

Spring 2004

# Up in Smoke: Evaluating Tobacco Use among Native American Adolescents in Montana

Daria Meyer

Follow this and additional works at: <https://dsc.duq.edu/etd>

---

## Recommended Citation

Meyer, D. (2004). Up in Smoke: Evaluating Tobacco Use among Native American Adolescents in Montana (Master's thesis, Duquesne University). Retrieved from <https://dsc.duq.edu/etd/928>

This Immediate Access is brought to you for free and open access by Duquesne Scholarship Collection. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Duquesne Scholarship Collection. For more information, please contact [phillips@duq.edu](mailto:phillips@duq.edu).

**Up in Smoke: Evaluating Tobacco Use among Native Adolescents in  
Montana**

A Thesis

Presented to the

McAnulty College and Graduate School of Liberal Arts

Duquesne University

In Partial fulfillment of

the requirements for the degree of

Master of Arts

By

Daria Meyer

April 3, 2004

## **Acknowledgements**

I would like to take this opportunity to extend my deepest gratitude to those that have been a huge part my journey thus far. I would like to thank Dr. Richard Colignon and Dr. Joseph Yenerall for their mentorship and guidance in bringing my project to fruition. It was their tremendous effort and support that brought out the best in me. I would also like to thank the silent players in the PS office and the students in the Center who acted as my sounding board and helped me with everything and I mean everything – by the way what page is this supposed to be?

While the Graduate Center offered so much support it was those outside the classroom that continue to enrich my life everyday. Aaron, your love and encouragement cannot be expressed in words. I am thankful for you and our relationship every single day...our adventure has just begun. My friendships have also made my life more rewarding. One such friend, Andrea, a goddess in her own right makes the world a better place for all those around her. Thank you my dear for everything.

A special thank you is in order for my mother Ursula and brother Jon who have all of my love, respect, and admiration. They have taught me what family really means. And for all those who have touched my life along the way, I thank you for being a part of the person I am today.

## Table of Contents

<b>Abstract</b>	iv
<b>I. Introduction</b>	1
<b>II. Literature Review</b>	3
History of Tobacco	
Social Factors	
Culture	
Demographics	
Education	
Family Structure	
Peer Influence	
Social Isolation	
<b>III. Research Design</b>	12
Hypothesis	
Description of Data	
Table 1: Descriptive Statistics	
<b>IV. Conceptual Framework &amp; Operational Definitions</b>	14
Dependent Variables	
Independent Variables	
<b>V. Data Analysis</b>	27
Bi-Variate Techniques	
Bi-Variate Results	
Multi-Variate Techniques	
Multi-Variate Results	
<b>VI. Conclusions, Implications &amp; Limitations</b>	51
<b>Appendix A: Tables</b>	54
Table 2: Bi-Variate Analysis – Tobacco	
Table 3: Profile of Variables	
<b>Appendix B: Instrumentation</b>	58
<b>Bibliography</b>	66

## **Abstract**

This study examines the relationship between culture, demographics, education, family structure, peer influence, and social isolation and the frequency of tobacco use among Native American adolescents in Montana. Peer influence and family structure were found to be the most influential factors regarding the frequency of tobacco use. Those who do not have close friends that smoke, believe smoking is wrong, do not believe they will smoke as an adult, have parents who believe smoking is wrong, have no older siblings at least not within close age proximity, have higher grades in school, are in a lower grade, and tend to be honest with their parents are less likely to smoke or smoke less frequently. The results suggest a greater need for culturally specific prevention programs to target the needs of minority racial and ethnic groups.

## **I. Introduction**

Tobacco use among all racial and ethnic groups is a health problem in the United States, particularly the rate of tobacco use among Native Americans. According to the National Center for Chronic Disease Prevention and Health Promotion, of the “five major racial and ethnic populations adult smoking prevalence was highest among American Indians (34.1%), followed by African Americans (26.7%), whites (25.3%), Hispanics (20.4%), and Asian Americans (16.9%)” (CDC 1998: 1). Nationally, lung cancer is the leading cause of death for Native Americans. In addition, death attributed to smoking from cancer of the lung, trachea, and bronchus were higher among Native Americans than other minority groups. Also, cardiovascular disease is a leading cause of death for Native Americans and tobacco use is an important risk factor for this disease (CDC, 1998).

Life expectancy and overall health has improved for most Americans, but not all groups are benefiting from the improvement in health. For many racial and ethnic minorities in the United States good health is difficult because care is associated with economic status, race, and gender. According to the Office of Minority Health, “Despite notable progress in the overall health of the Nation, there are continuing disparities in the burden of illness and death experienced by ... American Indians and Alaska Natives, ...compared to the U.S. population as a whole” (OMH 2000: 1). The overall health of the minority groups of the United States supports the burden of disease and illness experienced by these groups.

Smoking behavior among Native Americans varies by region and state. According to the CDC, “Smoking rates are highest in Alaska (45.1%), and the North

Plains (44.2%) and lowest in the Southwest (17.0%). The prevalence of heavy smoking (25 or more cigarettes per day) is also highest in the North Plains (13.5%)” (CDC 1998: 2). The geographical difference in smoking rates suggests individual health behaviors may be strongly influenced by social environments (Nelson, 1997). If social factors play a role in behaviors, they could be associated with high-risk behaviors, like tobacco use, among Native American youth. Understanding the behaviors of Native American youth can provide substantial support for recognizing the risk factors involved with these behaviors.

This research project seeks to define social factors that may influence tobacco use among Native American youth in Montana. One or more factors could be responsible for the high rate of tobacco use among Native Americans. Cultural beliefs, demographics, education, family structure, peer groups, and social isolation are among the factors that may influence this type of risky behavior among adolescents. Establishing an understanding of why Native American youth use tobacco can begin the process of producing adequate prevention, intervention, and treatment programs.

## II. Literature Review

### *Tobacco History*

The origins of the interest in tobacco by humans is unknown, but it is certain that early Americans invented the consumption of smoking tobacco and had reached the North American continent and was being cultivated by the time of Columbus's arrival (Gately 2001). The act of smoking suggested the lungs had a dual function of stimulation and respiration and that smoking "is one of the American continent's most significant contributions to civilization" (Gately 2001: 4). Evidence provides information suggesting that tobacco reached the northern part of the American continent by 2500 BC. Many tribes throughout the continent took a break from hunting and gathering to cultivate tobacco. Some of the plains Indians including the Blackfoot and the Crow planted and worked with tobacco. According to Iain Gately author of *Tobacco: A Cultural History of an Exotic Plant Seduced Civilization*, "Smoking was a defining habit of the diverse tribes and civilizations that occupied pre-Columbian North America. Every one of its cultures, living and vanished, used tobacco" (Gately 2001: 13). Throughout history, tobacco became an integral part of American society.

By the 20<sup>th</sup> Century, war, the Great Depression, and movies changed the tobacco industry. Cigarette companies, manufacturing, advertising, and pricing revolutionized American society. The 1950's brought about new kinds of cigarettes and R.J Reynolds had developed a process to bring more flavor to the tobacco in cigarettes to counteract the health concerns being raised about non-filtered cigarettes. With every new controversial development involved with tobacco, the industry fought back and kept the desire for tobacco products strong. In 1956, "the lung cancer death rate was 31 per 100,000 – more

than nine times the 1933 figure” (Gately 2001: 285). According to their research, if a twenty-year lag were permitted, the growth in lung cancer would match the increase in smoking. This possibility sparked new research regarding smoking and several studies were published on the topic. It was not until 1957 that the U.S Attorney General stated that smoking increased a person’s chances for lung cancer. This was the first time that the American Public Health Service had taken a position on smoking.

Since the 1960’s, smoking has been recognized as the most significant cause of preventable death (Abernathy & Massad, 1995). Warning labels were introduced to all cigarette products in 1966 suggesting smoking may be hazardous to one’s health. In 1971, all cigarette advertising was banned from televisions and in 1972 all other advertising had to carry a warning label. The 1970’s proved to be a public battle of the tobacco industry against those that oppose them.

Smoking over the years has been linked to several diseases from cancer, emphysema, to reproductive-related problems. The development of diseases prompted research to center its attention on prevention rather than intervention and treatment. Research focus has begun to turn towards adolescents and their risk behaviors including smoking.

In recent years, health professionals have shifted their emphasis from treating adult smokers to prevent smoking among children, since almost all adult smokers initiate the habit during adolescence, typically between the ages of 12-14. Moreover, prevention of smoking among adolescents is considered important not only because of its deleterious health effects, but because evidence suggests that cigarette smoking may act as a gateway for other drug and alcohol use and abuse (Abernathy & Massad 1995: 2).

This shift toward focusing on adolescent behavior has increased the number of studies involving the determinants for smoking among adolescents. Determining the factors that support or perpetuate adolescent smoking would open the door to more adequate prevention programs and deter more young people from smoking.

### *Social Factors*

Isolating the determinants for the prevalence of adolescent smoking could provide a better understanding of why adolescents choose to smoke. For instance, social factors could provide a greater understanding of the risk behavior of smoking based on the structural units of the factors listed below. The significance of these factors could steer prevention efforts towards what drives adolescents to engage in smoking behavior. The following six social factors involved in this study have been identified as possible predictors of the high prevalence of tobacco use among Native American youth.

*Culture.* Traditionally, within the Native American culture tobacco has been used for ceremonial purposes. Research suggested by Joseph Winter editor of *Tobacco Use by Native Americans: Sacred Smoke and Silent Killer*, shows that all plains groups grew or traded tobacco and that “no other plant figured so prominently in religious and secular ceremonies, rites of passage, economic and political alliances, or social events and relaxation” (Winter 2000: 171). Historical uses of tobacco can be explained in religious and other related practices, but historical uses may have an influence on the beliefs held by the tribe members today. The tobacco plant has been embedded into Native American culture for centuries and as a result has become associated with everyday practices of the Native American culture. In addition, Winter’s research suggests, “In many tribes,

tobacco was used on an individual basis, not only by shamans and medicine men who smoked to communicate with spirits and to heal, but also by ordinary tribal members, who utilized it for offerings and for pleasure” (Winter, 2000: 171). The use of tobacco for reasons directly related to ceremonies and for individual pleasure may affect the behavior of youth who identify with a culture of a tribe. *The Functional Value of Smoking and Nonsmoking from the Perspective of American Indian Youth* authored by Michelle Kegler suggests as a result of historical use of tobacco among Native Americans that “For American Indian youth, particular attention should be paid to the distinction between traditional uses of tobacco and cigarette smoking” (Kegler, 1999:8).

In a related study by Michelle Kegler, she found, traditional uses of tobacco added complexity to the issue surrounding the American Indian population. Cigarettes have been part of celebrations during pow wows and serve a major role in burial services. Kegler suggests, “Because of the sacred nature of tobacco and its embeddedness in American Indian culture, conventional tobacco control messages which portray tobacco as entirely negative may be ineffective, as well as culturally insensitive” (Kegler, 2000: 549).

*Demographic.* The prevalence of smoking among adult Montana residents has remained unchanged since 1990. According to the Montana Department of Public Health and Human Services, “Significantly more non-whites (32%) smoke cigarettes than whites (20%)” (MTDPHHS 1999: 1). Additionally, those who smoked on a regular basis were in the lower age categories throughout the state. The 2001 Surgeon General’s report on women and smoking found, “The gender difference in smoking prevalence among teens is smaller than that among adults” (U.S Surgeon General 2001: 1). The report suggests

that while the smoking rates are virtually the same among female and male youth, the health effects later in life from smoking are far more significant in women. A pattern established by the report found that, “In 1997-1998, smoking prevalence was highest among American Indian or Alaska Native women (34.5%), intermediate among white women (23.5%), and black women (21.9%), and lowest among Hispanic women (13.8%) and Asian or Pacific Islander women (11.2%)” (U.S. Surgeon General 2001:5). This suggests while smoking differences are slight in adolescence, a different approach specific to women may prevent health related problems later in life.

The initiation age for cigarette smoking is an important factor for examining smoking behavior. The Campaign for Tobacco-Free Kids suggests, “lifetime smoking and other tobacco use almost always begins by the time kids graduate from high school” (Tobacco Free Kids 2004:1). Sometimes early experimentation can develop into regular smoking and as a result an addiction to cigarettes. Peak years for first trying cigarettes is roughly ages 11 or 12 with some children starting earlier. The Campaign found that “Overall, more than 80 percent of all adult smokers first become regular smokers before the age of eighteen and over 90 percent do so before leaving their teens” (Tobacco Free Kids 2004:1). This research suggests, the earlier a child experiments with cigarettes, the stronger the chance they may become regular smokers.

*Education.* Education level has an active role in the behavior of adolescents. As reported in the *Journal of Adolescent Health*, “American Indian adolescents who were more academically oriented were less likely to smoke cigarettes” (LeMaster, 2002: 430). Academic Orientation was defined as “School attachment, academic competence, higher educational levels, having a good education or being in school, educational success, and

academic achievement” (LeMaster, 2002:430). Authors Ann Marie Machamer and Enid Gruber of *Secondary School, Family, and Educational Risk: Comparing American Indian Adolescents and Their Peers*, suggest that it has been consistently documented that “American Indians have the lowest levels of education attainment compared with any other ethnic group at all levels of the education pipeline” (Machamer & Gruber 1998: 3). Native American children were also found to have lower self-acceptance related to school and had a higher incidence of absenteeism and lower grades (Machamer & Gruber 1998). Thus, research indicates an inverse relationship between educational attainment and cigarette consumption.

*Family Structure.* Family influence and structure can create an unstable environment for an adolescent. According to a study conducted by Machamer and Gruber, Native Americans had the lowest levels of family connectedness and minority adolescents were also more than twice as likely than whites to come from broken families (Machamer & Gruber 1998:8). Behavior and perceptions of the parent make an impact on the adolescents in the home. In a study regarding the use of alcohol and other drugs published in the *Psychological Bulletin*, “Poor parenting practices, high levels of conflict in the family, and a low degree of bonding between children and parents appear to increase risk for adolescent problem behavior...” (Hawkins, 1992:92). These characteristics of a reasonably dysfunctional family atmosphere can provide an unsupportive environment. A study relating family factors to drug initiation found, “That maternal over-permissiveness and inconsistency in control practices were related to a more advanced stage of substance abuse” (Catalano, 1992:209).

According to the British Journal of Addiction, there are several risk factors involved with family structure that may enhance the chances of an adolescent to begin smoking. “Having brothers or sisters who smoke; having parents who smoke; living with a lone parent” were risk factors of smoking related directly to family structure (Goddard, 1992:17). Further support was issued in a study published by the Journal of Studies on Alcohol, which showed parental substance abuse is directly related to initiation and frequency of drug use by adolescents (Catalano, 1992).

Parents and siblings may be seen as role models within the family causing the child or younger siblings to follow the behavior of those within the household. A study conducted by Michelle Kegler indicates, particularly in the early stages of smoking found older siblings to be the most influential in the family unit (Kegler, 2000). Additionally, parental modeling and the amount of antismoking socialization was directly associated with the onset of smoking among adolescents. The author found family influence on tobacco in American Indian culture to be complex because “the extended family has a dominant place in the lives of many American Indian adolescents (Kegler, 2000: 548). The author concluded that the entire family, not exclusively the parents, needed to be addressed in order to fully understand the role of family on the frequency of tobacco use. Thus, lack of a supportive family environment, broken and dysfunctional families and tobacco consumption by parents and siblings is positively related to tobacco consumption.

*Peer Influence.* While family structure may have a great influence on behavior, it may not be the strongest influence on an adolescent. According to a study in the *Journal of Addiction*, the peer groups influence increases as the adolescent matures and this has been shown to be a strong correlate and predictor of the use of licit and illicit substances

(Duncan, Tildesley, Duncan, & Hops 1995: 1647). Kegler found, “That the primary functional value of smoking for American Indian youth, at least before they become addicted, is social – fitting in with family or friends, making friends, projecting a cool image, or countering a ‘goody-two-shoes’ image” (Kegler, 1999:5). The social environment of the youth in the community plays a key role in the initiation process of tobacco use. Stanton reported, “The most consistent, predominant risk factor for adolescent smoking has been having friends who smoke” (Stanton, 1995:76). In addition, “the peer group, which generally adopts greater influence as the adolescent grows older has consistently been shown to be a powerful correlate and predictor of use of licit and illicit substances” (Duncan, 1995:1647). At school and during other activities adolescents are strongly influenced by friends and peers. The research suggests that the use of tobacco prevalence increases as peer use increases.

*Social Isolation.* Social Isolation carries a number of definitions based on its context. However, for this proposal, it will involve feelings toward neighborhood, community, and whether favorable conditions exist for illegal actions or behaviors. Social isolation will be defined in terms of “low neighborhood attachment,” “community disorganization,” “transitions and mobility,” “laws and norms that favor drug use,” and “perceived availability of drugs and handguns” (PNA, 2000). Social isolation of an individual, especially an adolescent, can have adverse effects on negative behavior presented by the adolescent. An increased sense of hopelessness is often associated with high-risk behaviors (Nelson, 1997). Author John Cacioppo suggests, “social isolation is a potent but little misunderstood risk factor..., and its negative consequences are most

profound among the elderly, the poor, and minorities...” (Cacioppo, 2003:1). Its affects are physical and psychological and can be exacerbated by everyday stressors.

According to Nelson, social isolation is common among American Indians on reservations in Montana (Nelson, 1997). Social isolation also occurs in the urban centers because people are more likely to be separated from their families, friends, and other familiar people and surroundings. It is a further recommendation by Nelson that if the condition remains, the high prevalence of risky behaviors will not decrease (Nelson, 1997). If risk behavior includes tobacco use, social isolation is positively related to tobacco use.

### **III. Research Design**

#### *Hypothesis*

The purpose of this study is to answer the question, what are the social factors associated with the different smoking rates among Native American adolescents in Montana? The hypothesis is derived from the research question: Is there a relationship between culture, demographic information, education, family structure, peer influence, and social isolation and the frequency of smoking among Native American adolescents.

#### *Description of Data*

In order to test the hypothesis, I analyzed data from the 2002 Prevention Needs Assessment Survey (PNA) administered by the Chemical Dependency Bureau (CDB) of the Addictive and Mental Disorders Division (AMDD) of the Montana Department of Public Health and Human Services (DPHHS). The survey was developed with the collaboration of six states and the Social Development Research Group at the University of Washington. The goal was to develop a survey that provided scientifically based information about the levels of risk and protection in a community. There are four survey items that measure risk factors; alcohol, tobacco, marijuana, and tobacco with a total of 152 questions that require students to respond to a total of 230 items. The State of Montana has been conducting the PNA every other year since 1998 to youth in grades 8, 10, and 12 (Montana Department of Public Health and Human Services, 2002).

The 2002 PNA involved 1,066 Native American students in grades 8, 10, and 12 living in Montana. Six hundred and ninety-one of the students lived off the reservations and 375 lived on reservations. Fifty-three questions were chosen to define each of the six

blocks for the independent variables; culture, demographics, education, family structure, peer influence, and social isolation.

This study used SPSS to obtain bi-variate and multi-variate analyses of each of the independent variable and their relationship to the dependent variable regarding the frequency of tobacco use. The bi-variate techniques used were independent t-tests and one-way analysis of variance, depending on the level of measurement for each of the independent variables. The multi-variate technique used was a linear regression to produce a more efficient and precise explanation of the frequency of tobacco use.

The intention of such a project is to enhance the understanding of what drives individual behavior of Native American adolescents in Montana. Based on the results, the risk factors will be placed in a strategic order from most influential to least influential. This arrangement will provide a more directed and specific understanding of the most predominant risk factors. The risk factors may then be used to develop programs that are community specific to the Native American population in Montana with the hope of being more effective in preventing, intervening, and treating tobacco addiction.

#### **IV. Conceptual Framework & Operational Definitions**

To develop my project, I first identified what each social factor indicated to be associated with risk behaviors, particularly tobacco use, that were included in the PNA data set. Next, I defined a conceptual framework linking my dependent variable, frequency of tobacco use, with the relevant social factors, their conceptual definitions, and their operational measurement in the survey. The conceptual definition allows for a specification and operational measurement in order determine any possible relationship between the six blocks of independent variables and the frequency of tobacco use.

##### *Dependent Variables*

The dependent variable is the frequency of tobacco use in reference to the daily smoking habits of the past thirty days reported by the respondents in a of the PNA survey. The dependent variable was coded with seven responses; not at all, less than one cigarette a day, one to five cigarettes a day, about one-half pack a day, about one pack per day, about one and one-half packs per day, and two packs per day (see table 1).

The variable for the frequency of tobacco use was the daily use in a thirty day period with seven response categories ranging from not at all to two packs a day, with a mean of 0.72 and a standard deviation of 1.155.

##### *Independent Variables*

The independent variables are the factors that are possibly related to the difference in the frequency of tobacco use in Native American adolescents. This study examines 53 independent variables.

*Cultural Characteristics:* Cultural beliefs involving a particular group of people can have multiple understandings of importance and meaning that are embedded into a

history. For the eleven tribes in Montana, there are many different histories and beliefs. To measure the cultural beliefs within the communities, questions regarding “religiosity” and “belief in moral order” will be used (PNA, 2000). The definition of cultural beliefs will revolve around religiousness and morals to appropriately use the constructs available within the Prevention Needs Assessment Survey.

- *cheat*: The belief of whether it is ok to cheat in school. (coded as: (0) No, or (1) Yes, ranging from 0 to 1 with a mean of 0.46 and a standard deviation of 0.498.)

- *steal*: The belief of whether it is ok to take something without there being a chance of being caught. (coded as: (0) No, or (1) Yes, ranging from 0 to 1 with a mean of 0.23 and a standard deviation of 0.424.)

- *fight*: The belief it is ok to fight when someone else started the fight. (coded as: (0) No, or (1) Yes, ranging from 0 to 1 with a mean of 0.63 and a standard deviation of 0.483.)

- *relatt*: How often are religious services and activities attended. (coded as: (1) Never, (2) Rarely, (3) 1-2 times a month, (4) about once a week or more, ranging from 1 to 4 with a mean of 2.3072 and a standard deviation of 1.07382.)

- *honest*: How important it is to be honest with your parents, even if they become upset or punish. (coded as: (0) No, or (1) Yes, ranging from 0 to 1 with a mean of 0.77 and a standard deviation of 0.418.)

*Demographic Variables*: Demographic information collected from the survey data includes gender male/female, age 10 or younger through 19 and older, and grade 8<sup>th</sup>, 10<sup>th</sup>, or 12<sup>th</sup>. This information will provide a background on the students who participated in the survey, but will keep confidentiality regarding their specific identity or location

within the state. All students that participated in the survey collectively answered Native American to the ethnicity question and the gender distribution represents a 50/50 ratio.

- *co*: The respondents' county of residence. (ranging from 1 to 56 with a mean of 32.1720 and a standard deviation of 14.53123.)

- *gender*: The sex of the respondent (coded as: (0) Male, or (1) Female, ranging from 0 to 1 with a mean of 0.50 and a standard deviation of 0.500.)

- *age*: The age of the respondent. (ranging from 10 to 19 with a mean of 15.2679 and a standard deviation of 1.66550.)

- *grade*: The respondents' grade in school. (coded as: (1) 8<sup>th</sup> grade, (2) 10<sup>th</sup> grade, or (3) 12<sup>th</sup> grade, ranging from 1 to 3 with a mean of 1.73 and a standard deviation of 0.782.)

- *firstcig*: The respondents' age of their first cigarette. (coded as: (1) Never, (2) 10 or younger, (3) 11, (4) 12, (5) 13, (6) 14, (7) 15, (8) 16, or (9) 17 or older, ranging from 1 to 9 with a mean of 3.4919 and a standard deviation of 2.22096.)

*Educational Variables*: Rather than measure years of education, my education variables relate more to academic orientation. In this way, education will act as an indicator for whether school plays an active role in the behavior or action of the respondent. "Academic failure" and "low commitment to school" are to be used to address the level of academic orientation (PNA, 2000). Eight questions were used in the construction of the education orientation variable, including whether courses are interesting, enjoy, hate, or try best in school, things learned will be important later in life, grades for last school year, father's education, and mother's education. Together, these

questions can determine whether an adolescent has an orientation to school and educational success, or the family environment that contributes to academic orientation.

· *fathedu*: The respondents' father's education (coded as: (1) completed grade school or less, (2) some high school, (3) completed high school, (4) some college, (5) completed college, or (6) graduate or professional school, ranging from 1 to 6 with a mean of 3.44 and a standard deviation of 1.272.)

· *mothedu*: The respondents' mother's education (coded as: (1) completed grade school or less, (2) some high school, (3) completed high school, (4) some college, (5) completed college, or (6) graduate or professional school, ranging from 1 to 6 with a mean of 3.76 and a standard deviation of 1.262.)

· *courses*: The respondent's perceived interest of school courses. (coded as: (1) very dull, (2) slightly dull, (3) fairly interesting, (4) quite interesting, or (5) very interesting, ranging from 1 to 5 with a mean of 2.70 and a standard deviation of 1.014.)

· *enjoysch*: The respondent's perceived enjoyment of school. (coded as: (1) never, (2) seldom, (3) often, or (4) almost always, ranging from 1 to 4 with a mean of 3.1392 and a standard deviation of 1.10172.)

· *hatesch*: The respondent's perceived hate level for school. (coded as: (1) never, (2) seldom, (3) often, or (4) almost always, ranging from 1 to 4 with a mean of 3.1893 and a standard deviation of 1.08379.)

· *bestsch*: The respondent's perceived level of trying their best in school. (coded as: (1) never, (2) seldom, (3) often, or (4) almost always, ranging from 1 to 4 with a mean of 3.9485 and a standard deviation of 0.95271.)

· *schlater*: The respondent's perceived belief about school importance later in life (coded as: (1) not important at all, (2) slightly important, (3) fairly important, (4) quite important, or (5) very important, ranging from 1 to 5 with a mean of 3.58 and a standard deviation of 1.147.)

· *schgrades*: The respondent's grades for the last school year. (coded as: (1) mostly F's, (2) mostly D's, (3) mostly C's, (4) mostly B's, or (5) Mostly A's, ranging from 1 to 5 with a mean of 3.4775 and a standard deviation of 1.01673.)

*Family Structure Variables*: Parents and other family members in the home serve as role models for the younger family members. When boundaries are not set or there is stress in the household due to conflict or other issues, the family cannot act as a cohesive unit to guide the behavior of the child. The Montana Prevention Needs Assessment Survey measures the family domain into categories including "poor family management," family conflict," "family history of antisocial behavior," "parents attitudes towards antisocial behavior and drug use" (PNA, 2000). These categories contain a range from family roles to parental attitudes to family management, providing a holistic definition of a complex family unit. Twenty-three questions are included regarding family structure.

· *mother*: The respondent lives with mother. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.76 and a standard deviation of 0.429.)

· *grandmom*: The respondent lives with grandmother. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.09 and a standard deviation of 0.288.)

· *father*: The respondent lives with father. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.49 and a standard deviation of 0.500.)

- *stepfath*: The respondent lives with stepfather. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.11 and a standard deviation of 0.309.)
- *brother*: The respondent lives with brother. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.042 and a standard deviation of 0.494.)
- *sister*: The respondent lives with sister. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.40 and a standard deviation of 0.491.)
- *ptwts*: The respondents' parents think it is wrong to smoke. (coded as: (1) not wrong at all, (2) a little bit wrong, (3) wrong, or (4) very wrong, ranging from 1 to 4 with a mean of 3.35 and a standard deviation of 0.943.)
- *sibsmoke*: The respondents' siblings ever smoke cigarettes. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.66 and a standard deviation of 0.474.)
- *sibsus*: The respondents' siblings ever suspended from school. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.43 and a standard deviation of 0.495.)
- *clearul*: The respondents' family rules are clear. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.82 and a standard deviation of 0.381.)
- *famyell*: The respondents' family yells at each other. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.47 and a standard deviation of 0.499.)
- *location*: The respondents' parents know their whereabouts. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.78 and a standard deviation of 0.416.)
- *skipsch*: The respondents' parents would know if school were skipped. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.65 and a standard deviation of 0.476.)

· *closemom*: The respondents' indicate they are close to their mother. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.75 and a standard deviation of 0.436.)

· *sharemom*: The respondents' indicate they share thoughts with their mother. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.62 and a standard deviation of 0.487.)

· *sharfath*: The respondents' indicate they share thoughts with their father. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.45 and a standard deviation of 0.498.)

· *youngsibs*: The respondents' number of younger siblings. (ranging from 0 to 6 or more with a mean of 3.1011 and a standard deviation of 1.82776.)

· *oldsibs*: The respondents' number of older siblings. (ranging from 0 to 6 or more with a mean of 3.0461 and a standard deviation of 1.87011.)

· *closfath*: The respondents' indicate they are close to their father. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.60 and a standard deviation of 0.491.)

· *homework*: The respondents' parents ask if their homework is done. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.75 and a standard deviation of 0.436.)

· *knowlate*: The respondents' parents know if they are late. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.76 and a standard deviation of 0.430.)

· *pngj*: The respondents' parents notice when they are doing a good job. (coded as: (1) never or almost never, (2) sometimes, (3) often, or (4) all the time, ranging from 1 to 4 with a mean of 2.5819 and a standard deviation of 1.01421.)

· *ptpt*: The respondents' parents tell them they are proud of them. (coded as: (1) never or almost never, (2) sometimes, (3) often, or (4) all the time, ranging from 1 to 4 with a mean of 2.6455 and a standard deviation of 1.01578.)

*Peer Influence*: Peer groups include friends, classmates, and other people of about the same age that have an influence on the respondents attitudes and behaviors. The PNA survey defined the measure of peer interaction and influence as “rebelliousness,” “early initiation of antisocial behavior and drug use,” “attitudes favorable towards antisocial behavior and drug use,” “perceived risk of drug use,” “interaction with antisocial peers,” “friends use of drugs,” “sensation seeking,” and “rewards for antisocial behavior” (PNA, 2000). There were five questions chosen from the survey regarding peer influence.

· *frismoke*: The number of respondents' friends who smoke. (coded as: (1) none, (2) 1, (3) 2, (4) 3, or (5) 4, ranging from 1 to 5 with a mean of 3.0782 and a standard deviation of 1.57678.)

· *cool*: The respondents' perception of being cool if they smoked. (coded as: (1) no or very little chance, (2) little chance, (3) some chance, (4) pretty good chance, or (5) very good chance, ranging from 1 to 5 with a mean 1.7814 and a standard deviation 1.04879.)

· *wrsmoke*: The respondents' belief that smoking is wrong for someone their age. (coded as: (1) not wrong at all, (2) a little bit wrong, (3) wrong, or (4) very wrong, ranging from 1 to 4 with a mean of 2.84 and a standard deviation of 1.090.)

· *harm*: The respondents' perception of harm from smoking one or more packs of cigarettes a day. (coded as: (1) no risk, (2) slight risk, (3) moderate risk, or (4) great risk, ranging from 1 to 4 with a mean of 3.3602 and a standard deviation of 0.88356.)

· *adsmo*: The respondents' belief of whether they will smoke as an adult. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.23 and a standard deviation of 0.420.)

*Social Isolation*: Social Isolation carries a number of definitions based on its context. However, for this proposal, it will involve feelings toward neighborhood, community, and whether favorable conditions exist for illegal actions or behaviors. Social isolation will be defined in terms of "low neighborhood attachment," "community disorganization," "transitions and mobility," "laws and norms that favor drug use," and "perceived availability of drugs and handguns" (PNA, 2000). These terms formulate the measure of whether an individual has attitudes of attachment to their community.

· *encourag*: The respondents' perception of neighbors encouragement. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.37 and a standard deviation of 0.482.)

· *missngh*: The respondents' perception of missing their neighborhood if they had to move. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.59 and a standard deviation of 0.492.)

· *likengh*: The respondents' indicate whether they like their neighborhood. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.37 and a standard deviation of 0.482.)

· *safe*: The respondents' perception of feeling safe in their neighborhood. (coded as: (0) no, or (1) yes with a mean of 0.60 and a standard deviation of 0.490.)

· *leave*: The respondents' indicate whether they would want to leave their neighborhood. (coded as: (0) no, or (1) yes, ranging from 0 to 1 with a mean of 0.42 and a standard deviation of 0.494.)

· *extraact*: The respondents' involvement in extra-curricular activities. (coded as: (0) none, (1) one activity, (2) two activities, (3) three activities, (4) four activities, or (5) five activities, ranging from 0 to 5 with a mean of 2.88 and a standard deviation of 1.725.)

*Index for Extra-curricular activities:*

Preliminary tests indicated that respondents "engaged" in different types of extra-curricular activities were less likely to smoke and smoke less frequently. Thus, I decided to aggregate the five nominally coded variables sports teams; scouts; service clubs; four-H clubs; and Boys and Girls Clubs into an index of extra-curricular activities. This index was named "extraact". I employed this index aggregation strategy to reduce the number of variables and increase the reliability and stability of the measures. This strategy also creates a ratio level variable out of five nominal level variables.

One problem is that the missing information (no response) was not separately coded, but collapsed in with the "no" response. In other words, the approximately ten percent "non-response" for each of the five variables was counted as "no" the respondent did not engage in that activity. Although this loss of data is troubling, this coding procedure produced a conservative estimate of the percentage of respondents engaged in these activities.

The Extraact index is a cumulative index that simply counts the responses across the five variables. A yes to any of the five variables receives a "1" and a no receives a

“0”. The index is constructed to add the number of affirmative responses for each of the five variables for each respondent. A respondent who participates in all five activities receives a five on the extraact index.. Respondents within fewer activities receive that corresponding number. A respondent who participates in none of the five activities receives a zero on the index.

**Table 1: Descriptive Statistics****Descriptive Statistics of Dependent Variable**

	Valid N	Range	Min	Max	Mean	Std. Deviation
<b>Tobacco Use – tobacco</b> (Frequency 30 dy)	1064	6	0	6	0.72	1.155

**Descriptive Statistics of the Independent Variables**

	Valid N	Range	Min	Max	Mean	Std. Deviation
<b>Culture</b>						
<i>q40 – ok to cheat</i>	1055	1	0	1	0.46	0.498
<i>q41 – ok to steal</i>	1058	1	0	1	0.23	0.424
<i>q46 – ok to fight</i>	1046	1	0	1	0.63	0.483
<i>q49 – religious services attend.</i>	1035	1	0	1	2.3072	1.07382
<i>q146 – honest with parents</i>	899	3	1	4	0.77	0.418
<b>Demographic</b>						
<i>Co – county of residence</i>	1064	55	1	56	32.1720	14.53123
<i>q2 – age</i>	1064	9	10	19	15.2679	1.66550
<i>q3 – grade</i>	1064	2	1	3	1.73	0.782
<i>q1 – gender</i>	1056	1	0	1	0.50	0.500
<i>q32b – age of first cigarette</i>	1053	9	1	10	3.4919	2.22096
<b>Education</b>						
<i>q8 – father’s education</i>	833	5	1	6	3.44	1.272
<i>q9 – mother’s education</i>	905	5	1	6	3.76	1.262
<i>q11 – school courses interesting</i>	1050	4	1	5	2.70	1.014
<i>q22a – enjoy school</i>	1056	4	1	5	3.1392	1.10172
<i>q22b – hate school</i>	1051	4	1	5	3.1893	1.08379
<i>q22c – try best in school</i>	1049	4	1	5	3.9485	0.95271
<i>q26 – school importance later in life</i>	1046	4	1	5	3.58	1.147
<i>q27 – grades last year</i>	1001	4	1	5	3.4775	1.01673
<b>Family Structure</b>						
<i>q5a – live with mother</i>	1064	1	0	1	0.76	0.429
<i>q5d – live with grandmother</i>	1064	1	0	1	0.09	0.288
<i>q5f – live with father</i>	1064	1	0	1	0.49	0.500
<i>q5g – live with stepfather</i>	1064	1	0	1	0.11	0.309
<i>q5l – live with brother</i>	1064	1	0	1	0.42	0.494
<i>q5n – live with sister</i>	1064	1	0	1	0.40	0.491
<i>q121b – parents think it is</i>	953	3	1	4	3.35	0.943

<i>wrong to smoke</i>						
<i>q122c – siblings smoke</i>	923	1	0	1	0.66	0.474
<i>q122f – siblings ever suspended</i>	923	1	0	1	0.43	0.495
<i>q123 – family rules clear</i>	950	1	0	1	0.82	0.381
<i>q124 – family yells</i>	945	1	0	1	0.47	0.499
<i>q125 – parents know location</i>	939	1	0	1	0.78	0.416
<i>q131 – caught if skipped school</i>	933	1	0	1	0.65	0.476
<i>q132 – very close to mom</i>	927	1	0	1	0.75	0.436
<i>q133 – share thoughts with mom</i>	930	1	0	1	0.62	0.487
<i>q135 – share thoughts with father</i>	927	1	0	1	0.45	0.498
<i>q136 – # of younger siblings</i>	910	6.00	1.00	7.00	3.1011	1.82776
<i>q137 – # of older siblings</i>	912	6.00	1.00	7.00	3.0461	1.87011
<i>q141 – close to father</i>	893	1	0	1	0.60	0.491
<i>q143 – parents ask if homework is done</i>	905	1	0	1	0.75	0.436
<i>q145 – parents know if late</i>	905	1	0	1	0.76	0.430
<i>q150 – parents notice a good job</i>	885	3.00	1.00	4.00	2.5819	1.01421
<i>q151 – parents say they are proud</i>	883	3.00	1.00	4.00	2.6455	1.01578
<b>Peer Influence</b>						
<i>q28a – best friend smokes</i>	1049	4	1	5	3.0782	1.57678
<i>q29a – cool if you smoke</i>	1043	4	1	5	1.7814	1.04879
<i>q33g – wrong to smoke</i>	1054	3	1	4	2.84	1.090
<i>q51a – risk of harm</i>	1041	3	1	4	3.3602	0.88365
<i>q54a – when adult will smoke</i>	1038	1	0	1	0.23	0.420
<b>Social Isolation</b>						
<i>q106 – moving would miss ngh</i>	999	1	0	1	0.59	0.492
<i>q108 – like neighborhood</i>	992	1	0	1	0.37	0.482
<i>q110 – like to get out of ngh</i>	989	1	0	1	0.42	0.494
<i>q112 – encouraged by ngh</i>	988	1	0	1	0.37	0.482
<i>q113 – safe in neighborhood</i>	243	1	0	1	0.60	0.490
<i>extra- curricular activities index</i>	1064	5	0	5	2.88	1.725

## V. Data Analysis

### *Bi-Variate Techniques*

The level of measurement of these variables indicated the techniques for bi-variate analyses. There were three statistical techniques used for the bi-variate analyses: independent t-test, one-way analysis of variance and a correlation.

The independent-samples t-test was used to explore the relationship between the dependent variable (*tobacco*) and the following independent variables that are dichotomous nominal level variables: *fight, cheat, steal, honest, gender, rez, mother, skipsch, homework, location, famyell, clearrul, knowlate, closemom, closfath, sharfath, sharemom, grandmom, sister, sibsusp, and sibsmoke*. This procedure was used because we are examining the relationship between the interval level dependent variable and the nominal level independent variables. The independent-samples t-test is a statistical technique that examines two independent population means. The samples from the different groups are called independent because there is no relationship between the people in the different groups (Norusis, 2000). The test examines the variability of the independent sample means estimated from the variances and sample sizes of the independent groups. The statistic of interest is the t-statistic that measures the number of standard error units from the population means of 0 your observed difference is located (Norusis, 2000: 237).

One-way analysis of variance (ANOVA) was used to explore the relationship between the dependent variable (*tobacco*) and the following independent variables: *relatt, grade, co, schgrades, enjoysch, hatesch, bestsch, schlater, courses, mothedu, fathedu, ptwts, youngsibs, oldsibs, pngi, ptpt, stepfath, father, and brother*. This procedure was

used because we are examining the relationship between the interval level dependent variable and the interval or ratio level independent variables. ANOVA was a statistical technique used to test the null hypothesis that independent means are equal. The statistic of interest is the F ratio which is the ratio of the variability of the within-groups mean square and the between groups mean square. The Bonferonni test used with this technique was used to specify the differences among the groups where ANOVA indicates significant relationships existed (Norusis, 2000).

A correlation was used to examine the relationship between the dependent variable (*tobacco*) and the independent variables: *age* and *firstcig*, the age of the respondent and the age the respondent had their first cigarette. Correlation coefficients measure the strength of the linear association between two variables. The statistic of interest was the Pearson correlation coefficient that ranges from -1 to 1 and is the measure of how tightly points cluster around the line. The correlation indicates the strength and direction of the relationship between the dependent and independent variables.

### *Bi-Variate Results*

#### *Cultural Characteristics:*

*Fight.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated it is ok to fight if someone else starts it. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.42 in frequency of tobacco use and the t-statistic is -6.251. The observed two-tailed significance is .000 that suggests less than 1% of the time would you expect to see a sample difference of -.42 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say that it is ok to fight when someone else

starts it are more likely to smoke and smoke more frequently than adolescents who say they would not fight.

*Steal.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated it is ok to steal if there is no chance of getting caught. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.36 in frequency of tobacco use and the t-statistic is -4.058. The observed two-tailed significance is .000 that suggests less than 1% of the time would you expect to see a sample difference of -.36 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they would steal are more likely to smoke and smoke more frequently than adolescents who say they would not steal.

*Cheat.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated it is ok to cheat in school. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.23 in frequency of tobacco use and the t-statistic is -3.254. The observed two-tailed significance is .001 that suggests that .1% of the time would you expect to see a sample difference of -.23 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they would cheat in school are more likely to smoke and smoke more frequently than adolescents who say they would not cheat.

*Honest.* The null hypothesis is that there is not relationship between tobacco use and whether the respondent indicated they are honest with their parents. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .38 in frequency of tobacco use and the t-statistic is 3.802. The observed two-tailed significance is .000 that suggests less than 1% of the time would you expect to see a

sample difference of .38 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they are honest with their parents are less likely to smoke and smoke less frequently than adolescents who say they are not honest with their parents.

*Relatt.* A one-way analysis of variance test shows that the probability of obtaining an F ratio of 12.311 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this F-ratio or larger. The likelihood that adolescents attending services at different frequencies would smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significant differences between groups: never and 1-2 times a month, never and once a week+, and rarely and once a week+. This evidence indicates that adolescents who say they attend religious services on a regular basis are less likely to smoke or smoke at a lower frequency than adolescents who say they do not attend or sporadically attend religious services.

#### *Demographics:*

*Gender.* The null hypothesis is that there is no relationship between tobacco use and gender. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.32 in frequency of tobacco use and the t-statistic is -4.577. The observed two-tailed significance is .000 that suggests less than 1% of the time would you expect to see a sample difference of -.32 in frequency of tobacco use, when the null hypothesis is true. This unexpected evidence indicates that female adolescents are more likely to smoke and smoke more frequently than males.

*Grade.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the three grade categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 26.022 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents in 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grade smoke the same amount is highly unlikely. The Bonferroni test shows that there are significant differences in those that are in: 8<sup>th</sup> and 10<sup>th</sup> grade and 8<sup>th</sup> and 12<sup>th</sup> grade. The evidence indicates that students reporting they were in a higher grade are more likely to smoke and smoke more frequently than students reporting to be in a younger grade.

*Age.* The null hypothesis is that there is no relationship between tobacco use and age. The Pearson correlation of .184 has an observed two-tailed significance of .000. This correlation indicates a positive relationship between tobacco use and age. Specifically, the older an adolescent the more likely they are to smoke.

*Firstcig.* The null hypothesis is that there is no relationship between tobacco use and age the respondent indicated they had their first cigarette. The Pearson correlation of .115 with an observed significance of .000 unexpectedly indicates a positive relationship between smoking and frequency of smoking and reported age of first cigarette. In other words, the older the age of the first cigarette the more likely the respondent is to smoke and the more frequently the respondent smokes to be the predictor for adolescents that are more likely to smoke. This positive correlation is counter-intuitive and merits further examination.

*Education Characteristics:*

*Schgrades.* The null hypothesis is there is no difference in the frequency of smoking for respondents in the five school grade categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 11.090 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different grade ranges smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different as follows: Mostly A's and Mostly F's, Mostly B's and Mostly F's, Mostly A's and Mostly D's, Mostly B's and Mostly D's, Mostly A's and Mostly C's, and Mostly B's and Mostly C's. This evidence indicates that students who reported receiving mostly A's and B's are less likely to smoke or smoke less than students who reported receiving mostly C's, D's, and F's.

*Bestsch.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four trying you best in school categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 7.455 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents who have different levels of commitment to school smoke the same amount is highly unlikely. The Bonferroni test shows significant differences between groups: seldom and often and seldom and almost always trying to do their best in school. Students who say they seldom try their best in school are more likely to smoke and smoke more frequently than students who say they often and almost always try their best in school.

*Enjoysch.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four enjoying school categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 6.876 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents who have different levels of enjoyment at school smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different between those that perceived enjoyment in school: Never and sometimes, never and often, and never and almost always. Students who say they never enjoy school are more likely to smoke and smoke frequently more than students who say they sometimes, often and almost always enjoy school.

*Hatesch.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four hate school categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 6.840 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents who have different levels of hatred for school smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different are those that: almost always and never, seldom and almost always, sometimes and almost always say they hate school. Students who say they hate school are more likely to smoke and smoke more frequently than students who say they never, seldom, or sometimes hate school.

*Schlater.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the five school importance categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 8.763 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents who have different opinions for the importance of school later in life smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different are those that say they feel school is: very important and not at all important, very important and slightly important, and very important and fairly important. Students who say they feel school is not as important later in life are more likely to smoke and smoke more frequently than students who say school later in life is important.

*Mothedu.* The null hypothesis is that there is no difference in the frequency of smoking for respondents whose parent is in one of the six education categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 3.273 or larger when the null hypothesis is true is .006. This means that .6% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with mothers with varying educational backgrounds smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different for those whose mothers completed: some high school and completed college and some high school and graduate or professional degree. Students who reported their mothers have a lower educational background are more likely to smoke and smoke more frequently than students who reported their mothers have a higher educational level.

*Fathedu.* The null hypothesis is that there is no difference in the frequency of smoking for respondents whose parent is in one of the six education categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 2.918 or larger when the null hypothesis is true is .013. This means that 1.3% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with fathers with varying educational backgrounds smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different for those whose father completed: some high school and completed college. Students who reported their fathers have a lower educational background are more likely to smoke and smoke more frequently than students who reported their fathers have a higher educational level.

*Family Structure:*

*Mother.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated living with their mother. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .28 in frequency of tobacco use and the t-statistic is 3.183. There is an observed two-tailed significance is .002 that suggests that .2% of the time would you expect to see a sample difference of .28 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they do not live with their mother are more likely to smoke and smoke more frequently than those who say they do live with their mother.

*Sister.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated living with their sister. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .16 in frequency

of tobacco use and the t-statistic is 2.251. The observed two-tailed significance is .025 that suggests that 2.5% of the time would you expect to see a sample difference of .16 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they do not live with their sister are more likely to smoke and smoke more frequently than those who say they do live with their sister.

*Father.* The null hypothesis is that there is no relationship between tobacco use and whether respondents indicated they are close with their father. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .29 in frequency of tobacco use and the t-statistic is 4.142. The observed two-tailed significance is .000 that suggests that less than 1% of the time would you expect to see a sample difference of .29 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they are not close with their father are more likely to smoke and smoke more frequently than those who say they are close with their father.

*Oldsibs.* The null hypothesis is that there is no difference in frequency of smoking for respondents in the six older sibling categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 5.355 or larger when the null hypothesis is true is .000. This means less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with a different number of older siblings smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different for those with a number of older siblings: 6 or more and 0, 6 or more and 1, 5 and 0, and 5 and 1. This evidence indicates that adolescents who say they have a larger number of older siblings are more likely to smoke and smoke more frequently than those who say they have fewer older siblings.

*Youngsibs.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the six younger sibling categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 3.817 or larger when the null hypothesis is true is .001. This means that .1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different number of younger siblings smoke the same amount is highly unlikely. The Bonferroni test shows that the groups are significantly different for those with a number of younger siblings: 6 or more and 0, 6 or more and 1, 6 or more and 2, and 6 or more and 3. This evidence indicates that adolescents who reported a larger number of younger siblings are more likely to smoke and smoke more frequently than adolescents with fewer younger siblings.

*Sibsmoke.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated that their siblings smoke. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.55 in frequency of tobacco use and the t-statistic is  $-7.906$ . The observed two-tailed significance is .000 that suggests that less than 1% of the time would you expect to see a sample difference of -.55 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have siblings that smoke are more likely to smoke and smoke more frequently than those who do not have siblings that smoke.

*Sib susp.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated their siblings have been suspended from school. Levene's test indicates that equal variances cannot be assumed. There is an observed

difference of -.46 in frequency of tobacco use and the t-statistic is -6.145. The observed two-tailed significance is .000 that suggests that less than 1% of the time would you expect to see a sample difference of -.46 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have siblings who have been suspended from school are more likely to smoke and smoke more frequently than those who say they do not have siblings that have been suspended.

*Ptwtvs.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four parent beliefs about smoking categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 86.051 or larger when the null hypothesis is true is .000. This means that less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with parents who have different beliefs about them smoking smoke the same is low. The Bonferroni test shows that there are significant differences in beliefs about smoking as follows: not wrong at all and a little bit wrong, not wrong at all and wrong, not wrong at all and very wrong, a little bit wrong and wrong, a little bit wrong and very wrong, and wrong and very wrong. This evidence indicates that adolescents who say their parents think smoking is not wrong are more likely to smoke and smoke more frequently than adolescents who say their parents believe smoking is wrong.

*Knowlate.* The null hypothesis is that there is no relationship between tobacco use and whether the respondents indicated that their parents know if they return late. Levene's test indicates that equal variances are not assumed. There is an observed difference of .27 in frequency of tobacco use and the t-statistic is 2.724. The observed two-tailed significance is .007 that suggests that .7% of the time would you expect to see a sample

difference of .27 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have parents who don't know if they are late are more likely to smoke and smoke more frequently than those who say they have parents who know if they are late.

*Clearrul.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated that clear family rules are set. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .29 in frequency of tobacco use and the t-statistic is 2.596. The observed two-tailed significance is .010 that suggests that 1% of the time would you expect to see a sample difference of .29 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have unclear family rules are more likely to smoke and smoke more frequently than adolescents who say they have clear family rules.

*Famyell.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated their family yells at each other. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of -.17 in frequency of tobacco use and the t-statistic is -2.255. The observed two-tailed significance is .024 that suggests that 2.4% of the time would you expect to see a sample difference of -.17 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say their families yell at each other are more likely to smoke and smoke more frequently than those who say they do not have families that yell.

*Location.* The null hypothesis is that there is no relationship between tobacco use and whether the respondents indicated that their parents know their whereabouts. Levene's

test indicates that equal variances cannot be assumed. There is an observed difference of .41 in frequency of tobacco use and the t-statistic is 4.020. The observed two-tailed significance is .000 that suggests that less than 1% of the time would you expect to see a sample difference of .41 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have parents who do not know their whereabouts are more likely to smoke and smoke more frequently than adolescents who say their parents do know their whereabouts.

*Homework.* The null hypothesis is that there is no relationship between tobacco use and whether the respondents indicated their parents ask if their homework is done. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .41 in frequency of tobacco use and the t-statistic is 4.216. The observed two-tailed significance is .000 that suggests that less than 1% of the time would you expect to see a sample difference of .41 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they have parents that don't ask whether their homework is done are more likely to smoke and smoke more frequently than adolescents with parents that do ask.

*Skipsch.* The null hypothesis is that there is no relationship between tobacco use and whether the respondent indicated if they would be caught if they skipped school. Levene's test indicates that equal variances cannot be assumed. There is an observed difference of .29 in frequency of tobacco use and the t-statistic is 3.448. The observed two-tailed significance is .001 that suggests that .1% of the time would you expect to see a sample difference of .29 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they would not be caught if they

skipped school are more likely to smoke and smoke more frequently than adolescents who would be caught skipping school.

*Peer Influence:*

*Frismoke.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the five friend categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 62.461 or larger when the null hypothesis is true is .000. This means that less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with a different number of friends that smoke, smoke the same is highly unlikely. The Bonferroni test shows that there are significant differences as follows for the number of friends that smoke: 0 and 2 friends, 0 and 3 friends, 0 and 4 friends, 1 and 2 friends, 1 and 3 friends, 1 and 4 friends, 2 and 4 friends, 3 and 4 friends. This evidence indicates that adolescents who reported having more friends who smoke are more likely to smoke and smoke more frequently than adolescents who reported having fewer friends who smoke.

*Cool.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the five belief categories about being perceived as cool when smoking. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 12.557 or larger when the null hypothesis is true is .000. This means that less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different perceptions of whether it is seen as cool to smoke, smoke the same is highly unlikely. The Bonferroni test shows that there are

significant differences between groups about being cool if smoking as follows: no or very little chance and little chance, no or very little chance and some chance, no or very little chance and pretty good chance, no or very little chance and very good chance, little chance and very good chance, and some chance and very good chance. This evidence indicates that adolescents who reported having the perception that someone is cool if they smoke are more likely to smoke and smoke more frequently than adolescents who reported that there is no or very little chance of being cool when smoking.

*Harm.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four risk of harm categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 21.562 or larger when the null hypothesis is true is .000. This means that less than 1% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different views of the harms of smoking smoke the same is highly unlikely. The Bonferroni test shows that there are significant differences in the beliefs of risk of harm as follows: great risk and no risk, great risk and slight risk, great risk and moderate risk, and moderate risk and slight risk. This evidence indicates that adolescents who reported believing there is no or little risk of harm by smoking are more likely to smoke and smoke more frequently than adolescents who reported believing there is greater harm.

*Wrsmoke.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the four belief it is wrong to smoke categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 98.849 or larger when the null hypothesis is true is .000. This means that less than 1% of the time when the null

hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different views of whether it is wrong to smoke, smoke the same is highly unlikely. The Bonferroni test shows that there are significant differences in the beliefs that smoking is wrong as follows: very wrong and wrong, very wrong and a little bit wrong, very wrong and not wrong at all, wrong and a little bit wrong, wrong and not wrong at all, and a little bit wrong and not wrong at all. This evidence indicates that adolescents who reported believing that smoking is not wrong at all are more likely to smoke and smoke more frequently than adolescents who reported believing smoking is wrong.

*Adsmo.* The null hypothesis is that there is no relationship between tobacco use and the respondent's indication of whether they will smoke as an adult. Levene's test indicates that equal variances are not assumed. There is an observed difference of -1.51 in frequency of tobacco use and the t-statistic is -18.024. The observed two-tailed significance is .000 that suggests that 1% of the time would you expect to see a sample difference of -1.51 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they believe they will smoke when they are an adult are more likely to smoke and smoke more frequently than those who say they believe they will not smoke.

*Social Isolation:*

*Likengh.* The null hypothesis is that there is no relationship between tobacco use and the respondent indicating whether they liked their neighborhood. Levene's test indicates that equal variances are not assumed. There is an observed difference of .20 frequency of

tobacco use and the t-statistic is 2.525 observed two-tailed significance is .012 that suggests that 1.2% of the time would you expect to see a sample difference of .20 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they do not like their neighborhood are more likely to smoke and smoke more frequently than those who say they do not like their neighborhood.

*Leave.* The null hypothesis is that there is no relationship between tobacco use and the respondent indicating that they want to leave their neighborhood. Levene's test indicates that equal variances are not assumed. There is an observed difference of -.20 frequency of tobacco use and the t-statistic is -2.611 observed two-tailed significance is .009 that suggests that .9% of the time would you expect to see a sample difference of -.20 in frequency of tobacco use, when the null hypothesis is true. This evidence indicates that adolescents who say they would like to leave their neighborhood are more likely to smoke and smoke more frequently than those who say they do not want to leave their neighborhood.

*Extraact.* The null hypothesis is that there is no difference in the frequency of smoking for respondents in the five extra-curricular activities categories. A one-way analysis of variance test shows that the probability of obtaining an F ratio of 2.385 or larger when the null hypothesis is true is .037. This means that 3.7% of the time when the null hypothesis is true you would expect to this number or larger. The likelihood that adolescents with different levels of engagement in extra-curricular activities smoke the same is low. The Bonferroni test shows that there are significant differences between those respondents with: 0 extra-curricular activities and 3 extra-curricular activities. This evidence indicates that adolescents who reported engaging in three activities are less

likely to smoke and smoke less frequently than those who reported not being involved in any extra-curricular activities.

### *Multi-Variate Techniques*

I moved from bivariate to multivariate analysis to pursue a more efficient explanation of tobacco use. The six blocks of independent variables (culture, demographics, education, family structure, peer influence, and social isolation) were treated one at a time. The variables in each block were run separately against tobacco use to identify the most explanatory variables.

The statistical technique used for the multivariate analysis was the linear regression. This technique was used to evaluate the possible relationship between variables in the population from which the sample was collected. The statistics of interest are  $R^2$  and  $t$  statistics.  $R$  square indicates the amount of variance explained by that block of variables, the  $t$  value indicates the strength and direction of the relationship between the dependent variable and the individual independent variables in the blocks of variables (Norusis, 2000: 237).

### *Multi-Variate Results*

*Culture.* The null hypothesis is that there is no linear relationship in the population between the culture characteristics of the respondent and the frequency of tobacco use. With an  $F$  ratio of 13.520 and an observed significance level of .000, the null hypothesis can be rejected. The  $R$  square suggests that 7.2% of the observed variability in the frequency of tobacco use is explained by the culture variables. The most powerful

cultural variable is “attendance at religious services” with a t-value of  $-4.553$  and a corresponding probability of  $.000$ . This indicates that the greater the attendance at religious services the lower the use of tobacco. In order of variance explained the next most important variables were “ok to fight” with a t-value of  $3.565$  and a probability of  $.000$ , “honest with parents” with a t-value of  $-2.475$  and a probability of  $.014$ , and “ok to steal” with a t-value of  $2.301$  and a probability of  $.022$ . The variable “ok to cheat” was not significant when controlling for the other cultural variables. In summary, the more you attend religious services, the less you think it is ok to fight and ok to steal, and the more honest you are with your parents, the less likely you are to use tobacco or use it less frequently. This evidence suggests that while there is a relationship between frequency of smoking and the culture of a population, it is not the strongest predictor.

*Demographics.* The null hypothesis is that there is no linear relationship between the demographics of respondents and the frequency of tobacco use. With an F ratio of  $18.711$  and an observed significance level of  $.000$ , the null hypothesis can be rejected. The R square indicates that  $6.7\%$  of the observed variability in the frequency of tobacco use is explained by the demographics in the population. The most powerful demographic variable is “gender” with a t-value of  $4.553$  and a corresponding probability of  $.000$ . This indicates that males have a lower frequency of tobacco use than females. In order of variance explained the next most important variable was “grade” with a t-value of  $2.923$  and a probability of  $.000$ . The variables “age” and “age of first cigarette” were not significant when controlling for the other demographic variables. In summary, being male and being enrolled in a lower grade in school, the less likely you are to use tobacco or use it less frequently. This evidence indicates that while there is a relationship between

frequency of smoking and the demographic information of a population, it is not the strongest predictor.

*Education.* The null hypothesis is that there is no linear relationship between education performance and education orientation and the frequency of tobacco use. With an F ratio of 10.755 and an observed significance level of .000, the null hypothesis can be rejected. The R square suggests that 9.4% of the observed variability in the frequency of tobacco use is explained by education. The most powerful educational variable is “grades last year” with a t-value of -4.014 and a corresponding probability of .000. This indicates that those who have higher grades in school have a lower frequency of tobacco use. In order of variance explained the next most important variables were “school importance later” with a t-value of -3.394 and a probability of .001 and “mother’s education” with a t-value of -2.207 and a probability of .028. The variables “try best in school”, “hate being in school”, “enjoy being in school”, and “father’s education” were not significant when controlling for the other educational variables. In summary, those who receive higher grades, believe school is important later in life, and who have a mother with a higher educational background, the less likely you are to use tobacco or use it less frequently. This evidence suggests that while there is a relationship between frequency of smoking and the education, it is not the strongest predictor.

*Family structure.* The null hypothesis is that there is no linear relationship in the population between family structure and the frequency of tobacco use. With an F ratio of 21.732 and an observed significance level of .000, the null hypothesis can be rejected. The R square indicates that 27.8% of the observed variability in the frequency of tobacco use is explained by family structure. The most powerful family variable is “parents think

it is wrong to smoke” with a t-value of -12.780 and a corresponding probability of .000. This indicates that those respondents who have parents that believe it is wrong to smoke have a lower frequency of tobacco use. In order of variance explained the next most important variables were “siblings ever smoked” with a t-value of 2.847 and a probability of .005, “siblings ever suspended” with a t-value of 2.555 and a probability of .011, and “number of older siblings” with a t-value of 2.350 and a probability of .019. The variables “live with mother”, “live with sister”, “close to father”, “family yells”, “parents know if late”, “parents ask if homework is done”, “parents know location”, “clear family rules”, “caught if skipped school”, and “number of younger siblings” were not significant when controlling for the other family variables. In summary, those who have parents that believe smoking is wrong, have siblings that have never smoked or been suspended from school, and have a lower number of older siblings, the less likely you are to use tobacco or use it less frequently. This evidence indicates there is a strong relationship between frequency of smoking and family structure.

*Peer influence.* The null hypothesis is that there is no linear relationship in the population between peer influence and the frequency of tobacco use. With an F ratio of 132.893 and an observed significance level of .000, the null hypothesis can be rejected. The R square suggests that 40.0% of the observed variability in the frequency of tobacco use is explained by peer influence. The most powerful peer variable is “when adult will smoke” with a t-value of 12.628 and a corresponding probability of .000. This indicates that those who believe they will not smoke as an adult have a lower frequency of tobacco use. In order of variance explained the next most important variables were “best friend smokes cigarettes” with a t-value of 8.158 and a probability of .000 and “wrong to

smoke” with a t-value of  $-6.299$  and a probability of  $.000$ . The variables “risk of harm” and “cool if you smoke” were not significant when controlling for the other peer variables. In summary, those who believe they will not smoke as an adult and do not have a best friend who smokes, are less likely to use tobacco or use it less frequently. This evidence indicates there is a strong relationship between frequency of smoking and peer influence.

*Social isolation.* The null hypothesis is that there is no linear relationship in the population between social isolation and the frequency of tobacco use. With an F ratio of  $3.525$  and an observed significance level of  $.015$ , the null hypothesis can be rejected. The R square suggests that  $1.1\%$  of the observed variability in the frequency of tobacco use is explained by social isolation. When controlling for all the social isolation variables, “extra-curricular activities”, “like neighborhood”, and “like to leave neighborhood” were not found to be significant. This evidence suggests that while there is a relationship between frequency of smoking and social isolation, it is not the strongest predictor.

#### *Overall Model*

After evaluating the strongest variables from each of the six blocks using the linear regression technique, I again used the regression to evaluate the 16 most significant independent variables and the frequency of tobacco. Of the six blocks of variables (culture, demographics, education, family structure, peer influence, and social isolation), the social isolation block and its corresponding variables were not found to be significant and therefore will not be part of this progression of the analysis. This will allow for a more efficient explanation of tobacco use. The variables were run together against tobacco use to identify the most explanatory variables.

The null hypothesis is that there is no linear relationship in the population between culture, demographics, education, family structure, and peer influence and the frequency of tobacco use. With an F ratio of 43.266 and an observed significance level of .000, the null hypothesis can be rejected. The R square indicates that 51.8% of the observed variability in the frequency of tobacco use is explained by culture, demographics, education, family structure, and peer influence. The most powerful variable is “when adult will smoke” with a t-value of 10.919 and a corresponding probability of .000. This result indicates that those who believe they will not smoke as an adult have a lower frequency of tobacco use controlling for all other independent variables. In order of variance explained the next most important variables are “best friend smokes cigarettes” with a t-value of 6.601 and a probability of .000, “parents think it is wrong to smoke” with a t-value of -5.385 and a probability of .000, “wrong to smoke” with a t-value of -3.174 and a probability of .002, “honest with parents” with a t-value of 3.058 and a probability of .002, “number of older siblings” with a t-value of 2.181 and a probability of .030, “grade” with a t-value of 2.118 and a probability of .035, and “grades last year” with a t-value of -2.072 and a probability of .039. The variables “ok to fight,” “ok to steal,” “mother’s education,” “siblings ever smoked,” “siblings ever suspended,” “school importance later,” “gender,” and “religious service attendance” were not significant when controlling for the other variables. In summary, those who believe they will not smoke as an adult, do not have a best friend who smokes, have parents that think it is wrong to smoke, believe it is wrong to smoke, are honest with their parents, do not have older siblings, are in a lower grade in school, and have higher grades in school, the less likely they will be to use tobacco or use it less frequently.

## **VI. Conclusions, Implications & Limitations**

The findings suggest that peer influence and family structure are the most influential factors that influence tobacco use among Native American youth. The social factors of peer influence (40%) and family structure (27.8%) are followed by education (9.4%), culture (7.2%), demographics (6.7%), and finally social isolation (1.1%) as explanatory factors in understanding the frequency of tobacco use among Native American adolescents. Of the 53 variables in the six blocks of social factors 8 variables appeared to be the strongest when controlling for all the other independent variables. Specifically, the category of peer influence, if an adolescent does not have one or more best friends that smoke and they do not believe they will smoke as an adult and believe smoking is wrong indicates a lower frequency of tobacco use. For the category of family structure, if the parents believe it is wrong to smoke and the adolescent does not have older siblings that are close in age, they are less likely to smoke or have a lower frequency of tobacco use. The educational variable with the greatest significance is a respondent's grades from the past year in school. Those who received higher grades were less likely to smoke or smoke less frequently. The demographic information with the greatest significance was what grade the respondent was in during the time of the survey. Students surveyed were in 8<sup>th</sup>, 10<sup>th</sup>, or 12<sup>th</sup> grade and those in the lower grades were less likely to smoke or smoke less frequently. Finally, the cultural variable with the greatest significance was the belief about being honest with one's parents. The respondents who indicated they were honest with their parents were less likely to smoke or smoke less frequently.

Given that minority groups are at greater risk for smoking behavior further study is needed on whether these social factors would have the same influence in other states

with a population of Native American youth or whether these findings could be generalized to other minority populations in similar rural or urban settings. The results suggest a greater need for cultural specific prevention programs to target the needs of certain racial and ethnic groups. For instance, there could be programs that include the family in its prevention efforts to help structure a nurturing environment or prevention efforts could start in younger grades since most children according to the results of this study smoked more in the higher grades. Parents could be informed about the difference they could make in their child's behavior based on how they address the issue of smoking. Younger children may be more perceptive to the messages projected in prevention efforts and may have more of an impact on the decisions they make later on in adolescence.

The main idea would be to target the necessary factors in populations to better structure and orient prevention programs. According to a preventive study out of the University of California, "As the U.S. population becomes increasingly multicultural, it will become increasingly important to develop adolescent smoking prevention programs that will be relevant and effective for adolescents of diverse cultural backgrounds" (Unger, 2001: 19). A customized prevention program for different ethnic groups can provide more effective care for adolescents.

Based on the findings of this study, I would encourage prevention programs to begin with younger children to delay or prevent the initiation of smoking and help them build a negative belief about smoking and the potential dangers of smoking. While the programs may take in a school or learning environment, it would be important to engage the parents and family in the prevention efforts to support what the child may be learning

in the program. This would develop a nurturing environment for the child that may deter the risk behavior of smoking.

This study has several limitations. It can be suggested that risk factors may change over time, so to determine such changes a longitudinal analysis would be required at some point in the future. As this was an observational study the findings suggest an association between the given social factors and smoking, not causality. Existing survey data was used creating only certain constructs available to test each variable (LeMaster, 2002). These constructs were formulated through the particular questions asked regarding the possible risk factors that attribute high tobacco use rates among Native American youth. Again, since survey data was used, self-reported behavior can lead to inaccurate results.

While using existing survey data, the location of the students could not be identified, hindering the analysis. More students from one school or reservation could have been surveyed while another may have failed to or declined to take part in the survey. As a result, the tested variables may not be present in all areas regarding Native American students in Montana with the same magnitude.

The variance of the dependent and the independent variables were limited because the missing data was grouped into the “no” category on all questions as part of the original coding. Therefore, the responses in the “no” category are affected by the missing responses for each question.

Appendix A: Tables

Table 2: Bi-Variate Analysis

*tobacco*

<i>tobacco</i>							
	<b>df</b>	<b>F</b>	<b>t</b>	<b>Pearson Correlation</b>	<b>sig.</b>	<b>Mean difference</b>	<b>Bonferonni</b>
<b>Culture</b>							
<i>fight</i>	966	-	- 6.251	-	.000	-.42	-
<i>steal</i>	368	-	- 4.058	-	.000	-.36	-
<i>cheat</i>	992	-	- 3.254	-	.001	-.23	-
<i>honest</i>	295	-	3.802	-	.000	.38	-
<i>relatt</i>	1034	12.311	-	-	.000	-	1-3, 1-4, 2-4
<b>Demographics</b>							
<i>co</i>	1063	1.304	-	-	.100	-	-
<i>Age</i>	-	-	-	.180**	.000	-	-
<i>Rez</i>	1062	-	- 1.654	-	.098	-.12	-
<i>gender</i>	1046	-	- 4.577	-	.000	-.32	-
<i>grade</i>	1063	26.022	-	-	.000	-	1-2, 1-3
<i>firstcig</i>	-	-	-	.116**	.000	-	-
<b>Education</b>							
<i>fathedu</i>	832	2.918	-	-	.013	-	2-5
<i>mothedu</i>	904	3.273	-	-	.006	-	-
<i>courses</i>	1049	1.613	-	-	.169	-	-
<i>enjoysch</i>	1055	6.876	-	-	.000	-	1-3, 1-4, 1-5, 2-3, 2-4, 2-5
<i>hatesch</i>	1050	6.840	-	-	.000	-	1-5, 2-4, 2-5, 3-5, 2-3
<i>bestsch</i>	1048	7.455	-	-	.000	-	2-4, 2-5, 3-5
<i>schgrades</i>	1000	11.090	-	-	.000	-	1-4, 1-5, 2-4, 2-5, 3-4, 3-5
<i>schlater</i>	1045	8.763	-	-	.000	-	5-1, 5-4, 4-2, 4-1, 3-1, 2-5

<b>Family Structure</b>							
<i>mother</i>	401	-	3.183	-	.002	.28	-
<i>grandmom</i>	1062	-	-.770	-	.818	.123	-
<i>father</i>	1031	-	4.142	-	.000	-	-
<i>stepfath</i>	1063	-	1.922	-	.166	-	-
<i>brother</i>	1063	-	1.169	-	.280	-	-
<i>sister</i>	978	-	2.251	-	.025	.071	-
<i>sibsmoke</i>	791	-	- 7.906	-	.000	.070	-
<i>sibsus</i>	781	-	- 6.145	-	.000	.076	-
<i>clearrul</i>	218	-	2.596	-	.010	.29	-
<i>famyell</i>	920	-	- 2.255	-	.024	-.17	-
<i>location</i>	285	-	4.020	-	.000	.41	-
<i>closemom</i>	925	-	.988	-	.361	.087	-
<i>sharemom</i>	928	-	.351	-	.750	.078	-
<i>sharfath</i>	914	-	2.331	-	.020	.18	-
<i>closfath</i>	711	-	3.107	-	.002	.25	-
<i>skipsch</i>	574	-	3.448	-	.001	.29	-
<i>knowlate</i>	317	-	2.724	-	.007	.27	-
<i>pngj</i>	884	-	.320	-	.811	-	-
<i>ppt</i>	882	-	1.258	-	.288	-	-
<i>youngsibs</i>	909	3.817	-	-	.001	-	2-7, 3-7, 4-7
<i>oldsibs</i>	911	5.355	-	-	.000	-	1-6, 1-7, 2-6, 2-7,
<i>ptwts</i>	952	86.051	-	-	.000	-	1-2, 1-3, 1-4, 2-3, 2-4, 3-4
<i>homework</i>	338	-	4.216	-	.000	.41	-
<b>Peer Influence</b>							
<i>frismoke</i>	1048	62.461	-	-	.000	-	1-3, 1-4, 1-5, 2-3, 2-4, 2-5, 3-5, 4-5
<i>wrsmoke</i>	1053	98.849	-	-	.000	-	1-2, 1-3, 1-4, 2-3, 2-4, 3-4
<i>adsmo</i>	314	-	- 18.02	-	.000	.084	-
<i>harm</i>	1040	21.562	-	-	.000	-	1-4, 2-3, 2-4, 3-4

<i>cool</i>	1042	12.557	-	-	.000	-	1-2, 1-3, 1-4, 1-5, 2-5, 3-5,
<b>Social Isolation</b>							
<i>extraact</i>	1063	2.385	-	-	.037	-	0-3
<i>encourag</i>	718	-	1.539	-	.124	.079	-
<i>missngh</i>	997	-	.291	-	.978	.075	-
<i>likengh</i>	716	-	2.525	-	.012	.078	-
<i>safe</i>	388	-	1.627	-	.105	.090	-
<i>leave</i>	873	-	- 2.611	-	.009	.075	-

### Table 3: Profile of Variables

#### Frequency of Tobacco Use

Adolescents are less likely to smoke if they...

<b>Culture</b>
Attend religious services and activities on a regular basis
Believe it is not ok to fight if someone else starts the fight
Believe it is not ok to steal even if there is no chance of being caught
Are honest with parents
<b>Demographics</b>
Are male
Are in a lower grade in school
<b>Education</b>
Have higher school grades
Believe school carries importance later in life
Have a mother with a higher level of schooling
<b>Family Structure</b>
Have parents who believe smoking is wrong for adolescents
Have siblings who do not smoke
Have siblings that have never been suspended from school
Have a fewer number or no older siblings
<b>Peer Influence</b>
Believe as an adult they will not smoke
Have no best friends who smoke
Believe it is wrong to smoke
<b>Social Isolation</b>
No variables were found to be significant in a lower incidence of adolescent smoking

## **Appendix B: Instrumentation**

Administrative Instructions (read to each participating class):

Today, we will be completing the Prevention Needs Assessment Survey. The purpose of this survey is to learn how students in our school feel about their community, family, peers, and school. This survey also asks what students think about different health behaviors and drug use.

The survey is anonymous. You should read each question in the survey booklet and fill in the circle for your answer. The survey booklet does not have your name or any other identifying information on it, so no one will know how you answer any of your questions.

At the end of class, I will pass around an envelope and ask you place your completed survey booklet inside. The last person in class will seal this envelope before returning it to me.

The survey is voluntary. If you do not wish to participate in the survey, please raise your hand now.

I'm going to read some instructions to you about completing the survey. Please listen carefully.

Your answers will be read automatically by a machine. Please use a dark lead pencil like a number 2 pencil to mark your answers on the questionnaire. Fill in each circle completely and cleanly erase any answer you wish to change. Do not make any other marks or comments on the questionnaire. Remember, so not put your name on the questionnaire.

Please answer every question as honestly as you can so that the information that comes from the survey is correct and useful.

When you are finished, please remain at your desk and read or work quietly until the end of class. If, at any time during the survey, you have a question, raise your hand. For those of you who are still working at the end of class, I will let you know when it's time to stop. If you don't finish the entire questionnaire, that's okay.

You may begin.

The class period is over now. If you have not finished the survey, please stop where you are and close the survey booklet. I'm passing around an envelope now. Please put your completed survey inside the envelope and pass it to the next person. Will the last person seal the envelope and return it to me.

On behalf of the State of Montana, I would like to thank you for your participation in this important study.

(The following questions were selected to be part of the analysis)

**Culture**

(*CHEAT*) I think it's OK to cheat at school.

- 0 No
- 1 Yes

(*STEAL*) I think it is OK to take something.

- 0 No
- 1 Yes

(*FIGHT*) It is alright to beat up people if they start the fight.

- 0 No
- 1 Yes

(*RELATT*) How often do you attend religious services or activities?

- 1 Never
- 2 Rarely
- 3 1-2 times a month
- 4 About once a week or more

(*HONEST*) It is important to be honest with your parents, even if they become upset or you get punished.

- 0 No
- 1 Yes

**Demographic**

(*Co*) County of Residence

1-56

(*GENDER*) Are you:

- 0 Male
- 1 Female

(*Rez*) Respondents living on or off Indian Reservation

- 0 No
- 1 Yes

(*AGE*) How old are you?

- 10.00 10 or younger
- 11.00 11
- 12.00 12
- 13.00 13
- 14.00 14
- 15.00 15
- 16.00 16

- 17.00 17
- 18.00 18
- 19.00 19 or older

*(GRADE)* What grade are you in?

- 1 8
- 2 10
- 3 12

*(FIRSTCIG)* How old were you when you first smoked a cigarette, even just a puff?

- 1 Never
- 2 8 or younger
- 3 9 or 10
- 4 11
- 5 12
- 6 13
- 7 14
- 8 15
- 9 16
- 10 17 or older

### **Education**

*(FATHEDU)* What is the highest level of schooling your father completed?

- 1 Completed grade school or less
- 2 Some high school
- 3 Completed high school
- 4 Some college
- 5 Completed college
- 6 Graduate or professional school after college

*(MOTHEДУ)* What is the highest level of schooling your mother completed?

- 1 Completed grade school or less
- 2 Some high school
- 3 Completed high school
- 4 Some college
- 5 Completed college
- 6 Graduate or professional school after college

*(COURSES)* How interesting are most of your courses to you?

- 1 Very dull
- 2 Slightly dull
- 3 Fairly interesting
- 4 Quite interesting
- 5 Very interesting

Now, thinking back over the past year in school, how often did you...

*(ENJOYSCH)* Enjoy being in school?

- 1 Never
- 2 Seldom
- 3 Sometimes
- 4 Often
- 5 Almost always

*(HATESCH)* Hate being in school?

- 1 Never
- 2 Seldom
- 3 Sometimes
- 4 Often
- 5 Almost always

*(BESTSCH)* Try to do your best work in school?

- 1 Never
- 2 Seldom
- 3 Sometimes
- 4 Often
- 5 Almost always

*(SCHLATER)* How important do you think the things you are learning in school are going to be for your later life?

- 1 Not at all important
- 2 Slightly important
- 3 Fairly important
- 4 Quite important
- 5 Very important

*(SCHGRADES)* Putting them all together, what were your grades like last year?

- 1 Mostly F's
- 2 Mostly D's
- 3 Mostly C's
- 4 Mostly B's
- 5 Mostly A's

### **Family Structure**

Think of where you live most of the time. Which of the following people live there with you?

*MOTHER*

- 0 No
- 1 Yes

*FATHER*

- 0 No

1 Yes

*STEPFATH*

0 No

1 Yes

*GRANDMOM*

0 No

1 Yes

*BROTHER*

0 No

1 Yes

*SISTER*

0 No

1 Yes

*(PTWTS)* How wrong do your parents feel it would be for you: Smoke Cigarettes?

1 Not wrong at all

2 A little bit wrong

3 Wrong

4 Very wrong

*(SIBSMOKE)* Have any of your brothers or sisters ever: Smoked Cigarettes?

0 No

1 Yes

*(SIBSUSP)* Have any of your brothers or sisters: Been suspended or expelled from school?

0 No

1 Yes

*(CLEARRUL)* The rules in my family are clear.

0 No

1 Yes

*(FAMYELL)* People in my family often insult or yell at each other.

0 No

1 Yes

*(LOCATION)* When I am not at home, one of my parents knows where I am and who I am with.

0 No

1 Yes

(*SKIPSCH*) If you skipped school would you be caught by your parents?

0 No

1 Yes

(*CLOSEMOM*) Do you feel close to your mother?

0 No

1 Yes

(*SHAREMOM*) Do you share your thoughts and feelings with your mother?

0 No

1 Yes

(*SHARFATH*) Do you share thoughts and feelings with your father?

0 No

1 Yes

(*YOUNGSIBS*) How many brothers and sisters, including stepbrothers and stepsisters, do you have that are younger than you?

1 0

2 1

3 2

4 3

5 4

6 5

7 6 or more

(*OLDSIBS*) How many brothers and sisters, including stepbrothers and stepsisters, do you have that are older than you?

1 0

2 1

3 2

4 3

5 4

6 5

7 6 or more

(*CLOSFATH*) Do you feel close to your father?

0 No

1 Yes

(*HOMEWORK*) My parents ask if I have gotten my homework done.

0 No

1 Yes

(*KNOWLATE*) Would your parents know if you didn't come home on time?

0 No

1 Yes

*(PNGJ)* My parents notice when I am doing a good job and let me know about it.

- 1 Never or almost never
- 2 Sometimes
- 3 Often
- 4 All the time

*(PTPT)* How often do your parents tell you they're proud of you?

- 1 Never or almost never
- 2 Sometimes
- 3 Often
- 4 All the time

### **Peer Influence**

*(FRISMOKE)* Think of your four best friends. In the past 12 months, how many of your best friends have smoked cigarettes?

- 1 None
- 2 1
- 3 2
- 4 3
- 5 4

*(COOL)* What are the chances you would have been seen as cool if you smoked cigarettes?

- 1 No or very little chance
- 2 Little chance
- 3 Some chance
- 4 Pretty good chance
- 5 Very good chance

*(WRSMOKE)* How wrong do you think it is for someone your age to smoke cigarettes?

- 1 Not wrong at all
- 2 A little bit wrong
- 3 Wrong
- 4 Very wrong

*(HARM)* How much do you think people harming themselves if they smoke one or more packs of cigarettes a day?

- 1 No risk
- 2 Slight risk
- 3 Moderate risk
- 4 Great risk

*(ADSMO)* When I am an adult I will: Smoke Cigarettes?

- 0 No

1 Yes

**Social Isolation**

*(MISSNGH)* If I had to move, I would miss the neighborhood I now live in.

0 No

1 Yes

*(LIKENGH)* I like my neighborhood.

0 No

1 Yes

*(LEAVE)* I'd like to get out of my neighborhood.

0 No

1 Yes

*(ENCOURAG)* There are people in my neighborhood that encourage me to do my best.

0 No

1 Yes

*(SAFE)* I feel safe in my neighborhood.

0 No

1 Yes

*(EXTRAACT)* – *Index* In the past year, in which the following activities have you participated?

No or yes to each activity to determine how many activities the respondent's reportedly engaged or participated.

## Bibliography

Babbie, Earl, Fred Halley, Jeanne Zaino. *Adventures in Social Research*. 5<sup>th</sup> Edition. Pine Forge Press, California: 2003

Boyle, Michael, Mark Sanford, Peter Szatmari, Kathleen Merikangas, David Offord. *Familial Influences in Substance Use by Adolescents and Young Adults*. Canadian Journal of Public Health 2001,92;3:206.

Catalano, Richard F., Diane M. Morrison, Elizabeth A. Wells, Mary R. Gilmore, Bonita Iritani, J. David Hawkins. *Ethnic Differences in Family Factors Related to Early Drug Initiation*. Journal of Studies on Alcohol. 1992;53:208-217.

Campaign for Tobacco-Free Kids. *The Path to Smoking Addiction Starts at Very Young Ages*. Available at: [www.tobaccofreekids.org/reserach/factsheets/pdf/0127.pdf](http://www.tobaccofreekids.org/reserach/factsheets/pdf/0127.pdf). Accessed on March 23, 2004.

Duncan, Terry E., Elizabeth Tildesley, Susan C. Duncan, Hyman Hops. *The Consistency of Family and Peer Pressures on the Development of Substance Abuse in Adolescence*. Addiction. 1995;90:1647-1660.

Gately, Iain. *Tobacco: A Cultural History of How an Exotic Plant Seduced Civilization*. Grove Press, New York: 2001.

Goddard, Eileen. *Why Children Start Smoking*. British Journal of Addiction. 1992;87:17-25.

Hawkins, J. David, Richard F. Catalano, Janet Y. Miller. *Risk and Protective Factors for Alcohol and Other Drug Problems in Adolescence and Early Adulthood: Implications for Substance Abuse Prevention*. Psychological Bulletin. 1992;1992:64-105.

Health and Medicine Week. *Tobacco Use; Peer Pressure to Smoke Depends on Ethnicity*. 2001: 19-20

Kegler, Michelle, Vicki Cleaver, Martha Yazzie-Valencia. *An Exploration of the Influence of Family on Cigarette Smoking among American Indian Adolescents*. Health and Education Research 2000;15:5.

Kegler, Michelle C. Beverly Kingsley, Lorraine Halinka Malcoe, Vicki Cleaver, Julie Reed, Glenn Solomon. *The Functional Value of Smoking and Nonsmoking from the Perspective of American Indian Youth*. Family and Community Health. 1999;22:21-42.

Kessler, David A. *Nicotine Addiction in Young People*. The New England Journal of Medicine. 1995;333:186-189.

LeMaster, Pamela L., Cathleen M. Connell, Christina M. Mitchell, Spero M. Manson. *Tobacco Use Among American Indian Adolescents: Protective and Risk Factors*. Journal of Adolescent Health. 2002;30:426-432.

Montana Department of Public Health and Human Services. *Montana Prevention Needs Assessment: American Indian Students 2002*.

Montana Department of Public Health and Human Services. *Tobacco Use*. Available at: [www.dphhs.state.mt.us/...risks\\_factor/tobaccouse.pdf](http://www.dphhs.state.mt.us/...risks_factor/tobaccouse.pdf). Accessed on March 23, 2004.

National Center for Chronic Disease Prevention and Health Promotion. *American Indians and Alaska Natives and Tobacco*. Available at: <http://www.cdc.gov/tobacco/sgr/sgr1998/sgr-min-fs-nat.htm>. Accessed September 8, 2002.

Nelson, David E., Robert W. Moon, Deborah Holtzman, Patrick Smith, Paul Z. Siegel. *Patterns of Health Risk Behaviors for Chronic Disease: A Comparison Between Adolescent and Adult American Indians Living on or Near Reservations in Montana*. Journal of Adolescent Health. 1997;21:25-32.

Norusis, Marija. *Guide to Data Analysis*. Prentice Hall; New Jersey: 2000.

Office of Minority Health. *About Minority Health*. Available at: <http://www.cdc.gov/omh/amh/amh.htm>. Accessed on January 13, 2004.

Stanton, Warren R., John B. Lowe, Phil A. Silva. *Antecedents of Vulnerability and Resilience to Smoking Among Adolescents*. Journal of Adolescent Health. 1995;16:71-77.

State of Montana. *A History of Montana's Native Americans*. Available at: <http://www.lewisandclark.state.mt.us/indianhistory.htm>. Accessed December 9, 2002.

U.S. Surgeon General. *Woman & Smoking – A Report of the Surgeon General 2001*. Available at: [www.cdc.gov/tobacco/sgr/sgr\\_forwoman/eecutive-summary.htm](http://www.cdc.gov/tobacco/sgr/sgr_forwoman/eecutive-summary.htm). Accessed on March 23, 2004.

Winter, Joseph C. *Tobacco Use by Native Americans: Sacred Smoke & Silent Killer*. University of Oklahoma Press, 2000.