

AMERICAN INDIAN ADOLESCENT INHALANT USE

Pamela J. Thurman, Ph.D. and Vicki A. Green, Ph. D.

Abstract: Inhalant use and use patterns, decision-making pertaining to inhalant use, cognitive capacity, cognitive egocentrism, and adherence to traditional ways were studied in a sample of male and female American Indian adolescents residing in a boarding home. Significant differences were not found for gender. Inhalant use group differences were found for only one variable, participation in tribal activities. For males, cognitive ability, cognitive egocentrism and participation in tribal activities were significant predictors of inhalant use/non-use. For females, tribal activities was the only significant predictor.

Substance abuse in the American Indian population is a persistent and longstanding problem (Beauvais & LaBoueff, 1985; Dozier, 1966; Indian Health Service Task Force on Alcoholism, 1970; Segal, 1975). American Indian alcoholism and other drug abuse is not just an adult problem. An early study by Oetting and Goldstein (1979) reported a high incidence of alcohol use among American Indian children. These authors found that, compared to non-Indian youth, American Indian youth had higher rates of use of drugs other than alcohol. A later study by Beauvais (1992) confirmed these findings, indicating that drug use among American Indian youth is a continuing problem. In addition to these studies documenting higher rates of drug use in a specific time frame, Weibel-Orlando (1984) identified a trend over time of increasingly rapid escalation of drug use.

Gender differences in drug use have also been of interest. It is commonly believed that males have higher rates of drug use than females (Penning & Barnes, 1982). Two studies suggest that this expectation of gender differences in substance abuse does not hold true for American Indian youth. Beauvais, Oetting, Wolf, and Edwards (1989) found only four significant gender differences in lifetime prevalence rates; compared to males, females evidenced higher levels of cigarette use and lower levels of use of

cocaine, sedatives, and smokeless tobacco. Additionally, Beauvais (1992) found that American Indian females use drugs at the same rate as their male counterparts, with the exception of cocaine and smokeless tobacco.

Beauvais and LaBoueff (1985) identified yet another problem. Not only do American Indians start abusing substances at an earlier age than their Anglo counterparts, but the younger the children are when they begin abusing substances, the more likely it is that the substance used will be inhalants. Though extremely limited information is available, adolescent inhalant use appears to be a salient problem in the American Indian population. Adolescent users are being referred to therapists in increasing numbers (Dyer, 1984). Dyer (1982) reported that when American Indian adolescents were admitted into the Oklahoma mental health/substance abuse treatment system, inhalants were mentioned as the primary drug in 73% of the cases. This was compared to 6% for admitted non-Indian adolescents. Inhalant use appears to decline as other substances such as marijuana and alcohol become more accessible (Beauvais & LaBoueff, 1985). Thus, although inhalants may not appear to be the adolescent drug of choice, their low cost and ubiquitous presence make them very available.

Early studies (Cohen, 1973; Korman, Trimboli, & Semler, 1980) demonstrated higher rates of inhalant use among males than females in delinquents and psychiatric patients. The National Senior Survey (Johnston, O'Malley, & Bachman, 1985) indicated that, in high school, 18% of male respondents had tried inhalants compared to only 11% of female respondents. Edwards and Oetting (1995), however, reported that overall lifetime prevalence rates reflect male use higher than female use, for sixth-graders, boys use inhalants somewhat more than girls, but the difference decreases across the seventh through ninth grades.

It is obvious that inhalant use is a serious problem among American Indian adolescents. Given the magnitude of the problem, it would be important to obtain information pertaining to the etiology of this behavior. Although research has been replete on causal factors of substance abuse, the majority of studies have focused on identification of pertinent etiological factors leading to adult alcohol use/abuse. The identification of such factors in adolescent alcohol use/abuse is less clear than that for adults. Given the focus of such research on adults and generally related to alcohol, only possible etiological factors for adolescent substance abuse per se can be considered. Yet another factor to be considered are regional differences as well as rural and urban. Beauvais (1992) has provided a thorough report on factors related to reservation, rural and urban adolescent substance use patterns.

One possible etiological factor posited by Jessor and Jessor (1975) relates to "expectations" placed upon adolescents in their development into adulthood. America is a society that associates the use of alcohol with adult status; therefore, the onset of drinking constitutes a significant event that reflects and patterns the course of development through adolescence

to adulthood. Consistent with this view, Beauvais and LaBoueff (1985) have speculated that, with adult alcoholism so prevalent, it would be highly likely that children would tend to emulate such behavior. Such a pattern could exist among American Indian adolescents, possibly due to emulation of either the majority culture or their own culture.

In fact, some researchers have suggested that traditional American Indian culture is a causal factor in drinking behavior and drug use (Ackerman, 1971). However, though some psychoactive substances may be used in various American Indian tribal ceremonies and in the Native American Church, none of these institutions encourage or sanction recreational or illicit use of drugs. Researchers have also suggested that drug use is a result of acculturation stress, the stress of identifying with both the majority culture and the American Indian culture (Mail & McDonald, 1980).

In traditional models of acculturation, cultures are viewed as residing on opposite ends of a continuum; thus, it is difficult for an individual to identify with more than one culture. Oetting and Beauvais (1989) have advanced a theory of orthogonal cultural identification. In this model, cultures are viewed as orthogonal to each other, as independent continua; thus, the individual can successfully identify with more than one culture. According to Oetting and Beauvais (1989), the orthogonal model allows for high cultural identification with one's culture of origin. When successful identification with one's culture of origin is maintained, positive outcomes are likely and drug use is less likely. When cultural identification fails, negative outcomes are likely and "illicit" or culturally inappropriate substance use may occur. Oetting and Beauvais suggested that inhalant dependent adults may have been those who were considered culturally marginal, regardless of the culture with which they had tried to identify.

A second and related possible etiology focuses on adolescent peer groups. Both peer influence and peer pressure appear to be significant factors in the decision to use or not use alcohol and drugs (Beauvais, Oetting, & Edwards, 1985; Cockerham, 1975; Oetting & Beauvais, 1986; Oetting & Goldstein, 1979; Weibel-Orlando, 1984). Oetting and Beauvais (1989) suggested that youth lacking a strong cultural base may seek to identify with "deviant" subcultures. Oetting, Edwards, and Beauvais (1989) suggested that young inhalant users are likely to have more emotional problems than non-drug users or young marijuana users. Because of the feelings of alienation that occur, they tend to affiliate with groups that have similar feelings and also use inhalants.

A third possible etiology is related to the assumption found in recent literature that adolescent risk-taking is preceded by decision-making (Beyth-Marom, Fischhoff, Jacobs, & Furby, 1989; Irwin & Millstein, 1991). Horan (1979) suggested that classical decision theory provides a more suitable basis for drug education programs than frameworks presently being used for such programs, e.g., avoidance of future use, the "dos and don'ts," etc. Irwin and Millstein (1991) and Levitt, Selman, and Richmond (1991) put

forth models that divide factors involved in the risk-taking decision-making process into two major categories: contextual and structural. The contextual factors include peer and parental influences as well as the influences of culture. These factors are consistent with the etiological factors presented above: (a) cultural and developmental expectations placed on adolescents and (b) the influence of peer groups.

Structural factors can be further divided into three main categories: biological/physiological, dispositional, and cognitive. Of specific relevance to the present study is the cognitive category. One of the critical elements in adolescent decision-making is the ability to exhibit aspects of adolescent reasoning. These are: thinking abstractly, thinking about possibilities, thinking through hypotheses, thinking about thinking, and considering the perspective of others (Hoffman, Paris, & Hall, 1994). That these skills are developed in the period from preadolescence through adolescence is supported by the literature (Keating, 1980).

The achievement of adolescent reasoning ability does not guarantee maturity in decision-making. According to Peel (1971), mature decision-making capacity may be dependent on both the level of cognitive development and cognitive egocentrism. The capacity for considering the perspective of others may lead to a form of egocentrism. According to Elkind (1985), the capacity to infer what other people are thinking may lead to the adolescent's inference that other people are thinking about him/her; this type of egocentrism is characteristic of early adolescence.

Two aspects of egocentrism were identified by Elkind (1967); these are the imaginary audience and the personal fable. The first aspect, the imaginary audience, was based on the premise that, in social situations, adolescents assume that others are as obsessed with them as they are with themselves. In a sense, adolescents are constantly playing to, or responding to, an imaginary audience. In the second aspect, the personal fable, adolescents believe they are of such importance that they come to regard themselves as special and unique. Furthermore, adolescents' belief in their own personal uniqueness can lead to a conviction that they are invulnerable. While negative consequences may happen to others, it is their belief that such will not happen to them.

In an American Indian boarding home sample, the present study examined the following variables: inhalant use and use patterns, decision-making in inhalant use, cognitive capacity, cognitive egocentrism, and adherence to traditional ways. Males and females were included as subjects. Given the literature cited above and anecdotal information from the American Indian boarding home in which the subjects resided, hypotheses were that: (a) males would exhibit higher levels of drug use than females, and (b) differing drug use patterns would be observed in males and females. As there is some evidence of potential gender differences in specific measures of cognitive capacity and cognitive egocentrism (to be discussed in the methods section), further hypotheses related to gender were that: (a) males

would perform significantly better on the cognitive ability measures [Displaced Volume, Puns, Problems, and Word Problems], and (b) that males would score higher on the personal fable subscale of Rules and Impulsivity, but that females would score higher on the personal fable subscale of Magical Thinking and the two imaginary audience subscales. As no evidence exists in the literature pertaining to gender differences in adherence to traditional Native activities, no prediction was made for gender differences on these measures.

Subjects using and not using inhalants were included in the present study. As the literature suggests that inhalant use may be related to cognitive capacity, cognitive egocentrism, decision-making capacity, and the extent of identification with one's traditional culture, we hypothesized that, compared to nonusers, inhalant users would exhibit: (a) lower cognitive capacity, (b) higher cognitive egocentrism, (c) lower decision-making capacity, and (d) less adherence to traditional ways.

Combinations of these variables were used in predicting inhalant use. Based on the assumption that cognitive capacity and cognitive egocentrism influence decision-making and, thus, risk taking, we hypothesized that cognitive ability, cognitive egocentrism, and decision-making variables would be significant predictors of inhalant use. Furthermore, based on the literature emphasizing that positive outcomes are related to identification with one's culture of origin, we predicted that adherence to traditional ways would be predictive of inhalant use.

Method

Subjects

Subjects were 87 American Indians ranging in age from 10 to 18 years. The average age of the subjects was 13.5 (SD = 1.93); the average grade placement was 7.6 (SD = 1.88). These subjects were recruited from an American Indian boarding home facility located in a rural area of the southwestern part of the United States.¹ A boarding home environment was selected as opposed to a classroom in an effort to maintain a one-quarter minimum American Indian blood quantum rather than utilize subjects who were self-identified but with much lower blood quantum. All students in grades five through twelve were invited to participate in the study. Of the 92 children eligible to participate, all agreed to do so. However, data from one subject were discarded due to incomplete information, and data from four subjects were discarded as they identified themselves through self-report as inhalant users but were not identified by the Counselors in the boarding home as ever having been involved in an inhalant use incident. This distinction was necessary in order to ensure that youth did not report

use just to get out of class to participate in a novel experience. Further, by being counselor identified, at least experimental use was firmly established.

The population of this home consisted of students who were one-fourth or more degree of American Indian blood. Most of the students were from rural areas and small towns in the state, though approximately 25% came from metropolitan areas with populations exceeding 300,000. Of the participants in this study, 68% were 3/4 or more American Indian, 37% spoke their tribal language, and 59% indicated that they regularly participated in traditional activities.

The 87 subjects were divided into four groups: (a) male inhalant users [n = 25]; (b) male nonusers [n = 25]; (c) female inhalant users [n = 14]; and (d) female nonusers [n = 23]. Placement into the user group was based on identification by the boarding home counselor as a student who had been caught in at least one sniffing incident on residential grounds. Those subjects who were identified as users by school staff also identified themselves as users on the inhalant-use behavioral measure. (No chronic abusers and polydrug users were in residence at the home; the practice of the home was to refer such individuals to treatment centers.) The groups did not differ significantly in age or grade placement.

Materials²

Demographic Questionnaire. A 16-item questionnaire was used to assess socioeconomic status, age, grade, tribe, degree of American Indian blood, adherence to traditional ways, and familial demographic information.

Inhalant-Use Behavioral Measure. Based on the inhalant-use literature, a 19-item inhalant-use questionnaire was developed. The questionnaire assessed: previous use; frequency of use; age of first use; substances inhaled; methods used when inhaling; use of inhalants with other drugs or alcohol; and whether inhalants are used alone, with a friend, or in a group. Additionally, the questionnaire included seven true/false questions on inhalant use.

Cognitive Measures. Four pencil-and-paper measures were selected to assess specific aspects of adolescent reasoning. One measure (Displaced Volume) was a test often used in the literature for which reliability and validity have been established. A second measure (Proverbs) was a component of a standardized test. Use of an item from a standardized test was based upon the philosophy of criterion testing. The third measure (Word Problems) was a measure used often in adolescent research to ascertain formal operational thinking. The fourth measure (Puns) was developed by the second author and colleagues. Reliability and validity data are available for this measure. Jones and Green (1991), using a multiethnic sample of students in Catholic schools, grades 5 through 12, established the average grade level of attainment for three of these measures. The Displaced Volume test

was mastered at the sixth-grade level. While not compared to the other three measures, using a Job Corps sample, Frank, Green, and McNeil (1993) found the Word Problems task was a significant predictor of problem-solving behavior.

The Displaced Volume test (Linn & Pulos, 1983), measuring the ability to hypothesize, included eight problems with multiple-choice answers. Each required subjects to identify the relevant variables and then mentally manipulate them in order to predict their effect upon the water level in a pictured container.

The Word Problems task consisted of two problems involving deductive reasoning abilities (e.g., "Helen is taller than Mary, and Mary is taller than Jane; who is the tallest of the three?"). Subjects were required to solve the two problems.

The Proverbs task, measuring abstract reasoning, consisted of three proverbs drawn from the three adult levels of the Stanford Binet Test of Intelligence (Terman & Merrill, 1973) (e.g., "We only know the value of water when the well is dry"). Subjects were required to explain the meaning of each proverb.

The Puns task, measuring the ability to take more than one perspective, involved the presentation of three puns for which subjects were required to explain two alternative meanings of the phrase (e.g., "Wrestling is a sport which gets a hold on you"). Scoring was established along the lines of the Proverbs task by Jones and Green (1991). For all measures, correct solutions/higher scores were indicative of higher levels of cognitive ability.

Jones and Green (1991) did not find gender differences for the Puns or Proverbs tasks, but did find gender differences for the Displaced Volume test. Compared to females, males exhibited significantly more cognitive ability on this test. Frank et al. (1993) did not find gender differences for the Word Problems task.

Cognitive Egocentrism Measures. The Imaginary Audience Scale - IAS (Elkind & Bowen, 1979) presented 12 dilemmas designed to directly involve the subject in a potentially embarrassing situation. Six of the dilemmas involved situations which are momentarily embarrassing (the Transient Self Scale - TS), and the other six reflect more permanent possibly embarrassing aspects of self (the Abiding Self Scale - AS). For TS and AS, higher scores indicated higher levels of concern with the imaginary audience. Elkind and Bowen found gender differences on the TS and AS scales. Females had significantly higher scores than did males.

The Personal Fable Questionnaire - PFQ (Green, Morton, Starr, Jones, & Jaynes, 1992) contained 43 items. Subjects were asked to respond to each item using a five-point, Likert-like scale ranging from strongly agree to strongly disagree. In the study by Green et al., using a fifth through twelfth grade normative sample, psychometric properties and factorial structure were assessed. Five factors were identified: Rules/Impulsivity,

Egocentrism, Uniqueness, Magical Thinking, and Independence. Twenty-five items had salient loadings on one of these five factors. The five factors were scored as five scales. For four of these, high scores reflected higher cognitive egocentrism; for the Independence scale, high scores reflected thoughts regarding independent action. The scale scores represented the average response to all items on that scale. As the factors have been found to be independent, no combined score was used. Green et al. found gender differences for two of the scales. Males exhibited higher scores on Rules/Impulsivity, females on Magical Thinking.

Decision Making Abilities Measure. The Applied Dilemmas task (Lewis, 1981) for adolescents consisted of three open-ended decision making dilemmas with follow-up questions. Two neutral dilemmas employed by Lewis were used, the first dealing with parental divorce, the second concerning trust of a parental figure who is a lawyer. The third dilemma, developed by the first author, dealt specifically with inhalant use (i.e., "Some of my friends want to try drugs or alcohol but can't afford to buy any. However, one guy said that he heard that you could sniff paint and get just as high as you want. I heard about another guy at school that sniffed some paint and had to be put in the hospital—he got really sick. I don't want my friends to think I'm a sissy, and I do want to be one of the crowd, but I just don't know what to do. What should I do?") For each dilemma, the following were scored: (a) awareness of risks, (b) awareness of future consequences, (c) number of people consulted, and (d) consultation with a peer, an adult, or a professional. The three dependent measures used were the total combined scores for each of the three dilemmas. The dilemmas were scored by two individuals unaware of group membership. Scoring followed criteria set by Lewis (1981). Interrater reliability was .99.

Procedure

Consent was first obtained from the boarding home administration. Prior to obtaining consent from the subjects, the experimenter (the first author) spent time at the home to develop rapport. All subjects were tested individually. Tests were completed by the subjects in the presence of the experimenter; due to apparent literacy problems, the test questions were read to approximately 70% of the subjects. The tests were given in the following order: PFQ, IAS, cognitive tasks, the behavioral measure, the demographic questionnaire, and applied dilemmas.

During testing, the experimenter was blind as to group assignment. A school counselor kept a master list of subject code numbers matched with appropriate group identification. This information was provided to the experimenter only after all testing and scoring were completed.

Results

Gender and Use - Group Differences

Data were arranged in a 2x2 factorial design containing group dimensions (inhalant-user and -nonuser) and gender dimensions (male and female). Analyses were carried out to assess gender differences, use-group differences, and interaction effects. Depending upon the type of data, either multivariate analyses of variance (MANOVA) or Chi-square analyses were used. No interaction effects were found.

Gender Differences

A Chi-square test, used to assess gender differences in inhalant-use group placement, was not significant. A MANOVA, used to assess gender differences in responses on the behavioral questionnaire for the user group only, was not significant. A MANOVA, used to assess gender differences in the equal interval scaled demographic measures, was not significant. Three separate MANOVAs were used to assess gender differences in the dependent measures grouped as follows: (a) cognitive ability variables, (b) cognitive egocentrism variables, and (c) decision-making variables. No significant differences were found. Chi-square tests, used to assess gender differences in the two measures of adherence to traditional ways: participation in tribal activities (yes/no) and speaking the tribal language (yes/no), were not significant. In summary, no significant gender differences were found for any of the measures used. Additionally there were no gender differences in inhalant use *per se*, or patterns of inhalant use.

Use-Group Differences

A MANOVA, used to assess inhalant-use group differences in the equal interval scaled demographic measures, was not significant. Three separate MANOVAs were used to assess inhalant-use group differences in the dependent measures grouped as follows: (a) cognitive ability variables, (b) cognitive egocentrism variables, and (c) decision-making variables. No significant differences were found. Chi-square tests were used to assess differences between the two use-groups for the two measures of adherence to traditional ways. No significant difference was found for the variable speaking the tribal language. A significant difference was found for the variable participation in tribal activities, $X^2 = 21.34$, $p < .0001$. Of the 48 nonusers, 39 were involved in traditional activities; of the 39 users, 12 were

involved in such activities. In summary, the only significant use-group difference found for the measures used was for the variable, participation in tribal activities.

Predictors of Inhalant Use/Non-use

Stepwise multiple regression analyses were employed to determine if specific sets of predictor variables were significantly predictive of the outcome variable inhalant-use group placement (“use/non-use”). Analyses were performed separately for males and females.³ For all analyses, the confidence level for inclusion was set at .05. The cognitive variables (Puns, Word Problems, Proverbs, and Displaced Volume), the cognitive egocentrism variables (Imaginary Audience Scale, TS, and AS, and the five Personal Fable Questionnaire scales), the three decision-making variables (total scores for Applied Dilemma-Divorce, Applied Dilemma-Trust, and Applied Dilemma-Inhalant Use), and the two traditionalism variables (participation in tribal activities and speaking the tribal language) were employed as predictors of the outcome variable of “use/non-use”. For the female group, only one variable, tribal activities, was found to be a significant predictor of the outcome variable, $R^2 = .504$ (1,35), $F = 35.55$, $p < .0001$. The β value for this variable was -0.72. For the male group, three variables were found to be significant predictors of the outcome variable, $R^2 = .341$ (1,48), $F = 11.90$, $p < .001$. The variables, β values, and partial correlation coefficients (R^2) were as follows: tribal activities, -0.39, 0.20; the cognitive variable Proverbs, 0.14, 0.07, and the cognitive egocentrism variable PFQ Rules/Impulsivity, 0.28, 0.07.

Discussion

Findings in the present study did not support the hypotheses that males would exhibit a higher level of inhalant use than females and that the inhalant use patterns of males and females would differ significantly. Two studies in the literature reported gender differences in inhalant use by youth (Korman et al., 1980; Johnston et al., 1985). Additionally, boarding school personnel reported gender differences. (In fact, prior to initiation of the study, school administrators stated that there was no inhalant use by females in residence. Yet, counselor information documented 14 female users.) There are two likely explanations for the lack of significant findings. One, the hypotheses were incorrect: gender differences should not be expected in this type of sample; given the boarding home environment, adolescents of both genders are as likely to use inhalants. Oetting and Beauvais (1989) identified higher rates of drug use in boarding home environments. They speculated that higher rates may occur because of developmental isolation from parental sustenance and sanctions and increased dependence on peers for emotional and social support. Consequently, adolescents are likely to

serve as the primary role models for one another. In the boarding home situation, it is possible that such modeling occurs across gender and occurs in both males and females. Two, as residents exhibiting problem use were referred to treatment centers and did not participate in this study, the inhalant use group was really a minimal-using or experimental-use group. Perhaps in such a group, gender differences should not be expected.

Likewise, no significant gender differences were found in inhalant use patterns; males and females in this sample reported quantitatively similar patterns of use. However, an examination of the qualitative data reflected one interesting difference. More males reported using paint or gasoline; although females reported some use of paint, more of the females reported use of fingernail polish and correction fluid. Overall, the present findings are most important in pinpointing both male and female drug inhalant involvement for a sample of American Indian youth residing in a boarding home.

The hypotheses predicting gender differences in cognitive capacity, cognitive egocentrism, and decision-making were not supported. The prediction of gender differences was based on studies using multiethnic samples (Elkind & Bowen, 1979; Green et al., 1992; Jones & Green, 1991). It is possible that such gender differences are not present in American Indian groups. As some documented gender differences are thought to have their etiology in socialization (see Maccoby & Jacklin, 1974 for a general discussion), it is not surprising that such findings are not replicable using samples of single ethnic groups that may experience different socialization. Also, the lack of significant findings in the present study could be explained by the shared demographic characteristics of the subjects and/or the similarity of their daily lives and educational experiences. If males and females from any cultural group share similar backgrounds and present environments, it is likely that their cognitive capacity, cognitive egocentrism, and decision-making capacity would be very similar.

No literature exists defining gender differences in participation in tribal activities. Yet, it would appear that American Indian adolescents, both males and females, are often limited in their opportunity to develop identification with either their American Indian culture or the non-Indian culture. Certainly, research is needed on gender differences related to cultural identification, especially within the context of a view that lack of cultural identification leads to problem behaviors.

One focus of this study was to assess differences between user and nonuser groups. The hypotheses predicting differences in cognitive capacity, cognitive egocentrism, and decision-making were not supported. There are at least two possible explanations for the lack of significant findings. First, subjects had difficulty responding to the cognitive measures and decision-making measures; they frequently verbalized problems in understanding the instructions for the decision-making measures. Recall also the measures had to be read to approximately 70% of the subjects. This difficulty was reflected in the overall low scores on the decision-making

measures as compared to those found in the Lewis (1981) sample (middle class adolescents living with parents) and the overall low scores on the cognitive measures as compared to those found in the Jones and Green (1991) study. The comparatively lower scores for subjects in the present study may have partially resulted from the testing situation: they were tested in the early evening following a full school day. Many expressed fatigue and appeared distracted at times. It is possible that this lower level of performance was a more important factor than their inhalant use differences. In a sample of Job Corps youth, Frank, Green, and McNeil (1993) found cognitive ability to be a significant predictor of problem solving behavior, while substance use was not found to be a significant predictor; this group also performed more poorly on cognitive measures as compared to a more advantaged group. Second, it is important to remember that this sample did not include chronic users. Therefore, the lack of significant findings might be due to the comparison of nonusers and minimal- or experimental-users.

A significant difference between the two user groups was found for only one of the two measures of adherence to traditional ways. Participation in tribal activities was significantly greater for the nonusers than for the users. The fact that significance was found for this variable and not for the second, speaking the tribal language, may be related to the small sample size, coupled with the fact that only 37% spoke their tribal language, while 59% indicated they regularly participated in traditional activities. Nevertheless, this significant finding is consistent with the views of Oetting and Beauvais (1989) discussed earlier. It is likely that participation in tribal activities is indicative of a positive cultural identification which in turn is related to positive behavioral outcomes and peer identification with noninhalant-users.

The central focus of this study was to assess the efficacy of using specific variables in predicting inhalant use/non-use. In predicting this outcome variable, the picture was clearly different for males and females. Although, because of small sample size, the regression analyses findings for the females should be considered preliminary, the difficulty of obtaining data on large numbers of subjects in the boarding home environment would make these data of interest to the research and practitioner communities. However, it is clear that females do differ from males in the significant predictors of inhalant use/non-use.

In predicting inhalant use for females, only one variable, involvement in traditional activities, was significant. The amount of variance accounted for was 50%. For males three variables, involvement in traditional activities, the PFQ scale Rules/Impulsivity and the cognitive variable, Proverbs, predicted inhalant use/non-use. The total variance accounted for was 34%.

The finding of Rules/Impulsivity as a predictor for the male group only is consistent with the gender differences finding from Green et al. (1992), that males were more likely to ascribe to breaking the rules/demonstrating

greater impulsivity than were females. Thus, the level of impulsivity/inclination to break the rules in males may be of importance to understanding inhalant use/non-use.

The finding that a cognitive variable was a significant predictor of risk-taking behavior is consistent with one previous study. In Johnson & Green (1993) performance on the puns task predicted risk taking, operationally defined by factorially combining several variables measuring sexual activity (risk of pregnancy) and contraceptive use patterns (correction for the risk). In the present study, risk-taking was operationally defined by a single dichotomous variable measuring having taken the risk. Future research should measure both types of variables in operationalizing inhalant-use risk taking. It is unclear why the finding occurred for males only. Perhaps the smaller sample size for females was a factor; perhaps a measure with greater variability including correction for the risk would yield significance for the female sample.

The finding for both male and female samples, that involvement in traditional activities is a significant predictor of inhalant use/non-use, is the most intriguing finding in the present study. The literature documents that, in families of Caucasian alcoholic parents, failure to maintain family rituals has been associated with the development of alcohol problems in children (Wolin, Bennett, Noonan, & Feitelbaum, 1980). This finding is consistent with the significant difference found between the user groups in participation in tribal activities and, as with that finding, is consistent with Oetting and Beauvais' (1989) view on the importance of positive cultural identification to substance use. That so much variance is accounted for, especially in the female sample, is a powerful finding.

In summary, results of the present study provide information on use of inhalants in this specific population and suggest possible factors that are important in risk-taking related to inhalant use/abuse. While only minimal- or experimental-users, not abusers, were studied, results indicated that inhalant use is likely occurring among some American Indian youth and supports previous literature that such use likely occurs at an early age.

For males only, results in the current study supported the assumption that cognitive capacity and cognitive egocentrism may be important in the prediction of inhalant use. Future research, however, should explore further the influence of these types of variables in predicting risk-taking related to inhalant abuse. Given the amount of variance accounted for in these prediction equations and the lack of significant findings for females, other possible etiological variables must be explored as well as other measures of these factors.

For purposes of preliminary exploration of other etiological variables, subjects were asked to respond qualitatively to queries about reasons why they had used inhalants. An examination of these data revealed two possible etiological factors. Peer encouragement to use was most often mentioned. Family problems were also mentioned frequently by the subjects. In addition

to cognitive ability and cognitive egocentrism variables, future studies should examine the influence of these variables upon inhalant use.

Probably one of the most interesting findings of the current study was that for both males and females, results supported the assumption that adherence to traditionalism is an important factor in the prediction of inhalant non-use. The decision to adhere to a traditional way of life is an integral part of adolescent development; likely, this choice is intertwined with decisions regarding the modeling of both adult and peer behaviors. It is essential that future research explore this process further for American Indian adolescents, especially as it relates to decisions to abuse substances.

Colorado State University
Tri-Ethnic Center for Prevention Research
Department of Psychology
C-138 Clark Building
Fort Collins, CO 80523-1879

References

- Ackerman, L. A. (1971). Marital instability and juvenile delinquency among the Nez Percés. *American Anthropologist*, 73(3), 595-603.
- Beauvais, F. (Ed.). (1992). Indian adolescent drug and alcohol use: Recent patterns and consequences [Special Issue]. *American Indian and Alaska Native Mental Health Research*, 5(1), V-78.
- Beauvais, F., & LaBoueff, S. (1985). Drug and alcohol abuse intervention in American Indian communities. *International Journal of the Addictions*, 20(1), 139-171.
- Beauvais, F., Oetting, E. R., & Edwards, R. W. (1985). Trends in drug use of Indian adolescents living on reservations: 1975-1983. *The American Journal of Drug and Alcohol Abuse*, 11(3-4), 209-230.
- Beauvais, F., Oetting, E., Wolf, W., & Edwards, R. (1989). American Indian youth and drugs: 1975-1987 - A continuing problem. *American Journal of Public Health*, 79(5), 634-636.
- Beyth-Marom, R., Fischhoff, B., Jacobs, M., & Furby, L. (1989). *Teaching decision making to adolescents: A critical review*. Washington, DC: Carnegie Corporation.
- Cockerham, W. C. (1975). Drinking attitudes and practices among Wind River reservation Indian youth. *Journal of Studies on Alcohol*, 36, 321-326.
- Cohen, S. (1973). The volatile solvents. *Public Health Review*, 2, 185-214.
- Dozier, E. P. (1966). Problem drinking among American Indians. *Quarterly Journal of Studies on Alcohol*, 27, 72-87.

- Dyer, M. (1982, May). *Recommendations to the Department of Mental Health*. Paper presented to the Oklahoma Department of Mental Health, Oklahoma City, Oklahoma.
- Dyer, M. (1984). Inhalant abusers: A neglected aspect in substance abuse treatment. *Grassroots, 1*, 1-2.
- Edwards, R. W., & Oetting, E. R. (1995). Inhalant use in the United States. In N. Kozel, Z. Sloboda, & M. DeLaRosa (Eds.), *Epidemiology of inhalant abuse: An international perspective*, (NIDA Research Monograph No. 148). Rockville, MD: National Institute on Drug Abuse.
- Elkind, D. (1967). Egocentrism in adolescence. *Child Development, 38*, 1025-1034.
- Elkind, D. (1985). Egocentrism redux. *Developmental Review, 5*, 218-226.
- Elkind, D., & Bowen, R. (1979). Imaginary audience behavior in childhood and adolescence. *Developmental Psychology, 15*, 38-44.
- Frank, A., Green, V., & McNeill, D.W. (1993). Adolescent substance users: Problem solving abilities. *Journal of Substance Abuse, 5*, 85-92.
- Green, V., Morton, K., Starr, B., Jones, F., & Jaynes, W. (1992). The personal fable in adolescence: The development of an instrument. Unpublished manuscript, Oklahoma State University, Stillwater.
- Hoffman, L., Paris, S., & Hall, E. (1994). *Developmental psychology today* (6th ed.). New York: McGraw-Hill.
- Horan, J. J. (1979). *Counseling for effective decision making: A cognitive behavioral perspective*. North Scituate, MA: Duxbury.
- Indian Health Service Task Force on Alcoholism (1970). *A high priority problem*. Washington, DC: Department of Health, Education, & Welfare.
- Irwin, C. E., & Millstein, S. G. (1991). Risk taking behaviors during adolescence. In R. M. Lerner, A. C. Peterson, & J. Brooks-Gunn (Eds.), *Encyclopedia of adolescence*. New York: Garland Publications.
- Jessor, R., & Jessor, S. (1975). Adolescent development and the onset of drinking: A longitudinal study. *Journal of Studies on Alcohol, 36*, 27-51.
- Johnson, S. A., & Green, V. (1993). Female adolescent contraceptive decision making and risk taking. *Adolescence, 28*, 81-96.
- Johnston, L., O'Malley, P., & Bachman, J. (1985). Use of licit and illicit drugs by America's high school students 1975-1984. Rockville, MD: National Institute on Drug Abuse.
- Jones, F. A., & Green, V. (1991). The Oklahoma Pun Test—Examining measures of cognitive development in adolescence. Unpublished manuscript.

- Keating, D. P. (1980). Thinking processes in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 211-246). New York: Wiley.
- Korman, M., Trimboli, F., & Semler, I. (1980). A comparative evaluation of 162 inhalant users. *Addictive Behaviors, 5*, 143-152.
- Levitt, M. Z., Selman, R. L., & Richmond, J. B. (1991). The psychosocial foundations of early adolescents' high risk behavior: Implications for research and practice. *Journal of Research on Adolescence, 1*, 349-378.
- Lewis, C. (1981). How adolescents approach decisions: Changes over grades seven to twelve and policy implications. *Child Development, 52*, 538-544.
- Linn, M., & Pulos, S. (1983). Male-female differences in predicting displaced volume: Strategy usage, aptitude relationships, and experience influences. *Journal of Educational Psychology, 17*, 86-96.
- Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences*. Stanford, CA: Stanford University Press.
- Mail, P. D., & McDonald, D. R. (1980). *Tulapai to Tokay: A bibliography of alcohol use and abuse among Native Americans of North America*. New Haven: HRAF Press.
- Oetting, E. R., & Beauvais, F. (1986). Peer cluster theory: Drugs and the adolescent. *Journal of Counseling and Development, 65*(1), 17-29.
- Oetting, E. R., & Beauvais, F. (1989). Orthogonal cultural identification theory: The cultural identification of minority adolescents. *The International Journal of the Addictions, 25*(5A-6A), 655-685.
- Oetting, E. R., Beauvais, F., Edwards, R., Velarde, J., & Goldstein, G. (1982). *Drug use among Native American youth: Summary of findings (1975-1981)*. Ft. Collins, CO: Rocky Mountain Behavioral Sciences Institute.
- Oetting, E. R., Edwards, R., & Beauvais, F. (1988). Social and psychological factors underlying inhalant use. In R. A. Crider & B. A. Rouse (Eds.), *Epidemiology of inhalant use - An update* (Research monograph #85). Rockville, MD: National Institute on Drug Abuse.
- Oetting, E. R., & Goldstein, G. (1979). Drug use among Native American adolescents. In G. Beschner & A. Friedman (Eds.), *Youth drug abuse: Problems, issues, and treatment*. Lexington, MA: Lexington Books.
- Peel, E. A. (1971). *The nature of adolescent judgment*. New York: Wiley.
- Penning, M. E., & Barnes, G. E. (1982). Adolescent marijuana use: A review. *The International Journal of the Addictions, 17*, 749-791.
- Segal, J. (Ed.). (1975). *Research in the service of mental health: Report of the Research Task Force of the National Institute of Mental Health*. Rockville, MD: National Institute of Mental Health.

- Terman, L. M., & Merrill, M. A. (1973). *Stanford Binet Intelligence Scale: Manual for the third revision, form L-M*. Boston: Houghton Mifflin.
- Weibel-Orlando, J. (1984). Substance abuse among American Indian youth: A continuing crisis. *Journal of Drug Issues*, (Spring), 313-335.
- Wolin, S. J., Bennett, L. A., Noonan, D. L., & Feitelbaum, M. S. (1980). Disrupted family rituals: A factor in the intergenerational transmission of alcoholism. *Journal of Studies on Alcoholism*, 41(3), 199-214.

Author Note

This article is based on a doctoral dissertation submitted by the first author to Oklahoma State University.

The authors wish to acknowledge the helpful comments of three anonymous reviewers.

Reprint requests should be sent to the first author, Tri-Ethnic Center for Prevention Research, Department of Psychology, C-138A Clark Building, Colorado State University, Fort Collins, CO 80523-1879.

The second author is presently at Northern Arizona University.

Notes

1. The agreement negotiated with the school prohibits publication of the name of the school and American Indian tribal affiliations. However, where appropriate, the authors will assist researchers in obtaining permission from the school for release of such data.
2. The difficulty of finding tests that have been used with American Indian (AI) samples is an acknowledged problem. The cognitive and cognitive egocentrism measures have previously been used with multiethnic samples, including AI subjects, e.g., the Jones and Green (1991) and Frank, Green, and McNeil (1993) samples. The second author has a manuscript in preparation using multiethnic subjects, including AIs, and is presently involved in data collection with an AI college sample using three of the measures used in the present study: the Puns task and the cognitive egocentrism measures. Results and preliminary analyses reflect the continuing usefulness of these measures in examining decision making.
3. When subjects are divided into male and female groups, for the female group, the regression equations to predict "use" violate the rule of thumb requiring 4-5 times the number of subjects as predictor variables. However, reducing the number of predictor variables by two (omitting two of the three decision making variables) allows for greater than 3 times the number of subjects as predictor variables. Results of these three separate regression analyses (each using only one of the decision making variables) do not differ from results using all of the decision making variables in a single regression equation.