

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UMI[®]

DISSERTATION

**INHALANT ABUSE: SOCIAL CHARACTERISTICS
AND THEIR LINK TO EFFECTIVE PREVENTION**

Submitted by

Barbara Ann Plested

School of Education and Human Resource Studies

In partial fulfillment of the requirements

For the Degree of Doctorate of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2002

UMI Number: 3053441

UMI[®]

UMI Microform 3053441

Copyright 2002 by ProQuest Information and Learning Company.

All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

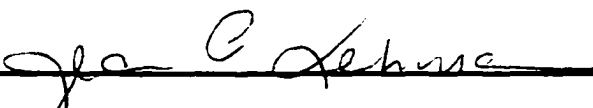
ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

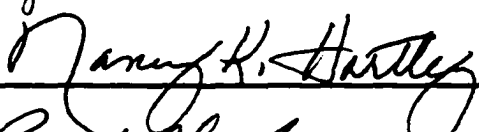
COLORADO STATE UNIVERSITY

March 20, 2002

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED
UNDER OUR SUPERVISION BY BARBARA ANN PLESTED ENTITLED
INHALANT ABUSE: SOCIAL CHARACTERISTICS AND THEIR LINK TO
EFFECTIVE PREVENTION BE ACCEPTED AS FULFILLING IN PART
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

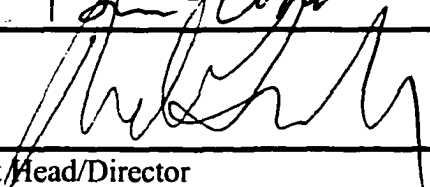
Committee on Graduate Work









Advisor


Department Head/Director

ABSTRACT OF DISSERTATION
INHALANT ABUSE: SOCIAL CHARACTERISTICS
AND THEIR LINK TO EFFECTIVE PREVENTION

The use of illicit drugs accounts for many preventable health conditions and other social problems. Unfortunately, substance use by youth is on the rise and initiation of use is occurring at younger ages. Of the substances used and very accessible to youth are inhalants. They are dangerous substances, yet, the problem of inhalant abuse is one that has not received much attention in research or media. Inhalant users are at risk for a variety of complex problems. However, little information has been established to build effective models of inhalant prevention and intervention. It has been noted that with other drugs, such as heroin and cocaine, specific strategies unique to that drug were developed to better treat the drug use. Studies are also strong in their support of the notion that the etiology of abuse varies greatly across individuals and ethnic groups. It seems logical that prevention strategies must also be specific in order to effectively address the factors that are unique and specific to inhalants as well as to examine prevention factors that may be important for gender and ethnicity.

The present study utilized archival data that were taken from a national sample of 7th through 9th graders. The study explored the factors important for effective development of inhalant abuse prevention programs by gender and across three ethnic groups, White non-Hispanic, American Indian, and Mexican American. A discriminant

function analysis was used to examine the differences between users and non-users in the three ethnic groups by gender. The predictor variables used were family, school, and peer factors.

The results indicated that females use inhalants at a higher rate than males and that American Indian females demonstrated the highest use rate. Mexican American and American Indian males and females reported higher use than White non-Hispanics. The analysis of the predictor variables on use and non-use found that, overall, the highest correlation was peer factors followed by school factors and family factors. The results were significant suggesting that both gender and ethnicity should be considered in the development of inhalant prevention strategies. Implications for prevention are discussed.

Barbara Ann Plested
School of Education
Colorado State University
Fort Collins, CO 80523
Spring 2002

ACKNOWLEDGEMENTS

There are many people who have given me encouragement and support over the course of my graduate work and in the preparation of this dissertation. I am deeply thankful to them all.

I am grateful to my committee members, Dr. Randy Swaim, Dr. Jean Lehmann, Dr. Nancy Hartley and my committee chair, Dr. Brian Cobb for working with me to design and complete a program tailored to my interests and goals. I appreciate their time, ideas, encouragement and patience.

To my co-workers and friends, Dr. Ruth Edwards and Dr. Julie Chen. They have been unbelievably supportive and helpful to me in finishing this study. They are magnificent women and I am truly appreciative of them. I am thankful to the staff at the Tri-Ethnic Center for Prevention Research for their patience and support in having to hear about this dissertation for the past seven years.

I am also thankful to my friends, Gary Thurman, Renee Trapp, Pat Novak and Heather Helm for their friendship, their ability to keep me laughing and their support in completing this dissertation.

To my entire family, especially my brother, Brian Plested, my cousins Jacki Shumski and Margaret and Vic DeCarlo, my uncle, John Shumski, my aunt, Justine Tom and my aunt and uncle, Bert and Lorraine Tarasi, for sharing their love and encouragement throughout my life. I love them all dearly.

Last, but most certainly not least, I want to thank Dr. Pamela Jumper Thurman who for the past thirteen years has given me unending support, love, encouragement and help not only in completing this dissertation but in all things. My life is so much richer because of her presence.

Barbara Ann Plested
School of Education
Colorado State University
Fort Collins, CO 80523
Spring 2002

DEDICATION

This dissertation is dedicated to the memory of my mother, Antoinette (Dolly) Plested, and my father, Warren Plested, who taught me the value of family, friends, laughter, hard work and education. The love and encouragement they gave me throughout their lives instilled in me the confidence that I could accomplish my goals.

**Barbara Ann Plested
School of Education
Colorado State University
Fort Collins, CO 80523
Spring 2002**

TABLE OF CONTENTS

Signature Page	ii
Abstract	iii
Acknowledgments	v
Dedication	vii
List of Tables	x
List of Figures	xi
 CHAPTER I: INTRODUCTION	 1
The Problem	1
Adolescents and Substance Use	3
Inhalant Abuse	5
Dangers and Risks Associated to Inhalant Use	8
Social Characteristics and Their Importance in Inhalant Research	10
Research Questions	14
Delimitations	14
Limitations	14
Significance Section	15
 CHAPTER II: LITERATURE REVIEW	 17
Introduction to the Problem	17
Substance Use and Adolescents	18
Substance Use and Gender	22
Substance Abuse and Ethnicity	24
Inhalants	25
Inhalant Trends in Age, Grade, and Gender	26
Age and Grade	27
Gender	27
Inhalant Use and Family Factors	28
Inhalant Use and School Factors	30
Inhalant Use and Peers	31
Inhalant Use and Psychosocial Factors	32
Inhalant Abuse and Ethnicity	33
Inhalant Use by American Indian Youth	34
Inhalant Use by Mexican American Youth	35
Inhalant Use Prevention and Ethnicity	36
The Evolution of Prevention Programming	36
Summary	40

CHAPTER III: METHODOLOGY	41
Secondary Data Analyses.....	41
Subjects	42
The Instrument	43
The Scales	44
Inhalant Scales.....	44
Family Scales.....	46
School Scales.....	46
Peer Inhalant Association Scales.....	47
Reliability and Validity of Risk and Protective Factor Measures	47
Procedure for Data Collection.....	48
Analyses.....	48
CHAPTER IV: RESULTS.....	50
Sample.....	50
Analyses Used for Research Question One	53
Analyses Used for Research Question Two.....	57
CHAPTER V: DISCUSSION.....	67
Introduction.....	67
Research Question One.....	67
Research Question Two	70
Family Factors	73
School Factors	76
Peer Factors	76
General Implications for Prevention.....	78
Types of Prevention.....	78
General Prevention Implications for Peer Factors.....	80
General Prevention Implications for School Factors.....	80
General Prevention Implications for Family Factors.....	81
Inhalant Prevention Implications by Gender and Ethnicity	82
Implications for Gender.....	82
Implications for Ethnicity.....	84
Limitations of This Study	85
Implications for Research	86
Recommendations for Future Research	87
REFERENCES	89
APPENDIX	
American Drug and Alcohol Survey Questions.....	101

LIST OF TABLES

Table

1. Lifetime Prevalence of Inhalant Use among U.S. Students.....	28
2. Inhalant Use by Gender and Grade.....	29
3. Inhalant Coding	45
4. Inhalant Questions	45
5. Number of Subjects by Gender and Ethnicity	51
6. Use and Non-use Sample Used for Analyses	52
7. Means and Standard Deviation on Inhalant Involvement Scores by Gender and Ethnicity	54
8. ANOVA by Inhalant Use, Gender and Ethnicity	55
9. Planned Contrasts	56
10. Correlation of Independent Variables.....	58
11. Group Means and Standard Deviations of Scale Scores by Gender and Ethnicity	59
12. Correlation Coefficients	64
13. Wilk's Lambda	65

LIST OF FIGURES

Figure

1. Number of Subjects by Gender and Ethnicity	52
2. Non-user Sample for Analyses	53
3. Inhalant User Sample for Analyses	53
4. Means on the Inhalant Involvement Scale by Gender and Ethnicity.....	54
5. Mean Scores for Family Cares About How You Do In School	60
6. Mean Scores for Family Involvement in School	60
7. Mean Scores for School Success	61
8. Mean Scores for School Liking.....	61
9. Mean Scores for Family Care.....	62
10. Mean Scores for Peers.....	62
11. Correlation Coefficients for Males by Ethnicity	64
12. Correlation Coefficients for Females by Ethnicity.....	65

CHAPTER I: INTRODUCTION

The Problem

Substance abuse in the United States has been well established in the literature as a matter of great concern (Bratter & Forrest, 1985; Fonseca et al., 1995; Helzer, 1987; Lazebnik, Grey, & Ferguson, 2001). In fact, the use of alcohol, tobacco, and other illicit drugs accounts for many preventable health conditions and other social problems that are all too common in the United States (Lopez-Torrecillas, Godoy Garcia, Garcia, Izquierdo, & Sanchez-Barrera, 2000). Alcoholism alone has been cited as having affected the lives of approximately 14 million people in the U.S. -- alcohol abusers and their families--an estimated 98 million Americans. Although a dollar figure can not really reflect a true picture of the social and human devastation caused by substance abuse, it *is* estimated that the economic and health care costs to society from substance use have approached \$100 billion annually. (Rice, 1993).

Many of the most frequently cited research studies examine three primary topics in their discussions of factors that relate to substance abuse: the physiological, the sociological, and the psychological (Lawson & Lawson, 1989). First are the physiological studies, which suggest that there may be a genetic factor for some forms of substance abuse (Cotton, 1979; Segal, 1997). Second is the body of sociological research which examines the extent of the influence of family and peers and the roles they play in

the abuse of alcohol and other drugs (Cahalan, 1970; Glynn, 1981; Oetting & Beauvais, 1987b). Finally there are the psychological factors, or individual traits and behaviors, which are believed to play a strong role in alcohol abuse (Lawson, Peterson, & Lawson, 1983) as well as in the chronic abuse of other drugs such as cocaine, barbiturates, and heroin (Craig, 1982; Spotts & Shontz, 1982).

Each of these factors presents a strong case for consideration in the study of substance use. Yet, in reality, what these studies confirm is that there are multiple pathways leading to substance abuse (Bry, McKeon, & Pandina, 1982; Maddahian, Newcomb, & Bentler, 1988; Newcomb, Maddahian, & Bentler, 1986; Weinberg, Rahdert, Colliver & Glantz, 1998). There has even been speculation that early childhood traits such as the "difficult child syndrome", fetal alcohol syndrome or fetal alcohol effects and hyperactivity may be associated with substance abuse later in life, though these theories do not have a strong written research base as yet (May & Del Vecchio, 1997). Still other research delves into the psychosocial factors such as family dysfunction, parental modeling of use, and use by peers as identified risk factors for the development of substance use (Swaim, Oetting, Edwards, & Beauvais, 1989; Weinberg et al., 1998). The combined and additive nature of these risk factors may be responsible for the development and emergence of adolescent substance abuse (Swaim, 1991). Considering the depth and breadth of all of this knowledge, it is highly likely that the interaction of these risk factors -- stemming from the genetic, the psychological, and the sociological -- carry considerable weight in explaining the variations in substance use. However, this knowledge base also expands our awareness of the variations in the patterns of protective

factors that could be used to prevent the initiation of use or the development of abusive patterns of substance use.

These studies are clear in their support of the notion that the etiology of abuse varies greatly across individuals and groups. Therefore, it is imperative that both prevention and treatment strategies be specific to more effectively address those factors that are unique to specific youth or groups of people.

Over the past few decades, the treatment field has reached greater levels of sophistication. It is accepted that there are distinct differences in the treatment methods and models that are used effectively to address abuse of and dependence on various chemicals. For example, people with cocaine addiction appear to have lower relapse potential if they complete a program with specific implications for cocaine treatment (Rodriguez, 1989). Heroin addiction represents yet another treatment modality with unique considerations, particularly when one considers the use of methadone maintenance (Dole & Nyswander, 1965) or the newer drug, buprenorphine (Levin, 1999).

Treatment has made great strides in recognizing and accommodating such differences. Prevention, however, has not yet reached the same level of sophistication as treatment. Prevention models have been aimed broadly, targeting both genders as well as all groups of people with the same prevention messages. Perhaps this is one reason that prevention for substance use has not been as effective as most would like.

Adolescents and Substance Use

Adolescents have been the focus of many studies over the last fifty years and numerous studies that have focused primarily on the problem behaviors associated with adolescents. Generally, there is a specific focus such as delinquency, substance use,

suicide, teen pregnancy, mental illness, or a variety of other problems from general development to the influence of media and entertainment. Still, relatively little is known about the distribution of problems in the adolescent populations, their temporal ordering or developmental progression into multiproblem patterns, and even whether these problems are causally related to one another, or have independent causal factors (Bachman, 1989). Nonetheless, it is necessary to make a concerted effort to understand some of the profiles of at risk youth and to examine the strengths and resiliency factors that will provide them with the opportunity for a healthy and successful life. Substance use is one of the barriers to a healthy life for any adolescent.

Sadly, substance use by young people or adolescents is very much on the rise, and initiation of use is occurring at ever-younger ages (Winters, 1999). Winters reports that the patterns of substance use over the past 20 years have been well documented by two surveys--the National Household Survey on Drug Abuse conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA) and the Monitoring the Future Study conducted by the National Institute on Drug Abuse (NIDA). Those data, released in 1996, indicated that "in the early to mid-1990s, the percentage of 8th graders who reported using illicit drugs (i.e., drugs illegal for Americans of all ages) in the past year almost doubled, from 11.3 percent in 1991 to 21.4 percent in 1995." Further, drug use by high school students has also risen steadily since 1992 and the survey indicates that 33 percent of 10th graders and 39 percent of 12th graders reported the use of an illicit drug within the preceding 12 months. Winters (1999) speculates that these estimates may very likely be much lower than what is cited because the statistics that are gathered in

schools do not include the high-risk groups of students who are dropouts or who are frequently absent.

Of the substances generally used and very accessible to younger adolescents are the volatile solvents. These are very dangerous substances, and yet, the problem of inhalant abuse is not one that has received much attention in either the research or media. Some television talk shows have showcased the topic only when there have been tragedies in various communities. Beauvais (1992b) reports that most treatment providers and practitioners are perplexed by the problem of inhalants, suggesting that there is a need to delve further into inhalants and how their use can be prevented by youth today.

Inhalant Abuse

It should be noted that the terms “solvent abuse” and “inhalant abuse” are often used interchangeably in the literature. The term inhalant abuse will be used in this study, except for citations that specifically use the term solvent abuse. Inhalant abuse is the act of inhaling any volatile substance for the purpose of achieving an altered or euphoric state. Volatile substances or inhalants are typically household and commercial products such as gasoline, spray paint, hair spray, model cement, fingernail polish remover and paint thinners, just to name a few. These substances contain the chemicals toluene, acetone and/or benzene, all of which are capable of causing an altered state or “high”. The most common method used to inhale is to place the substance in a bag or on a rag and inhale through both the nose and the mouth. Recent reports also indicate that there are some who fill a garbage bag with the fumes and place the bag over the entire top half of their body to inhale the fumes.

The treatment and prevention of inhalant abuse and dependence has presented a particularly difficult challenge for service providers, especially given the general lack of direction for effective prevention and treatment strategies. While prevention may lack the gender and ethnic specific focus previously mentioned, inhalant abuse prevention presents even more of a challenge due to the lack of knowledge and studies conducted on inhalants. There are other considerations as well; some parents and teachers believe that educating youth about dangers of inhalant use will only make youth more aware of those substances that are so easily available (Beauvais, 1992b). Yet, effective prevention is essential given the potentially fatal consequences of inhalant use, even at the first experimental use.

Inhalant abuse prevention and treatment presents other challenges as well. Inhalants are very accessible -- most substances can be found on any household shelf and having them in one's possession is not illegal. Inhalants are not categorized as a drug and therefore few states have policies in place related to inhalant use. In addition to the lack of clear policy, there are also psychological and health challenges. Inhalant abusing youth also bring with them a multitude of other problems - academic, legal, social, cultural, gender, and family issues. They have been recognized as among the most difficult people to treat (Jumper-Thurman & Beauvais, 1992; Oetting & Webb, 1992) and are highly prone to relapse according to anecdotal reports from treatment providers. Yet, with the challenges faced in working with this population, little practical direction has been available to meet the specific needs of inhalant abusers or to prevent the initial use of inhalants.

Research has established that youth who abuse inhalants are more deviant in their use of other drugs than are primarily alcohol or marijuana using youth (Beauvais, 1992a). Beauvais presents strong evidence that these youth are more likely to exhibit multiple problem behaviors. Inhalant users are also identified as more likely to have emotional problems. Though there has been ample evidence presented that inhalant use is believed to lead to emotional problems, given the level of disordered lives of inhalant users and their families, it is likely that the emotional and family problems may very well predate inhalant use. It has also been recognized that children who are not doing well in school (poor grades, having discipline problems, or dropping out of school) are more likely to use inhalants. Friends of inhalant users are also likely to have social, school, and other adjustment problems *and* are likely to be inhalant users. Oetting and Webb (1992) suggest that culture and ethnicity can be important factors in inhalant use as well. They argue that influences such as culture, urbanity or rurality, local community norms, and even fads can influence ethnic group participation in inhalant use. Further, they say, though there is variance in use among different ethnic groups, even the variance *within* the ethnic groups can be very high from one community to the next.

Overall, inhalant users appear to be at risk for a variety of complex problems, even previous to their inhalant use. Little information has been established to build effective models of prevention and intervention, and researchers have recognized serious gaps in the literature related to various behavioral issues, particularly among the behavioral subtypes of solvent users (May & Del Vecchio, 1997). These gaps leave the field lacking for good prevention and treatment strategies that effectively address the dangerous use of inhalants.

Dangers and Risks Associated to Inhalant Use

Recognizing that there is always a percentage of youth who continue to experiment with inhalants despite the risk, what remains very troubling is the risk of serious injury or fatality, even on first use. The dangers range from serious health consequences to death, and the grave lack of information on how to prevent and treat inhalant use may contribute to continued injuries and/or deaths. The fact that youth use inhalants in spite of the risks is alarming.

Practitioners initially reported that children who used inhalants regularly were also suffering from irreversible brain damage. However, these reports were often difficult to corroborate and were anecdotal in nature. There were frequent stories about children who had used inhalants and as a result could not focus on tasks, were learning disabled, physically disabled, or had memory loss (Dyer, 1984). However, these were youth who were often placed in a primary alcohol treatment facility - the only option available at that time - and most of the placements were limited to thirty days with no inhalant specific treatment (Jumper-Thurman, personal communication, 1999). It has since been learned that inhalant abuse treatment, like heroin, cocaine, and other drug abuse treatment, must be specific and address all of the concomitant problems associated with the damage related to solvents (Bates, Plemons, Jumper-Thurman, & Beauvais, 1997; Beauvais, 1997; Jumper-Thurman & Beauvais, 1992). Further, chronic inhalant abusers are generally people who have numerous other problems as well, making it difficult to determine which kinds of damage are associated with physiological problems prior to treatment and which may be a result of neurological problems that were present prior to inhalant use. This makes treatment difficult.

Certainly, there is no question that inhalants can cause both physical and emotional damage. There has been considerable evidence from animal studies and from occupational exposure studies that documents serious damage and death from either extremely high one-time exposure or from chronic exposure at lower levels. Studies on the toxicity of inhalants have been presented by Rosenberg and Sharp (1992) and much of what follows is based on their studies.

There have been a number of reports of death related to the toxic effects of inhalants (Garriott, 1992). However, accurate reports are difficult to obtain because of problems in determining the extent of inhalant exposure and isolating it from exposure to other substances. Further, because there is no current consistent testing for the presence of inhalants in accident/injury incidents, many inhalant associated deaths or injuries may be attributed to other causes (Garriott, 1992). Though the actual total number of deaths from acute exposure is probably fairly low, any loss is still tragic and unnecessary. Other irreversible clinical effects can occur from secondary effects such as metabolic acidosis, but sudden death usually occurs as a result of cardiac arrhythmia (Rosenberg & Sharp, 1992). This arrhythmia may be due to sensitization of the heart to adrenaline. These deaths have occurred most often from use of fluorocarbons, although deaths associated with these chemicals have declined after use of fluorocarbons as propellants in spray cans was discontinued (Rosenberg & Sharp, 1992). Cases have also been reported of death from arrhythmia from use of typewriter correction fluids and less often from toluene or gasoline (especially since gasoline is now unleaded). Death from anoxia has been reported from use of nitrous oxide (Rosenberg & Sharp, 1992).

Inhalants can also lead to physiological damage just short of death (Rosenberg & Sharp, 1992). Because so many different chemicals are used, and because many abused substances include more than one volatile component, it is difficult to define a specific damage syndrome (Rosenberg & Sharp, 1992). Inhalant use has, however, been linked to neurological damage and to damage to the liver, heart and blood (Rosenberg & Sharp, 1992). A reasonable conclusion is that inhalants are dangerous and damaging substances and that prevention of inhalant abuse is an important undertaking. The fact that death can occur among first time, or naive users, emphasizes the importance of initiating early and effective prevention.

Social Characteristics and Their Importance in Inhalant Research

The bulk of the inhalant research has been completed in the area of epidemiology (Beauvais, 1992b; Beauvais, 1997) though some studies have examined psychosocial characteristics in the broader sense of substance use (Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993). Likewise there have been a few articles on inhalant treatment (Beauvais, 1997; Jumper-Thurman & Beauvais, 1992), though few are based on quantitative data and most focus on questions that need to be answered. Scientific data-based studies on the etiology or correlates of inhalant abuse as compared to other user groups are also rare. More importantly, the identification of the antecedent risk factors and examination of the causative factors of inhalant use geared to gender and ethnicity are sparse but much needed in order to plan effective inhalant prevention and intervention programs. Identification of these issues and their potential contribution to the field give this particular study great potential.

There has been considerable research examining the possible causes of adolescent substance use/misuse in general. Many theories have been discussed in the literature, with peer cluster theory being recognized as fairly robust (Oetting & Beauvais, 1987a; Swaim, Oetting, Thurman, et al., 1993). This theory suggests that adolescent substance use is almost exclusively a function of peer activity. Close knit adolescent groups (peer clusters) form their own unique attitudes, norms, and sanctions about drug use. These factors then play a very critical role in the adolescent's decision to use or not use drugs. Although peers appear to have the most important proximal effect on drug use, other variables (family and school) also have a very strong effect on a youth's decision to use drugs though less research has been conducted in the area of family. Certainly the theory seems quite robust; however, peer cluster theory specifically has not yet been taken into the field of prevention and tested for its utility.

In 1979, Barnes reviewed what was known at that time about inhalant users, suggesting that these youth were more likely to use other drugs, to have dysfunctional families, to be poorly adjusted to school, and to associate with other drug users. In 1992, Oetting and Webb concurred with the above conclusion and noted that the studies conducted in recent years had not established any changes in those trends. In fact, the review of inhalant literature has not shown many changes at all related to creative ideas including family and school for prevention.

From the literature, inhalant users appear to be youth who are most at risk for a variety of problems, which is true even for experimental users. "High risk" youth are *not* the only ones using inhalants. When about one out of five eighth grade children have tried inhalants, there must be a considerable number of children who have not been

identified as having serious problems, but who are, nevertheless, experimenting with inhalants. Peers seem to exert a strong influence on the attitudes related to substance use, suggesting that prevention should be broad enough to reach larger number of peer clusters but specific to the population targeted. It is evident that inhalant use is a serious problem that needs additional research and a more effective application of prevention.

The studies presented in this review certainly emphasize the need to answer important questions about inhalant prevention. These questions are: What is an accurate profile of an inhalant user and how can that profile guide practitioners toward effective prevention of inhalant use? At what age is inhalant abuse prevention most effective? Since some ethnic groups seem to exhibit higher rates of inhalant use, might culturally specific interventions be more effective in reaching those youth at higher risk for inhalant use? Are there gender differences in inhalant use and if so, should prevention efforts be gender specific? If gender differences exist in inhalant use profiles, what factors would hold their greatest influence for effective prevention? What family factors would be important to incorporate into effective prevention? How might school factors figure into effective prevention strategies? What peer factors are most robust for inclusion in effective prevention?

In summary, there appears to be certain groups (age, grade, ethnicity) at higher risk for inhalant use. Effective prevention methods must be developed in order to reach these youth. Finally, prevention methods must also be built on established research findings, giving this study high potential for valuable insight into building a creative model or theory for effective inhalant prevention.

This study proposes to use secondary data analysis in order to investigate the relationship between ethnicity, gender, family factors, peer factors, school factors and inhalant use of 7th through 9th grade youth from three ethnic groups. The analyses will use the American Drug and Alcohol Survey (ADAS) and Prevention Planning Survey data from 1993-2000, focusing on males and females from three ethnic groups, American Indian, Mexican American and White non-Hispanic, and their inhalant use/non-use counterparts.

The data were gathered by the Rocky Mountain Behavioral Science Institute in Fort Collins, Colorado. The ADAS database is utilized at the Tri-Ethnic Center for Prevention Research at Colorado State University through a memorandum of understanding between RMBSI, Inc. and Colorado State University. The Tri-Ethnic Center offers these data to interested graduate students for research studies. This study will examine the level of inhalant use (user or non-user) as a dependent variable. The independent variables are: gender, ethnicity, family factors, school factors, and peer factors. It is anticipated that this study will expand the knowledge of the etiology of inhalant use related to gender and ethnicity and take that information into the field for building a model for successful prevention intervention. A conceptual framework with which to view adolescent inhalant use will be offered as well.

In order to examine the differences between inhalant users and non-users (level of use), a discriminant function analysis will be utilized that includes a variety of social characteristics suggested by the literature. These characteristics include ethnicity, gender, family factors, school factors, peer factors and inhalant use. The author is employed at

the Tri-Ethnic Center and works closely on the data collection and recruitment for projects focusing on drug use.

Research Questions

A discriminant function analysis will be performed to answer the following research questions:

1. Does the level of inhalant use vary by gender and ethnicity?
2. Does the level of inhalant use vary by family, school and peer inhalant association factors with respect to gender and ethnicity?

Delimitations

There are several delimitations of the database being used for this study. First, the data used for this study are only from schools that chose to utilize the American Drug and Alcohol survey, thus it is a sample of convenience. Second, there are entire states that are not represented in this sample. Also, some schools employ their own state surveys and others use different commercial surveys.

Limitations

There are limitations to this study and any study using voluntary survey data. Surveys are an efficient way to gather information; however, they do rely on volunteer respondents and self report data which may be a threat to the validity of the survey results due to the students feeling they should respond in a socially appropriate way. However, this limitation is diminished since the survey was completed anonymously by the youth. Another limitation of survey data is that participation is voluntary. Some students, perhaps those who are high risk for inhalant use, may not have taken the survey. Another

limitation is that the survey is given in a school setting with no attempt to include youth not in school, either because they have dropped out, or are absent.

Significance

This proposed study is important in that it intends to take current research findings further to determine the factors important for gender specific and ethnic specific prevention and intervention strategies. It will examine what differences exist between the males and females that may suggest specific intervention points. It also looks at the differences that may exist between ethnic groups that suggest elements with high potential for inclusion in an effective prevention model. Beauvais (1997, pg. 107) identified several research questions that should be addressed in order to further efforts in the prevention of solvent abuse. He asked, "Do males and females perceive the harm of solvents differently? What are the sociocultural conditions related to the patterns of solvent abuse? What are the psychosocial factors associated with solvent abuse among youth? And finally, What are the elements needed to develop an effective solvent abuse prevention curriculum?" Bates et al. (1997) also asked how might female profiles and use patterns differ from males? Are their peer dynamics different? Are changing cultural roles involved? They indicated the need for an in-depth risk factor study as well as longitudinal studies to examine these issues. This study will attempt to answer some of these questions.

Yet another reason that this study is important is that it responds to previous questions posed by researchers. Beauvais (1997) asked for an examination of inhalant use in a framework of ethnicity and gender related to social characteristics and level of risk for inhalant use. Considering all of the information that has been presented thus far

and the studies that will be discussed in the next chapter, it is believed that there is a strong call for cultural and gender specific prevention and interventions strategies. As presented previously in this chapter, it has been established and accepted by practitioners that treatment strategies must be individualized so that they more effectively address those risk factors that are unique to specific clients. It may be that the same is true for prevention.

A recent National Institute on Drug Abuse (NIDA) prevention initiative stated that it is imperative that gender status be treated as an explanatory variable and not just a descriptive one. In other words, there must be a theoretical basis that gives guidance to the intervention designed and that will allow for discussions of outcomes in a way that contributes to an in-depth scientific understanding of prevention theory that best meet the unique needs of females (National Institute on Drug Abuse, 2000). Finally to quote Dr. Alan Leshner, former director of the National Institute on Drug Abuse (NIDA) “accumulating evidence indicates that drug abuse may begin and progress differently, have different consequences and require different prevention and treatment approaches for males and females. Therefore, NIDA strongly supports research to identify gender differences and gender specific aspects of drug abuse and addiction and to apply these findings toward more effective drug abuse prevention (Leshner, 1998).

Finally, the research to date, combined with anecdotal reports from providers, ask for more culturally based approaches to prevention. Additional research is needed to determine if this is necessary and if so, what factors are needed to develop the type of models that might be more effective. Are there significant differences in gender and ethnicity that call for inhalant prevention strategies for specific groups?

CHAPTER II: LITERATURE REVIEW

Introduction to the Problem

Substance use and misuse is associated with a wide variety of severe health and social consequences. The intensity and variety of these problems are attributable to many things – the substance used, the pattern of use, genetic factors/predisposition and psychological and social factors (Bratter & Forrest, 1985; Fonseca et al., 1995; Helzer, 1987; Lazebnik et al., 2001). Likewise, ethnic and cultural health disparities in substance use have become a major focus in federal funding of both treatment and prevention (National Institute on Drug Abuse, 2000). Various ethnic groups are over represented in rates of those affected by substance use (National Institute on Drug Abuse, 2000). The continuing scientific efforts to examine the incidence, prevalence, etiology, and course of substance related problems among ethnic populations is of fundamental importance. In fact, research on the interaction of ethnicity, culture, and environment as they affect patterns and profiles of use may provide valuable information about the prevention of substance use. Certainly, there is a critical need to identify and evaluate the efficacy of interventions to substance use among genders and within the various ethnic groups. There is a need to examine the theories that identify robust factors that may be valuable to prevention. It is important to identify and use the strengths of the populations that would

build effective prevention. Finally, research is needed to identify the social and cultural factors that may influence prevention as well as the factors that may interact with gender.

In order to gather the most comprehensive and recent data for this study, various techniques and numerous libraries were used. The primary key words used in the searches were: inhalant/solvent abuse, substance abuse, substance abuse prevention, inhalant/solvent use prevention, adolescent substance abuse, adolescent inhalant/solvent use, school adjustment, family caring, peer sanctions, ethnicity and substance use, gender and substance use, ethnicity and inhalant/solvent use, and gender and inhalant/solvent use. The internet was used to locate the following web sites: Psych Abstracts, Medline, National Institute on Drug Abuse, National Institute on Alcoholism and Alcohol Abuse, Substance Abuse and Mental Health Services Administration, National Clearinghouse for Alcohol and Drug information, Partnership for a Drug Free America, On Line Journals, Prevline and Google. Literature was downloaded from the computer; however, some was located and/or obtained in the Tri-Ethnic Center for Prevention Research at Colorado State University library and still other documents were ordered from the main library at Colorado State University.

Substance Use and Adolescents

It is speculated that many youth have limited opportunities for the benefits that come with a healthy adulthood (Dryfoos, 1990; Tweed, 1998). Literature indicates they are not learning the skills necessary to participate successfully in the educational system nor are they making a successful transition into the labor force. They appear to experience difficulty in becoming responsible parents due to limited experiences in family life and effective family communication. Many lack the resources necessary to raise their own

children as they would like, which continues the cycle of use and its consequences.

Many of the youth who live on the social fringes are also disconnected from school and are prone to drug or alcohol use. The media offers many stories dramatizing the problems of adolescents. There are daily challenges and difficult choices faced by youth in the United States today. When the data are carefully examined regarding the number of youth who may be at risk for substance use, it is necessary to consider that all youth are at risk, at least, for experimental substance use, if not misuse. But then, as the number of risk factors increase, so does the potential for substance abuse, addiction, or misuse (Clayton, Leukefeld, Donohew, Bardo, & Harrington, 1995; Swaim, 1991).

Most of the models that have been used to explain adolescent drug use are those that emphasize the psychoactive and addictive qualities of drugs and theories that link drug use to personality traits or to emotional distress. These theories may provide a partial explanation; however, most adolescents who use alcohol or drugs use them experimentally or occasionally, not regularly (De Jong, 1995; Dryfoos, 1990). Therefore, theories that view adolescent drug use as a function of social learning and influence may have some explanatory value. Jessor and his colleagues (Jessor, Chase, & Donovan, 1980) view adolescent drug use as an interaction between personality, environment and behavior that leads to "problem behavior proneness," a characteristic vaguely suggesting likelihood of later drug use. Among the environmental variables contributing to the degree of "problem proneness" are those major socialization links that connect a youth to society and to society's values (Dryfoos, 1990). The major socialization systems that are likely to influence youth include the neighborhood, the family, religion, school or work, and peers (Oetting & Webb, 1992). Many research studies have examined these

characteristics and their potential influence on use of drugs. While it is hard to isolate the effects of these socialization characteristics from one another, there is ample evidence that each is important and perhaps should not be isolated from one another, especially in prevention efforts.

When ethnic populations are isolated, drug use among youth is likely to be particularly high (Beauvais, Oetting, Wolf, & Edwards, 1989). Communities or neighborhoods with high drug involvement are typically marked by underemployment, poverty, prejudice and lack of opportunity. These underlying factors are often identified as root causes creating conditions that encourage drug use.

Family problems are also important factors in determining the potential or likelihood of adolescent drug use. Drug use may be higher when the family is not intact, when there is drug and alcohol abuse within the family, when family relationships are poor, and particularly when the family does not have strong sanctions against drug use (Friedman & Glassman, 2000; Swaim, 1991).

Likewise, when school adjustment is poor, chances of drug use are much greater (Annis & Watson, 1975; Tweed, 1998). A major socialization link for youth is peers. Drug use is highly related to whether or not friends use drugs, and whether youth believe their friends would discourage their use of drugs (Oetting & Beauvais, 1987). These "peer cluster" members use or do not use drugs together, share ideas with each other, and, over time, establish attitudes and beliefs about drugs.

A circular model can be used to explain the relationship between these three very important factors (Oetting & Beauvais, 1987a). Consistent with a developmental model, when a child is very young (birth to 4 years), the family provides the greatest influence.

The family *is* the child's world and affects the development of personality and personal characteristics. The values that the family holds important are impressed upon the child - spirituality, religion, emotional expression, and self esteem (Oetting & Beauvais, 1987).

Oetting and Beauvais (1987a) tell us that as the child reaches the ages of five through eleven, school also becomes an important part of the child's world. The bond between school and family then becomes as important as the bond between the school and the child. School failures and successes have a great amount of influence for both the child and his or her family. When a family is positively involved in the child's school life, this strengthened bond ensures greater chance for school success and less chance of school failure, drop out, poor choice of peers, and even drug and/or alcohol involvement. When the child reaches the age of twelve (through the age of 18) peers enter the picture and become a major influence that occupies much of the child's life. When the family base and the school base have been positive, choice of peers and peer involvement generally reflects the values and cultural traditions of the family and the community. When all factors are operating optimally, peers are chosen who have similar values and traditions and are therefore accepted and bonded to a child's family. When the family base and the school base are weak, peers are often chosen in a rebellious or hostile manner. Frequently these children will go out of their way to choose friends who the family disapproves of and may then be at risk for drop out, drug use, and alcohol involvement.

Finally, there are many reasons for initiating effective prevention programs. Successful prevention improves quality of community life by promoting health. It reduces the use of costly treatment services and lowers student absenteeism, dropout rates, and

family disruption by keeping individuals, families, peers and communities clear of the problems associated with alcohol and other drug use.

Substance Use and Gender

Gender differences in youth drug use have also been a recent topic of interest. It has long been thought that males have higher rates of drug use than females (Conrad, Pihl, Stewart, & Congier, 2000; Penning & Barnes, 1982; Sobeck, Abbey, Agius, Clinton, & Harrison, 2000). Yet, 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 cocaine, sedatives, and smokeless tobacco use. Additionally, Beauvais (1992a) found that American Indian females use drugs at the same rate as their male counterparts, with the exception of cocaine and smokeless tobacco.

Research by Van Etten and colleagues certainly suggests that males are more likely than females to have an opportunity to use drugs. However, they report that there is no male-female difference with respect to trying a drug once an opportunity to do so has been experienced. In other words, given the opportunity to use males and females are equally likely to use but males are more likely to have the opportunity. In fact 44.2% of males and 42% of females began using marijuana within one year when presented with the opportunity; 37.7% of males and 33.2% of females began using cocaine; 50.5% of males and 50% of females began using hallucinogens; and 14.6% of males and 22.1% of females began using heroin (Van Etten & Anthony, 1999; Van Etten, Newmark, &

Anthony, 1999). Certainly, more information is needed to try to understand the opportunity to use drugs and what application it might hold in shaping prevention efforts.

In fact, more attention to gender specific prevention/intervention could potentially reduce drug use by both males and females (Zickler, 2000). Problems with past research are that subjects have been almost exclusively male and gender has not been separated, resulting in very little data on females. More recently, drug abuse research has begun to focus on the study of females as well as to examine gender differences to a much greater extent. Gender differences are emerging in biological factors related to drug abuse, progression and initiation to drug use, the antecedents and consequences of drug use, and prevention and treatment.

Considering just the information discussed thus far, it is noted that there is not only a need for, but a demand for cultural and gender specific prevention and interventions strategies. It was established in Chapter One that literature supports that treatment strategies must be individualized in order to more effectively address those risk factors that are unique to specific clients and specific drugs. It can then be speculated that this kind of specificity is equally true for prevention efforts. Females have differing substance abuse etiologies and opportunities to use as than males; and likewise, ethnic groups vary greatly in their history, experiences, socioeconomic characteristics, values, beliefs and behaviors resulting in differing attitudes and experiences that may lead to substance use. The studies tell us then, that the uniqueness that exists in individuals also exists for larger groups of people and these factors should be considered when developing prevention and treatment strategies. They may, in fact, also be important when considering age and developmental issues, as well as gender and ethnicity.

Substance Abuse and Ethnicity

In the last decade, health risk behavior in various ethnic groups has gained the focused attention of researchers, treatment providers, and policymakers (Lindenberg, Solorzano, & Krantz, 1998; Orlandi, Weston, & Epstein, 1992). Many report that minority or specific ethnic populations are at higher risk for alcohol and other drug abuse than the general population (Kirpatrick, Acierno, Benjamin, Resnick, & Best, 2000; U.S. Department of Health and Human Services, 1985). In fact, recently the Surgeon General produced a monograph dedicated to a review of the literature on health disparities among ethnic minorities (Satcher, 2001).

However, one must recognize that many of the earlier studies on substance abuse in ethnic communities focused on negative aspects rather than resiliency factors, and data were often obtained from sources where minorities were likely to be over-represented (e.g., emergency room facilities, public treatment programs, jail based programs) resulting in misleading results. In addition, most studies have been comparative in nature, comparing ethnic groups to White non-Hispanics and often using one sample of a study of one group to generalize to an entire ethnic population. This has unfortunately led to erroneous stereotypes and negative assumptions regarding the nature and extent of substance abuse among ethnic groups.

Current research indicates that, in general, White non-Hispanics tend to use alcohol and most drugs at higher rates than African Americans, Mexican Americans, or Asians. American Indian youth have the highest rates of lifetime and annual prevalence, and the highest rates of heavy use of alcohol (Mackesy-Amiti, & Fendrich, 2000; Rebach, 1992). Results from four years of survey data conducted on over 200,000 eighth

and twelfth grade students indicated that American Indian, Mexican American, and White non-Hispanic youth had higher lifetime prevalence rates for a number of substances compared to African American and Asian youth. Researchers indicated that 50 to 90 percent of American Indian youth, depending on the tribe, have experimented with alcohol (Beauvais, 1992a; May 1986). When minority populations are isolated, drug use among youth is likely to be particularly high (Beauvais et al., 1989).

Although substance use in general has been a topic of concern among some ethnic groups, there is a growing alarm about the use of inhalants. Inhalant use rates have been found to be higher among some ethnic populations (Beauvais, 1992b). There have been several studies that have compared inhalant rates among White non-Hispanics, American Indian, and Latino youth (Bates et al., 1997; Beauvais, 1992a). Both Beauvais and Bates have reported that American Indian youth use inhalants at higher rates than their white counterparts. These studies emphasize the need to delve further into inhalant use, its history and methods to prevent its use.

Inhalants

Carroll (1977) pointed to the Greek oracles as reporting the earliest incidents of inhalant use as intoxicants. However, heavy use of incense and other substances in religious and other ceremonies throughout history suggests the possibility of a much longer history of use of inhalants as intoxicants or mind altering substances. In more recent history, there are records from the last century of "ether-drinking" in England and Ireland and of nitrous oxide parties in England (Mercie, 2000; Sharp, 1992).

Though information is extremely limited, documented cases of inhalant use first appeared in the early 1950s with glue and gasoline as the primary substances used.

Inhalant use by children achieved public recognition as a "glue sniffing" epidemic with extensive newspaper reports in the 1960s (Brecher, 1972). Brecher, in fact, attributes the rapid spread of inhalant use across the country to the newspaper accounts. Around the same time, an epidemic of gasoline sniffing was reported among Australian aborigines early in the 1950s, although the practice had been described much earlier. However, it continues to this day and because of the sniffing, gas pumps in the Australian outback are typically enclosed in locked metal cages (Brady, 1989; Letcher & White, 1999).

It is important to point out that as youth have become more sophisticated, so has their range of substances. Currently, some of the more commonly inhaled substances are spray paints, hair spray, spray deodorant, paint, varnish remover, gasoline, fingernail polish, liquid paper, and various aerosol propellants. The substance is usually placed on a cloth and held over the mouth and nose during inhalation. It may also be folded and sucked on or placed in a plastic bag and the opening held tightly over the mouth and nose. Aerosol products are often sprayed directly into the bag and then inhaled (Beauvais, 1992b; Segal, 1997; Wyse, 1973).

Inhalant Trends in Age, Grade, and Gender

Inhalant abuse is cause for concern due to the accompanying dangers as well as the ease of accessibility (Beauvais, 1992b). Few states have established laws or policies related to sniffing inhalants. Inhalants are not generally categorized as a drug and therefore school and community policies are non-existent as well (Beauvais, 1992b). Still, inhalants pose a great threat. Beauvais (1992b) tells us that although they may not be the primary drug of choice for most youth, they are widely used due to their affordability and availability. Adding to this concern is a general lack of knowledge in

the professional community regarding inhalant abuse treatment or prevention compared to other drugs despite the fact that inhalants comprise a very dangerous form of contemporary youth chemical abuse/misuse. Previous studies based on school surveys have indicated that inhalant use appears to decline as other substances become more accessible (Beauvais, Oetting, & Edwards, 1985; Edwards & Oetting, 1995) yet the exact level of inhalant use among youth who may have dropped out is difficult to determine.

Age and grade. Different surveys lead to somewhat differing estimates of inhalant use. Perhaps the most widely accepted explanation for this is that there is little initiation to inhalants after the 8th grade and that early inhalant users have a high rate of dropout (Beauvais, 1992b). In fact, studies in the late 1980's reflect that about one third of both Mexican American and White non-Hispanic dropouts had tried inhalants, almost double the rate of inhalant use of youth who stayed in school (Chavez & Swaim, 1992). Table 1 provides data from the American Drug and Alcohol Survey from 1987 to 1992 for grades 4th through 12th. The question asked was "Have you ever tried inhalants? The results indicated that lifetime prevalence rates of inhalant use rose steadily from the 4th through the 8th grade, where it peaked at about 16%. After the 8th grade, the prevalence rates decreased slightly to the 12th grade at about 11%. Edwards and Oetting (1995) believe this decrease may be partially due to youth who dropout of high school.

Gender. It is well established that both girls and boys use inhalants (Bates et al., 1997; Beauvais, 1992b). Anecdotally, teachers, counselors and principals often reported that they did not believe that the girls in school are trying inhalants. Yet survey data clearly reflect that although young girls may have slightly lower rates of use, there are still significant numbers of female users at every age.

Table 1

Lifetime Prevalence of Inhalant Use among U.S. Students

	1987	1988	1989	1990	1991	1992	Total N
4th	5%	6%	5%	6%	7%	6%	22,907
5th	7%	7%	7%	7%	7%	6%	38,595
6th	12%	8%	7%	9%	9%	7%	25,542
7th	12%	13%	10%	11%	14%	11%	74,604
8th	15%	16%	14%	15%	16%	16%	153,491
9th	14%	15%	14%	14%	15%	16%	84,545
10th	16%	14%	13%	13%	15%	15%	95,180
11th	11%	13%	11%	12%	13%	13%	69,035
12th	11%	11%	10%	11%	12%	13%	133,056
Total N	45,174	113,690	124,994	142,753	198,936	71,408	696,955

Note. Source: The American Drug and Alcohol Survey™

Table 2, using the American Drug and Alcohol survey data reflects rates of inhalant use by gender and grade. It shows that from 1992 to 1993 males had higher lifetime prevalence rates than females in all grades, with the 12th grade showing the greatest difference of 15.1% for males and 8.6% for females. The current use data also shows that males used more inhalants than females in the past thirty days. Johnston, O'Malley and Bachman (1989) reported similar gender differences among seniors, with 21% of male seniors and 14% of female seniors reporting that they had tried inhalants and 3.5% and 2.0% respectively reporting use in the last 30 days.

Inhalant Use and Family Factors

Studies are clear that whatever strata of society from which inhalant users may come, they are still more likely to come from families which are unstable, have high

Table 2

Inhalant Use by Gender and Grade

	Lifetime Prevalence		Current Use	
	Males	Females	Males	Females
6th graders (n=14,249)	10.4%	7.5%	4.0%	2.6%
7th graders (n=22,699)	13.6%	11.6%	4.7%	4.4%
8th graders (n=36,220)	17.1%	16.2%	6.2%	6.4%
9th graders (n=20,283)	16.4%	15.9%	5.0%	4.9%
10th graders (n=22,948)	15.7%	13.2%	4.3%	3.5%
11th graders (n=16,710)	15.3%	10.8%	3.3%	2.1%
12th graders (n=22,592)	15.1%	8.6%	2.7%	1.2%

Note. Source: The American Drug and Alcohol Survey™, 1992-93 database.

levels of alcohol and other drug use, and are generally dysfunctional (Oetting & Beauvais, 1987a). This is a fact expounded upon by many researchers (Albaugh & Albaugh, 1979; Gilbert, 1983; Guitierrez, Hernandez, & Rabago, 1978; Korman, Trimboli, & Semler, 1980; Soback et al., 2000). De Barona and Simpson (1984) support this reasoning in their study. They showed that chronic inhalant users report experiencing more anger and aggression in their family environment than do experimental users. Non-users reported having significantly more parental empathy, trust and interest from their parents.

Additional studies (i.e. Jacobs & Ghodse, 1988) suggest that inhalant abusing youth may exhibit a slightly higher tendency of being exposed to more dysfunctional family issues than non inhalant users. These family issues may include criminal histories, substance use, and problems in education (lower grades, drop out) than do the non

inhalant users. A study by Bachrach and Sandler (1985) also supports the notion of family dysfunction. They found that 60% of inhalant abusing youth reported that their parents had some type of problem with drug use. Compounding the issue, these families were more likely to live in poverty and be less involved in youth activities than non-using families (Christensen & Manson, 2001).

Inhalant Use and School Factors

It has also been well established that youth who are not doing well in school (poor grades, discipline problems) are more likely to turn to inhalants (Bates et al., 1997). Many researchers agree on this point (Altenkirch & Kindermann, 1986; Crites & Schuckit, 1979; Massengale, Glaser, LeLievre, Dodds, & Klock, 1963; Sobeck et al., 2000). For example, Bates and colleagues (1997) showed that high school dropouts were 2.27 times more likely than non-dropouts to have used inhalants in their lifetime. School dropouts were also 2.88 times more likely than non-dropouts to have used inhalants in the last month. Barker and Adams (1963) study of delinquent boys using inhalants concluded that they were behind by at least two grades in the standard achievement when compared to the control group of non-users. Yet another study (De Barona & Simpson, 1984) suggested that non-users had greater confidence in their school abilities. Inhalant users who were still in school reported lower or failing grades and more behavior problems than non-users. Frank, Marel and Schmeidler (1988) found a strong and consistent inverse relationship that was maintained over time between grade-point average and recent rate of solvent use. A large percentage of the inhalant users across all grades demonstrated a grade average of "poor". Matthews and Korman (1981) using distal consequence (one of the early ways to define prevention suggesting that actions taken

now, i.e. prevention, would have a distal consequence or future impact/reduction on the problem behavior being changed) established that since beginning their inhalant use, students reported more negative consequences such as degree of trouble in school and difficulty in maintaining grades. Kandel (1975) concluded that students who were involved in drug use were more likely to be absent from school than their non-using classmates and further, that the absentees had lower academic interests and lower achievement than regular students. Tweed (1998) indicated that adolescent substance abuse can have devastating consequences, one of which is educational failure. With education failure comes decreased opportunities in later life.

Inhalant Use and Peers

The friends or peers of inhalant users will very likely also have social, school and other personal or interpersonal adjustment problems, and those friends are also very likely to be inhalant users (Huxsahl; 1999, Bachrach & Sandler, 1985; Beauvais et al., 1985; Stybel, Allen, & Lewis, 1976). De Barona and Simpson (1984) concluded that the friends of heavy inhalant users reported having experienced more school and legal problems, and also reported spending little time in conventional activities such as sports and school activities than did friends of experimental users. The heavy users also reported that they were less satisfied with their personal relationships and social activities.

Beauvais (2000) and McGarvey, Clavet, Mason and Waite (1999) reported finding that inhalant users have friends who are marginalized and who are likely to be involved with drugs, and are probably also using inhalants. Oetting, Edwards and Beauvais, (1988) believe that most inhalant use is a group activity until chronic solitary use begins.

Inhalant Use and Psychosocial Factors

The point has been made that inhalant users have been found to exhibit more emotional problems than non-users (Frendrich, Mackesy-Amiti, Wislar, & Goldstein, 1997; Jacobs & Ghodse, 1987, 1988; Oetting et. al., 1988; Smart, Fejer, & White, 1972; Weise, Busse, & Hall, 1973) and that although inhalant use may lead to emotional problems, given the disordered lives of inhalant users and their families, it is likely that the emotional problems predate inhalant use (Beauvais, 2000; Gilbert, 1983). It is truly difficult to differentiate between what has occurred to exacerbate inhalant use and what is a result of the inhalant use itself.

Inhalant users are also much more likely to be involved in other deviant behaviors, including other drug use (Beauvais, 2000; Crites & Schuckit, 1979; Dinwiddie, Zorumski, & Rubin, 1987; Mata & Andrew, 1988). In a 1985 study by Bachrach and Sandler, 97% of the inhalant respondents had been arrested, not only for drug use but also for assault, shoplifting and vandalism. De Barona and Simpson (1984) found 55% of those who were on probation were chronic inhalant users. In another study, Jacobs and Ghodse (1988) compared detention facility non-inhalant users with inhalant users and found that the inhalant users were first arrested at a much younger age (11.6 years of age) than the non-inhalant users (13 years of age). They also reported that 100% of the inhalant users reported using other drugs. In a related study, Mackesy-Amiti and Fendrich (2000) concluded that upper grade level students who used inhalants were more likely to be involved in minor criminal activity and that inhalant users reported more problem behaviors than did other drug using peers.

Inhalant Abuse and Ethnicity

As previously mentioned, there have been ethnic differences identified in rates of inhalant use. Mackesy-Amiti & Fendirch (2000) found that Mexican American seniors did have about the same rates of inhalant use as White non-Hispanics. However, it is important to note that the data also demonstrated that at the 8th grade, Mexican American youth have higher rates of inhalant use than White non-Hispanic youth (Chavez & Swaim, 1992) as do American Indian youth (Beauvais, 1992a). This difference can probably be explained by the higher dropout rate among Mexican American youth and American Indian youth along with higher use of inhalants among drop outs.

Padilla, Padilla, Morales, Olmedo and Ramirez (1979) also found higher rates of use among Mexican American barrio youth. While this can not be generalized to all Mexican American youth, it can be speculated that the poverty, prejudice, and lack of opportunity found in the barrio might be related to inhalant use. This might also fit the data trends for American Indian youth living on reservations. The American Drug and Alcohol survey data have consistently shown that there are unusually high rates of use on reservations where poverty and lack of employment are at their worst, while among non-reservation American Indian youth rates are higher than those for White non-Hispanics, but not as high as those for reservation youth (Beauvais, 1992b).

It has been proposed that inhalant users from minority groups may also suffer from cultural anomie -- a loss of identification with both majority and minority culture (Gilbert, 1983; Guitierrez et al., 1978; Nurcombe, Bianchi, Money, & Cawte, 1970). Only one study, however, has actually examined cultural identification of inhalant users (Oetting & Beauvais, 1990b) and that study found only a small relationship.

Inhalant Use by American Indian Youth

One in every seven American Indian eighth graders is currently using inhalants (Beauvais, 1992b). Sadly, it has been established that American Indian youth use almost every type of drug with greater frequency than non-American Indian youth and that the age of first involvement with alcohol is younger for American Indian children. The rates of drug use and involvement can be two to three times higher for American Indian youth than for White non-Hispanic youth (Beauvais, 1992b). Inhalants are problematic for American Indian and Alaska Native youth. Inhalants are often the first drug used, and prevalence rates for reservation youth are almost three times those of their White non-Hispanic counterparts (Beauvais, 1992b).

The most recent research in the area of risk factors for substance-abusing Native youth has cited use by peers, weak family bonding, poor school adjustment, weak family sanctions against drugs, positive attitudes toward alcohol use, and risk of school dropout (Manson, 2000; Swaim, Oetting, Thurman, et al., 1993; Swaim, Thurman, Beauvais, Oetting, & Wayman, 1993). Still other studies have reported that substance abuse behavior among Native youth may be influenced by cultural values and norms (May, 1986). Other risk factors that account for high use rates among Native youth are low educational achievement and employment opportunity. Substance abuse rates for school dropouts are higher than those of students who remain in school (Chavez, Edwards, & Oetting, 1989).

When Native youth begin to reach adulthood, they have limited chances of securing decent jobs, limited educational opportunities, and very few resources for improving their situation. Even though the misuse of substances may be well underway

by dropouts by the time they leave school, the lack of opportunity they will face in obtaining adequate employment and thus positive quality of life may contribute to the maintenance of their use of alcohol and/or drugs (Braveheart & Spicer, 2000; Oetting 1992; Oetting & Beauvais, 1990a). Unfortunately, limited economic opportunity and other negative community factors such as prejudice and violence are prevalent in many minority neighborhoods (Oetting, 1992).

Inhalant Use by Mexican American Youth

High dropout rates among Mexican Americans, with estimates of 40 percent and higher in major population centers, point to a need for early prevention efforts in both reduction of drug and alcohol use and school drop out rates. Data from a number of studies confirm that Mexican American children are at high risk for use of alcohol and other drugs.

It is well documented that Mexican American families place importance on family relationships and the importance of the extended family. The Mexican American family has been described as group-oriented, even in decision making (Chavez & Swaim, 1992). All members are likely to have a voice in adopting family rules and solving family problems. Thus, family beliefs and attitudes about drug and alcohol use are very important. This factor may have strong implications in developing an effective and culturally specific prevention model.

"Familism" (strong family norms, mutual obligations and expectations) is still considered to be a significant psychological factor that influences most Mexican American persons (Chavez & Swaim, 1992). As far as treatment is concerned, Mexican American family-focused programs, such as the Spanish Family Guidance Center in

Miami, Florida have been successful in their intervention with drug use via family oriented therapy. Therefore, given the successful use of familism in treatment, it may also be a strength for prevention efforts. Perhaps for Mexican American families, open and honest discussion between parents and children could be encouraged to include information about family sanctions regarding substance use. Former Center for Substance Abuse Prevention Director, Elaine M. Johnson and author Jane Delgado (1989) pointed out that the overall youthfulness of the Mexican American population underscores the importance of directing appropriate and culturally specific prevention messages to children and youth.

Inhalant Use Prevention and Ethnicity

From the literature presented there is no single set of prevention messages or single delivery strategy that will adequately communicate to all people of all cultures. There are no simple cultural triggers which, through their incorporation in communications programs, will automatically yield products that are appropriate for and effective with all ethnic populations. Language translation alone does not ensure "cultural sensitivity" in a project. However, there are a number of approaches that should be considered in the prevention process - approaches that cut across audiences and in combination, may contribute to more effective prevention efforts. Diversity across ethnic populations and communities must be recognized and considered when developing effective prevention.

The Evolution of Prevention Programming

Prevention is evolving quite rapidly. Early efforts in prevention focused on scare tactics. From there, the focus turned to education and raising awareness. From that came

the more systemic approaches to prevention. Research in the past two decades (Hawkins & Weis, 1985; Kumpfer, 1987; Lindenberg et al., 1998; Oetting & Beauvais, 1987a) has resulted in the development of a conceptual framework for prevention based on risk and protective factors. The greater the number of risk factors, the greater the likelihood that a youth might turn to alcohol and other drug abuse. More recently, studies have focused on the strength of protective factors. Benard (1991) provided a meta-analysis of risk/protective factor research which emphasized three main arenas for prevention: family, school and community. Within these, five major factors were addressed: high expectations, caring and support, social competence, life skills and meaningful participation in family, school and community. Kaftarian and Wandersman (2000) identified the risk and protective factors or domains that should be included in prevention programming: community, school, family and peers. Although there does seem to be some consensus among both practitioners and researchers as to the validity of risk/protective factors in the general population, more work needs to be done on the relative importance of the various factors in specific subcultures (Gilbert & Cervantes 1986). Other studies have supported the strong relationship of school failure to patterns of absenteeism and drug use. Bonnie Benard (1991), in her work on "Moving Toward a 'Just and Vital Culture': Multi-culturalism in Our Schools", highlighted the importance of multiculturalism in schools and the redistribution of power and authority as key elements in any true prevention programs. Delgado and Humm-Delgado (1984) also supported the importance of natural support systems (including extended family, healers and social clubs) as protective factors in the Hispanic community. A summary report by The Office of Substance Abuse Prevention (OSAP), now the Center for Substance Abuse

Prevention (CSAP), generally concurs with the importance of all of the above factors (1990). The CSAP report is strong in its premise that culture must represent the cornerstone of any serious effort at preventing alcohol and drug use and abuse.

A number of authors including Oetting and Beauvais (1987a) indicate that family and friends are important factors in substance use by minority adolescents. Still others (Schinke & Cole, 1995) focused on life skills such as problem-solving, coping strategies and social support as key elements in prevention programs. Schinke, Mancher, Palleja, Zayas and Schilling (1988) cited the breakdown of cultural support systems as a major risk factor. Finally, it seems there is consensus that peer teaching, family involvement, and programs which enhance self-image and cultural identity are of particular merit. Surveys of existing prevention programs (Center for Substance Abuse Prevention, 1996) report high interest and support for cultural and spiritually-based strategies among prevention practitioners.

A study by Stybel and colleagues (1976), found that low income Chicano youth used inhalants at a higher rate than other ethnic groups suggesting that cultural factors should definitely be considered in the prevention and treatment of the problem. However, additional research is called for to determine what type of models might be more effective and where the differences may lie so that successful drug and alcohol prevention strategies for specific cultural groups may be developed.

Much less work has been done to explore gender as a crucial factor in the development of prevention models. There is substantial literature suggesting that males and females might differ in the etiology and consequences of alcohol use (Sher, 1994). The Center for Substance Abuse Prevention (CSAP) has shown interest in prevention

strategies that specifically target females with their recent funding of programs in 1999 under the initiative of “Girl Power” funding. At this point it’s too early to determine the impact of those strategies on the target population but certainly the concept of “Girl Power” has been well accepted by those providing prevention programs. It could be of great value to further examine the importance of targeting gender in drug and alcohol strategies.

Effective prevention is the use of planned activities and events aimed at reducing the risk that individuals will experience drug-related problems in their lives. It is a positive, proactive approach that attempts to influence people before the earliest onset of such problems. Effective prevention begins within communities - helping your friends, neighbors or acquaintances to learn that they can have an impact in solving their local problems and setting local norms. Prevention emphasizes collaboration and cooperation, both to conserve limited resources and to build on existing relationships within the community. Community groups are routinely used to explore new, creative ways to use existing resources. It is also most helpful if it is part of a broader health promotion effort. As such, any prevention effort should focus on helping people develop new, more positive views of themselves. The efforts should be aimed at both users and non-users, with the goal of helping all community members to achieve healthier lifestyles. Prevention efforts should also target the agencies and systems community in order to have the broadest possible impact. Finally, the efforts should be ethnically and culturally appropriate to the targeted community and result in healthy, responsible, productive human beings who will be unlikely to experience drug related problems in their families

or their lives. Effective prevention is a moral and an ethical imperative to ensure the health of our future.

Summary

Although there are certainly adult inhalant users, inhalants are a particularly serious problem among young children and prevention is a key factor in helping potential inhalant abusers lead healthy, productive lives. Both Johnston, O'Malley and Bachman (1993) and Edwards (1993) reported that 8th graders are now more likely to try inhalants than they are to try marijuana, suggesting that inhalants may be "the children's drug of the 90's". Further, the rate of inhalant use by younger children has been increasing during recent years. Mexican American and American Indian youth also seem to be at particularly high risk for inhalant use (Beauvais, 1997; McGarvey et al., 1999). Certainly more studies related to prevention and treatment programs specific to inhalants are needed with special attention to models that provide information on actually developing these programs.

CHAPTER III: METHODOLOGY

Secondary Data Analyses

The data for this secondary analysis are taken from a commercial database, The American Drug and Alcohol Survey (ADAS). Surveys, using the ADAS and supplements to the survey are provided by Rocky Mountain Behavioral Science Institute, Inc. (RMBSI, Inc.) to schools across the country. These are schools who want an assessment of the rates of substance use and the correlated factors among their students for the purposes of planning and evaluating effective prevention programming. The sample is one of opportunity, but it is large enough and diverse enough to provide a good estimate of national rates. Evidence of this comes from the high level of comparability of rates reported in the ADAS database with the rates reported by the Monitoring the Future study (Johnston et al., 1993), which is funded by the National Institute of Drug Abuse and is based on a stratified random sample of students across the US. Monitoring the Future is used to provide NIDA with estimates of national and regional substance use rates (Oetting & Beauvais, 1990a; Johnston et al., 1993). The ADAS database is available for use by the Tri-Ethnic Center (hereafter referred to as "the Center") through a memorandum of understanding between RMBSI, Inc. and Colorado State University. The analyses for this study are within the guidelines set forth by that memorandum of understanding.

One of the missions of the Center is to provide graduate students and other researchers with data that the Center has not been able to analyze due to staff time and grant focus. Because of the wealth of data that have been collected and the need for such information in the field of prevention and treatment, especially related to inhalant use, this study conducted secondary analysis on data that were collected from 1993-2000. It includes information on inhalant use and the specific variables that have been identified in literature as risk factors related to drug use. Yet another reason supportive of a study using secondary data analysis is that, while there is a considerable body of literature that deals with inhalant use and its causes and correlates, a careful examination of that literature shows that many of the papers are based only on observation, not on formal data collection. Few, if any of the published studies have dealt with gender or ethnicity as anything other than reporting descriptive data. In fact, nearly all of the studies have looked at only one, or at the most, a few, individual factors, and almost no published studies have examined characteristics by gender or ethnic breakdown. Information that follows describes how the data were collected.

Subjects

The subject pool consisted of 7th through 9th grade youth across the country who self identified as Mexican American, non-reservation American Indian, or White non-Hispanic youth. These youth were surveyed using the American Drug and Alcohol Survey, (ADAS) from 1993 to 2000. The original sampled groups included 51,403 White non-Hispanic youth, 3,991 non-reservation American Indian youth, and 3,605 Mexican American youth. For the analyses, the data were weighted so that the ethnic group samples were of equivalent size. The weighting was based on the size of the smallest

subject pool (n= 1960). There are no duplicate youth in this study. If a school was surveyed in multiple years, only the data for one of those years was used for this study. The year that had the highest number of students surveyed was the group that was chosen for use in the study. The survey is available in Spanish for those students who more comfortable with the Spanish language. The survey instructions informed anyone who did not want to take the survey to work quietly on homework while others complete the survey. The internal consistency checks built into the survey prevent any responses of students who may have trouble understanding or completing the survey from being counted.

The students self identified their ethnicity on the survey. If the student identified as White non-Hispanic and, in addition, either American Indian or Mexican American, the student was counted as either American Indian or Mexican American rather than white non-Hispanic. However, if the student identified with *both* American Indian and Mexican American, the data for that student were dropped from the study. This is consistent with the protocol used by the Center.

The Instrument

The ADAS is an anonymous, self-report questionnaire that involves multiple choice type questions. It assesses the respondents use of several drugs: alcohol, tobacco, marijuana, cocaine, crack, stimulants, methamphetamines, downers, quaaludes, tranquilizers, cocaine, inhalants, hallucinogens, PCP, and heroin. The ADAS provides several measures of drug involvement for each drug including lifetime prevalence (ever used), use in the last year, and use in the last month. For some of the drugs, the nature of use is also assessed. The survey also asks about attitudes toward drugs (i.e., perceived

harm of alcohol and drugs used once or regularly). Self-identification as a user or non-user and future intent to use are also measured. The scales are derived from the supplemental psychosocial survey, the Prevention Planning Survey, which is given in conjunction with the ADAS and contains the psychosocial scales that are mentioned above. These scales have been thoroughly tested with ethnic youth. A wide range of psychosocial characteristics (risk and protective factors) are also assessed by these instruments such as the following: peer associations, school adjustment, family sanctions, and family caring.

The Scales

The data from the ADAS database that were analyzed for this study are gender, ethnicity and the scales: level of inhalant use, family factors, peer factors and school factors. The scales with the questions used for this study are found in the Appendix.

Inhalant scales. The scale of inhalant involvement consists of three items: use in last month, use in last year and self report as a user. These items yield internal consistency reliabilities in the three ethnic groups of .92 for Mexican Americans (MA), .89 for White non-Hispanic (WNH), and .83 for American Indians (AI). For this study, the inhalant use variable is a scale ranging from one to eight that indicates intensity of use, based on each individual's reported use in the last month, use in the last year, and self identification as to their level of involvement with inhalants. To be assigned a score of eight, the student must have indicated that they have used inhalants twenty or more times in the past month or ten or more times in the past month and either 50 or more times in the past year or self identify as a "very heavy user" of inhalants. The score is based on an empirically derived combination of these same variables in hierarchical fashion down to a

score of one, which indicates that the student reported that they have not used inhalants within the past month and that they self-identify as a "non-user". Table 3 reflects the scoring used to distinguish between a user and non user. The questions are shown in Table 4.

Table 3

Inhalant Coding

If all sniff questions equal 1	sniff score = 1 (non user)
If sniff in the last month equals 5	sniff score = 8
If sniff equal 1 and sniff in last month equals 5	sniff score = 7
If sniff equals 1 and sniff in last month equals 4 and self identification as a user is greater than 5	sniff score = 6
If sniff equal 1 and sniff in last month equals 4 or sniff in last month equals 3 and self identification as a user is greater than 5	sniff score =5
If sniff equals 1 and sniff in last month equals 3 and self identification as a user is greater than 4	sniff score = 4
If sniff equals 1 and sniff in last month equals 3	sniff score =3
If sniff equals 1 and ever sniffed is greater than 3 and self identification as a user is greater than 3	sniff score = 2

Table 4

Inhalant Questions

1. Have you used any of these drugs to get high during the last 12 months? "Sniff, something like glue, gasoline, etc. 0=None, 1=1-2 times, 2=3-9 times, 3=10-19 times, 4=20-49 times, 5=50 or more
2. Have you used any of these drugs to get high during the last month? "Sniff, something like glue, gasoline, etc. 0=No, 1=1-2 times, 2=3-9 times, 3=10-19 times, 4=20 or more times
3. In using each of the following, are you a..... "Sniff, something like glue, gasoline, etc. 0=Non user, 1=very light use,2= light user, 3=moderate user, 4=heavy user, 5=very heavy user

Family scales. The scale of family factors is from three separate scales, family cares about you, family involvement in school and family cares about how you do in school. The family cares scale consists of the sum of three items which the respondent rates from three to twelve, three if all the answers are one to twelve, if all the answers are a four. The items are: does your family care about you? how much do you care about your family? and does your family care what you do? These items yield internal consistency reliabilities in the three ethnic groups of .92 (MA), .85 (WNH) and .79 (AI) respectively. The family involvement scale in school activities is the sum of two items which has a range of 2 to 8. The items are: does your family go to school events like music programs, sports events, etc.? does your family go to school meetings like PTA or PTO, back to school night, etc? The family support of school goals is the sum of one scale with four items with a range from 4 to 16. The items are: how much would your family care if you.....skipped school, got a bad grade, did not do your homework and quit school? These items yield internal consistency reliabilities in the three ethnic groups of .80 (MA), .75 (WNH) and .88 (AI).

School scales. The scale of school factors is from two separate scales, school success and school liking. The school success scale is the sum of two items with a range from 2 to 8. The items are: what kind of grades do you get? and what kind of student are you? These items yield internal consistency reliabilities in the three ethnic groups of .83, .85 and .83 respectively. The school liking scale is the sum of four items with a range of 4 to 16. The items are: I like school, my teachers like me, I like my teachers, and school is fun. These items yield internal consistency reliabilities in the three ethnic groups of .84, .82 and .80.

Peer inhalant association scales. The measure of peer factors comes from merging two separate scales, peer sanctions/encouragement and peer use. The peer sanctions/encouragement/use measure is the sum of four items with a range from 4 to 16. The items are: how much would your friends try to stop you from...“sniffing” glue or gas, etc.? how much would you try to stop your friends from...“sniffing” glue or gas, etc.? and how often have your friends asked you to use...“sniff” glue or gas, etc.? The peer sanctions and encouragement items yield internal consistency reliabilities in the three ethnic groups of .97, .94 and .94 respectively. The peer use measure has one item, how many of your friends do each of the following...“sniff” glue or gas, etc.? This item yields internal consistency reliabilities in the three ethnic groups of .92, .92 and .90. The ADAS questions and answer codes used for this study are in the Appendix.

Reliability and validity of risk and protective factor measures. The scales assessing risk and protective factors evaluate latent constructs relevant to the general models presented above, and most of the selected latent constructs have been found, in the literature, to relate to substance use. Nearly all of the scales proposed for use in this study have been tested for reliability in samples of both majority and minority youth. Cronbach alpha reliabilities range from .75 to .97 with most measures in the high .80's. Key cluster variable analysis shows that each of these scales can be discriminated from the others. Numerous research studies have used the ADAS and the results show trends that are consistent with other self administered drug and alcohol surveys. (Oetting & Beauvais, 1987a; Oetting, Swaim, Edwards, & Beauvais, 1989; Swaim et al., 1989; Swaim, Oetting, Thurman, et al., 1993; Swaim, Nemeth, & Oetting, 1995).

Procedure for Data Collection

The same general data collection procedures were used in all the schools from 1993 to 2000. The school approval was obtained previous to students completing forms. Surveys were then sent to the school and parents were notified of the nature of the survey and given an opportunity to withdraw their children from the survey. The survey was administered during a regular school day to all students whose personal consent and whose parents' consent were obtained for participation. Students were informed of the purpose of the survey, advised of their right to refuse participation, and assured of their anonymity. Students were asked not to place their names on any survey materials. School personnel, in most cases the regular classroom teachers, administered the survey.

Once students had completed the surveys they placed them face down and were asked to continue with regular class work until all students were through. A box or envelope was passed around and students were instructed to place their survey in the container in a random order. The box or envelope was then sealed and returned promptly to the Center. Once the Center received the surveys they were entered into the computer, data cleaning and validity checks were made, and the surveys were then destroyed. Using these procedures, the students are assured of complete anonymity.

Analyses

A Pearson Correlation was performed on the three family variables and two school variables that were used as predictors in the discriminant function analysis, in addition to gender and a peer influence variable. The family and school variables were retained rather than combining them into a single family and school scale because of

relatively low correlation among the family and school scales, suggesting they each provide unique information.

A two way ANOVA and chi square tests were used to answer the first research question, "Does the level of inhalant use vary by gender and ethnicity?". This was followed by a discriminant analysis to answer the second question "Does the level of inhalant use vary by family, school and peer factors with respect to gender and ethnicity?". This analysis was used within ethnicity and gender to explore and classify the weighting each of the predictor factors has in separating users from non-users. This type of analysis most directly assisted in identifying the type of information needed in inhalant prevention programs.

CHAPTER IV: RESULTS

The results of this study are divided into three sections. The first section will describe the sample used for the study. The second section examines the dependent variable, level of inhalant use with the independent variables of gender and ethnicity using ANOVA and chi-squares. This section addresses the research question, "Does level of inhalant use vary by gender and ethnicity?" The third section examines the independent variables of gender, ethnicity, family, school and peer factors with the dependent variable of level of inhalant use using discriminant analysis. This section answers the research question, "Does the level of inhalant use vary by family, school, and peer factors with respect to gender and ethnicity?"

Sample

The subjects used in this study are males and females from the 7th through 9th grades from across the United States who completed the American Drug and Alcohol Survey from 1993 to 2000. They represent youth from the three ethnic groups of White non-Hispanics, American Indians and Mexican Americans. Due to the very large N in some groups and the likelihood of obtaining significant results that would not be meaningful, the number of subjects in the White-non-Hispanic and Mexican American categories was weighted based on the sample size of the American Indian sample, 1960 subjects. The original number of subjects for White non-Hispanic was 56,309, American Indian was 1960 and Mexican American was 3565. Using the weighted sample size, a

listwise deletion was utilized on subjects with incomplete data. A total of 13.5% of the White-non-Hispanic sample, 18.6% of the American Indian sample and 26.4% of the Mexican American sample were eliminated by this process. Table 5 and Figure 1 shows the sample size used for the study following the elimination of incomplete data by gender and ethnicity. Although the sample is one of convenience, it is widely distributed geographically and drug use rates from this data base closely match rates found in stratified purposeful samples such as in the Monitoring the Future study (Johnston et al, 2000). The inhalant scale on the American Drug and Alcohol Survey was used to identify inhalant users and non-users. Table 6 and Figures 2 and 3 shows the sample used after weighting and listwise deletion of missing subjects broken down by gender and ethnicity and inhalant use.

Table 5

Number of Subjects by Gender and Ethnicity

Gender and Ethnicity	Number
White non-Hispanic	
Male	814
Female	882
Total	1696
American Indian	
Male	757
Female	839
Total	1597
Mexican American	
Male	714
Female	729
Total	1443

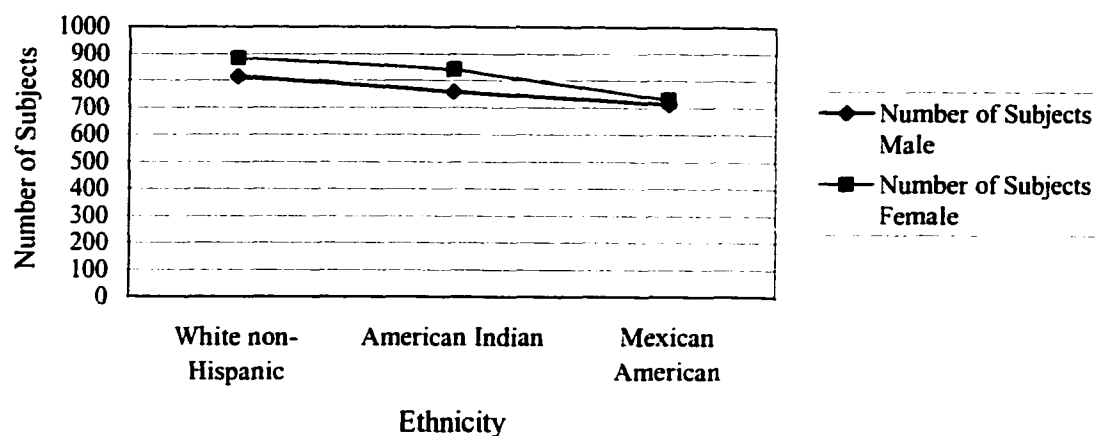


Figure 1. Number of Subjects by Gender and Ethnicity

Table 6

Use and Non-use Sample Used for Analyses

	Users	Non-users	Total
White			
Male	73 (9%)	741 (91%)	814
Female	88 (10%)	794 (90%)	882
American Indian			
Male	93 (12%)	665 (88%)	757
Female	152 (18%)	687 (82%)	839
Mexican American			
Male	86 (12%)	628 (88%)	714
Female	108 (15%)	621 (85%)	729

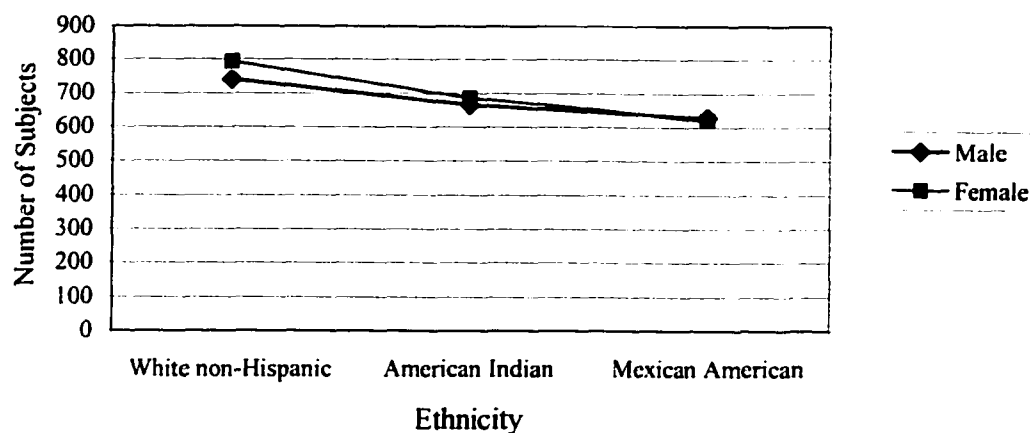


Figure 2. Non-user Sample for Analyses

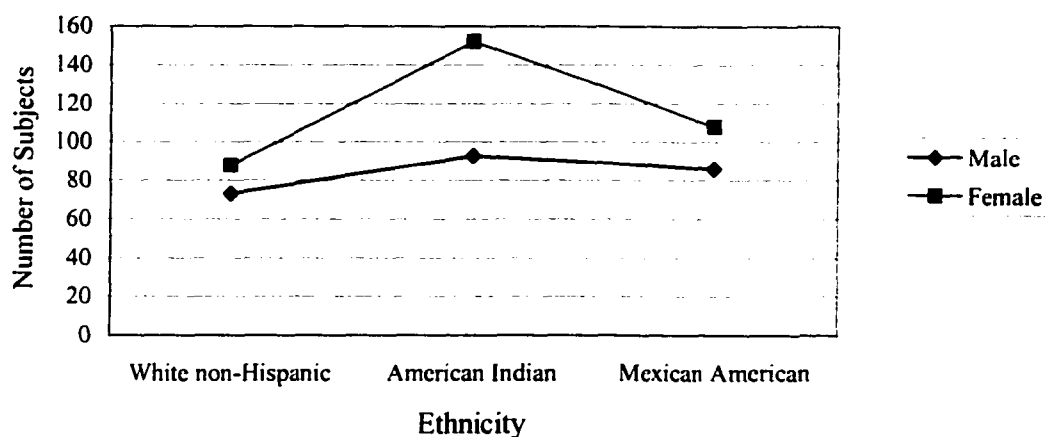


Figure 3. Inhalant User Sample for Analyses

Analyses Used for Research Question One

The means and standard deviation on the continuous inhalant involvement score by gender and ethnicity are presented in Table 7. The means for females in all three ethnic groups are higher than their male counterparts and the means differ across the

three ethnic groups. Figure 4 presents the means on the continuous inhalant involvement score by gender and ethnicity.

Table 7

Means and Standard Deviation on Inhalant Involvement Scores by Gender and Ethnicity

	Males	Females
White non Hispanic		
Mean	1.25	1.28
s.d.	.90	.92
American Indians		
Mean	1.33	1.54
s.d.	1.02	1.28
Mexican Americans		
Mean	1.34	1.42
s.d.	1.06	1.17

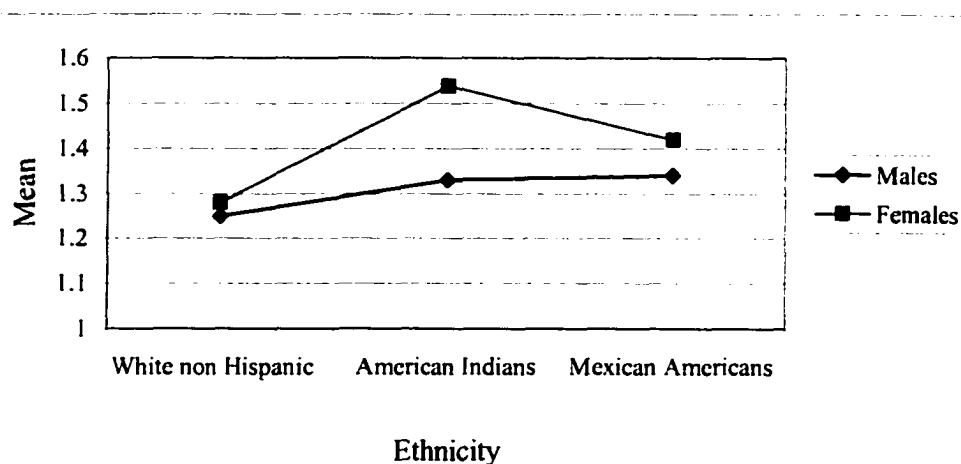


Figure 4. Means on the Inhalant Involvement Scale by Gender and Ethnicity

A two-way analysis of variance (ANOVA) of gender by ethnicity was conducted to test the first research question of whether level of inhalant use varies by gender and ethnicity. Table 8 shows that there was a main effect for gender ($F= 14.21, p<.001$) and ethnicity ($F= 13.25, p<.001$). Further, there was also a significant gender by ethnicity interaction ($F= 3.61, p<.05$). The results support the hypothesis that level of inhalant use

differs by gender and ethnicity. Since that data did not meet the assumption of normality the non-parametric statistic of chi square was conducted. The results of the chi square analyses are consistent with the two-way ANOVA. It showed there is association between gender and use/non-use groups, $\chi^2(1) = 14.40$ $p < .001$. The chi square analyses also showed an association between ethnicity and use/non-use groups, $\chi^2(2) = 27.66$ $p < .001$.

Table 8

ANOVA by Inhalant Use, Gender and Ethnicity

Source of Variance	Sum of Squares	DF	Mean Square	F	Sign. of F
Main Effects	46.28	3	15.42	13.47	.001
Gender	16.27	1	16.27	14.21	.001
Ethnicity	30.33	2	15.16	13.24	.001
2 Way Interaction					
Gender by Ethnicity	8.26	2	4.13	3.60	.05
Explained	55.09	5	11.09	9.62	.001
Residual	6533.43	5707	1.14		
Total	688.52	5712	1.15		

To examine where the differences lie, a planned contrast was conducted. Table 9 shows the results from the planned contrasts. The first comparison of American Indian youth and Mexican American youth showed no significant difference by ethnicity, $t = 1.68$ (n.s.) or for the interaction between gender and ethnicity, $t = 1.69$ (n.s.). The second comparison of White non-Hispanic youth and American Indian youth indicated that there was a significant difference by ethnicity, $t = -5.01$ ($p < .001$) and a significant interaction between gender and ethnicity, $t = 2.65$ ($p < .01$). The ethnicity difference can be explained by American Indian youth having higher inhalant use scores than the White non-Hispanic youth. The gender by ethnicity interaction is due to the higher inhalant

involvement of American Indian females compared to White non-Hispanic females. The final comparison of White non-Hispanic youth and Mexican American youth showed that there was a significant difference by ethnicity, $t=-3.33$ ($p<.001$) but no significance in the interaction between gender and ethnicity, $t=.93$ (n.s.). The ethnicity difference resulted from the Mexican American youth having higher inhalant use scores than the White non-Hispanic youth.

Table 9

Planned Contrasts

	Mean (s.d)	Mean Diff.	Std. Err.	t-Value	Sig. T	Lower 95%	Upper 95%
Gender							
Male/Female		-.05	.01	-3.76	.001	-.08	-.025
male	1.31 (.99)						
female	1.42 (1.14)						
Ethnicity							
White non-Hispanic and American Indian		-.17	.03	-5.05	.001	-.24	-.10
White non-Hispanic							
male	1.25 (.90)						
female	1.28 (.92)						
American Indian							
male	1.33 (1.02)						
female	1.54 (1.28)						
White non-Hispanic and Mexican Americans		-.11	.03	-3.33	.001	-.18	-.04
White non-Hispanic							
male	1.25 (.90)						
female	1.28 (.92)						
Mexican Americans							
male	1.34 (1.06)						
female	1.42 (1.17)						
Gender by Ethnicity							
White non-Hispanic and American Indian		.09	.03	2.65	.01	.02	.15
White non-Hispanic							
male	1.25 (.90)						
female	1.28 (.92)						
American Indian							
male	1.33 (1.02)						
female	1.54 (1.28)						

Analyses Used for Research Question Two

In order to address the research question, “Does the level of inhalant use vary by family, school, and peer factors with respect to gender and ethnicity?” a discriminant function analysis was chosen as the best way to maximize differences between users and non-users on each of these independent variables for each gender and each ethnicity. A discriminant function analysis finds the predictor variable that has the strongest discriminatory power between users and non-users, as well as finding the strength of all the variables. It provides a rating of the highest to lowest strength predictor variables which will assist in the development of inhalant prevention programming.

Prior to running the discriminant analysis, Pearson correlations were conducted on the family and school scales in order to determine whether the individual family and individual school scales could be combined into a single family and a single school scale for the discriminant analysis. These analyses yielded a correlation of .48 between the two school scales, school success and school liking; correlation of .21 between family involvement in school and family caring about how well the student does in school; .26 between family involvement in school and the youth’s perception of general family caring about them, and .47 between family caring about how well the student does in school and the youth’s perception of general family caring about them. Based on these relatively low correlations, it was determined that each of the individual scales needed to be retained for maximum interpretability. Table 10 shows the correlations among all independent variables.

Table 11 shows group means and standard deviations and Figures 5-10 show the group means of the independent variable scale scores for White non-Hispanic, American

Indian and Mexican American youth by gender and level of use. The range of possible scores for each scale is: family cares about how you do in school, 4 to 16; family involvement in school, 2 to 8; school success, 2 to 8; school liking, 4 to 16; family cares about you, 3 to 12; and peer inhalant associations, 4 to 16.

Table 10

Correlation of Independent Variables

	Gender	FcSch	FamSch	SchSuc	SchLike	FamCare	Peers
Gender	--	--	--	--	--	--	--
	--	--	--	--	--	--	--
	--	--	--	--	--	--	--
FcSch	.01	--	--	--	--	--	--
	5342	--	--	--	--	--	--
	n. s.	--	--	--	--	--	--
FamSch	.05	.20	--	--	--	--	--
	5648	5355	--	--	--	--	--
	$p<.001$	$p<.001$	--	--	--	--	--
SchSuc	.12	.18	.38	--	--	--	--
	5647	5334	5645	--	--	--	--
	$p<.001$	$p<.001$	$p<.001$	--	--	--	--
SchLike	.15	.27	.35	.48	--	--	--
	5609	5287	5591	5592	--	--	--
	$p<.001$	$p<.001$	$p<.001$	$p<.001$	--	--	--
FamCare	.04	.46	.25	.26	.32	--	--
	5355	5322	5363	5342	5297	--	--
	$p<.001$	$p<.001$	$p<.001$	$p<.001$	$p<.001$	--	--
Peers	.11	.23	.17	.22	.27	.23	--
	5459	5058	5314	5304	5278	5053	--
	$p<.001$	$p<.001$	$p<.001$	$p<.001$	$p<.001$	$p<.001$	--

Note. Scale definition:

FcSch- family cares about how you do in school

FamSch- family involvement in school

SchSuc- school success

SchLike- school liking

FamCare- family cares about you

Peers- peer inhalant associations

Table 11

Group Means and Standard Deviations of Scale Scores by Gender and Ethnicity

	FcSch	FamSch	SchSuc	SchLike	FamCare	Peers
White Non-Hispanic						
Male						
Users	13.3	4.5	5.5	9.2	10.8	9.2
	2.6	1.7	1.3	2.9	1.7	2.1
Non-users	14.2	4.8	6.2	11.1	11.5	11.7
	2.1	1.7	1.2	2.7	1	1.8
Female						
Users	12.9	4.5	5.7	10	10.7	9.6
	2.4	1.7	1.3	2.7	1.6	2.1
Non-users	14.2	5.5	6.6	12	11.6	12.2
	2.4	1.6	1.1	2.3	.94	1.4
American Indian						
Male						
Users	13.5	4.5	5.4	9.3	10.8	9.7
	2.7	1.8	1.3	3.3	1.6	2.4
Non-users	13.7	4.6	5.7	10.4	11.1	11.3
	2.7	1.7	1.2	3	1.5	2.2
Female						
Users	13.3	4.3	5.5	10.1	10.5	9.5
	2.2	1.6	1.1	2.6	1.7	2.1
Non-users	13.9	5.0	6.2	11.6	11.4	11.9
	2.4	1.7	1.1	2.5	1.1	1.8
Mexican American						
Male						
Users	12.7	4.1	5	8.4	10	9.3
	3.3	1.7	1.4	3.3	2.6	2.2
Non-users	14	4.6	5.8	10.8	11.4	11.2
	2.6	1.8	1.3	2.9	1.2	2.1
Female						
Users	13.2	4.2	5.1	9.6	10.8	10
	2.6	1.8	1.3	3	1.7	2.1
Non-users	14.2	4.7	6	11.6	11.4	11.7
	2.2	1.8	1.1	2.5	1.2	1.9

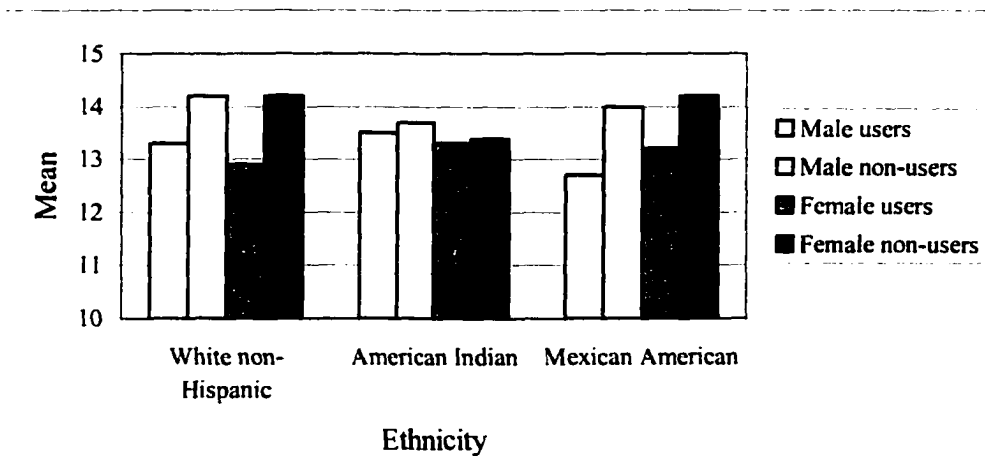


Figure 5. Mean Scores for Family Cares About How You Do In School (Range 4-16)

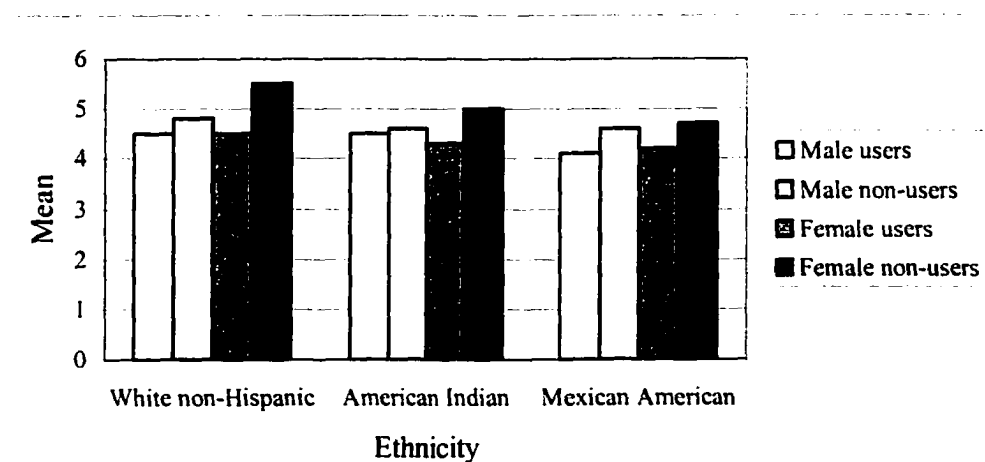


Figure 6. Mean Scores for Family Involvement in School (Range 2-8)

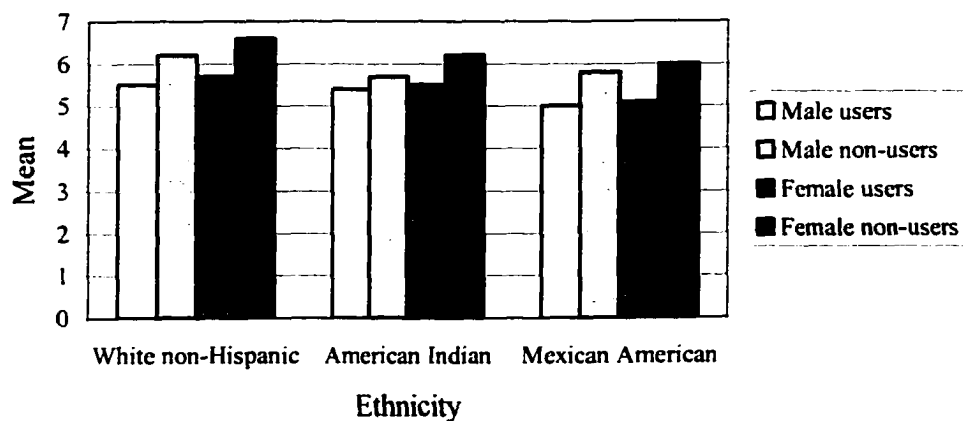


Figure 7. Mean Scores for School Success (Range 2-8)

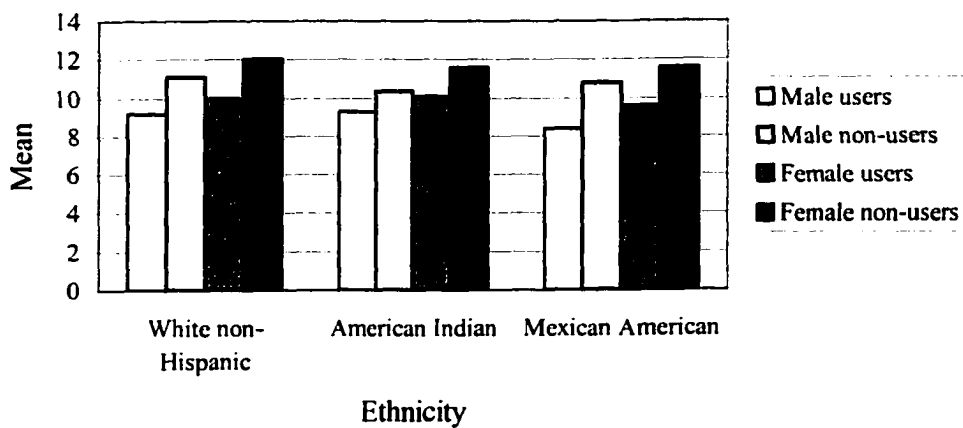


Figure 8. Mean Scores for School Liking (Range 4-16)

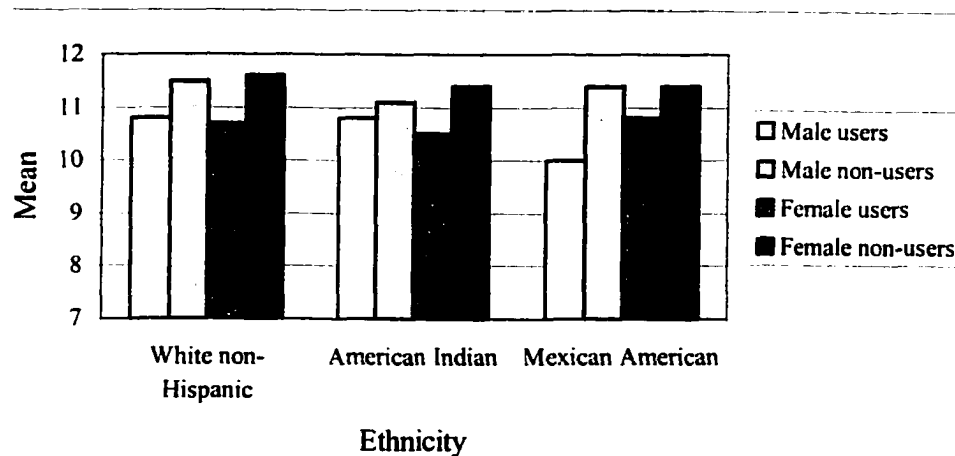


Figure 9. Mean Scores for Family Care (Range 3-12)

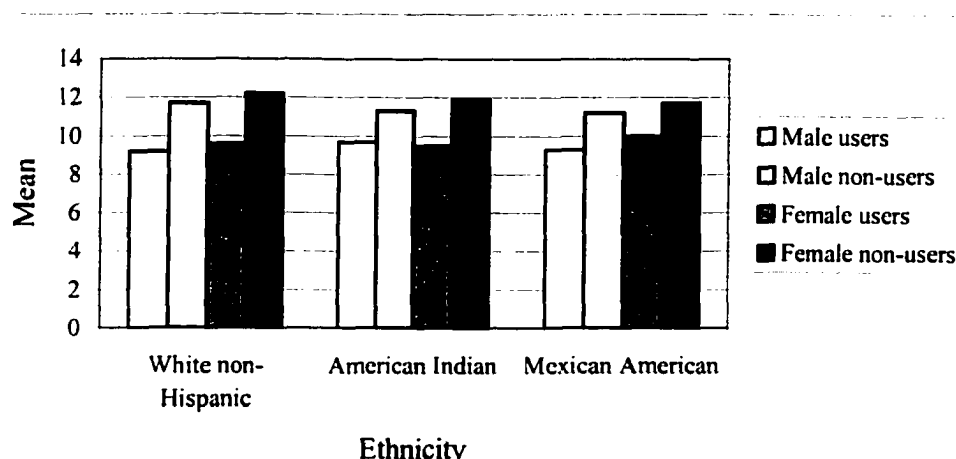


Figure 10. Mean Scores for Peers (Range 4-16)

Table 12 and Figures 11 and 12 present the results of the discriminant analysis with correlations between predictors and the discriminant function. Evaluation of the correlation coefficients with the function indicates that within each ethnic group and gender there were distinct differences. For White non-Hispanic males the highest correlation was peer inhalant associations (.93) followed by school liking (.46) and

school success (.44). The highest correlation for White non-Hispanic females was peer inhalant associations (.92) followed by family cares (.46) and school liking (.44). Peer inhalant association was also the highest correlation among American Indian males (.91) followed by school liking (.44) and school success (.36). The American Indian females also were best predicted by peer inhalant associations (.87) followed by family caring (.52) and school liking (.42). The highest correlation for Mexican American males was family caring (.72) followed by peer inhalant associations (.69) and school liking (.61). The female Mexican American's highest correlation was peer inhalant association (.74) followed by school liking (.65) and school success (.65).

The canonical correlation was conducted to provide the correlation between the discriminant scores and the levels of inhalant use. This type of correlation informs if the function is highly related to the levels in the dependent variable. The correlation for White non-Hispanic males was .37 and for females was .47. By squaring this coefficient, this indicates that 14% and 22% of variances in inhalant level, (user, non-user) respectively was explained using these predictor variables. For American Indian males, the canonical correlation of .23 and .46 for females indicates that 5% and 21% of variances respectively was explained. The canonical correlation for Mexican American males was .38 and for females was .37 which indicates that 14% and 14% of variances respectively was accounted for by the function.

Table 12

Correlation Coefficients**Correlation Coefficients with Discriminant Function****White Non-Hispanic**

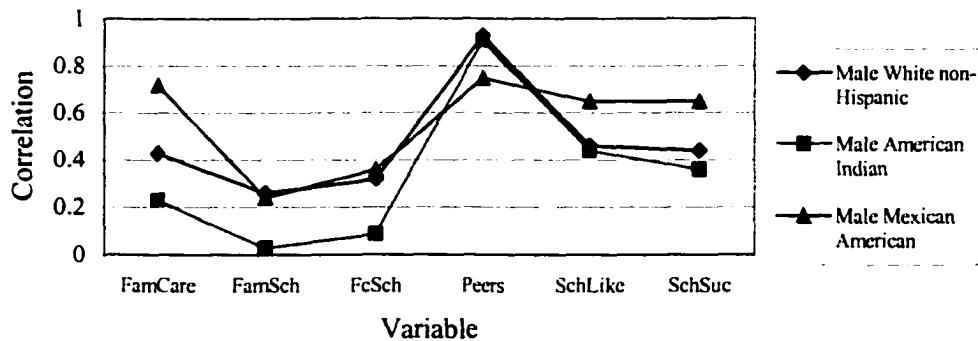
	Male		Female
Peers	.93	Peers	.92
SchLike	.46	FamCare	.46
SchSuc	.44	SchLike	.44
FamCare	.43	SchSuc	.39
FcSch	.32	FcSch	.33
FamSch	.26	FamSch	.32

American Indian

	Male		Female
Peers	.91	Peers	.87
SchLike	.44	FamCare	.53
SchSuc	.36	SchLike	.42
FamCare	.23	SchSuc	.38
FcSch	.09	FamSch	.28
FamSch	.03	FcSch	.18

Mexican American

	Male		Female
FamCare	.72	Peers	.74
Peers	.69	SchLike	.65
SchLike	.69	SchSuc	.65
SchSuc	.46	FamCare	.41
FcSch	.37	FcSch	.36
FamSch	.23	FamSch	.23

*Figure 11. Correlation Coefficients for Males by Ethnicity*

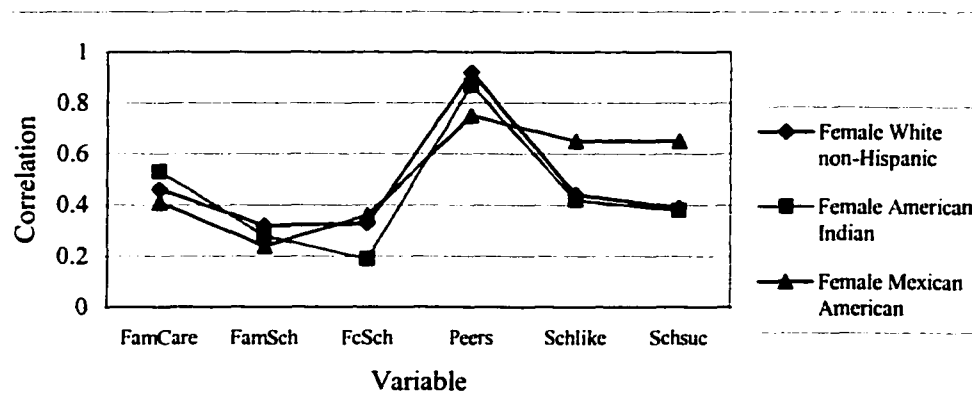


Figure 12. Correlation Coefficients for Females by Ethnicity

Table 13 shows the Wilks' Lambda for White non-Hispanic males was $\Lambda=.85$, $\chi^2(6,814)=124.80$, $p<.001$; for females was, $\Lambda=.77$, $\chi^2(6,882)=228.50$, $p<.001$; for American Indian males was $\Lambda=.94$, $\chi^2(6,757)=43.78$, $p<.001$; for females was $\Lambda=.78$, $\chi^2(6,839)=206.75$, $p<.001$; Mexican American males was $\Lambda=.85$, $\chi^2(6,714)=112.07$, $p<.001$; and for females was $\Lambda=.85$, $\chi^2(6,729)=111.52$, $p<.001$ which indicates that the function using these predictors significantly differentiates between users and non-users for each gender within each ethnicity.

Table 13

Wilk's Lambda

	Test of Function	Wilk's Lambda	Chi-square	df	Significance
White Non-Hispanic					
Male	1	.85	124.80	6	.001
Female	1	.77	228.50	6	.001
American Indian					
Male	1	.94	43.78	6	.001
Female	1	.78	206.75	6	.001
Mexican America					
Male	1	.85	112.07	6	.001
Female	1	.85	111.52	6	.001

The discriminant functions were able to successfully classify 79% of the White non-Hispanic males and 84% of the females, 70% of the American Indian males and 80% of the females and 77% of Mexican American males and 74% of the females into inhalant user and non-user groups.

CHAPTER V: DISCUSSION

Introduction

This chapter will present and summarize the major findings of the study in the context of the factors that should be incorporated into an inhalant prevention program related to gender and ethnicity. It will discuss the findings for the research question “Does the level of inhalant use vary by gender and ethnicity?” The results will also be presented to respond to the research question “Does the level of inhalant use vary by family, school, and peer inhalant association factors, with respect to gender and ethnicity?” Included will be an examination of the findings of the discriminant analysis results for family, school and peer factors. Implications of the study will be discussed related to the suggestions for inhalant prevention programming in the context of family, school and peers. Following that will be information that focuses on inhalant prevention implications for gender and ethnicity. Finally, the reader will find a summary presenting the limitations of the study, the implications of this study for research and a discussion of the recommendations for future research.

Research Question One

Findings in the present study did reveal significant differences by gender and ethnicity in the level of inhalant use, answering the first research question, "Does the level of inhalant use vary by gender and ethnicity?" An ANOVA and chi-square tests

demonstrated significance between gender and use/non use groups and between ethnicity and use/non use groups. By conducting planned contrasts following the ANOVA, the analyses indicated no differences in ethnicity or in the interaction between gender by ethnicity between American Indians and Mexican Americans in level of use. However, planned contrasts did reveal significant differences by ethnicity and between gender and ethnicity for White non-Hispanics and American Indians and significant differences for ethnicity between White non-Hispanics and Mexican Americans. This analysis indicated that White non-Hispanic subjects are most different from American Indian subjects and that American Indian subjects are most similar to Mexican American subjects. The two minority groups were more similar on the level of inhalant use than the White non-Hispanic group. When gender was examined, the mean scores for level of inhalant use for all subjects indicated that across all three ethnic groups, females exhibited higher averages for inhalant use than their male counterparts. For females, American Indians report the highest level of use of inhalants (mean = 1.54) and the White non-Hispanics report the lowest level of use (mean = 1.28). Mexican American females were in the middle (mean = 1.42). For males, Mexican Americans and American Indians are similar in level of use (means = 1.34 and 1.33, respectively) and the White non-Hispanics reported the lowest level of inhalant use (mean = 1.25).

Though few studies have been published on inhalants and gender, early research reported higher male use than female use. For example, Johnston and colleagues (1992) reported that 21% of high school male seniors reported having used inhalants compared to 14% of their female counterparts. In a 1994 study, the trends began to shift somewhat, and no gender differences in inhalant use were found among a sample of illicit substance

abusers (Compton et al., 1994). Then, Edwards and Oetting, (1995) reported that males were more likely to use inhalants up to the sixth grade and again after the tenth grade; however, gender differences during the 7th through 9th grade were very small. Beauvais (1992a) noted that the rates of inhalant use for American Indian males and females have been converging over the past two decades. Then, Bates et al. (1997) reported a notable long term trend wherein American Indian females had surpassed American Indian males in their use of inhalants. The current study expounds on the more recent research stating that inhalant use, among females, and specifically American Indian and Mexican American females has revealed higher levels of use than males.

Another topic of research has been inhalant use among the different ethnic groups. The research that has been published has focused on specific ethnic communities, American Indians or Latinos. For example, some researchers report higher rates of inhalant use among American Indians (Beauvais et al., 1985), Alaska Natives (Segal, 1997) and Latinos (Padilla et al., 1979). However, there are some conflicting reports. Chavez and Swaim (1992) report that lifetime prevalence is no higher nationally among Latinos than among White non-Latinos. Still others state that where some Latino communities may experience extremely high rates of inhalant use, others report no problems (May & Del Vecchio, 1997). Smitham pointed out (unpublished dissertation, 1999) that these inconsistencies may be a result of the cyclic pattern of inhalant use -- the outbreaks that occur from time to time in various communities. Communities have reported that they go for some time with no problems with inhalants, and when an outbreak does occur, it affects groups of youth. There may be injuries or fatalities that

are attributed to inhalant use by youth during those times. This pattern may very well exert an influence on the reported differences in inhalant use.

It was revealed in the current study that the Mexican American and American Indian groups are similar in their level of inhalant use and that both are significantly different from the White non-Hispanic group. The current study supports previous studies reporting that American Indian and Mexican American youth have higher rates of inhalant use. It could be speculated that the American Indian and Mexican American youth in this study exhibit higher and more similar levels of use than their White non-Hispanic counterparts due to the similar life experiences that have been noted in previous studies, i.e. less access to opportunity, accessibility and availability of inhalants, economic stressors, prejudice, and isolation in barrio or rural Native clusters (Braveheart & Spicer, 2000; Oetting & Beauvais, 1990b). Beauvais (1992b) noted that the literature has been very consistent in identifying poor economic conditions as being strongly correlated with high levels of inhalant abuse in minority communities. He adds that the dimensions of poverty leading to use are unclear, and that solvents may be used because they are cheap and more available. He speculates further that there may be a specific level of poverty associated with use or even less stigma attached to inhalant abuse in poor communities.

Research Question Two

Findings related to research question two, "Does level of inhalant use vary by family, school, and peer inhalant association factors, with respect to gender and ethnicity?" were examined using a discriminant function analysis. This analysis revealed that an average rate of 81% of the White non-Hispanics, 75% of the American Indians,

and 75% of the Mexican Americans were correctly classified into user or non user groups. An average across genders was computed resulting in seventy nine percent (79%) of all females and seventy five percent (75%) of all males in the three ethnic groups being classified correctly. The American Indians had the highest rate of correct classification and Mexican Americans, the lowest. It should be noted that these rates are considered somewhat low hit rates since most researchers prefer at least a 90% correct classification depending on the issue being analyzed (Stevens, 1992). However, in discussing these rates with statisticians in the field of drug and alcohol research, they indicated that for the purpose of this study, (exploring the differences in gender, ethnicity, family, school and peer factors with the purpose of developing appropriate inhalant prevention strategies) the hit rates appeared to be adequate (R. Swaim, Ph.D., January, 2002; R. Edwards, Ph.D., January, 2002; J. Chen, Ph.D., January, 2002, personal communication).

Canonical correlations were performed as part of the discriminant function analysis in order to determine the variance (between users and non users) related to the predictor variables used in this study. The analysis showed that between 14% and 22% of the variance for females in all three ethnic groups could be explained by the predictor variables. For males, the variance was 5% to 14% that could be explained by the predictor variables. American Indian males had a variance of only 5% between users and non-users. It is clear that for all groups, and especially American Indian males, other variables such as individual psychological factors, family drug use, environmental elements, and socioeconomic factors are responsible for additional variance in explaining

use and non use. However, the variables used in this study did show significance as predictors and should be taken in the context of the variance that they do contribute.

The correlation coefficients were examined in order to determine which of the predictor variables had the strongest relationship in differentiating users and non-users. This is important information to consider in order to determine what variables would be most important to include in building effective prevention strategies to reduce inhalant use. White non-Hispanic males, American Indian males, and Mexican American females had the same relationship order: peers, school liking, school success, family cares about you, family cares about how you do in school and family involvement in school. White non-Hispanic females and American Indian females had similar relationship orders. The relationship order for White non-Hispanic females was: peers, family cares about you, school liking, school success, family cares about how you do in school, and family involvement in school. The relationship order for American Indian females was peers, family cares about you, school liking, school success, family involvement in school, and family cares about how you do in school. Only the last two variable relationships (family cares about how you do in school and family involvement in school) differed in their order for the White non-Hispanic females and American Indian females. The Mexican American males were different from all others groups, with family cares about you as the highest relationship followed by peers, school liking, school success, family cares about how you do in school and family involvement in school. The over-arching variable demonstrating a high relationship for all three ethnic groups, and gender, was peer inhalant association. The peer variable, overall, was followed by school liking, family cares about you, and school success. The only variation noted was in Mexican American

males, who had family cares about you as the greatest relationship, though peer association rated second highest for this group. The predictor variables of family involvement in school and family cares how you do in school had the lowest relationship in differentiating users from non users for all groups.

Family factors. The three scales used for this factor included: family cares about you, family involvement in school and family cares about how you do in school. Based on the results from the current study, the ability to discriminate inhalant users from non-users, on two of the family scales (family involvement in school and family cares about how you do in school) is low. However, even though the relationship order was low, it does not mean that these variables are unimportant. In fact, non-users still exhibited more family involvement in school and reflected that their families care more about how they do in school. It may seem a surprising finding that family cares about how you do in school and family involvement in school revealed a very low correlation between inhalant use and non use for American Indian males (.09 and .03, respectively). Even though American Indian females demonstrated higher correlations (.28 and .18, respectively) than American Indian males, they also had low correlations for family cares how you do in school and family involvement in school. It could be speculated that these results reflect the influence of forced boarding schools and their effect on how both youth and their parents feel about school, in general, whether they are users or non-users of inhalants. Tierney (1990) pointed out that there are numerous unfortunate and insensitive transitions that American Indians have had to endure, but the boarding school experience is perhaps one of the most influential, even today. For many Indian people, this

experience is still strong in their hearts, and as a result, some remain reluctant to fully encourage and support the educational process for their children.

Past literature has consistently indicated that youth who use inhalants come from dysfunctional or disruptive families (Edeh, 1989). Poor parent child relationships for inhalant users are cited in other literature as well. DeBarona and Simson (1984) noted that the parents of inhalant users generally exhibit a lack of concern for their child's welfare. Another study reported that parents of inhalant users had some type of drug abuse problem themselves (Bachrach & Sandler, 1985), possibly resulting in less parental involvement in activities (Christiansen & Manson, 2001). It is apparent from these studies that the bonds between families and inhalant users are stressed. These may be important factors in explaining why the correlations between inhalant use and family cares about how you do in school and family involvement in school are low.

An interesting finding that resulted from this analysis was that the family cares about you variable demonstrated high correlations (.53, American Indian females, 46, White non-Hispanic females, 43, White non-Hispanic males; and .41, Mexican American females) for all groups except Mexican American males who were very high at .72 and American Indian males, who were very low at .23. This indicates that for all groups except the American Indian males, the family cares about you variable discriminates between users and non users suggesting that users are reporting less family caring than non users. The mean scores in Table 7 support these results. This also implies that Mexican American males who use inhalants very likely believe that their families care about them less than the non-using Mexican American males. But for American Indian males, the correlation between users and non-users on the family cares about you variable

is low suggesting that the difference is not as pronounced between users and non-users (means = 10.8, user and 11.1, non-user).

Smitham, in her study on inhalants and primary socialization theory, found that caring families tend to discourage drug use (unpublished dissertation, 1999). This is consistent with a study published by Oetting and Donnermeyer (1998) that stated that primary socialization theory conceptualizes the family as a major potential source for transmitting prosocial norms. Few studies have focused on family caring and gender and ethnic differences. In a state report published about youth in Michigan, the authors discuss three primary assets that deter students from alcohol, tobacco and other drug use (Cheatham, 1997). They included family support as one of those assets and concluded that family support can protect against risky behavior. The students in this study who were categorized as less likely to use substances indicated that they could turn to their families for support if they had a substance abuse problem. Family support did seem to be an important factor in deterring students from smoking, using marijuana, and drinking.

The finding related to lower family caring for inhalant using Mexican American males is important to examine further. It has been discussed earlier in this paper that Mexican Americans place importance on family relationships and that these families have been described as goal oriented (Chavez & Swaim, 1992). The entire family is said to have a voice in family decisions thus family beliefs about drug and alcohol use are very important. So familism may be an important factor to consider related to this finding. Without the important family inclusion, or family caring, Mexican American inhalant using males feel less cared for than their non-using counterparts. Certainly, in

the current study, family caring does seem to be an important factor for predicting inhalant use or non-use.

School factors. The school factors consist of two scales, school liking and school success. Based on the results from the current study, the ability to discriminate inhalant users from non-users, on the two school scales (school liking and school success) is high for all groups. This suggests that within each group, by gender and ethnicity, non-users like school more than users and further that non-users feel more school success than users. This finding supports previous research that inhalant use has been consistently linked to lack of academic success (Edwards & Oetting, 1995). Oetting and Webb (1992) pointed out that inhalant users tend to have greater difficulty in school when compared to non users or users of other drugs. It makes sense that if students do not like school and feel unsuccessful, they may skip school or drop out. Certainly, they are more likely to have higher rates of absenteeism and are more likely to be expelled as well. Beauvais' study supports this premise. He reports that inhalant users tend to disappear from the school surveys about the eighth grade (1992a). This may suggest that the inhalant using students may not like school and/or may not be successful. These difficulties suggest that the bonds between the school and the student have broken down. When this occurs, the potential prosocial influence of the school is lost which can leave the student more susceptible to the influence of the peer group.

Peer factors. The peer factor is comprised of two scales that are combined to make the peer inhalant association variable. This scale involved peer sanctions, encouragement and use. Based on the results from the current study, the ability to discriminate inhalant users from non-users, on the peer association scale is extremely

high for all groups. This suggests that within each group, both gender and ethnicity, non-users are reporting that they have friends who don't use and those friends encourage them not to use, whereas users have friends who use and those friends encourage them to use.

Oetting, Edward and Beauvais (1988) have conducted extensive research on peer inhalant associations and peer clusters. They found that inhalant users have friends who are marginalized, who are likely to be involved with drugs and are likely to be using inhalants. Other research on inhalant use has also found a consistent strong relationship between peers and inhalant abuse. The peer groups of inhalant users tend to be more deviant and delinquent than peer groups that engage in other drug use (Jumper-Thurman & Beauvais, 1992). Literature suggests that inhalant use at grades 7th through 12th is a group activity and peers of inhalant users tend to be using inhalants as well (Oetting, Edwards & Beauvais, 1988). In fact, a major socialization link for youth is peers. Drug use is highly related to whether or not friends use drugs and whether youth believe that their friends would discourage their use of drugs (Oetting & Beauvais, 1987). These peer cluster members use or don't use drugs together, share ideas with each other and over time, establish attitudes and beliefs about drugs.

It could be speculated that since drug use is a group activity and peer association is strong, both in previous research and in this study, the peer influence and attitudes of those that may be using, reinforces and perpetuates negative attitudes. These attitudes would extend to negative thinking about school, willingness to engage in deviant activities, alienation from family and generally gauging their success by different standards.

General Implications for Prevention

Given the findings of the current study, it is apparent that youth across the three ethnic groups studied are using inhalants. For example, 10% White non-Hispanics, 15% of American Indians, and 13% of Mexican Americans reported using inhalants. It is well established both in previous research and in this paper, that inhalants are dangerous and destructive. Adding to the complexity are the facts that inhalants are accessible, available, and a clear policy related to use is sadly lacking. Beauvais (2000) indicated that it is impossible to limit the availability of inhalable substances. These factors make prevention of inhalants a key issue as well as a complex one.

Types of prevention. A variety of substance abuse prevention programs have been developed over the past three decades for preventing drug use among youth (Botvin, 1990; Flay, 1985; Grover, 1998). These programs differ in focus as well as in method. Programs have been found to focus on increasing social competency skills, improving decision-making skills, and on drug education/awareness. Other prevention efforts primarily build on education and others use interactive methods to allow participants to learn positive behaviors in hypothetical settings. There are hundreds of prevention programs that have been developed, but generally, they fall into three broad categories: (a) knowledge/information programs, (b) affective programs, and (c) social influences programs. A fourth category includes alternative activities as well as activities that are after school or outside of the school setting (Bruvold, 1993). Knowledge/information based programs were the earliest school-based prevention efforts to be developed. However, development of inhalant prevention programs that are knowledge based have been met with a great deal of resistance. Parents are reluctant to have information about

inhalants introduced to their children. This is due, in part, to the availability and accessibility of inhalants. When adverse consequences are presented, youth are reluctant to believe that the injury could happen to them. There is also the problem of scare tactics. Too often, prevention is framed in the context of the serious consequences, brain damage and death. It is believed that once youth know about the negative consequences, they will choose not to use inhalants. Yet, youth know that some of their peers have used inhalants and didn't experience those consequences. The prevention effort then loses credibility.

The second type of prevention program, affective, is based on the assumption that youth use drugs because of personal and social deficits. The focus is on building self-esteem, enhancing self-awareness, clarifying values, making responsible decisions, and improving interpersonal skills (Bruvold, 1993). These programs generally do not mention drugs but instead build skills. There have been no published studies that utilize affective prevention methods specifically to inhalant prevention. However, it would seem that elements of this method would be useful for inhalant prevention.

Finally, there are the social influences programs. These programs are based on the assumption that youth use drugs because they do not have the social competencies needed to resist social pressures to use drugs (Bruvold, 1993). They focus on teaching youth the skills needed for resisting drug use influences. They may include active, participatory learning experiences, such as modeling, role-playing, and practicing behavioral skills (Bruvold, 1993). What is particularly promising about the social influence strategies for inhalant prevention is that they actively incorporate peers, as mentors, teachers, and discussants. This study revealed that peers are a strong factor in

inhalant use and would therefore, be essential for inclusion in any prevention efforts for inhalants.

General prevention implications for peer factors. The prevention methods in the previous section are presented in the context of the discussion of this study and how the elements of this study could be included in effective inhalant prevention. Since previous research has already established that there is a substantial percentage of students already using inhalants at the seventh grade level, it is already recognized that prevention efforts must begin early, even in elementary school. These efforts should also be reinforced in the home for consistency and efficacy. Given the strong influence of peers and inhalant using behavior, effective prevention must include reinforcing positive peer associations. This would hold true for all three ethnic groups and both genders included in this study. An important consideration for prevention efforts would be the involvement of an entire peer cluster in healthy activities that are appropriate for gender and ethnicity. A prevention specialist must also be able to develop and teach the social skills necessary for those who have already begun experimental inhalant use to change their peer group and remain in a new non using peer group. This follows the findings of the Texas Commission on Alcohol and Drug Abuse (1997) that stated that a major task of treatment programs is to resocialize inhalant users into a new peer environment. If prevention could effectively address the issue of healthy peer clusters, many youth would not have to enter treatment.

General prevention implications for school factors. Many of the prevention curricula are school-based programs. In the midst of educating youth, schools have also acquired the responsibility of socializing them, teaching them coping skills, life skills,

and preventing substance abuse. Cheatham (1997) reported that most high school students like school and that these students were less likely to use ATOD. This was also found to be true in this study. The results demonstrated a high correlation between users and non-users on the predictor variables of school liking and school success. This suggests that it is important that in the midst of the many tasks that schools already have, they must also incorporate creative methods to improve and maintain the at risk students' positive attitudes about school. This would also very likely impact those students' capacity for school success.

General prevention implications for family factors. Changing parental involvement and family bonding has been a difficult task for prevention programs. Yet, it is apparent that youth who come from families with clear communication, healthy parenting skills, provide positive activities and experiences for their children, and who do not use illicit drugs are more likely to have children who will not use drugs, specifically inhalants. This study recognized the value of family caring about their youth and family caring about school as being important discriminators between users and non-users of inhalants. Part of family caring and involvement in school should include parents actively seeking knowledge about inhalants, what they are, their accessibility, their consequences, signs of use, and how to talk about them. Parents working in conjunction with schools would make a significant impact on inhalant use reduction. Since family influence is greater at younger ages, it would seem appropriate to involve parents in prevention programming at the elementary level.

Inhalant Prevention Implications by Gender and Ethnicity

The following implications are specific to ethnicity and gender and are based on the findings of the current study. The strategies discussed in the section on general implications will apply to all groups, however, what follows will be a specific discussion based on prevention strategies for each group and the variables that correlated highest with users and non users by gender and ethnicity.

Implications for gender. All of the variables studied were found to be important for both males and females but at differing levels. Peer associations correlated highly for both males and females related to inhalant use and non use as did school liking, family cares about you and school success. These elements were addressed in the section above on general implications. However, there were some interesting findings that differentiated females from males and may have implications for female gender specific prevention programming. Most prevention programs are aimed at a wide audience and really don't take into consideration the elements that may be unique to females.

It has been established that White non-Hispanic females are using inhalants more than their White non Hispanic male counterparts, but less than American Indian males and females and Mexican American males and females. American Indian females are using inhalants more than any other group in this study. Mexican American females use inhalants more than any other group with the exception of American Indian females. This confirms the previously cited trend of increasing inhalant use among females, and specifically, increasing inhalant use among specific ethnic groups of females. This is an alarming trend. It has been found in treatment milieus that treatment is more effective if it is gender specific. It is clear that inhalant prevention must also make an extra effort to

target females, especially females in specific ethnic groups. It is not clear what types of inhalants females are using and why this trend has appeared, however, it can be speculated that they are using common cosmetics such as hair spray, nail polish, nail polish remover, and nail glue. A study by McGarvey et al., (1999) found that over half of the female inhalant users were more likely to report using hair spray while males reported no use of hair spray. Access is easy for these products and most may be found in any young girl's room. Another reason for the rising trend for females may be the weight loss factor. Young girls have provided anecdotal comments about losing weight when they sniff hair spray – they say that it decreases their appetite. It may be that education for parents on the trends and nature of female inhalant use would be a good prevention strategy. Additional strategies might include presentations on healthy body image and self-acceptance.

The variable of family cares about you had a high correlation with inhalant use and non-use for females in general. Though this variable is important for both males and females, the female context of family cares about you is different from the male perception. Females communicate differently and process things differently from males. Prevention strategies should consider these differences in the development of programs and activities. It may be that conducting focus groups with females and their parents from the different ethnic groups would prove valuable in gathering qualitative information on what these differences are and how best to apply them in prevention. If in fact, there is an irreversible lack of family caring, perhaps prevention strategies could include adult mentoring.

Implications for ethnicity. It is important to acknowledge that we all come from differing backgrounds, ethnic groups, and regions, and each of us has our own unique values and traditions. Given this diversity it would be beneficial if educators develop an understanding of the culture and traditions of their students. It may be that family lack of involvement in school or caring about school may have different connotations for specific ethnic groups based on group history and experiences. Understanding the way that families communicate in different cultures and incorporating that into prevention strategies specific to that culture would be advantageous. For example, where White culture may use more direct communication in parenting techniques, American Indians utilize a less direct communication style. These types of differences are important in the understanding of ethnic differences and their implication for prevention. To increase school liking and school success for specific ethnic groups, the school may incorporate assignments that deal with local history, family histories, family documentaries and sharing of student cultures in the classroom setting. This would integrate family and school very effectively. For example, the Sisnaajini Program in southern Colorado, serving primarily a Hispanic population, utilized a drug and alcohol prevention curriculum that integrated culture into each aspect of the program (D. Briones, January, 2002, personal communication). Their model utilized traditional metaphors and highlighted the use of cultural arts and traditional practices as a means of strengthening spirit (preventing drug use). They used a circular model of prevention that was more congruent with Hispanic cultural practices. A unique feature of their project was the use of traditional artists and elders (including storytellers, weavers, sculptors, and musicians) as teachers and mentors throughout the project. Children and their families actively

participated in projects based around cultural arts and traditional practices. They emerged from the program with not only lessons and new skills (better parent child communication, improved school liking, and parent child bonding) but an increased appreciation and respect for their rich traditional cultures and in themselves as members, of the culture.

One very interesting finding that emerged from this study, related to ethnicity, was that Mexican American males were the only group whose highest correlation between users and non users was family cares about you. This element would be important to include in any inhalant prevention programming for this population. Strategies might include some of the elements utilized in the Sisnaajini program, specifically the family involvement activities, documentation of family histories, and the building of family communication skills.

Finally, based on the results of this study, any inhalant prevention program should include at a minimum, four of the six predictor variables, peer association, family care about you, school liking and school success. These were the top four predictor variables to differentiate between users and nonusers across all three ethnic groups and both genders.

Limitations of this Study

The following limitations were found for this study. The survey is comprised of self report data which may be a threat to validity. The analysis revealed that the variables used in this study accounted for 5% to 22% of the variances between users and non-users depending on the group. This suggests that there are other variables, perhaps psychological, socioeconomic, and/or environmental that account for the majority of

differences between users and non-users. Another limitation was that the discriminant functions only successfully classified 79% of the White non-Hispanic males and 84% of the females, 70% of the American Indian males and 80% of the females and 77% of Mexican Americans males and 74% of the females into inhalant user and non-user groups. Generally, researchers prefer a 90% classification.

Implications for Research

This study suggested several implications for future research. For example, a more in depth examination of the profiles of inhalant users is needed. This study confirmed previous research indicating an increasing trend of inhalant use among females. Certainly, more information is needed to explain this phenomena, define the nature of the use, and suggest strategies to reduce use. Another helpful path to follow would be a study of ethnic groups with low to no use, their strengths and resiliencies and factors that keeps them from using. Perhaps some of these same strategies could be applied to increase the resiliency of American Indian and Mexican American children. Since the analysis revealed that the variables used in this study accounted for only 5% to 22% of the variances between users and non users, future research might examine other predictor variables discussed earlier that may have higher discriminatory strength between users and non users. May and Del Vecchio (1997) stated that researchers have recognized serious gaps in the literature related to various behavioral issues, particularly among the behavioral subtypes of solvent users. Smitham (1999) in her dissertation supported this notion. In addition, inhalant users have been found to exhibit more emotional problems than non-users (Freundrich et al., 1997). Finally, the findings related to school factors (school liking and school success) suggest further exploration to

increase youth's liking of school as well as their successful experiences. This may hold high potential in strategies that could be used in inhalant prevention efforts.

Recommendations for Future Research

There are a variety of research questions that emerge as important issues to be explored for effective inhalant prevention. They include: What other variables have a major impact on inhalant use? How does economic status impact the level of inhalant use? What are the types of inhalants being used by gender and ethnicity? What are the profiles of female inhalant users and how does this relate to prevention efforts? What inhalant prevention curricula are currently being used and what components are successful? What components are lacking? It is suggested that a longitudinal study should be conducted to include third or fourth graders to explore peer, behavioral, emotional, family and school factors. Youth could be followed through the eighth grade, during the high risk inhalant years, to determine what factors build resilience. Different ethnic groups should be included as well as both genders. This type of study would benefit the field of prevention by providing a clearer picture of what youth are experiencing, where the onset of use begins and how family and school variables impact decision making.

Another research area to be explored could utilize qualitative research, in-depth interviews with parents of inhalant users in an effort to explore and better define the signs and symptoms they noted as their children starting using inhalants. Many parents indicate that they saw none of the published signs of use (blood shot eyes, odor of inhalants, confusion, staggering or tremors) in their children. In a recent interview on Good Morning America with parents of youth who had died from inhalant use (February

26, 2002), they indicated that they had no idea their children were using and saw none of the signs of use. It appears that the signs that are in prevention material relate to youth that are using regularly, not those who use occasionally or are just beginning their experimentation. It is a reality that some youth can die even when experimenting with inhalants, though this is rare. It is necessary to explore the possibility of signs and symptoms even at these early stages of use. The controversial issue of how much information should be presented to youth about inhalants remains high among both school staff and parents. There is a fear that if inhalant education is presented, youth will be more likely to try them. Adding to the complexity of the issue is the fact that inhalants are so accessible. Research might further examine this concern and determine what level of information is informative but not provocative. Unfortunately, inhalant experimentation begins at early ages; therefore, what type of information can be beneficial to prevention and what is the appropriate age for presentation of the information? Another important research study would be one that utilized the Community Readiness Model, developed at the Tri-Ethnic Center for Prevention Research at Colorado State University (Edwards, Jumper-Thurman, Plested, Oetting, E.R., & Swanson, 2000; Oetting, Donnermeyer, Plested, Edwards, Kelly & Beauvais, 1995). It would examine the readiness of a community using key community factors to assist in the development of community approaches to the prevention of inhalant use. Certainly, inhalants have been established to be very dangerous and inhalant prevention is more than just an individual, family, or school problem but one that could best benefit from full community involvement and support.

REFERENCES

- Albaugh, B., & Albaugh, P. (1979). Alcoholism and substance sniffing among the Cheyenne and Arapaho American Indians of Oklahoma. *International Journal of the Addictions, 14* (7), 1001-1007.
- Altenkirch, H., & Kindermann, W. (1986). Inhalant abuse and heroin addiction: A comparative study on 574 opiate addicts with and without a history of sniffing. *Addictive Behaviors, 11*, 93-104.
- Annis, H. M., & Watson, C. (1975). Drug use and school dropout: A longitudinal study. *Canadian Counsellor, 9*, 155-162.
- Bachman, J. G. (1989). Changes in deviant behavior during late adolescence and early adulthood. Paper presented at the meetings of the International Society for the Study of Behavioral Development. July 12-16, 1987, Tokyo, Japan. In D. S. Elliott, D. Huizinga, & S. Menard (Eds.), *Multiple problem youth, delinquency, substance use, and mental health problems*. New York: Springer-Verlag.
- Bachrach, K. M., & Sandler, I. N. (1985). A retrospective assessment of inhalant abuse in the Barrio: Implications for prevention. *International Journal of the Addictions, 20*(8), 1117-1189.
- Barker, G. H., & Adams, W. T. (1963). Glue sniffers. *Sociology and Social Research, 47*(3), 298-310.
- Barnes, G. E. (1979). Solvent abuse: A review. *International Journal of the Addictions, 14*(1), 1-26.
- Bates, S. C., Plemons, B. W., Jumper-Thurman, P., & Beauvais, F. (1997). Volatile solvent use: Patterns by gender and ethnicity among school attenders and dropouts. *Drugs and Society, 10*(1/2), 61-78.
- Beauvais, F. (1992a). Trends in Indian adolescent drug and alcohol use. *American Indian and Alaska Native Mental Health Research Journal, 5*, 1-12.
- Beauvais, F. (1992b). Volatile solvent abuse: Trends and patterns. In C. W. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp. 14-42). Rockville, MD: National Institute on Drug Abuse.

- Beauvais, F. (1997). Research topics for the problem of volatile solvent abuse. *Drugs and Society*, 10(1/2), 103-107.
- Beauvais, F. (2000). Inhalant abuse: Causes, consequences and prevention. *The Prevention Researcher*, 7(3), 3-6.
- Beauvais, F., Oetting, E., Edwards, R. (1985). Trends in use of inhalants among American Indian adolescents. *White Cloud Journal*, 3(4), 3-11.
- 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.
- Beauvais, F., Wayman, J. C., Jumper-Thurman, P., Plested, B., & Helm, H. (2002). Inhalant abuse among American Indian, Mexican American, and non-Latino White adolescents. *The American Journal of Drug and Alcohol Abuse*, 28(1), 171-187.
- Bernard, B. (1991). *Fostering resiliency in kids: Protective factors in the family, school, and community*. Portland, OR: Northwest Regional Educational Laboratory.
- Botvin, G. J. (1990). Substance abuse prevention: Theory, practice, and effectiveness. In M. Tonry, & J. Q. Wilson (Eds.), *Drugs and crime* (pp.461-519). Chicago: The University of Chicago Press.
- Brady, M. (1989). Number one for action. *Australian Aboriginal Studies*, 1, 62-63.
- Brady, M. (1992). *Heavy metal: The social meaning of petrol sniffing in Australia*. Canberra: Aboriginal Studies Press.
- Bratter, T. E., & Forrest, G. G. (Eds.). (1985). *Alcoholism and substance abuse: Strategies for clinical intervention*. New York: Free Press.
- Braveheart, M. Y. H., & Spicer, P. (2000). The sociocultural context of American Indian infant mental health. In J. D. Osofsky, & H. E. Fitzgerald (Eds.), *The World Association of Infant Mental Health handbook of infant mental health: Vol. 1* (pp. 151-179). New York: John Wiley & Sons.
- Brecher, E. M., & Editors of Consumer Reports. (1972). *Licit and Illicit Drugs*. Mount Vernon, NY: Consumers Union.
- Bruvold, W. H. (1993). A meta-analysis of adolescent smoking prevention programs. *American Journal of Public Health*, 83, 872-880.

- Bry, B. H., McKeon, P., & Pandina, R. J. (1982). Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology, 91*, 273-279.
- Cahalan, D. (1970). *Problem drinkers: A national survey*. San Francisco: Jossey-Bass.
- Carroll, E. (1977). Notes on the epidemiology of inhalants. In C. Sharp, & M. Brehm (Eds.), *Review of inhalants euphoria to dysfunction* (NTIS No. PB 275-798/AS, pp. 14-24). Rockville, MD: National Institute on Drug Abuse.
- Center for Substance Abuse Prevention. (1996). *A review of alternative activities and alternatives programs in youth-oriented prevention* (DHHS Publication No. SMA 96-3117). Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.
- Chavez, E. L., Edwards, R. W., & Oetting, E. R. (1989). Mexican American and White American dropouts' drug use, health status, and involvement in violence. *Public Health Reports, 104*, 594-604.
- Chavez, E. L., & Swaim, R. C. (1992). An epidemiological comparison of Mexican American and White non-Hispanic 8th and 12th grade students' substance use. *American Journal of Public Health, 82*(3), 445-447.
- Cheatham, M. (1997). *Protecting youth against risk behaviors: A retrospective study from Michigan's capital area*. Lansing, MI: Ingham County Health Department.
- Christensen, M., & Manson, S. M. (2001). Adult attachment as a framework for understanding mental health and American Indian families. *American Behavioral Scientist, 44*(9), 1447-1465.
- Clayton, R. R., Leukefeld, C. G., Donohew, G., Bardo, M., & Harrington, N. G. (1995). Risk and protective factors: A brief review. *Drugs and Society, 8*(3/4), 7-14.
- Compton, W. M., Cottler, L. B., Dinwiddie, S. H., Sitznagel, E. L., Mager, D. E., & Asmus, G. (1994). Inhalant use: Characteristics and predictors. *The American Journal on Addictions, 3*, 263-272.
- Conrad, P. J., Pihl, R. O., Stewart, S. H., & Congier, M. (2000). Validation of a system of classifying female substance abusers on the basis of personality and motivational risk factors for substance abuse. *Psychology of Addictive Behaviors, 14*(3), 243-256.
- Cotton, N. S. (1979). The familial incidence of alcoholism: A review. *Journal of Studies on Alcohol, 46*, 98-116.
- Craig, R. J. (1982). Personality characteristics of heroin addicts: Review of empirical research 1976-1979. *International Journal of the Addictions, 17*, 227-248.

- Crites, J., & Schuckit, M. A. (1979). Solvent misuse in adolescents at a community alcohol center. *Journal of Clinical Psychiatry*, 40, 39-43.
- De Barona, M. S., & Simpson, D. D. (1984). Inhalant users in drug abuse prevention programs. *American Journal of Drug and Alcohol Abuse*, 10(4), 503-518.
- De Jong, J. A. (1995). An approach for high risk prevention research. *Drugs and Society*, 8(3/4), 125-138.
- Delgado, M., & Humm-Delgado, D. (1984). Hispanics and group work: A review of the literature. *Social Work with Groups*, 7, 85-96.
- Dinwiddie, S. H., Zorumski, C. F., & Rubin, E. H. (1987). Psychiatric correlates of chronic solvent abuse. *Journal of Clinical Psychiatry*, 48, 334-337.
- Dole, V., & Nyswander, M. A. (1965). A medical treatment for diacetylmorphine (heroin) addiction. *Journal of American Medical Association*, 93, 646-650.
- Dryfoos, J. G. (1990). *Adolescents at Risk-Prevalence and Prevention*. New York: Oxford University Press.
- Dyer, M. (1984). Inhalant abusers: A neglected aspect in substance abuse treatment. *Grassroots*, 1, 1-2.
- Edeh, J. (1989). Volatile substance abuse in relation to alcohol and illicit drugs: Psychosocial perspectives. *Human Toxicology*, 8, 313-317.
- Edwards, R. W. (1993). Drug use among 8th grade students is increasing. *International Journal of the Addictions*, 28(14), 1621-1623.
- Edward, R. W., Jumper-Thurman, P., Plested, B. A., Oetting, E. R., & Swanson, L. (2000). Community readiness: Research to practice. *Journal of Community Psychology*, 28(3), 291-307.
- Edwards, R. W., & Oetting, E. R. (1995). Inhalant use in the United States. In N. Kozel, Z. Sloboda, & M. De La Rosa (Eds.), *Epidemiology of inhalant abuse: An international perspective* (NTIS No. PB 97-101208). Rockville, MD: National Institute on Drug Abuse.
- Flay, B. R. (1985). Psychosocial approaches to smoking prevention: A review of findings. *Health Psychology*, 4, 449-488.
- Fonseca, H., Vieira, C., Costa, S., Ramos, N., Antunes, J., & Costa, A. (1995). Study of a population of adolescents at risk. *International Journal of Adolescent Medicine and Health*, 8(2), 107-112.

- Frank, B., Marel, R., & Schmeidler, J. (1988). The continuing problem of youthful solvent abuse in New York state. In R. A. Crider, & B. A. Rouse (Eds.), *Epidemiology of inhalant abuse: An update* (NTIS No. PB 89-123178/AS). Rockville, MD: National Institute on Drug Abuse.
- Freundrich, M., Mackesy-Amiti, M. E., Wislar, J. S., & Goldstein, P. J. (1997). Childhood abuse and the use of inhalants: Differences by degree of use. *American Journal of Public Health, 87*(5), 765-769.
- Friedman, A. S., Glassman, K. (2000). Family risk factors versus peer risk factors for drug abuse: A longitudinal study of an African American urban community sample. *Journal of Substance Abuse Treatment, 18*, 267-275.
- Garriott, J. (1992). Death among inhalant abusers. In C. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp.181-192). Rockville, MD: National Institute on Drug Abuse.
- Gilbert, J. (1983). Deliberate metallic paint inhalation and cultural marginality: Paint sniffing among acculturating California youth. *Addictive Behaviors, 8*, 79-82.
- Gilbert, M. J., & Cervantes, R. C. (1986). Patterns and practices of alcohol use among Mexican-Americans: A comprehensive review. *Hispanic Journal of Behavioral Sciences, 8*, 1-60.
- Glynn, T. J. (1981). From family to peer: A review of transitions of influence among drug-using youth. *Journal of Youth and Adolescence, 10*, 363-383.
- Grover, P. (1998). *Preventing substance abuse among children and adolescents: Family-centered approaches*. (DHHS Publication No. SMA 3224-FY 98). Washington, DC: Department of Health and Human Services.
- Guitierrez, F., Hernandez, I. M., & Rabago, S. (1978). Psychological, familial, and social study of 32 patients using inhalants. In C. W. Sharp, & L. T. Carroll (Eds.), *Voluntary inhalation of industrial solvents* (DHEW Publication No. ADM 79-779, pp. 75-89). Rockville, MD: National Institute on Drug Abuse.
- Hawkins, J. D., & Weis, J. G. (1985). The social development model: An integrated approach to delinquency prevention. *Journal of Primary Prevention, 6*, 73-97.
- Helzer, J. E. (1987). Epidemiology of alcoholism. *Journal of Consulting and Clinical Psychology, 55*, 284-292.
- Huxsahl, J. E. (1999). Inhalant abuse. *Minnesota Medicine, 82*, 46-48.
- Jacobs, A. M., & Ghodse, A. H. (1987). Depression in solvent abusers. *Social Science and Medicine, 24*(10), 863-866.

- Jacobs, A. M., & Ghodse, A. H. (1988). Delinquency and regular solvent abuse: An unfavourable combination? *British Journal of Addiction*, 83, 965-968.
- Jessor, R., Chase, J. D., & Donovan, J. E. (1980). Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. *American Journal of Public Health*, 70, 604-613.
- Johnson, E. M., & Delgado, J. (1989). Reaching Hispanics with messages to prevent alcohol and other drug abuse. *Public Health Report*, 104(6), 588-594.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1989). *Drug use, drinking, and smoking: National survey results from high school, college, and young adults populations, 1975-1988* (DHHS Publication No. ADM 89-1638). Rockville, MD: National Institute on Drug Abuse.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1992). *Smoking, drinking, and illicit drug use among American secondary school students, college students, and young adults, 1975-1991* (NIH Publication No. ADM 93-3480). Rockville, MD: National Institute on Drug Abuse.
- Johnston, L., O'Malley, P., & Bachman, J. (1993). *National survey results on drug use: Vol. 1, Secondary school students*. Bethesda, MD: National Institute on Drug Abuse.
- Jumper-Thurman, P., & Beauvais, F. (1992). Treatment of volatile solvent abusers. In C. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp. 203-213). Rockville, MD: National Institute on Drug Abuse.
- Kaftarian, S. J., & Wandersman, A. (2000). Bridging the gap between research and practice in community-based substance abuse prevention. *Journal of Community Psychology*, 28(3), 237-240.
- Kandel, D. (1975). Reaching the hard to reach: Illicit drug use among high school absentees. *Addictive Disorders*, 1(4), 465-480.
- Kirpatrick, D. G., Acierno, R., Benfamin S., Resnick, H. S., & Best, C. L. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology*, 68(1), 19-30.
- Korman, M., Trimboli, F., & Semler, I. (1980). A comparative evaluation of 162 inhalant users. *Addictive Behaviors*, 5, 143-152.

- Kumpfer, K. (1987). Special populations: Etiology and prevention of vulnerability to chemical dependency in children of AOD abusers. In B. S. Brown, & A. R. Mills (Eds.), *Youth at risk for substance abuse* (DHHS Publication No. ADM 87-1537). Rockville, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse.
- Lawson, G., Peterson, J., & Lawson, A. (1983). *Alcoholism and the family: A guide to treatment and prevention*. Rockville, MD: Aspen Publishers.
- Lawson, G. W., & Lawson, A. W. (1989). *Alcoholism and substance abuse in special populations*. Rockville, MD: Aspen Publishers.
- Lazebnik, R., Grey, S. F., & Ferguson, C. (2001). Integrating substance abuse content into an HIV risk-reduction intervention: A pilot study with middle school-aged Hispanic students. *Substance Abuse*, 22(2), 105-117.
- Leshner, A. I. (1998). Gender matters in drug abuse research. *NIDA Notes*, 13(4), 3-4 (NIH Publication No. 98-3478). Rockville, MD: U.S. Dept. of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse.
- Letcher, T., & White, V. (1999). Australian secondary students' use of over the counter and illicit substances in 1996 (Department of Health and Aged Care, Monograph Series No. 33). Canberra, ACT: Publications Projection Unit.
- Levin, A. (1999). Addicts preferred Buprenorphine over Methadone. *Clinical Psychiatry News*, 27(9), 12.
- Lindenberg, C. S., Solorzano, R. M., Krantz, M. S., Galvis, C., Baroni, G., & Strickland, O. (1998). Risk and resilience: Building protective factors. *The American Journal of Maternal Child Nursing*, 23(2), 99-104.
- Lopez-Torrecillas, F., Godoy Garcia, J. F., Garcia, M. P., Izquierdo, D. G., & Sanchez-Barrera, M. B. (2000). Brief report: Variables modulating stress and coping that discriminate drug consumers from low or nondrug consumers. *Addictive Behaviors*, 25(1), 161-165.
- Mackesy-Amiti, M. E., & Fendrich, M. (2000). Trends in inhalant use among high school students in Illinois 1993-1995. *American Journal of Drug and Alcohol Abuse*, 26(4), 569-590.
- Maddahian, E., Newcomb, M. D., & Bentler, P. M. (1988). Risk factors for substance use: Ethnic differences among adolescents. *Journal of Substance Abuse*, 1, 11-23.
- Manson, S. M. (2000). Mental health services for American Indians: Need, use, and barriers to effective care. *Canadian Journal of Psychiatry*, 45(7), 617-626.

- Massengale, O. N., Glaser, H. H., LeLievre, R. E., Dodds, J. B., & Klock, M. E. (1963). Physical and psychological factors in glue sniffing. *New England Journal of Medicine*, 269(25), 1340-1344.
- Mata, A. G., & Andrew, S. R. (1988). Inhalant abuse in a small rural south Texas community: A social epidemiological overview. In R. A. Crider, & B. A. Rouse (Eds.), *Epidemiology of inhalant abuse: An update* (NTIS No. PB 89-123178/AS). Rockville, MD: National Institute on Drug Abuse.
- Matthews, R. W., & Korman, M. (1981). Abuse of inhalants: Motivation and consequences. *Psychological Reports*, 49, 519-526.
- May, P. A. (1986). Alcohol and drug misuse prevention programs for American Indians: Needs and opportunities. *Journal of Studies on Alcohol*, 47, 187-195.
- May, P. A., & Del Vecchio, A. M. (1997). The three common behavioral patterns of inhalant/solvent abuse: Selected findings and research issues. In F. Beauvais, & J. E. Trimble (Eds.), *Drugs and Society*, 10(1/2), 3-38.
- McGarvey, E. L., Clavet, G. J., Mason, W. (1999). Adolescent inhalant abuse: Environments of use. *The American Journal of Drug and Alcohol Abuse*, 25(4), 731-741.
- Mercie, S. (2000). Nitrous Oxide and Nitrite inhalants: Funny facts. Do It Now Foundation.
- National Institute on Drug Abuse. (2000). Inhalant Abuse (NIH Publication No. 00-3818). Rockville, MD: Author.
- Newcomb, M. D., Maddahian, E., & Bentler, P. M. (1986). Risk factors for drug use among adolescents: Concurrent and longitudinal analyses. *American Journal of Public Health*, 76, 525-531.
- Nurcombe, B., Bianchi, G., Money, J., & Cawte, J. (1970). A hunger for stimuli: The psychosocial backdrop of petrol inhalation. *British Journal of Medical Psychology*, 43, 367-374.
- Oetting, E. R. (1992). Planning programs for prevention of deviant behavior: A psychosocial model. In J. Trimble, C. Bolek, & S. Niemcryn (Eds.), *Ethnic and multicultural drug abuse: Perspectives on current research* (pp. 313-344). Binghamton, NY: Harrington Park Press.
- Oetting, E. R., & Beauvais, F. (1986). Peer cluster theory: Drugs and the adolescent. *Journal of Counseling and Development*, 65, 17-22.

- Oetting, E. R., & Beauvais, F. (1987a). Peer cluster theory, socialization characteristics and adolescent drug use: A path analysis. *Journal of Counseling Psychology*, 34, 205-213.
- Oetting, E. R., & Beauvais, F. (1987b). Common elements in youth drug abuse: Peer clusters and other psychosocial factors. *Journal of Drug Issues*, 17(1/2), 133-151.
- Oetting, E. R., & Beauvais, F. (1990a). Adolescent drug use: Findings of national and local surveys. *Journal of Consulting and Clinical Psychology*, 58(4), 385-394.
- Oetting, E. R., & Beauvais, F. (1990b). Orthogonal cultural identification theory: The cultural identification of minority adolescents. *International Journal of the Addictions*, 25(5A/6A), 655-685.
- Oetting, E. R., & Donnermeyer, J. F. (1998). Primary socialization theory: I. The etiology of drug use and deviance. *Substance Use & Misuse*, 33, 995-1026.
- Oetting, E. R., Donnermeyer, J. F., Plested, B. A., Edwards, R. W., Kelly, K., & Beauvais, F. (1995). Assessing community readiness for prevention. *The International Journal of the Addictions*, 30(6), 659-683.
- Oetting, E. R., Edwards, R. W., & Beauvais, F. (1988). Social and psychological factors underlying inhalant abuse. In R. A. Crider, & B. A. Rouse (Eds.), *Epidemiology of inhalant abuse: An update* (NTIS No. PB 89-123178/AS). Rockville, MD: National Institute on Drug Abuse.
- Oetting, E. R., Swaim, R. C., Edwards, R. W., & Beauvais, F. (1989). American Indian and Anglo adolescent alcohol use and emotional distress: Path models. *American Journal of Alcohol and Drug Abuse*, 15(2), 153-172.
- Oetting, E. R., & Webb, J. (1992). Psychosocial characteristics and their links with inhalant use: A research agenda. In C. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp. 59-98). Rockville, MD: National Institute on Drug Abuse.
- Orlandi, M. A., Weston, R., & Epstein, L. G. (Eds.) (1992). *Cultural competence for evaluators: A guide for alcohol and other drug abuse prevention practitioners working with ethnic/racial communities* (DHHS Publication No. ADM 92-1884). Rockville, MD: U.S. Department of Health and Human Services.
- Padilla, E. R., Padilla, A. M., Morales, A., Olmedo, E. L., & Ramirez, R. (1979). Inhalant, marijuana, and alcohol abuse among barrio children and adolescents. *International Journal of the Addictions*, 14(7), 945-964.
- Penning, M. E., & Barnes, G. E. (1982). Adolescent marijuana use: A review. *The International Journal of the Addictions*, 17, 749-791.

- Rebach, H. (1992). Alcohol and drug use among American minorities. In J. Trimble, C. Bolek, & S. Niemcryk (Eds.), *Ethnic and multicultural drug abuse: Perspectives on current research* (pp. 23-58). Binghamton, NY: Haworth Press.
- Rice, D. P. (1993). The economic cost of alcohol abuse and alcohol dependence. *Alcohol Health and Research World*, 17(1), 10-11.
- Rodriquez, M. E. (1989). Treatment of cocaine abuse: Medical and psychiatric consequences. In K. K. Redda, C. A. Walker, & G. Barrett (Eds.), *Cocaine, marijuana, designer drugs: Chemistry, pharmacology, and behavior* (pp 97-111). Boca Raton, Florida: CRC Press, Inc.
- Rosenberg, N., & Sharp, C. (1992). Solvent toxicity: A neurological focus. In C. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp. 117-172). Rockville, MD: National Institute on Drug Abuse.
- Satcher, D. (2001). Mental health: Culture, race, ethnicity. In *Supplement to mental health: Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services.
- Schinke, S., & Cole, K. (1995). Prevention in community settings. In G. J. Botvin, S. Schinke, & M. A. Orlandi (Eds.), *Drug abuse prevention with multiethnic youth* (pp. 215-232). Thousand Oaks, CA: Sage Publications.
- Schinke, S. P., Moncher, M. S., Palreja, J., Zayas, L. H., & Schilling, R. F. (1988). Hispanic youth, substance abuse and stress: Implications for prevention research. *International Journal of the Addictions*, 23(8), 809-826.
- Segal, B. (1997). The inhalant dilemma: A theoretical perspective. *Drugs and Society*, 10(12), 79-102.
- Sharp, C. (1992). Introduction to inhalant abuse. In C. Sharp, F. Beauvais, & R. Spence (Eds.), *Inhalant abuse: A volatile research agenda* (NTIS No. PB 93-183119/LL, pp. 1-12). Rockville, MD: National Institute on Drug Abuse.
- Sher, K. J. (1994). Studies of risk at individual levels. In R. Zucker, G. Boyd, & J. Howard (Eds.), *The development of alcohol problems: Exploring the biopsychosocial matrix of risk* (NIH Publication No. 94-3495, pp. 77-108). Rockville, MD: U.S. Department of Health and Human Services.
- Smart, R. G., Fejer, D., & White, J. (1972). *Drug use trends among metropolitan Toronto students: A study of changes from 1968 to 1972* (40 pp.). Unpublished manuscript, Toronto: Addiction Research Foundation.

- Smitham, D. (1999). *Understanding inhalant abuse: An application of primary socialization theory*. Unpublished doctoral dissertation, Colorado State University, Fort Collins.
- Sobeck, J., Abbey, A., Agius, E., Clinton, M., & Harrison, K. (2000). Predicting early adolescent substance abuse: Do risk factors differ depending on age of onset? *Journal of Substance Abuse, 11*(1), 89-102.
- Spotts, J. V., & Shontz, F. C. (1982). Ego development, dragon fights, and chronic drug abusers. *International Journal of the Addictions, 17*, 945-976.
- Stevens, J. (1992). *Applied multivariate statistics for the social sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Stybel, L. J., Allen, P., & Lewis, F. (1976). Deliberate hydrocarbon inhalation among low-socioeconomic adolescents not necessarily apprehended by the police. *International Journal of the Addictions, 11*(2), 345-361.
- Swaim, R. C. (1991). Childhood risk factors and adolescent drug and alcohol abuse. *Educational Psychology Review, 3*, 363-398.
- Swaim, R. C., Nemeth, J., & Oetting, E. R. (1995). Alcohol use and socialization characteristics among Hungarian adolescents: Path models. *Drugs and Society, 8*(3/4), 47-63.
- Swaim, R. C., Oetting, E. R., Edwards, R. W., & Beauvais, F. (1989). The links from emotional distress to adolescent drug use: A path model. *Journal of Consulting and Clinical Psychology, 57*(2), 227-231.
- Swaim, R. C., Oetting, E. R., Thurman, P. J., Beauvais, F., & Edwards, R. W. (1993). American Indian adolescent drug use and socialization characteristics. *Journal of Cross-Cultural Psychology, 24*(1), 53-70.
- Swaim, R. C., Thurman, P. J., Beauvais, F., Oetting, E. R., & Wayman, J. (1993). Indian adolescent substance use as a function of number of risk factors. Manuscript submitted for publication.
- Texas Commission on Alcohol and Drug Abuse. (1997). *Understanding inhalant users*. Austin, TX: Author.
- Tierney, W. G. (1990). The college experience of Native Americans: A critical analysis. In L. Weis, & M. Fines (Eds.), *Silenced voices: Issues of class, race and gender in today's schools*. Albany, NY: State University of New York Press.
- Tweed, S. T. (1998). Intervening in adolescent substance abuse. *Nursing Clinics of North America, 33*(1), 29-45.

- U.S. Department of Health and Human Services. (1985). *Report of the Secretary Task Force on black and minority health* (DHHS Publication No. ADM 85-487). Washington, DC: U.S. Government Printing Office.
- Van Etten, M. L., & Anthony, J. C. (1999). Comparative epidemiology of initial drug opportunities and transitions to first use: Marijuana, cocaine, hallucinogens and heroin. *Drug and Alcohol Dependence*, 54, 17-125.
- Van Etten, M. L., Newmark, Y. D., & Anthony, J. C. (1999). Male-female differences in the earliest stages of drug involvement. *Addiction*, 94(9), 1413-1419.
- Weinberg, N., Rahdert, E., Colliver, J., & Glantz, M. (1998). Adolescent substance abuse: A review of the past 10 years. *Journal of the American Academy of Child Adolescent Psychiatry*, 37(3), 252-261.
- Weise, C. E., Busse, S., & Hall, R. J. (1973). *Solvent abuse: An annotated bibliography with additional related citations*. Toronto: Addiction Research Foundation.
- Winters, K. C. (1999). *Treatment of adolescents with substance use disorders* (Treatment Improvement Protocol Series 32, DHHS Publication No. SMA 99-3283). U.S. Department of Health and Human Services, Public Health Service, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment.
- Wyse, G. D. (1973). Deliberate inhalation of volatile hydrocarbons: A review. *Canadian Medical Association Journal*, 108, 71-74.
- Zickler, P. (2000). NIDA studies clarify development effects of prenatal cocaine exposure. *NIDA Notes*, 14(3), 5-7.

APPENDIX

AMERICAN DRUG AND ALCOHOL SURVEY QUESTIONS

Inhalant Factors

Inhalant Scale

1. Have you used any of these drugs to get high during the last 12 months?
 "Sniff, something like glue, gasoline, etc.
 None, 1-2 times, 3-9 times, 10-19 times, 20-49 times,
 50 or more
2. Have you used any of these drugs to get high during the last month?
 "Sniff, something like glue, gasoline, etc.
 No, 1-2 times, 3-9 times, 10-19 times, 20 or more times
3. In using each of the following, are you a.....
 "Sniff, something like glue, gasoline, etc.
 Non user, very light use, light user, moderate user, heavy user,
 very heavy user

Family Factors

Family Cares Scale

1. Does your family care about you?
 Not at all, not much, some, a lot
2. How much do you care about your family?
 Not at all, not much, some, a lot
3. Does your family care what you do?
 Not at all, not much, some, a lot

Family Involvement in School Activities Scale

1. Does your family go to school events like music programs, sports events, etc.?
 Not at all, not much, some, a lot
2. Does your family go to school meetings like PTA or PTO, back to school night, etc?
 Not at all, not much, some, a lot

Family Support of School Scale

1. How much would your family care if you.....
 Skipped school
 Got a bad grade
 Did not do your homework
 Quit school
Not at all, not much, some, a lot

School Factors

School Success Scale

1. What kind of grades do you get?
Poor, not too good, good, very good
2. What kind of student are you?
Poor, not too good, good, very good

School Liking Scale

1. I like school.
2. My teachers like me.
3. I like my teachers
4. School is fun.
Not at all, not much, some, a lot

Peer Inhalant Association Factors

Peer Sanctions/Encouragement/Use Scale

1. How much would your friends try to stop you from...
"Sniffing" glue or gas, etc.
Not at all, not much, some, a lot
2. How much would you try to stop your friends from
"Sniffing" glue or gas, etc.
Not at all, not much, some, a lot
3. How often have your friends asked you to use...
"Sniff" glue or gas, etc.
Not at all, not very often, some, very often

Peer Use

1. How many of your friends do each of the following
"Sniff" glue or gas, etc.
None, a few, most of them, all of them