effects (through combined paths) between variables were observed and their coefficients tested with t-tests (the ratio of the estimate to its standard error) to determine whether they were statistically significant.

Figure 2 also summarizes several relevant findings about students’ backgrounds, interpersonal and intrapersonal characteristics, reported substance use, and reported educational outcomes. The path diagram represents the simultaneous effects of the variables in the model. Intrapersonal factors exerted the strongest direct effect on Educational outcomes (0.57), as well as a small indirect effect on Outcomes through Interpersonal factors. In contrast, Interpersonal factors were only weakly related to Educational outcomes (0.22). There was, however, also a small, but significant, positive indirect effect of Interpersonal factors on outcomes through AOD use (–0.13x + 0.13 = 0.10).

Interpersonal factors were strongly and negatively related to AOD use (–0.73). This suggests that students with stronger social bonding characteristics (i.e., more involved in school activities, less involved in delinquency, more involved in the community) were less likely to report using substances.

In contrast to our initial hypothesis, we observed no significant direct relationship between AOD use and reported AOD use (0.06). However, there was a moderate indirect effect (0.78 × –0.73 = 0.57) of Interpersonal factors on AOD use (through the Interpersonal Factors path). As expected, AOD use was weakly (but significantly) related to students’ perceptions of Educational outcomes (–0.13), suggesting that students who used substances less frequently reported higher academic outcomes, attendance, and future educational aspirations.

Figure 2 also summarizes the effects of several background and environmental variables included in the model on the various latent constructs. Only three variables (ethnicity, father’s education, and church attendance) exerted small effects on Educational outcomes. Minority students, for example, reported lower perceptions of their educational outcomes (–0.22). The hours that students worked affected AOD usage moderately (–0.41), suggesting that students who held jobs as seniors reported lower use of substances. Ethnicity, student work, and political beliefs also exercised small effects.
on perceptions of intrapersonal and interpersonal factors.

Other evidence of the model’s validity is provided by examining the errors in the structural equations corresponding to each latent construct. The coefficients in parentheses in Figure 2 indicate variance unaccounted for by the model (i.e., variance due to other variables not in the model or errors of measurement). These coefficients are all relatively small. For example, the structural model accounted for over 80 percent of the variance in perceptions of educational outcomes (84 percent), with only 16 percent due to other possible sources of error. Moreover, the background variables and intrapersonal and interpersonal factors accounted for 48 percent of the variance in perceived substance use (with 52 percent from other influences). The background variables in the model accounted for almost all of the variance in students’ perceptions of their intrapersonal and interpersonal factors (90 percent and 80 percent, respectfully).

It should be noted that the results of any model test are always limited to the variables studied within the context of the proposed structural model. Given the amount of variance accounted for in the model, however, it was concluded that the proposed model provided a reasonable explanation of variables that affect students’ reported AOD use and educational outcomes.

### Discussion

In this article, we presented results from a study investigating factors that influence high school seniors’ reported current AOD use and perceptions of their educational attainment. The proposed model hypothesized that socio-environmental variables, intrapersonal factors, and interpersonal factors influenced students’ reported drug and alcohol use. In turn, these variables were hypothesized to affect students’ perceptions of several educational outcomes. The results indicated that our proposed model fit the data quite well.

---

**Table II**

Maximum likelihood goodness-of-fit indices

| Goodness-of-fit Index (GFI) | = 0.970 |
| Adjusted Goodness-of-fit Index (AGFI) | = 0.930 |
| Comparative Fit Index (CFI) | = 0.910 |
| Root Mean Square Residual (RMR) | = 0.042 |
| Root Mean Square Error of Approximation (RMSEA) | = 0.057 |
| P-value for Test of Close Fit (RMSEA < 0.05) | = 0.076 |

---

**Figure 2**

Structural model of background, interpersonal and intrapersonal variables affecting student AOD use and educational outcomes
Most importantly, the model confirms that stronger interpersonal factors (i.e., greater involvement in school activities, lower delinquency, stronger relationships with parents, participation in the community) were associated with lower reported current AOD usage among high school seniors. Similarly, intrapersonal factors (attitudes toward school and self) were indirectly related to lower reported alcohol and drug use. Our findings, therefore, are consistent with research demonstrating that stronger social adjustment and personal feelings of self-worth can be protective factors against drug usage (Huba and Bentler, 1982; Oetting and Beauvais, 1987; Rhodes and Jason, 1990).

The model also confirmed that several variables affected students’ perceptions of educational outcomes. For example, interpersonal factors were positively related, and the strength of that influence was also increased somewhat because of its impact in providing a screen against AOD use (see Figure 2). As expected, intrapersonal factors also had a moderate direct effect on educational outcomes. Similarly, AOD usage had a small (but significant) negative effect on students’ reported educational outcomes.

Implications

In proposing and testing a structural model of psycho-social variables, AOD use, and reported educational attainment, we attempted to investigate a number of relationships of interest to professionals in schools who work with adolescents. Structural equation modeling can make a significant contribution to research attempting to describe and evaluate the effects of various psycho-social dimensions on student substance use and reported educational outcomes. An important requirement for the evaluation of models via structural equation modeling lies in using theoretically appropriate operationalizations of both observed and latent variables.

The overall support of our proposed model suggests evidence of its construct validity and provides a preliminary snapshot of how interpersonal and intrapersonal factors may moderate substance use among adolescents. These results provide school counselors with a potential model for guiding their clinical practice and intervention strategies when working with youngsters having difficulties with the major component variables (i.e., interpersonal and intrapersonal skills, AOD usage, educational outcomes).

Students’ problem behavior and educational attainment are obviously shaped by the complex cultural and social fabric that surrounds them (Hoare, 1991). The results of our study are consistent with the belief that adolescents’ AOD usage and educational attainment are a multidimensional process involving the interaction of several important psychological and socio-environmental variables. Of course, it is likely that AOD use and educational attainment have reciprocal effects, which we could not confirm in this study because of the limitations of cross-sectional data. Future studies might consider the use of longitudinal data to enhance our insights into how these processes unfold over time.

The variables included in our model accounted for substantial variation in adolescents’ perceptions about both their current AOD usage and their educational outcomes. We note, however, that practitioners should always consider the results of structural models as limited to the variables and factors specified within the context of the model developed. Other variables outside of the model that could not be tested may also affect the experiences of adolescents in various ways. It is therefore important to recognize that school personnel should use caution when making inferences about student needs in isolation. Moreover, our outcome measures were students’ perceptions of their educational experiences, as opposed to the actual outcomes. This, of course, introduces the possibility of some bias in these outcomes, although it is reasonable to assume that students have a fairly reliable understanding of their educational outcomes and aspirations by the time they have spent 13 years in schools.

Keeping these cautions in mind, one educational goal may be to help students understand the interaction of their backgrounds (e.g., ethnicity, values, family lives, cultural traditions) on their sense of not belonging or fitting in within various school and societal groups. As Hoare (1991) argues, there may be a lack of fit between the student’s internal and social worlds and the expectations and values of the school. Acting out of a negative identity may follow, as adolescents are deprived of a positive share in the roles, practices, and rewards of the majority’s set of expectations.

Intrapersonal (e.g. self-concept) and interpersonal skills (e.g. positive social relationships) may be potential screens to adolescent alcohol and drug usage. From our data, it appears that the relationship between intrapersonal skills and reported AOD use is primarily indirect, through the adolescent’s pattern of social relationships in the school, home, and community environment. From
this perspective, counselors and other school personnel would do well to look for ways to involve isolated students in developing rewarding social relationships and increased self-concept as a possible means of reducing student substance use. Strategies focusing on strengthening interpersonal relationships (e.g., peers, family, teachers) and self-esteem, conflict negotiation, role identity, and getting help may also be important in reducing adolescents’ problem behavior (delinquency, truancy, substance abuse). School counselors can work with teachers to develop effective classroom strategies to reduce disciplinary problems and increase classroom academic success. The research on student assistance programs is mixed, however, indicating that while they have been widely adopted, their effectiveness varies (Carlson, 1994).

Coupled with our findings, this suggests the further need to develop and evaluate for mal programs more comprehensively by specifying carefully the determinant variables. We hope that future efforts to understand the complex interrelationships between adolescents and their home and school environments will lead to the development and implementation of more effective educational and clinical interventions.

Note
1 Observed variables conceived of as scales were judged to be within normal limits for model estimation (Boomsma, 1987), with all kurtosis coefficients ranging from −0.9 to 2.2 (except one variable that when transformed was still a bit peaked at +4.1) and skewness of −1.8 to +1.6.

References


Botvin, G. and Willis, T. (1985), Personal and Social Skills Training: Cognitive-Behavioral Approaches to Substance Abuse Prevention, Research Monograph Series No. 63, Department of Health and Human Services, Rockville, MD.


Dryfoos, J. (1990), Adolescents at Risk, Oxford University Press, New York, NY.


Ronald H. Heck and Robert C. Voliter

Background, psycho-social factors and substance use: their effects on high school seniors’ perceptions of their education


Kelham, S. and Brown, H. (1982), Social Adaptational and Psychological Antecedents of Adolescent Psychopathology Ten Years Later, Johns Hopkins University, Baltimore, MD.


Ronald H. Heck and Robert C. Voliter

Background, psycho-social factors and substance use: their effects on high school seniors’ perceptions of their education


Tobias, J. (1986), Schools and Drugs, Panda Press, Annandale, VA.