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Risk Factors for Selected Health-Related Behaviors Among American Indian Adolescents: A Longitudinal Study

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RISK FACTORS FOR SELECTED HEALTH-RELATED BEHAVIORS AMONG AMERICAN INDIAN ADOLESCENTS: A LONGITUDINAL STUDY

by

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ABSTRACT

Risk Factors for Selected Health-Related Behaviors
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by

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Suicide and accidents are the leading causes of death among American Indian (AI) adolescents. Engaging in health-compromising behaviors (HCB) is higher among AI youth than among multicultural, national samples of adolescents. These HCBs include: smoking, drinking alcohol, drug use, and delinquency. Studies that identify legitimate predictors of these behaviors among AI adolescents are needed to guide research and interventions.

Primary socialization theory (PST) suggests that peer groups, family, and school are the only areas where adolescents are directly taught to accept or reject deviant or normative behavior. Gateway theory indicates that use of certain drugs by adolescents, such as cigarettes or alcohol, leads to the use of additional illicit drugs. Both of these theories were investigated in the current study as possible guides to identifying risk factors for HCBs among AI adolescents.

The behaviors investigated in this study were alcohol use, cigarette use, illicit drug use, delinquency, suicidality (i.e., ideation and behaviors), and self-protection (seatbelt and helmet use) at Time 2. Predictor variables included behaviors and intrapersonal factors at Time 1 (one year earlier). All variables came from measurements provided by the National

Longitudinal Study of Adolescent Health. Multiple linear regressions were calculated for all youth together, males only, and females only to determine which combination of predictors accounted for the most variance in the target behavior.

Support was found for PST across behaviors in that variables measuring the primary socialization sources (i.e., peer groups, family members, and involvement with school) were significantly predictive of HCBs one year later in all regressions calculated. Little support was found for gateway theory regarding substance use, as experimentation with alcohol and cigarettes at Time 1 was not predictive of illicit drug use at Time 2.

There were 398 self-identified AI adolescents at Time 1, and 298 at Time 2, included in this study. There were 175 females and 123 males, ranging in age from 13 to 20 at Time 2. One limitation of this study is that all information was obtained via self-report. Other limitations, implications for future research, and areas for prevention or intervention with AI youth are discussed.

(186 pages)

DEDICATION

This dissertation is dedicated to Catherine Williams and our son, Jacob Randall.

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Finally, my love and appreciation go to my family. They trudged with me every step of the way through graduate school. It is only because of their love and support I have finished this project.

Amy Jo Williams

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CHAPTER I

INTRODUCTION

A 1996 study of American Indian (AI) health found the leading cause of death among AI youth (aged 15-24) to be unintentional injury (Indian Health Service [IHS], 1996). The second leading cause of death for AIs of this age group was suicide. By 2002, subsequent research showed this had not changed and appears to be a stable pattern among AI adolescents (and Prevention [CDC], 2002; Joe, 2001). This study also found the overall death rate for AIs ages 15 to 34 was more than double (2.5 times) the U.S. average. Additional studies noted the acute and chronic use of alcohol was a factor in the majority of accidents (2.4 times the national average), especially motor vehicle crashes (5.5 times the national average: e.g., Taylor, 2000; Wissow, Walkup, Barlow, Reid, & Kane, 2001). Alcohol is also a major factor in completed suicides and homicides, being present in 80% of completed suicides (IHS; Wissow et al.) and 90% of homicides (Taylor). Researchers have found that AI youth are almost twice as likely to drink alcohol frequently and heavily compared to Whites (e.g., Beauvais, 1996; Moran & Reaman, 2002). In fact, alcohol use now plays a part in five of the ten leading causes of death among AIs (May & Moran, 1995). One study suggested that as many of 75% of all AI deaths are directly or indirectly related to alcohol use (Young, 1991). Studies also show the age of onset for substance abuse is younger and polysubstance abuse is more common among AIs than among White or Black youth (e.g., Barrera, Biglan, Ary, & Li, 2001). Cigarette smoking among AI adolescents is higher than among most other ethnic groups (Myers, Kagawa-Singer, Kumanyika, Lex, & Markides, 1995) and may be socially sanctioned by AI culture (Novins, Beals, & Mitchell, 2001). Another finding by contemporary researchers shows juvenile delinquency for youths aged 10-17 is on the rise for all ethnic groups, with ethnic minorities at higher risk for delinquent behavior than White majority youths (Judy & Nelson, 2000). Finally, for each of the above-mentioned

risky activities, males are more at risk than females for engaging in them. What is influencing the males to engage in these behaviors is less clear, whereas females appear to be strongly influenced by others to engage in risky behaviors (Pleydon & Schner, 2001; Williams, 2001). One study suggests that being displaced from traditional lands, having altered traditional lifestyles, unemployment, poverty, lack of education, and intrapersonal factors (especially depression and being ashamed of their cultural heritage) may be significant risk factors among young AI men (Joe).

In short, the high rates of health compromising behaviors (HCBs) by AIs has been firmly established in the literature (Bachman et al., 1991; Beauvais, 1992; Neumark-Sztainer et al., 1996). What has not been established, however, is the etiology of these behaviors. Research focusing on AIs needs to establish predictors for these behaviors, including who is most at risk, so that effective interventions can be implemented.

In an attempt to make an inclusive theory, which would take into account culture, social and psychological factors, and conflicting findings from various theories, Oetting and Donnermeyer (1998) developed primary socialization theory (PST). The roots of this theory are grounded in previous social learning theories, which have been found to be applicable to AI adolescent behaviors (Williams, 2001). Primary socialization theory focuses on how humans learn to behave through socialization with significant others as does social learning theory. In fact, the basic tenet of PST is that all human behavior is learned through primary socialization processes. It also emphasizes that both deviant and normative behaviors are learned through these social interactions, as does social learning theory, and these interactions are mediated by social, psychological, and cultural characteristics. However, PST differs from social learning theory, especially when applied to adolescents or preadolescents, by stating that during adolescence youth learn behaviors from three primary sources only: close peer groups, family, and school. This theory further asserts that the youth interacts with the primary socialization sources within the context of

a culture (Oetting, Donnermeyer, Trimble, & Beauvais, 1998). That is, the family, school, and peer clusters interact with culture and transmit what is culturally appropriate or deviant to the youth. Further, PST postulates that the social, psychological, and cultural characteristics of individual adolescents only influence that adolescent's behaviors by affecting the primary socialization process. Within the theory, this occurs when any of the bonds between the youth and family, peers, or school are broken (Oetting, Deffenbacher, & Donnermeyer, 1998). For example, severe depression may undermine a youth's ability to bond with parents, or a poor relationship with parents may precipitate depression in the youth. Both of which will then reduce the influence parents have on the behavior of that youth. This theory also notes that the youth and their primary socialization sources are located within a community that may influence the norms of these sources, or may influence the socialization process itself (Oetting, Donnermeyer, & Deffenbacher, 1998). Many of these community factors are: religious institutions, extended family, neighborhood or community, media, and more distant peers. Because these factors are further removed from the adolescent, but are still social sources of information, they are termed secondary socialization sources by the authors (Oetting, Donnermeyer, & Deffenbacher, 1998).

With regard to the current study, PST was chosen as a guiding theory because of its relationship with social learning theory, which has been previously supported by research with AI adolescents (Williams, 2001; Winfree, Griffiths, & Seller, 1989). Social learning theory has consistently gathered support for its ability to predict health related behaviors among adolescents (e.g., Balassone, 1991; Foshee, Bauman, & Linder, 1999). Primary socialization theory gets more specific than social learning theory by stating that only the three primary socialization sources directly influence the adolescents' acceptance of certain behaviors. If this is correct, then the findings of the current study should indicate family, peer, or school factors as the most predictive of HCBs one year later. Additional

factors, such as intrapersonal factors or religiosity, would then be expected to only mediate or add to the predictability of the primary socialization sources. Social learning theory, conversely, would suggest that socialization with religious groups or community centers, for example, could be as influential on the behaviors of adolescents as the primary socialization sources suggested by PST. Studies by the team of researchers developing PST indicate that socialization variables are much more predictive of adolescent behavior than factors such as personality traits or psychopathology (Oetting, Deffenbacher, & Donnermeyer, 1998). This finding was another reason this theory was chosen for use in the current study. If it is supported, it may provide specific social areas where intervention or prevention efforts could be implemented, targeting large groups of AI adolescents at once instead of individually. This would save time, and might be more effective with AI tribes due to the interdependent nature of Native American people. Primary socialization theory was also chosen because of its attempt to acknowledge the role culture plays in defining what is deviant or normative, or what is family and schooling, for a given group (Oetting, Donnermeyer, Trimble, & Beauvais, 1998). Support for this theory, then, may make it a more appropriate theory to use with minority, heterogeneous cultures in guiding research and practice than other available theories.

Another theory guiding this dissertation research is based on previous findings that young people follow an orderly pattern of progression from one substance to another (Oetting & Beauvais, 1986). These findings have been named gateway (Dupont, 1984), stepping stone (O'Donnell & Clayton, 1982), precursors (Kandel, Kessler, & Margulies, 1978), and stage (Golub & Johnson, 1994; Kandel, 1980; Kandel & Faust, 1975) theory of substance use. Although all these theories are similar, related to one another, and fall under the umbrella term "gateway theories," only the actual concept of gateway theory will be studied in this paper. This theory suggests that the use of common substances, such as cigarettes, creates a gateway through which the youths begin using more and

varied substances (Dupont). This theory does not necessarily suggest a given order of drug use. Stage theory, stepping stone theory, and so forth, also claim that a gateway drug often starts the youths' use of substances, but they further assert that the youths then go through specific stages or steps of drug use. These specific steps may differ depending on the theory. All gateway theories state that certain substances are frequently used first by youth (i.e., substances legal for adults). Some studies have supported stage theories and shown that youths do follow a set pattern of increasingly serious drug use (e.g., Recio Adrados, 1995). The stages they go through were originally identified as: (a), beer or wine, (b), cigarettes or "hard" liquor, (c), marijuana, and (d), other illicit drugs (Kandel, 1975). However, further research with other cultures has indicated that cigarettes are the first substances used among Spanish adolescents (Recio Adrados), and AI youth may initiate substance use with alcohol, marijuana, inhalants, or a combination of the three (Novins et al., 2001). Stage theory also asserts the use of a substance at a preliminary stage is necessary for advancement to the next stage of use, but not every person who uses a substance at one stage advances in the progression of use (Kandel; Recio Adrados). The reason for advancement is most likely due to the influence of social, and to a lesser degree, intrapersonal factors (Novins et al.; Oetting & Beauvais).

Because the particular order of substance use may differ by culture (and, therefore, by AI tribe) and theory, the stage or stepping stone theory was not chosen for study in this paper. Because the majority of articles focusing on the gateway phenomenon of substance use do support the idea that use of a specific substance, such as alcohol or marijuana, precedes harder drug use, such as crack or heroine, just the gateway phenomenon was chosen. Gateway theory was also included in this study because of the note made by previous researchers that replication is needed across cultures (Kandel, Yamaguchi, & Chen, 1992). This study may help identify a developmental pattern of use among AI

adolescents, or may help determine that other factors are more important in predicting cocaine, heroine, and other substance use among AIs than initiating use.

This dissertation utilized both PST and gateway theory to provide a framework for guiding and interpreting the analyses. In part, the current research also provided support for, or rejection of, the use of these theories with AI youth. Further, this study utilized the large quantity of research in the area of adolescent HCB, especially with regard to etiology, prediction, prevention, or intervention programs to guide the use of certain variables in the analyses. Much of this information will be presented briefly here, and in more detail in the review of the literature.

Etiological and prevalence studies show that drinking by adolescents (including AIs) is related to familial alcoholism, lack of knowledge regarding the effects of chronic or severe acute use, having peers who drink, low community or cultural involvement, and several interpersonal factors such as depression (e.g., Coker, Borders, Rose, & Vaughan, 2001; Moran & Reaman, 2002). The initiation of smoking and gateway illicit drug use (i.e., marijuana and inhalants) may be related to similar predictor variables (Andrews, Tildesley, Hops, & Li, 2002; Ennett, Bauman, Foshee, Pemberton, & Hicks, 2001; Novins et al., 2001). Use of gateway drugs (i.e., cigarettes and alcohol) was found to be a predictor of adolescents using more serious drugs, such as heroin or crack, in large national samples (Kandel et al., 1992; Novins et al.). Other factors found to predict the onset of additional drug use include a negative future orientation, low or mistimed parental monitoring, associating with a delinquent peer group, low SES, poor mental health, and a community that tolerates or supports drug use (Harris, Duncan, & Boisjoly, 2002; Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000).

Research on another HCB, the lack of self-protection (i.e., helmet or seatbelt use) by adolescents, indicates that parent education, modeling of use by significant others, school adjustment, peer pressure, and future orientation (e.g., thinking they will not live to

age 35) are all influential in adolescents engaging in this behavior (e.g., Nelson, Bolen, & Kresnow, 1998; Shin, Hong, & Waldron, 2000). Only one study on seatbelt or helmet use, however, specifically identified AI participants (Williams, 2001).

Factors associated with suicide and serious suicidality among adolescents include a negative future orientation, alcohol use, knowing close others who committed suicide, and several intrapersonal factors such as depression (Wissow et al., 2001). Among AIs specifically, family problems, having a marginalized Indian identity, or wanting to get away from stressors may increase suicidality (Novins, Beals, Roberts, & Manson, 1999; Zitzow & Desjarlait, 1994).

The primary influence found in several studies regarding juvenile delinquency is negative peer associations, often moderated by parental monitoring and the youth's relationship with parents (Pleydon & Schner, 2001; Simons, Chao, Conger, & Elder, 2001). One study even suggested that delinquency may not take place outside of a deviant peer group (Pleydon & Schner). Studies focused on AIs note that loss of culture and traditional ways increase the chance of AI juveniles engaging in delinquent acts (Bond-Maupin, 1996; Lujan, 1995).

While many of the above studies included AIs, many did not (e.g., Simons et al., 2001). Further, those that did include AIs often combined them and Asian Americans, or collapsed all ethnic minority groups into one to compare to Whites (e.g., Harris et al., 2002). Although articles specifically focused on AIs were intentionally selected for review in this study, very few of the total articles available actually included AI samples. This is unfortunate considering the elevated risk of AIs compared to their peers of other ethnic and racial cultures (Beauvais, 1996; Myers et al., 1995; Neumark-Sztainer et al., 1996). Therefore, further research into the etiology of HCBs among AI youth is needed to develop a foundation upon which to build intervention programs that are culturally specific to AIs. Research focusing specifically on AI youth also needs to be done due to

the large percentage of AIs in their adolescence. The birth rate among AIs has been at least 1% percent higher than the national average for some time, and the life expectancy has been much shorter than is typical in all races combined (death rates for AIs under age 45 is three times the national average: CDC, 2002; United States Census Bureau, 2002a). This has created a very young culture with a large percentage being children and adolescents (Moran & Reaman, 2002). To illustrate this point, the 2000 census data showed that 45.5% of AIs are under the age of 25, compared to 32.4% of Whites; and only 5.6% of AIs are over age 65 compared to 14.4% of Whites. Also, AIs have a bulge in their juvenile population, with 17.6% of all AIs being between the ages of 5 and 13 (United States Census Bureau, 2002b). Second, the age of onset of many HCBs is during preadolescence or adolescence, with AIs typically initiating HCBs at younger ages than the national average (CDC; Novins et al., 2001). Finally, as stated above, the top two killers of AI adolescents are directly linked to their own behaviors: accidents and suicides.

Before successful programs can be instated in AI communities, research should be done that can assist practitioners in establishing approaches that will be most effective. Along with that, new research should be focused solely on AIs because of the heterogeneous nature and special needs of these ethnic groups (Joe, 2001). For example, prior research has shown cultural differences between rural and urban AIs with regard to suicidality, substance abuse, and the influence of parents versus peers (Moran & Reaman, 2002; Wissow et al., 2001). Exercise and health education programs with AI women have been shown to be effective only when the social role and cultural food and eating expectations of these women are taken into account (Thompson et al., 2002). Other studies have noted that drug use and drug exposure are culturally specific and often involve culturally determined social roles and norms regarding their use (Moran, & Reaman; Okamoto, Hurdle, & Marsiglia, 2001). Having a strong sense of ethnic pride as well as an AI cultural identity was shown to reduce the likelihood of drug use among AI

seventh graders in one urban area (Kulis, Napoli, & Marsiglia, 2002). Use of traditional, tribally specific stories have been found to be effective for promoting wellness and educating members about mental health issues, and providing AIs with the memory of a healthier time among the tribe (Hodge, Pasque, Marquez, & Geishirt-Cantrell, 2002). As can be seen, including culturally and tribally specific treatments improves the health of AIs. One author summed the issue of culture influencing mental health issues well by stating that psychopathology can be experienced or manifested the same or differently across cultures depending on such basic assumptions as the relationships between mind, body, and spirit; or the primacy of the individual's or the collective's needs (Manson, 2000). This indicates that culture not only determines what illness is, but how it is treated. This can easily be applied to determining what is HCB and how it should be prevented, and gives support to the idea that culturally relevant research must be done to guide the practice of culturally relevant interventions.

Regarding the issues of heterogeneity and the myth of a "model Indian" (Moran & Reaman, 2002), there are currently at least 562 federally recognized tribes in the U.S. (United States Census Bureau, 2002b), and many more tribal groups without federal recognition. Individually, AIs are enrolled in a tribe only if they have a certain degree of Indian blood or can prove descendency from an enrolled member. Commonly referred to as blood quantum, this varies greatly on the individual and tribal level and can affect how the person is viewed by the tribe or how the individual views him/her self (Moran & Reaman). Gender differences have also been found among AI youth for various HCBs (e.g., Williams, 2001; Zitzow & Desjarlait, 1994), and differences have been indicated in HCBs among tribes from various geographic areas (Novins et al., 2001; Wissow et al., 2001). All the above findings illustrate the need for a comprehensive and focused look at HCBs among AI youth.

Therefore, the current study focused specifically on AI adolescents in an attempt to discover which predictive variables best accounted for the AI youths engaging in six selected HCBs one year later. This was deemed necessary in hopes of guiding future research with specific AI tribes, and to add to the existing data regarding AI adolescent behavior. The results of this study may help in establishing effective intervention efforts with AI youth engaging in HCBs and prevention efforts with younger AI youth who have several risk factors associated with the selected HCBs. The behaviors studied include: alcohol drinking (acute and chronic), cigarette smoking, illicit drug use, suicidality, self-protection, and delinquency. As detailed above, these behaviors were chosen because of their severe deleterious effects on AIs, and because the onset of these behaviors often happens during preadolescence or adolescence. Primary socialization theory and the gateway theory of substance use were used to guide the selection of predictor variables. Also, gender differences were studied to determine if different types of intervention efforts would be necessary for male AIs versus female AIs. To help establish predictability, a longitudinal design was used comparing the youths' behaviors at Time 2 to their predictive variables one year earlier. Stepwise multiple regression analyses were utilized to indicate which variables are most predictive of the behavior in question (measured by the sum of variance accounted for), and if additional variables added to this prediction.

CHAPTER II

REVIEW OF THE LITERATURE

The search for articles used in this study began with material found from *PsychINFO, Sociological Abstracts, Medline, Search Elite, and PsychARTICLES* for the years spanning 1995-2003. The key words used in the preliminary searches focused on any articles that specifically included AIs engaging in the selected HCBs. Further, articles focusing on ethnic minority studies, adolescents, and risky behaviors were also included. An effort was made to identify articles that had already determined significant predictors of selected HCBs. Finally, studies of the etiology or prevalence of HCBs, the cultural norms of AIs, or theories developed to explain HCBs were included in the initial search. Research studies were also obtained through references given in primary and secondary sources. The time of publication for the initial search was limited because research in these general areas is plentiful and there are new findings countering older research that did not have the benefit of longitudinal data. However, many articles were obtained from secondary sources, and these included research conducted well before this time limit. This is especially true of theoretically based studies. In addition, research over time is indicating changing patterns in youth HCB, and the latest data are required to make the findings of this study applicable to today's practitioners.

Health-Compromising Behavior

Based on previous research, and for the purpose of this study, HCB was defined as any behavior that increased the likelihood of a person being killed, injured, or diagnosed with a chronic illness (Williams, 2001). These behaviors were often labeled as risky or risk taking in the literature, however they were labeled HCB in this research because the initial risk of such behavior may not be apparent, especially to the youths engaging in them. Examples of these behaviors might include: smoking; drinking alcohol, especially binge

drinking or chronic use; using or selling illegal drugs; driving or riding in a car without a seatbelt; not visiting medical or health professionals regularly, including mental health providers; having unprotected sexual intercourse; attempting suicide; or associating with peers who engage in HCBs and promote their acceptability (e.g., Dressler, Bindon, & Gilliland, 1996; Williams, 2001). Any behaviors that reduced the likelihood of death, illness or accidental injury--such as abstinence from drugs or always using a seatbelt--were labeled health-promoting behavior (HPB).

The HCBs investigated in the current study were alcohol use, cigarette smoking, illicit drug use, delinquency, suicidality, and lack of self-protection (no or irregular helmet and seatbelt use). Conversely, HPB would be abstinence from substance use, not engaging in delinquent behavior or suicidality, and always wearing protective helmets or seatbelts. These HCBs were chosen because the onset of each is usually during childhood, adolescence, or young adulthood (Beauvais, 1992), with the incidence of the behavior being higher during the adolescent stage of development than during childhood (Judy & Nelson, 2000). Also, for the majority of these HCBs, the younger the onset of the behavior, the more severe the potential consequences (Sutherland & Shepard, 2001).

Youth and Alcohol Use

Alcohol use may be the most important behavior to prevent among AI adolescents for a variety of reasons. First, as a drug itself chronic use can lead to long term, possibly fatal illnesses, such as cirrhosis. In fact, among AIs, the death rate from cirrhosis of the liver is 4.4 times the national average and accounted for 29% of all deaths among AIs in 2000 (CDC, 2002; Young, 1991). Second, the use of alcohol is associated with a higher incidence of other HCBs such as unprotected sex (and subsequent sexually transmitted diseases), delinquency, suicide, homicide, accidental death, and the use of other illicit substances (Novins et al., 2001; Peterson, Hawkins, Abbott, & Catalano, 1994). For AI

adolescents, alcohol use is especially important to study because research has shown that the way AI youth drink leads to more severe negative consequences than with other ethnic groups. For example, May (1994) noted that chronic use by AIs typically happened among older, unemployed, culturally marginalized (i.e., one who has limited or stereotypical Indian identity, but is not fully assimilated in the majority culture) peoples. Recreational drinking, however, was most common among younger AIs and occurred as frequent binge drinking (i.e., drinking to intoxication) episodes. In support of this finding of excessive drinking, Beauvais (1996) reported that between 1974 and 1995, 75% of reservation AI youth between the 7th and 12th grades had tried alcohol. Fifty-one percent of those had drunk to intoxication at least once. Walker and colleagues (1996) noted that 41.5% of AI adolescents had drunk to the point of intoxication by age 15 in a longitudinal study of Seattle area AIs. This rate is considerably higher than intoxication by White (25.8%) and Black (9.9%) adolescents of the same age (O'Malley, Johnston, & Bachman, 1998).

In an effort to reduce the use and negative consequences of alcohol, several studies have investigated the potential causes of alcohol initiation and continued use. For example, in a longitudinal study of Seattle youth, Kosterman et al. (2000) looked at risk factors for later alcohol use. They determined the factors that best predicted initiation of alcohol use between the ages of 10 and 18 were, in order of importance; parents' proactive family management (i.e., rules, discipline, monitoring, and reinforcement), parents' norms regarding use, and friends or associates use. Especially noted in this study was that when parents clearly communicated norms against use, the likelihood of adolescent alcohol initiation was significantly reduced. The authors suggest this is even more important than attachment to parents in reducing alcohol initiation. They also found that bonding to mother had no predictive value nor did the target youth's own norms about use. The findings of this study supported the gateway hypothesis by noting that those who used alcohol were then more likely to use marijuana. Additionally, Kosterman et al. found no

sex or race differences with regard to these variables predicting initiation (6% of the sample was AI, whereas 46% was White). However, they did note that AIs and Blacks were more likely to initiate use than Whites, which is supported by other studies (e.g., Okwumabua & Duryea, 1987; Thomas, 1996). One problem with this study is that the students were selected based on being in a school that had an overrepresentation of students from high crime areas and from lower SES families.

Another longitudinal study that focused specifically on the peer influence of substance use in young adults (ages 18-25) found both a concurrent and prospective positive relationship between friends' use and the target's use for binge drinking behaviors (Andrews et al., 2002). The authors based this study on social learning theory and assumed that peer groups would be the most influential others in a young adult's life. The researchers found a concurrent, but not prospective, relationship between more chronic alcohol use and peers' use. This follows the findings of a 1993 longitudinal study that found parental modeling of alcohol use did not effect concurrent use in their children but was predictive of later use by their adolescents (Ary, Tildesley, Hops, & Andrews, 1993). The authors suggest the reason for these findings may be due to the fact that drinking becomes legal in young adulthood, and this may lead to experimentation with binge drinking and drinking with like minded peers. Further, because there is a high prevalence of alcohol use in American society, the impact of peers' use may be negated by cultural norms, but the youth's personal norms for use may be formed by the parents' use. These authors noted that young women in their sample were especially influenced by older male friends, whereas, males in the study were more likely to drink alcohol but were less likely to be influenced by others. They then suggested that men's use of alcohol may be linked more to intrapersonal factors than social ones. Based on their results, the authors found only partial support for social learning theory. Unfortunately, the generalizability of this study was limited because the participants were 91% White, paid volunteers, from entirely

urban areas in the Northwest, and were selected based on being at high risk for cigarette use.

A one-year, longitudinal study focusing on parent-child communication, and its effects on tobacco and alcohol use by children, found that communication was not related to initial use of these substances (Ennett et al., 2001). In this study communication was verbal and measured in the following areas: negative consequences of use, how to resist peer pressure to use, encouragement to chose friends who do not use, media portrayals of use, encouragement not to use, telling the adolescent not to use, family rules about use, and family discipline. This study showed that if the youth had already initiated use, talking about rules and discipline related to the substance actually increased their use. However, the authors found that talking about the dangers of substance use, and the family expectations of abstinence did lower initiation rates for children who had not yet started using. This study indirectly supported social learning theory, and PST as well, in that parental modeling of use was a major indicator of initiation regardless of the parent- child communication. As with previous studies, the generalizability to AIs is limited. All ethnic minorities included in this study were collapsed into one group that was compared to Whites. Also, although the authors used a national sample, all data was collected via phone interviews that might have excluded those from lower socioeconomic brackets who did not have phone access. By using phone interviews, the researchers had no physical access to the participants and never actually witnessed the parent-child communication.

In another longitudinal study of binge drinking among adolescents Coker and colleagues (2001) looked at various environmental and social factors in a sample of 8th graders (parental monitoring, parental support, community involvement, school climate, and peers' values) to determine what was most predictive of associating with binge drinking peers two years later. A major assumption in this study was that associating with binge-drinking peers greatly increased the likelihood of the target peer engaging in those

same behaviors, which the authors based on findings from social learning and control theories. They found that peer values at Time 1 were mediating factors for all other independent variables with regard to the formation of relationships with peers with positive values at Time 2. Additionally, they found that having peers with negative attitudes toward binge drinking in the 8th grade significantly reduced the chance of this bingeing behavior in the 10th grade. Parental support, followed by school climate, both significantly influenced the peer relationships of adolescents in the 10th grade. However, once mediated by peer values the significance was greatly reduced. Coker et al. also found evidence suggesting that those adolescents with early stable relationships with parents had lower alcohol use than those who did not. Overall, these findings indicate that peer values in the 8th grade greatly affects peer choice in the 10th grade, which in turn effects binge drinking in the 10th grade. The authors suggest that prevention efforts targeting peer associations is a valid intervention that should probably start earlier than the 8th grade. Finally, these researchers state that binge drinking should be included in all studies on alcohol use in addition to chronic use because of the associated dangers of being extremely drunk (e.g., motor vehicle crashes).

In a cross-sectional study, Sutherland and Shepard (2001) used a stratified sample of English youths aged 11-16 to find possible correlates with substance use. They looked at family structure (i.e., if the child lived with both parents), religiosity, peer and family influences (i.e., whose opinion mattered most to the youth), academic achievement, academic expectations, and delinquency as possible factors that could discriminate users from nonusers. They found that having been in trouble with the police or suspension from school was correlated with alcohol use. The youths' academic achievements and expectations, that is whether or not they believe they have done well in school, also discriminated alcohol users from nonusers. However, the authors found the highest correlated factor (negatively so) with alcohol use was religiosity. They went on to note

that a high proportion in the study may have been Moslem (a religion that prohibits drinking) but did not ask the participants which religion they observed. They further hypothesized that those with strong religious convictions were less likely to associate with peers involved in HCBs. The authors found that family structure had a weak link to substance use, but the difference between those youth who valued the opinions of family and friends and those who did not were indistinguishable by use rates. The results of this study indicated substance use increased with age, was more common among boys than girls, and was mediated by several social variables. Sutherland and Shepard hypothesized that peer influence may be stronger for substances such as alcohol, but familial influences may be stronger for preventing harder illicit drug use (e.g., cocain, heroine, or LSD). As with most of the above-mentioned studies, the generalizability was limited because the authors did not include a measure of ethnicity, and AIs were almost certainly not included in this English sample.

One study utilizing a random sample of 114 American Indian/Alaska Natives between the ages of 18 and 25 focused on how general self-efficacy (GSE) and substance use self-efficacy (SSE) related to alcohol use (Taylor, 2000). General self-efficacy was defined as one's perceived ability to bring meaningful change to one's life, whereas SSE was defined as one's belief in her or his ability to control substance use in a variety of situations. Overall, the study found that lower GSE and higher SSE scores was associated with higher alcohol use. The author noted that the combination of low GSE and high SSE was associated more highly with use by males, whereas, SSE was correlated significantly more than GSE with females. Not surprisingly, this study found that GSE was positively correlated with level of education. As is nearly always the case in studies with AIs, generalizability was limited in this study. Participants were recruited almost exclusively in urban areas (through Pow Wows and community centers); and tribal affiliation,

geographic area of residence, and urbanicity of residence of the participants was not recorded.

In summary, chronic and acute (binge drinking) use of alcohol has a higher prevalence for AI youth than other ethnic groups, and the consequences are severe (Oetting & Beauvais, 1990). Across studies, alcohol appears to be the drug of choice among AIs and initiation of its use may lead to use of additional drugs, such as crack, and many deleterious health consequences. Generally, PST was supported in that peers' use of alcohol, and peers' norms regarding use appear to predict alcohol use in target youths most strongly. Further, the use of participants mirrors that of their peers (i.e., chronic use versus binge drinking are the same for subjects and peers). These findings were stronger for young women than men, indicating gender differences in the area of socialization and peer influence. Parental use and norms are also strong predictors of the same types of use with the youth. Parental monitoring, discipline, communication, and rules appear to lower alcohol initiation and use if done prior to initiation. However, if implemented after initiation, they may actually increase use. School climate and academic achievement were also found to be predictive of alcohol use. Gateway theory was supported in one study, indicating that those who used alcohol were more likely to use other illegal substances. Finally, additional factors found to be predictive of alcohol use were: cultural norms, religiosity, delinquency or school probation, and low self-efficacy.

Youth and Cigarette Use

A few of the above studies focusing on alcohol use also included cigarette use as a studied behavior. For example, Ennett and colleagues (2001), found that parent-child communication about tobacco use after initiation had already occurred often increased the amount of tobacco used, just as it did for alcohol use. The quality of the communication had no relationship with the youth's smoking status. The authors also found a strong

correlation between parents' use and the adolescents' use, supporting the idea that behavioral modeling by parents is a stronger predictor than communication. Finally, these authors concluded that not all parents are opposed to cigarette use so communication of family norms and expectations may not be focused on abstaining or quitting.

Andrews et al. (2002), found that cigarette use among young adults was very similar to concurrent and prospective peers' use. The authors suggested that socialization with peers was the primary predictor of engaging in deviant or normative behaviors in this age group. Also, they noted that cigarette use was legal for this age group and no longer had the social taboo of deviancy. They found no differences in cigarette use between different gender friendships for target males or females, and the quality of the relationship also did not mediate use.

In their study of adolescents in England, Sutherland and Shepard (2001) found similar results with smoking as they did with alcohol use. They used the same predictor variables for both substances, which were family structure, peer influence, religiosity, academic factors, and delinquency. As with alcohol use, they found being in trouble with police or at school was strongly associated with smoking. However, whereas alcohol was highly linked to religiosity, smoking was strongly correlated to family structure. The authors suggested this was due to the fact that many more divorced or separated parents smoked than did those in intact families, thus cigarette use was more commonly modeled by these parents. Sutherland and Shepard also found that school achievement and peer values were moderately correlated with tobacco use. Finally, these authors noted a link between cigarette and alcohol use. Although their cross-sectional design did not allow them to determine which came first, this may be providing additional support for the gateway theory of drug use.

A 10-year, longitudinal study in Oslo, Norway (Øygard, Klepp, Tell, & Vellar, 1995) found that siblings, peers, and parents all influenced the smoking behavior of

adolescents. They also determined that the influence of siblings' and peers' smoking behaviors declined over time, while mother's smoking status emerged as the strongest long-term predictor of smoking behavior by adolescents. This study noted that mother's smoking status, but not smoking by friends, was predictive of adolescents moving from a nonsmoking status at Time 1 to being a regular smoker (i.e., at least one cigarette a day) 10 years later. These authors did not specifically state whether AIs were included in particular, or in their cultural category of "other." However, it is unlikely they were included, especially in large enough numbers for their inclusion to influence the results.

Another longitudinal study that focused on social learning theory and the influence of family versus peer modeling found that peer use was most predictive of concurrent smoking by target adolescents, but mother's cigarette use was most predictive of the target youth's use one year later (Epstein, Botvin, & Diaz, 1999). These authors found no significant influence from father's or sibling's smoking either concurrently or one year later. This study may not generalize to AIs in that this ethnic group comprised only 1% of this sample.

In a study of AI adolescents and parental modeling, Williams (2001) also found support for social learning theory. This author noted that mother's use of cigarettes was significantly correlated with the concurrent regular use of cigarettes by both male and female adolescents but was not correlated with initiation of use (i.e., experimentation). Also, this study found that with female AI youth only, the father's use was more predictive than mother's use with regard to the adolescent's initiation of cigarette use. Biological relatedness and ethnicity of the parent (i.e., if the parent was AI or not) was included in this study and added no additional predictive strength. This suggests that socialization and modeling are more influential than biology or heritability. Age was also found to be positively correlated with regular cigarette use in this study. As with other national samples of AIs, tribal affiliation was not reported in this study.

To summarize, findings regarding which factors are most predictive of adolescent smoking indicate that mother's smoking is the most predictive of regular smoking by their children over the long term, and is somewhat predictive during adolescence. However, peer use of cigarettes, and their norms regarding use, were the most predictive of concurrent use and initiation of smoking during this age. Across the studies, modeling of use by parents was correlated most with adolescent smoking, followed by peer use. All of these findings are supportive of PST. One study found that cigarette and alcohol use were highly correlated, suggesting some support for the gateway theory of substance use. Other factors found to be predictive of cigarette use were: grades in school, delinquency and school probation, family structure, parental communication prior to initiation, and father's use with female AI youth.

Illicit Drugs

Many of the articles studied separated more commonly used illicit drugs (e.g., marijuana) from less commonly used drugs (e.g., cocaine, mushrooms) while some did not. To remain parsimonious, this review will include all articles that studied illicit drugs, regardless of type, in one section.

Novins et al. (2001) used a cross-sectional survey of AI youth in grades 9 through 12 from four rural communities west of the Mississippi River to study substance use initiation and stage theory. They found the majority of AI youth begin abusing alcohol before illicit drugs, especially females; however, there was considerable variability among AI adolescents and initiation of drug use. The authors noted that marijuana and inhalants were commonly the first drugs used by AIs, especially on "dry" reservations where the sale of alcohol is prohibited. A gender difference was noted, with boys initiating drug use more often with marijuana and girls initiating more frequently with alcohol. The study also showed that many AIs initiate use with two or three substances at once or in extreme

proximity to each other, and this phenomenon has not been typically found with other ethnic groups, especially White samples. These authors stated that the prevalence of substance use was extremely high, and the age of first use of illicit drugs was around age 13, lower than national averages. Whereas the authors found that alcohol, marijuana and inhalants were all gateway drugs (i.e., used before drugs such as cocaine, heroine, and crack) for AIs, almost all the adolescents who went on to use drugs such as cocaine had specifically used alcohol first. Thus, these authors found little support for the stage theory (i.e., going through specific stages of increasingly dangerous drug use), but some support for certain substances being gateway drugs to additional substance use. It should be noted the questionnaires used in this study were given in school, so dropouts who may have had different patterns of drug use were not included. Also, the questions were retrospective so the accuracy may be limited by recall bias. Urban AI adolescents were not included, and in an effort to protect the confidentiality of the AI communities surveyed, the individual tribes were not identified and generalizability to tribal nations was reduced.

In a review of the literature regarding substance abuse among youth, Moran and Reamon (2002) found that Indians who lived on a reservation were more likely to use inhalants than nonreservation AIs; that the age of initiation is lower for AIs than other ethnic groups; and that the three most abused drugs by AI adolescents are alcohol, marijuana, and inhalants (in order). They further noted that whenever alcohol was accessible on the reservation, it was the drug of choice--being used first and most often. The risk factors Moran and Reamon found to be associated with drug use among AIs include: a belief it is the "Indian thing to do," having drug-abusing peer clusters, not doing well in school academically, familial drug abuse, and not strongly identifying as Indian (i.e., having a marginalized identity). To a lesser extent, but still significant, poor social adjustment in school, poor peer and family relationships, having little hope for the future, and other intrapersonal factors (e.g., depression, motivation) were all found to be

associated with use. They noted that those youths having an early strong attachment with a family who valued culture and school, while viewing substance use negatively, had the lowest use rates. Additionally, these authors discussed the trouble inherent in doing research, and establishing prevention efforts, with AIs. That is, most studies that include AIs either have a small sample focusing on one specific tribe, or a large sample that could not identify the tribes included. They suggest that neither of these approaches is ideal, and probably partially account for inconsistent results found in the research with drug abuse among AIs.

The study by Kosterman et al. (2000) found that drug use initiation by AI youth was younger than in the general population. The authors noted a small but steady increase in marijuana use among all ethnic groups in their sample until the age of 13 when marijuana use dramatically increased. As with previous research, they noted that AIs were more likely to start using illegal drugs than Whites, Asian-Americans, or Blacks. According to this research, the best indicator of drug use onset is proactive family management followed by the youth's own norms for or against use. The authors theorized that early effective family management (especially parental monitoring) probably instills norms against use in the youths, thus reducing the likelihood they will use drugs over time.

The findings by Andrews et al. (2002) were interesting with regard to illicit drug use and provided partial support for social learning theory. They found that women were more influenced by older male friends with regard to problem marijuana use, whereas men were equally influenced by any friends, regardless of their gender, who used marijuana. However, with regard to less common drug use (i.e., cocaine and heroin), they found no relationship between peers' use and the target's use. The authors theorized that use of harder drugs may be due more to individual factors such as personal norms, mental health, or a negative view of the future. Their review provided some support for gateway theory,

in that those who used harder drugs had also used alcohol. The reverse direction of this use was not found. That is, not everyone who used alcohol went on to use harder drugs.

Overall, studies on drug use among AI adolescents indicate these youth use illicit drugs at a younger than average age and may start use with more than one substance. Aside from alcohol, marijuana and inhalants (typically not including cocaine) are the two most commonly used drugs in this population. Primary socialization theory was supported in that modeling use by peers and family was most predictive of use among the participants as compared to more intrapersonal factors. A couple of studies noted that proactive, clear communication of familial norms against use, prior to initiating use, was the best predictor of youth not using illicit drugs. School social adjustment and academic achievement were also predictive of drug use. Gender differences were found in that male AI adolescents tend to initiate use with marijuana, and males across cultures were strongly influenced by all peers; whereas female AI youth tend to initiate with alcohol, and females across cultures were more influenced by older male peers. Gateway theory garnered some support from these findings, but which substances are actually the gateway drug with AIs is less clear. Alcohol use appears to be most predictive of later illicit drug use; however, marijuana and inhalants are also gateway substances among AIs in particular. In longitudinal studies, the only factor found to be predictive of "harder" drug use, such as cocaine or heroin, was initiating use of "lesser" substances, such as alcohol, at the first measurement. Some authors suggested intrapersonal factors may be predictive of harder drug use, because socialization factors were not predictive in this area. Finally, other factors associated with use were: depression, belief in Indian stereotypes or having a marginalized ethnic identity, a negative future orientation, and living on an Indian reservation.

Juvenile Delinquency

From 1960-1980, the rate of delinquency for 10- to 17- year olds increased 131% (Judy & Nelson, 2000). This increasing trend in delinquency among juveniles continued until 1993, where it peaked and began to decline. The decline, however, has only been by 33% in overall crime; certainly not as pronounced as its increase. For example, the number of juvenile court dispositions dropped by 5% between 1995 and 1999, but were still 27% higher than the number in 1990 (Office of Juvenile Justice and Delinquency Prevention [OJJDP], 2002). According to the OJJDP, 16% of all arrests for violent crime, 16% of forcible rapes, 25% of robberies, and 32% of all arrests for property crime in the year 2000 were juveniles under the age of 18. Unfortunately, certain crimes among juveniles are still increasing dramatically each year. For example, drug law offenses for juveniles increased 169% from 1990-1999; and public order offenses (e.g., obstruction of justice, disorderly conduct, liquor law violations, and nonviolent sexual offenses) increased by 74%. Overall, across the last 25 years, 25% of all violent crimes have been committed by juveniles (OJJDP).

Due to these alarming statistics, researchers are seeking to determine which factors predict and which factors prevent delinquent behavior in adolescence. Judy and Nelson (2000) specifically looked at the moral development level of the youth, peer involvement in delinquent behavior, and adolescent attachment to parents as possible predictors of juvenile delinquency. They found that if the youth already had associations with delinquent peers, there was no moderating effects of attachment to parents. Along with that, they found that associating with delinquent peers was the top predictor of delinquent behaviors. Within this study, the authors used Piaget's two stages of moral reasoning, Kohlberg's six stages of moral and cognitive development (expanded from Piaget's original theories), and Bandura's explanation of deviant behaviors as guides for the research (cited in Judy and Nelson, 2000). Kohlberg's cognitive and Bandura's social theories were supported. There

were several problems with this study. First, the majority of forms these authors used to measure morality were filled out improperly and were rendered invalid, leaving them with no way to properly include or analyze Piaget's or Kohlberg's constructs of moral development. Second, the sample size of those youth who reported engaging in delinquent behaviors was small ($n = 22$). This may be due to the fact that 20% of the sample came from accelerated English classes instead of the general student body. Finally, the study was conducted at one school on one day in a middle-class Virginia town where the majority were Caucasian, and AI ethnicity was not measured. All these factors greatly limit the generalizability of this study.

Focusing on the development of aggressive behaviors with Hispanic and AI youth, Barrera et al. (2001) looked at family relationships, parental monitoring, and associating with deviant peers as predictors for deviant behaviors. They also looked at the influence of gender on which predictors were best. The authors found that AI girls had the largest correlations between inadequate parental monitoring and peer deviance. Peer deviance was then highly correlated with the target youth engaging in problem behaviors. American Indian boys had the second largest correlations between parental monitoring and peer deviance, followed by White and Hispanic boys then White and Hispanic girls, respectively. This indicates the link between parental modeling and deviant behavior is especially strong for AIs. The authors also found that for all youth, higher perceptions of family conflicts and low levels of positive relations with the family were associated with higher aggressive behavior. Based on their findings, these authors suggest that active involvement in family activities decreased the amount of time adolescents could spend with deviant peers. They suggest parental monitoring of adolescents is one of the most age appropriate ways to reduce the amount of delinquent behaviors in adolescents. Generalizability was limited in this study, because the sample came from entirely rural areas in Oregon.

Other authors based their research on theories and previous findings in criminology and psychology that childhood conduct problems are a strong predictor of future involvement in antisocial behavior (Simons et al., 2001). Simons and colleagues used a longitudinal study to investigate latent trait theory and social influence theory as possible explanations for the association between conduct problems in childhood and delinquent behavior in adolescents. They found that oppositional defiant behavior (ODB) was strongly related to ineffective parenting, which in turn predicted a high association with deviant peers and engagement in delinquent activities. Snyder and Stoolmiller (2002) found similar results in that coercive behavior in children is learned from parents, and low-level coercive behavior increases in amplitude over time. Simons and colleagues found that the quality of parenting affected friendship choices later on, which then affected delinquency. However, they found no direct association between ODB during childhood and an increase in involvement with deviant peers and delinquency in adolescence. Based on these findings, the authors recommend parents be taught how to maintain good parenting practices in the face of ODB in young children, and learn to monitor their children's friendships closely. Part of this recommendation comes from a major finding in this study that parents of young children who are displaying ODB do not monitor their children well. Parents of conforming children monitor well during childhood and decrease this monitoring during adolescence, but they still monitor more at that time than the parents of children with ODB. These findings are further supported in the literature, in that findings indicate boys who engage in delinquent behavior at an early age (pre-teen) are arrested 36% more in adulthood than those boys who begin engaging in delinquent behavior in their late teen years (e.g., Patterson, Capaldi, & Bank, 1991; Patterson & Yoerger, 2002). Plus, those boys who engage in delinquency early are much more likely to come from homes where the parents employ ineffective discipline practices. There was little support for latent trait theory, which forwards the idea that some children have a

basic stable pattern of engaging in risky or deviant behavior. The social influences appear to be stronger predictors of deviant behavior. Generalizability was again questionable because only White families from small, rural towns in Iowa were used. Also, the measure they used for determining family quality was the Iowa Family Interaction Rating Scales, which they reported had good reliability but provided no mention of its validity. No further substantiation of the psychometric properties of this scale could be found.

Pleydon and Schner (2001) focused their study specifically on female adolescent delinquency to see if the quality of peer relationships was different for juvenile offenders versus nonoffenders. They focused on social learning theory, which in part proposes that the quality of delinquent friendships have to be at least as close as those of nondelinquents. This stems from the idea that an individual cannot be influenced by others unless there is some vested interest or attachment. They looked at several intrapersonal (e.g., impulse control) and interpersonal (e.g., attachment, involvement with family, peer association) factors in this comparison. The results showed that perceived peer pressure was the largest risk factor of those studied for engaging in delinquent behavior, and the measure of perceived peer pressure was highest for early maturing girls. Pleydon and Schner found one could discriminate between the delinquent and nondelinquent groups based on perceived peer pressure and the communication (style and amount) within the group but not on amount of companionship, conflict, helping, security, trust, closeness, or intimacy. Finally, they concluded that female delinquency happens in an environment conducive to law-breaking attitudes and behaviors, and may not happen at all outside of a delinquent peer group. A major problem with this study is that the two groups were different at selection in terms of age, education, ethnicity, and peer group gender (delinquents reported more male peers, while nondelinquents had mostly female peers). Further, the delinquent group was selected from a detention facility in Western Canada, while the nondelinquent group was from a local Canadian high school, and the sample size was

small ($n = 29$ and $n = 47$, respectively). Although they included 21 "Aboriginal Canadians" in the study, they were collapsed into a "non-Caucasian" group with Asians that may produce misleading results.

In a study of AI women and crime, Lujan (1995) noted the historical mistreatment of AIs, and AI women in particular, as a possible cause of delinquency. Some of these historical factors included colonialization, reorganization of social structures, and the destruction of matriarchal tribal systems. In addition to providing a detailed history of these problems, Lujan found that poverty, unemployment, undereducation, and substance abuse were all factors correlated with those AI women in jail. This study noted that AI women were routinely harassed by police officers, arrested because of discrimination not criminal actions, had a disproportionately high number in prison compared to the overall population in several Western states, and received stiffer penalties than White women for similar crimes. The conclusions of this study indicate that AI women may end up in adjudication and in jail more often than is warranted by their behaviors. However, they probably also commit more criminal acts than women from the majority culture due to the negative social and intrapersonal factors presented in this study.

In another qualitative study, Bond-Maupin (1996) looked at the risk factors and correlates of juvenile delinquency among AI youth in one AI community. This author described the history of interactions between the U.S. government legal system and those of the tribal nations. It was noted that the two often had different definitions of crime, law, and justice. This has caused problems with AI justice systems, because established U.S. Indian policy has forced most tribal nations to accept the Bureau of Indian Affairs' (BIA) standards of legal policy and punishment. This author noted that the beginnings of the BIA juvenile legal system were rooted in arresting and punishing those AI youth who had escaped from, or avoided confinement in, an off-reservation boarding school. Bond-Maupin suggests that this history is causing conflict within AI legal systems, which

contributes to the number of AI juvenile delinquents processed by the systems. Also, interviews with those working within an undisclosed BIA-operated, tribally run juvenile justice facility, supported her assumptions. Those interviewed reported that lack of parental supervision, parental alcohol or drug abuse, parents with no parenting skills, loss of respect and traditional values, loss of traditional subsistence (i.e., the river on which they lived was dammed once the tribe was federally recognized), influx of a nearby major city, and media influences were all cited as major factors in the rise of juvenile delinquency. Some interviewees said that traditional ways of disciplining youth and teaching appropriate behavior within the community was lost with tribal restructuring, leaving many AI parents at a loss as to how to discipline or monitor their children. Additionally, some interviewees noted that runaway or truant children entered the system when they were picked up and briefly incarcerated, because their homes were unstable or unsafe, or the youths were posing a threat to themselves by being extremely intoxicated or making suicidal gestures; not necessarily because they were engaging in delinquent behaviors.

To summarize, juvenile delinquency has increased dramatically and rapidly over the last few decades. These studies show that peer delinquency, or perceived peer delinquency, appears to be the largest factor associated with delinquent behavior across ethnic groups and genders. However, appropriate parental monitoring, especially before the youths have contact with deviant peers mediates this relationship. Both of these findings support PST by indicating that two of the three primary socialization sources are most predictive of delinquency and are supported routinely in the literature (e.g., Snyder, 2002). Support for PST was also found in several studies that showed ODB interfered with the bonding between parents and children, which, in turn, lowered parental monitoring and increased the risk of these children engaging in deviant behaviors. It was suggested that female delinquency may not occur at all outside of a deviant peer group,

and there was no support for an underlying stable trait being predictive of delinquency. Studies specifically focused on AIs suggest that historical mistreatment of AIs, parental drug use, lack of parenting skills, unemployment, undereducation, loss of traditional ways, and loss of community involvement may all combine to increase and predict juvenile delinquency. Previous research supports these findings in that violence and homicide rates increased within AI tribes as the tribes themselves became more assimilated, and the tribal members began working outside of the traditional tribal structure (Young & French, 1997). It was noted that the traditional U.S. government definitions of delinquent activity may not apply well to traditional AI definitions of delinquency. This difference of definitions may increase the number of AI adolescents who come in contact with the juvenile justice system.

Suicidality

A recent study of suicide in a Southwestern Native American tribe focused on three variables by request of the tribe: (a) the characteristics of those at risk, (b) if the suicides were happening in clusters, and (c) the rates of AI suicides compared to nonnatives in the same geographic area (Wissow et al., 2001). The authors determined that alcohol use was involved in 83% of the suicides committed by the AI tribal members, 53% of them had made previous suicide attempts, while only 13% had any known previous mental health contact. Also, there was a significant gender difference in that 90% of AI and nonnative attempters and completers in the geographic area were male. The authors noted that acculturation level and income were not known, but most of the suicidal AIs had English as a second language, and the majority of the tribe was unemployed. With regard to suicide clusters, the researchers studied death certificates and tribal reports and determined a cluster did occur when seven AI people hanged themselves within 40 days of each other, accounting for 16% of all suicides in the 4-year period

studied. Because hanging was an unusual method, and these deaths happened in such close proximity of time, these authors suggested that those who committed suicide knew of each other's suicides. From that, they suggest that knowing someone who completed suicide may be a significant predictor for suicidality among AIs. When compared to the nonnative suicide rates in the area, the overall rate was comparable. However, there was a large age difference between the two groups in terms of the age of those who committed suicide. Most AI suicides occurred between the ages of 20-29, with a dramatic increase in suicides among those aged 10-19, and there were almost no suicides reported for those over age 50. In the nonnative community there was a slow increase in suicides to ages 20-29 that had a small peak, with another small peak at ages 50-59; but the largest number of suicides occurred for those aged 70 and over. These trends in age were found nationally as well (United States Census Bureau, 2002a). This study also noted that because this research was done posthumously, much information on the suicide victims, such as intrapersonal factors, were not available.

Another study sought to specify the differences between suicidal and nonsuicidal Zuni adolescents (Howard-Pitney, LaFromboise, Basil, September, & Johnson, 1992). The factors they studied were social support, interpersonal communication, parental use of drugs or alcohol, traditionalism, depression, hopelessness, stressful life events over the previous 12 months, frequency of coping behavior, psychological distress, use of various drugs, and previous attempts or suicidal ideation. The authors found that previous suicide attempts were highly correlated with current suicidality. In fact, the most significant correlations found with current suicidality were previous attempts, previous ideation, and psychological distress. They also found that poor communication skills, higher drug use, low social support, and a low liking for school were all associated with increased suicidality. No differences between the two groups were found when degree of traditionalism or concern about parental drug use were measured. Thirty percent of all the

Zuni youth studied reported being currently suicidal to some degree, yet 35% of those had not reported this to anyone. The authors suggested that focusing on communication skills, for both parents and youth, may be an excellent place to intervene. However, although they noted that communication on this topic may be helpful, they also reported that suicide is forbidden among the Zuni and culturally taboo to even think about. This dilemma between communicating more openly about suicidal ideation and the cultural taboo was not addressed in this study. Another problem with this study is that the information was gathered over two days in a Zuni public high school, during which 25% of the student body was absent.

In a 5-year assessment of suicide attempts and completions in an American Indian community in Pine Ridge, South Dakota, Zitzow and Desjarlait (1994) found the suicide rate in that community to be two and one half times the U.S. average. Most attempts occurred within the 15- to 19-year-old age group. Among adolescent attempters, they found that being more assimilated (which may relate to being marginalized), having family relationship problems, and a negative future orientation were all predictive of attempts. Gender differences were found in the community with women attempting three times more than men, but men completed suicide three times more than women. Men were more likely to have drunk alcohol or used drugs prior to their attempts and were less likely to take precautions against being discovered. Along with that, this study found that during the majority (80%) of suicide attempts, at least one person was present within earshot, and the attempt occurred in such a way that disruption was likely. However, it was noted that only 21% of attempters reported gaining attention as a motivator, whereas 39% reported getting away from stressors as the primary motivation (this was higher among adolescents than adults). Only 18% of attempters said that the attempt was really to end their lives. Finally, these authors noted that unemployment in the area was high (80-85% in winter), and 75% of Indians in the community were on welfare.

In a more nationally representative study of risk factors for AI suicide, Novins and colleagues (1999) included tribes from three geographic regions: the Southwest, the Pueblo area, and the Northern Plains. These authors included many different predictor variables focused on substance use, intrapersonal factors, bicultural competence, and demographics. They found similar levels of suicidality among the various tribes but different predictors of suicide. For the Pueblo tribe, they found that the suicidal ideation of a friend within the last six months, lower perceived social support, and depression were the best predictors. In the Southwest tribe, not having an intact family, stressful events over the last six months, and antisocial behavior were the best predictors. Concerning the latter variable, the authors noted that thinking of or talking about death is taboo; therefore, suicidality goes against the cultural norms and can be seen as antisocial itself. Further, a gender difference was noted with regard to predicting suicidality in this particular tribe only. Historically, this tribe is matriarchal and for female adolescents only, lack of personal control over life events was predictive of increased suicidality. For the Northern Plains tribes, low self-esteem and higher levels of depression were most predictive. The authors noted that the tribes in this region had the most egocentric concept of self (i.e., more individualistic and less interdependent) of all the tribes included in the study. This may partially explain why self-esteem was so predictive among these tribes. Generalizability in this study was limited because the tribes were not specifically identified for confidentiality purposes, and the data were collected in seven rural high schools West of the Mississippi. Therefore, the finding may not apply to Eastern, Northern Pacific, or urban AIs. The authors noted that they did not use previous suicidality as a predictor, and recommended this variable be used in future studies. They also noted that their findings were concurrent in nature and recommend longitudinal studies to further develop predictability.

In a cross-sectional study of Native Hawaiian adolescents, Yuen and colleagues (1996) found no differences in the rate of attempts between the sexes, which is in contrast

to most studies of adolescent suicide across cultures. They also found that depression was the largest predictor of suicide attempts, and substance abuse added additional predictive value to this variable. Family support was found to be predictive independent of depression, but peer support was not. The authors suggest this latter finding may be due to the interdependent nature of the culture and the concept of "ohana," which places great value on the extended family. Although findings with Native Hawaiians may not generalize to AIs in general, many tribes have similar interdependant ties to family. In addition, a more recent study by Yuen, Nahulu, Hishinuma, and Miyamoto (2000) looked at risk factors for suicidality in Native Hawaiian adolescents compared to an inclusive sample of all ethnic groups in Hawaii. Grades 9 through 12 were included in this cross-sectional study. The authors found that the Native Hawaiians had significantly higher rates of suicide attempts than other ethnic groups. Parental education and SES, depression, substance abuse, and grades were all predictive of suicide attempts in the Native Hawaiian adolescent population. This was in contrast to the non-Native population, where depression, substance abuse, and aggression were the best predictors.

In summary, the suicide rate for AIs, Alaska Natives, and Native Hawaiians is slightly more than double the national average overall. However, in some geographic areas the suicide rates are even higher, but the rates are similar to non-Native rates in other areas. Further, specific predictors for suicidality among AI youth probably vary by the tribe being studied. Across the articles reviewed, the factor most often associated with suicidality in the indigenous populations is depression. Other factors also found to be highly predictive across the studies are substance abuse, family relational problems or low social support, low academic adjustment or grades, and previous suicide attempts or ideation. This review noted that most suicides occur at a young age among AI populations, as opposed to the population as a whole. Other factors found to be predictive of suicidality in at least one article are: knowing a close other who attempted suicide; poor

communication skills; a marginalized AI identity; a negative future orientation; low SES; high stressors over time; family structure (i.e., not having an intact nuclear family); a stable, a stable external locus of control; and low self-esteem. Within the framework of PST, depression and other psychological factors have probably interfered with the socialization processes with significant others, or conversely, broken bonds with the primary socialization sources have lead to depression and other negative mental health consequences among these suicidal adolescents. This is supported in that relationship problems with family, low social support, knowing close others who attempted suicide, and poor academic adjustment were all found to be highly associated with suicidality.

Self-Protection

In a recent national survey by the Automotive Coalition for Traffic Safety, 62% of people surveyed reported always wearing a seatbelt in a motor vehicle. That left 38% of motorists reporting they never, or only sometimes, wore their seatbelts (Field, 2003). Based on the following research, most of those not wearing a seatbelt are minorities and adolescents. Other authors have noted that 50 years of research focused specifically on adolescents has not reduced the leading cause of death for this age group--automobile accidents (Schichor, Beck, Bernstein, & Crabtree, 1990).

These findings are unfortunate given a report prepared for Congress by the Department of Transportation (Lorenzi, 1996). This report found that three of five unbelted motorists who die in traffic accidents would have survived if they had been wearing a seatbelt. Further, it noted that hospitalization costs are less for those in motor vehicle accidents who were wearing seatbelts ($5000 less on average) versus those who were not. On a more positive note, a longitudinal study of safe driving behaviors found that, from 1985 to 1995, the use of seatbelts increased 80% (Shinar, Schechtman, &

Compton, 2000). This increase was assumed to largely be due to the increase in mandatory seatbelt laws across the country (Field, 2003).

Previous studies have focused on the effects of mandatory laws, parental modeling, and youth education as ways to increase seatbelt use. This study that focused on the influence of modeling on youths' seatbelt use indicate modeling is a strong predictor of use. One study found that younger children use their seatbelts more often when their parents use theirs, but it did not include adolescents (Sleet, Hollenbach, & Hovell, 1986). Further, modeled nonuse of seatbelts by peers has been shown to lower the frequency of seatbelt use in a young adult sample, even below their self-reported usual use (Nocks & Howell, 1993). Another factor found to influence seatbelt use is socioeconomic status (SES), with those in lower SES brackets using seatbelts less often and expressing less belief in their effectiveness (Shin et al., 2000). This study also found that lower SES was associated with lower education, and those who came from middle class or private schools often had better grades and more frequent seatbelt use. Those youth with less education or lower grades often had parents who were not college educated and expressed the same doubts about the effectiveness of seatbelt use. In this study, the youth from lower SES brackets reported that they were less often told to wear seatbelts, and they frequently saw their parents riding or driving in a car without seatbelts being used. The association between education and self-protection was also illustrated by Field (2003), who surveyed 1000 readers of a physical engineering magazine. Ninety-two percent of the respondents reported always wearing their seatbelts (compared to the national average of 62%), 8% reported sometimes using theirs, and only one reader reported never using a seatbelt. This author noted that the magazine often addressed physical safety issues in the field of engineering as well as the physics of automotive accidents.

When minorities were included in seatbelt use or motor safety studies, it was noted that they were in greater danger of death or injury than the national average. Motor

vehicle deaths of Hispanic and Black teenagers were found to be much higher in motor vehicle crashes than White teens of the same age and geographic area (Baker, Braver, Chen, Pantula, & Massie, 2000). This association was assumed to be due to the lower use of seatbelts among these groups, which was again associated with lower SES, lower emphasis on education, and less belief in the effectiveness of seatbelts (Shin et al., 2000). To study this assumption, another article focused on seatbelt use by minority youth. Schichor and colleagues (1990) focused on psychosocial risk factors to determine which were associated with seatbelt use in a Black and Hispanic adolescent populations. These authors obtained a sample of inner city youth, between the ages of 14 and 19, who were attending a specific medical clinic for the first time. Their study was conducted shortly after a mandatory seatbelt use law was passed in the area. They found that only 46% of their sample reported always using their seatbelts (the national average was 62%). The factor most highly associated with consistent use was if others in the car also used their seatbelts. Those who never, or only occasionally, used their seatbelts were more likely to indicate feeling down, reported more problems in school, were more often in trouble with the law, more likely to be on probation, had less supportive home lives, and indicated life was not going well when compared to the "always" group. These authors did not find any association between drug, alcohol, or cigarette use and seatbelt use frequency. However, one of the problems with this study was that the questionnaires were included with their other medical paperwork filled out in the waiting room, and confidentiality was not assured. Therefore, the authors assumed that negative behaviors, such as drug use, were probably underreported, whereas positive behaviors were probably overreported. This study also showed that seatbelt use increased with age. The above findings were consistent across both ethnic groups. There were additional problems with this study beside confidentiality, in that the authors created the questionnaires and did not report reliability or validity. The sample was from one medical clinic in one city, and it could be that those

seeking medical attention may differ in their self-protective behavior from those who do not visit medical clinics.

In a study of social learning theory with a national sample of AI adolescents, parental modeling of seatbelt use was found to be significantly associated with similar use among male, but not female youth (Williams, 2001). Further study revealed that 78% of the females in this study reported always or almost always wearing a seatbelt, whereas 65% of the males reported this. The study concluded that female AI adolescents were more likely to wear their seatbelts regardless of others' use, whereas adolescent AI boys were more likely to wear their seatbelts only when parental use was modeled. These findings were for concurrent use so predictability was limited. The author noted that the reasons for females' higher use was unclear, but may have been due to better academic achievement by the girls. More study on seatbelt use using a longitudinal design and including additional predictor variables was recommended.

In an attempt to increase self-protection among children, a program was implemented in pediatric clinics in the Northeast U.S. The program focused on providing safety information to children and their parents and increasing the communication about safety issues between them (Stevens et al., 2002). This information was given to the families when they came in to the medical clinics for routine checkups, physicals, or emergency care with the family doctor. The program lasted 36 months and covered gun safety, tobacco and alcohol use, and helmet and seatbelt use. At the end of the program, researchers found that while bicycle helmet use increased, there was no change in seatbelt use or any of the other health-related behaviors studied. They concluded that the major focus of the program, increasing parent-child communication regarding safety issues, may not have been the most appropriate area for intervention. They also noted that the program did not begin until the children were in the fifth grade, and this was deemed to be too late for such a program to be effective. The researchers noted that if the community as

a whole was involved, not just the child's doctor and parents, then the results may have been more encouraging. Part of this may be due to the selection of families coming in to a medical clinic. These families may be more likely to use HPBs, with or without interventions, than families who do not routinely get medical care.

This review of the literature noted that seatbelt use is a significant way to reduce the risk of injury and death in motor vehicle crashes. Increased seatbelt use is very important to the adolescent age group, as death by motor vehicle accident is their leading cause of death. Across studies, modeling of seatbelt use by significant others appears to be the most predictive of seatbelt use by adolescents, however this may differ by gender with AI youth. This is supportive of PST in that peer and family self-protective behavior was strongly associated with the same behaviors by the adolescents. Socioeconomic status and education were also predictive of self-protective behaviors. Certain psychosocial factors were associated with less consistent seatbelt use, for example: depression, delinquency, negative future orientation, and a poor relationship with family.

Other Factors Influencing Health-Compromising Behavior

Harris and colleagues (2002) looked at the role a belief in having "nothing to lose" played in adolescent HCBs within the Add Health data set. They defined this construct as having low expectations for a positive future in economic and educational terms, and in the adolescents' life expectancies (i.e., if they think they will live past age 35). The authors found that a belief in having nothing to lose was associated with selling drugs and weapons use, but had little relationship with other problem behaviors such as onset of sexual activity. They then looked at having nothing to lose in conjunction with three social and economic conditions; parents' education level, welfare receipt, and family structure to see how these factors combined to predict the selected HCBs. One interesting factor in this study was that these variables were included at an individual level, with the target

youth, and at the school level with the youth's student body reports. The results of this study suggest that the mental health of an adolescent's student body predicted early onset of sexual activity by girls, as well as drug dealing and weapon carrying by boys. The authors suggested that school-based interventions may be helpful if they include a model for focusing on improving the mental health of students. They picked three HCBs to focus on in this study: sexual behavior, drug dealing, and weapon carrying, and separated the analyses by sex. However, they reported that female adolescents did not engage in drug dealing or weapon carrying enough to be included in the analyses at the individual level. Also, the authors found no differences across race or ethnicity. However, this finding was very nonspecific due to their combining Asians, AIs, and "other" into one group. Generally speaking, cross-cultural studies show that Asians have the fewest HCBs, whereas AIs have the most; and combining these groups into one may give misleading results (Bachman et al., 1991; Neumark-Sztainer et al., 1996). Another study did give support to the idea that having a nothing to lose, or a "fatalistic" attitude among AI youth was predictive of HCBs. Ramirez and colleagues (2002) found that families who expressed higher levels of fatalism, and who had less communication regarding healthy behaviors, produced adolescents with less knowledge about risk factors for illnesses and accidents, and less knowledge about HPBs.

Another longitudinal study looked at how family relationships and school factors served as protection against adolescents engaging in deviant behaviors at Time 2 with youth who had relationships with deviant peers at Time 1 (Crosnoe, Erickson, & Dornbusch, 2002). The data were collected in 1987 and 1990 in California and Wisconsin and were analyzed separately by sex. Deviant behavior in this study was identified as smoking, drinking, marijuana and other drug use, delinquency, and sexual activity. The study found that boys engaged in more deviant behaviors overall than girls. Boys had more deviant friends and were more influenced by friends' behaviors than were girls in this

study. For both sexes, however, having deviant friends at Time 1 increased the risk of a youth engaging in deviant behavior later. Female youth in this study were more sensitive to input from teachers or other school authority figures, and they performed better in school. Having this positive adjustment to school appeared to serve as protection against engaging in deviant behavior, even when the girls had a deviant peer group. Conversely, once the youth had a deviant peer group at Time 1, increasing parental involvement, especially monitoring, appeared to increase deviant behavior in both sexes at Time 2. Household organization (i.e., scheduled chores, family functions, and mealtimes) did serve as a small protection for boys but not girls. The authors suggest that once these youth are intimately involved with a deviant peer group, the influence of that group, and school adjustment, become more important than family relationships in influencing deviant behaviors. The vast majority of participants in this study were from White, middle class, suburban families; therefore, the findings regarding the influence of family may be different for AIs who have a more interdependent worldview and focus on the family.

Another factor frequently studied as a protection against HCB is religiosity. Hope and Cook (2001) looked at the role of Christian commitment in drug use among adolescents and young adults. They studied a sample of youth attending a Christian function in the United Kingdom (UK: Spring Harvest) and separated them into two groups by age: 12- to 16-year-olds, and 17- to 30-year-olds. The authors looked at how self-reported Christian commitment influenced smoking, drinking, and drug use. They found that the amount of substance use in the Christian sample overall was lower than the UK population average. Level of Christian commitment was determined by the youths' answers to how often they attended church, if they had given their lives to Jesus, if they read the Bible every week, and if they prayed most days. They found that all four of these factors were significant in predicting substance use among the 12- to 16-year-olds. However, only two factors were predictive of smoking and drug use among the older

group; having given their lives to Jesus and reading the Bible regularly. It was decided by the authors that these factors indicated a higher level of commitment than the other two. None of the religious factors predicted drinking among the older group. The authors assumed that much of these findings were due to the socializing effects of church functions and doctrine. For example, smoking and drug use is condemned by most UK churches, but drinking is not for adults. The authors concluded that social and familial influences associated with church attendance acts as a moderator against substance use with younger church goers, then, later in their development, the Christian beliefs are internalized and this reduces substance use through adulthood.

Religiosity was also studied in a national sample of AI adolescents as a predictor of HCBs (Williams, 2001). Using the Wave I data from the Add Health study, religiosity was defined as how important religion was to the youths, how often they prayed, and how often they attended church. The results indicate that, for female AI youth, higher religiosity was correlated with fewer regular smoking and drinking behaviors. However, there were no significant findings between religiosity and binge drinking or seatbelt use. There were also no significant findings for male youth with substance use and religiosity; however, higher religiosity scores were significantly correlated with higher seatbelt use in the male AI sample. Although the reasons for this latter finding were unclear, it was assumed that other factors, perhaps social modeling, may have influenced the results. To illustrate this point, it was found that the religiosity score of the male adolescents' mothers was significantly correlated with the male youths' religiosity scores. It may be then that mothers who have a higher religiosity score spend more time with the youth, engage in self-protective behavior more often, or have a closer relationship with the male AI youth within the context of attending religious functions.

Another study investigated help seeking behaviors, in order to cope with or resolve problems, as a protective factor among Zuni high school students (Bee-Gates, Howard-

Pitney, LaFromboise, & Rowe, 1996). These researchers looked at 23 different personal, social, and academic problems as well as which sources of help Zuni youth choose for these problems. An interesting finding in this study was that the male and female youth reported the same level of problems, and the same level of help seeking behavior. This was surprising in that previous studies with White youth indicate that females report more problems and more help seeking behavior (Rickwood & Braithwaite, 1994), and the authors of this study assumed that AI males place an emphasis on their cultural norm of connection with others. However, the most pressing problems and who was the preferred source of help did differ by sex. For females, the most common problems were grades, family relationships, and trouble making decisions. One third of the female youth also reported not wanting to live, but this was not identified by these youths as one of their most common problems. The male youth indicated that concerns over their future and their own Indian identity were their primary problems. For both sexes friends, parents, other relatives, or no one were the top helper choices. Female youth were more likely to get assistance from a teacher, and the male youth were more likely to get help from no one (neither of these differences were significant). This study found that suicidality was positively correlated with help-seeking behavior, which was surprising to the authors because of the cultural taboo against suicide. Another unexpected finding in this group of adolescents was that none of them sought assistance for problems from a community service center or an IHS clinic. Additionally, it was noted that higher self-esteem amongthe youth was associated with fewer psychological problems, less stress, and less help-seeking behavior.

To summarize, having nothing to lose (i.e., a negative future orientation) is one factor found to be predictive of certain HCBs, especially with males. The mental health of an adolescents' school-based peers may also predict certain deviant behaviors. Associating with a deviant peer group and having a poor family relationship were predictive of

substance use and delinquency in adolescents. Conversely, positive school adjustment consisting of high grades and a good relationship with teachers was found to be negatively associated with HCBs, even if the youths had a deviant peer group. Religiosity, or commitment to a religious organization was also found to reduce HCBs, especially substance use. However, with AI adolescents, this may apply more to females than males. Seeking help from others may also be a viable way for adolescents to engage in HPB, to cope with problems and reduce HCBs. With AIs, it may be that males and females seek help with equal frequency, but seek the help more from peers or family than from professional sources.

Summary

From the above review of literature, it is apparent that AI youth are at greater risk of engaging in certain HCBs than youth from other ethnicities and are at overall greater risk of engaging in all HCBs than adolescents on average (e.g., Neumark-Sztainer et al., 1996; Oetting & Beauvais, 1990). Findings seem to indicate that AIs engage in HCBs at a younger age and suffer more severe consequences than youth of other ethnicities (e.g., Barrera et al., 2001; Moran & Reaman, 2002). Additional studies indicate that the incidence, prevalence, and possible risk factors of several HCBs appear to differ by gender, age, assimilation degree, and geographic location (e.g., Novins et al., 1999; Schichor et al., 1990). Across the behaviors studied in this literature review, and across ethnic and tribal groups, support was found for PST. Although the social group found to be the most influential for any given behavior may differ from another (i.e., parents versus peers), socialization and modeling of deviant or normative behaviors by significant others appears to be the largest factors associated with HCBs. Where intrapersonal factors were found to be significant predictors, these just added to the social predictors' overall value. Partial support was found for gateway theory, but less was found for the stage theory of

substance abuse among AIs. That is, certain substances do appear to be used first, and the use of these may lead to the use of more severe drugs. However, which substance, or substances, the AI youth start with may differ by sex, tribe, and geographic region.

For the purpose of the current study, this review of the literature attempted to include research that made use of multicultural samples or focused specifically on AIs. However, the vast majority of research articles related to HCBs among adolescents used only White samples, used minorities other than AI, or combined AIs with other ethnic minority groups. Most studies specifically focused on AIs did not report which tribes were used; either for confidentiality purposes or because the sample was national and individual tribal status was not measured. The other problem found with research with AIs was that one tribe was used and identified, but the findings may not generalize past that tribe. An effective or plausible solution to this research dilemma is yet to be discovered. However, even with these limits, research that focuses specifically on AIs needs to continue due to the health crises the AI people face. It has been noted that intervention or prevention efforts will not be successful with AIs unless these programs are founded on culturally relevant information (Moran & Reaman, 2002). Finally, it was noted in the literature that interventions will not be successful until the primary risk factors are identified and targeted (Novins et al., 2001).

The current research, therefore, used a longitudinal approach to identify the most salient risk factors for selected HCBs among a national sample of AI adolescents. By establishing a foundation of pertinent modifiable risk factors for these HCBs among AIs, it is hoped that interventions will be established to reduce risky behavior among AI youth thereby increasing the quality of their lifelong health. Further, by using a national sample, the findings could provide a broad foundation from which researchers can begin to study and intervene with specific tribal nations. This work builds on the existing adolescent health literature with AIs by exploring many behaviors at once and by attempting to be

comprehensive while still being legitimate with regard to risk factors. The findings from this study will also provide evidence regarding the adequacy of PST and gateway theories of substance use with AI adolescents.

To build this research foundation, the following questions were investigated:

1. Which combination of the following variables at Time 1 (Wave I data) account for the most variance with the dependent variables at Time 2 (i.e., alcohol use, cigarette use, illicit drug use, self-protection, delinquency, and suicidality: Wave II data): age, urbanicity, SES, grades, school adjustment, future orientation, depression, neighborhood involvement, parental monitoring, perceived peer behavior, relationship with family, relationship with father, relationship with mother, religiosity, initiation of substance use, and in home access to drugs or weapons?

2. In addition to the independent variables in question one, which combination of the following variables accounts for the most variance in suicidality at Time 2: knowing someone who completed suicide at Time 1, knowing someone who completed suicide at Time 2, and suicidality at Time 1?

3. In addition to the independent variables in question one, which combination of the following variables accounts for the most variance in adolescent self-protection, alcohol use, and cigarette use, respectively, at Time 2: parental seatbelt use, parental alcohol use, and parental cigarette use at Time 1?

3. Which combination of all of the above predictor variables best accounts for the most variance in the sum score of all the HCBs at Time 2?

4. Do different combinations of variables predict the selected HCBs better for male AI adolescents versus female AI adolescents?

CHAPTER III

METHODS

Overview

Data collected from the National Longitudinal Study of Adolescent Health (Add Health), Wave I and Wave II in-home interviews were used for this study. Add health was designed to focus on adolescents' health-related behaviors in a variety of social and intrapersonal contexts.

Wave I data were collected in 1995 among adolescents in Grades 7 through 12, and the Wave II in-home data were collected one year later. The procedures of the Add Health team, as well as information regarding the participants in the current study, are detailed below. If a more detailed description of the Add Health study design is of interest to readers, see Bearman, Jones, and Udry (1997) or visit the Add Health Web site at www.cpc.unc.edu/addhealth. This Web site contains information on the design, investigators, data collection, participants, codebooks (questionnaires used), and publications that have resulted from this study. The following sections will provide some detail regarding the Add Health methodology and questions used, as well as how they were manipulated for this study.

Purpose and Procedures of the Add Health Study

The Add Health study was initiated based on the understanding that the largest threat to adolescents' health is their own behaviors. It is predicated on the theory that there are three sources of differential health for adolescents: different social environments, different health-related behaviors, and different vulnerabilities or protective factors. With that in mind, Add Health was designed to focus on what influences adolescents' behaviors, especially within their social contexts: family, friends, romantic and sexual relationships,

peer groups, schools, neighborhoods, churches, and communities. To achieve this design goal, various aspects of the adolescents' lives were explored, for example; diet, exercise, pubertal development, depression, injury, violence, sexual activity, illnesses, pregnancy, drug and alcohol use, suicidal thoughts, and health service use. Not only were data gathered from the adolescents themselves but also from parents, siblings, friends, romantic partners, and fellow students.

The primary sampling frame for the Add Health survey was a database provided by Quality Education Data, Incorporated. From this database, 80 high schools across the country were selected based on the following criteria: they included an eleventh grade and had enrollments of more than 30 students. The Add Health study design incorporated systematic sampling methods and implicit stratification to ensure that the sample was representative of U.S. schools with respect to region in the country, urbanicity, school type, ethnicity, and school size. If a high school refused to participate, another school was selected as its replacement from within the same stratum. Once a high school was recruited, its feeder schools (those schools that included seventh grade and sent the graduates to the selected high school) were identified and selected based on the proportional number of students it sent to the high school. In all, there were 134 discrete schools in the core study consisting of approximately 80 pairs of high schools and feeder schools (some high schools were their own feeder schools, because they included a seventh grade).

The Wave I interviews were the same for all respondents and took from 1-2 hours depending on the respondent's age and experiences. Most of the interviews were done at the respondent's place of residence in a one-on-one interview with a trained researcher. Wave II interviews were also done at home, 1 year later, and consisted of adolescents who participated in the core sample at Wave I and agreed to be interviewed again. Parents were interviewed at the time of Wave I interviewing only.

To provide for the respondent's confidentiality and to minimize interviewer or parental influence, no paper questionnaires were used. Instead, all responses were recorded on laptop computers. For less sensitive sections, the interviewer read the questions aloud and recorded the respondent's answers. For more sensitive sections (e.g., substance use and sexual conduct) the respondent listened to prerecorded questions through earphones and entered the answers directly into the laptop computer. Sample questions were used prior to switching questionnaire sections to insure the adolescents understood the directions and could follow through with them. Not every respondent was asked every question. Some questions were not asked due to the respondent's age, sex, and experiences (e.g., if youths responded they have never had a drink, they were not asked questions pertaining to how much or how often they drank).

Participants

The data used for this study came from the Add Health in-home sample, Wave I, main (core) sample and the Wave II in-home sample. To obtain this core sample, the Add Health designers took all rosters from the 134 chosen schools, analyzed them, and then stratified the students by grade and sex. Approximately 17 students were randomly chosen from each strata so that a total of about 200 adolescents was selected from each of the 80 pairs of schools. This resulted in a sample of 20,745 adolescents who were interviewed at home for Wave I, between April and December, 1995. For Wave II, the number of adolescents interviewed at home was reduced to 14,738 and were interviewed between April and August, 1996.

For the current study, only those adolescents who participated in both Wave I and Wave II in-home interviews, and who indicated they are American Indian/Native American, or that American Indian/Native American best described them, were selected for analysis. It is important to note that the American Indian status of the adolescent was

determined by self-identification only, they did not have to provide blood quantum or tribal affiliation status. This method resulted in an initial sample size of 399 AI adolescents with completed Wave I data. However, only 334 also had a parent questionnaire that was necessary for some, but not all, planned analyses. Roughly 90% of these adolescents also had a completed Wave II questionnaire, leaving a sample size of 298 AI adolescents with completed Wave I and Wave II information. Of these, 175 (59%) were female youth and 123 (41%) were male youth. One hundred thirty-nine (35%) were from urban areas, 97 (24%) were from suburban areas, and 52 (13%) were from rural areas; and their ages ranged from 13 ($n = 2$) to 20 ($n = 1$) with 59% of the adolescents falling between the ages of 15 and 17 at the time of the Wave II data collection.

Instrument

The questions selected for the dependent variables focused specifically on the adolescents' health-related behaviors and included the following self-report measures: *cigarette use*, consisting of how many days and how many cigarettes the adolescents smoked per day in the last 30 days; *alcohol use*, which measured how many days the youth drank and how often they binged when they did drink; *illicit drug use*, which measured how many times in the past year they had used marijuana, cocaine, inhalants, or other illegal drugs (not including cigarettes or alcohol); *self-protection* measured how often the youth used seatbelts when in a car or wore a helmet when on a bicycle; *suicidality* measured whether or not the adolescents seriously contemplated suicide and the number of attempts they made; *delinquency* which measured how often the youth had engaged in a variety of illegal or deviant acts in the past year; and finally *all HCBs*, which was the sum of the reported behaviors across the six dependent measures. For a more detailed description of these measures, including the individual questions asked the participants, see Appendix A. The predictor variables were those behaviors or constructs

at Time 1 (and Time 2 for suicidality) that research or theory indicated would predict the youth engaging in the selected HCB or HPB at Time 2. These include demographic measures such as: *adolescent age*; *urbanicity*, which measured whether the youth was from a rural, suburban, or urban area; *family SES* which was measured by if both, one, or no parents received welfare; and *ethnicity*. The remaining predictor variables were: *school adjustment*, which was measured by the youth's report of feeling involved, happy, and attentive at school and with the teacher; *grades* over the last year, which gave an indication of academic achievement; *depression*, which was measured by selected questions from the Center of Epidemiological Studies--Depression Scale (CES-D), included within the Add Health questionnaire. This scale was developed by researchers at the National Institute of Mental Health (NIMH) to detect major or clinical depression in adolescents and adults (NIMH, 2003). Further predictor variables include: the *relationship with family*, which focused on the youth's report of feeling cared about, having fun with family members, and receiving attention; *relationship with father* had the youths report how satisfied they were with the relationship, communication with their fathers, and how loving their fathers were; *relationship with mother* had the youths report the same information as with fathers, only focused on the mother; *parental monitoring* measured how much control the youth had over personal decisions versus how much the parents had in a variety of situations; *in home access*, which was measured by the youth reporting if cigarettes, alcohol, or illicit drugs or a gun was easily available in the home; *religiosity*, which was measured by how often the youth attended services, prayed, attended religious youth groups, and how important religion was to that youth; *future orientation* which was a measure of whether or not the youths thought they would die early, get married, or contract HIV/AIDS; *initiation of substance use* was a measure of whether or not the youths had tried cigarettes and alcohol; *knowing others who committed suicide* measured whether or not the youth knew a friend, family member, both, or neither who had

attempted suicide in the past 12 months (this was measured at Time 1 and Time 2); *perceived peer behaviors* had the youths report how many of their three best friends used cigarettes, alcohol, and marijuana regularly; *neighborhood involvement*, which included feeling safe and happy in their community, feeling connected to others, and using a community center in the neighborhood. Again, for a more detailed description of the questions used in any of the variables, see Appendix A. The parents' behaviors were also used as predictor variables in the analyses. These consisted of whether or not the parents who answered the questionnaire smoked (*parental smoking*), how often the parents used their seatbelts when in a car (*parental seatbelt use*), and *parental alcohol use* measured how often the parents drank, and how often they drank to excess (binged).

The above predictor variables were chosen based on the findings from the review of the literature, and not all variables were included in the analysis for each behavior measured. For example, knowing others who committed suicide was not a predictor variable included in the analyses targeting substance use. Further, many of the predictors were chosen based on PST. Because PST states that the primary areas for socialization among adolescents are family, peer groups, and school; the predictors chosen based on this theory were: relationships with family, mother, and father; parental monitoring, in home access to drugs/guns, perceived peer behavior; and school adjustment and grades. To test the gateway theory of drug use, cigarette and alcohol use at Time 1 were used as predictors for alcohol, drug, and cigarette use at Time 2. The remaining predictor variables were chosen based on the review of the literature and design of the Add Health data set.

To summarize, the dependent variables, that is the behaviors at Time 2, were chosen because they were determined to be the HCBs most engaged in by this age group based on a review of the relevant literature. The independent variables were chosen based on the socialization sources distinguished by PST, and gateway theories of substance use,

and the predictors found in the literature review. The independent variables consisted of a core set of predictors that were used in the regression analyses for every HCB if preliminary analyses indicated a relationship between the independent and dependent variables. Certain predictors were selected to be used in analyses of specific behaviors, such as parental seatbelt use was only used as a predictor variable for self-protective behavior among the adolescents.

The Add Health questionnaire was developed in such a way that it included several questions designed to measure one construct (e.g., the grades scale includes the youths' reports of grades across four class subjects). Before being included in the current study, factor analysis was calculated, using principal component analysis on SPSS 10.0, for each scale to determine how many underlying factors were present (Amherst University, 2000). Eigenvalues were used to determine how many latent factors were measured in each scale, and the total eigenvalue had to be greater than one to be considered a single factor in this study. Varimax rotation with Kaiser normalization was used as well to help determine the number of factors in a scale. Most of the scales, however, could not be rotated because only one factor was extracted. One example of this is religiosity, and the factor extracted accounted for 98% of the variance within the scale (see Appendix A). The principal component analysis form of factor analysis was chosen for use, because it has been show to determine the variability an item has with the other items in a scale. Thus, it assisted in data reduction and calculated how much variance was accounted for within the scale by the factor extracted (StatSoft, Inc., 2003). If the results of these analyses showed that a scale was measuring more than one latent construct, that scale was split into its separate factors. For example, the Add Health School Adjustment Scale originally included both the academic scales used in this study, *grades* and *school adjustment*. Because factor analysis showed these were separate constructs, they were split into separate predictor scales. In the larger scales, if only one or two questions in that scale measured a separate

factor, those specific questions were dropped from the scale rather than used as a separate predictor. These were the only ways the original questions in each scale of the Add Health questionnaire were limited and defined, in order to restrict the altering of the Add Health scales (see Bearman et al., 1997).

Cronbach's alpha was then calculated for each scale, and a score of .70 was chosen as the cutoff for scales having more than three questions, scales having two or three questions had a cutoff score of .65 to be included in the instrument. Once the scales were determined to have adequate reliability, and were found to only measure one factor, the sum of each scale was taken for inclusion in the regression analyses using that scale (Trochim, n.d.). The demographic questions did not have a scale score, and each were entered separately into the stepwise regression analyses. Every question in each of the scales used for this study, the variance accounted for by the latent factor in each scale, and the results of alpha analyses, and the factor loadings are found in Appendix A.

Data Analysis

As described above, in the instrument section of Chapter II, factor analyses and Cronbach's alpha analyses were done on all scales used for this study. This was done to insure that each scale measured only one construct, and that it held together reliably. Once these were done, the sums of each scale were calculated and used in the subsequent analyses. Most scales were scored in such a way that lower scores indicated more HPB, while higher scores indicated higher HCBs. If a scale was not scored in this fashion, the scores were reversed. All analyses were run on the Statistical Package for the Social Sciences (SPSS), version 10.0 for Windows.

Stepwise multiple linear regression (MLR) analyses were used to determine which independent variables best predicted the HCB (i.e., which predictor accounted for the most variance within the youths' behaviors at Time 2), and which variables added to this

prediction. This method of analysis was chosen over other forms of correlational analyses, because for each analysis there was one dependent variable and many independent variables. Further, the independent variables were all correlated with each other to some extent, and they were obtained from "natural" rather than experimental situations (Garson, 2002). To answer the research questions, three models were constructed and analyzed, one using all the AI adolescents, one using only male AI adolescents, and one using only female AI adolescents for each behavior. Separating the models by sex was considered necessary versus simply including sex as an independent variable because prior research indicates that the predictive factors for the same behaviors may be quite different for the two sexes (e.g., Joe, 2001; Williams, 2001). As mentioned above, the longitudinal design of the Add Health study was utilized to aid in establishing predictability.

For each of the dependent variables (behaviors at Time 2) the predictor variables (independent variables at Time 1) were selected to be entered in a MLR analysis based on theory and information from the literature review. As stated above, for most of these variables the adolescents' responses to a number of questions were summed to determine that variable's score (see Appendix A). For example, suicidality consisted of two questions: one asking if they had seriously thought of attempting suicide in the last 12 months, and one asking the number of times they actually attempted suicide in the last 12 months. If, in any list of questions pertaining to one variable a participant was missing an answer, the mean of their remaining answers was used to replace the missing value (i.e., mean imputation; Allison & Gorman, 1993) if they had at least two other answers in that variable's set. However, if the participant was missing more than one value if less than ten questions were asked; or more than three values if at least ten questions were asked, that participant was excluded from all analyses using that variable. This was done based on previous research that suggested ways to determine if the missing variables were random or intentional (Roth, 1994; Streiner, 2002). Also, this method of data imputation was

chosen because it was the most conservative of the currently accepted methods, and would not bias the results in favor of finding meaningful relationships that do not exist (Huberty & Julian, 1995). To further illustrate this method, notice the suicidality scale; if a participant did not answer one of the two questions in that scale, that participant was excluded from all analyses using suicidality as a variable.

This data imputation was done to maintain an adequate sample size in each regression and to maintain power in the analyses without compromising the participants' reporting (Roth, 1994). Unfortunately, each predictor variable still had a number of missing subject values after the mean imputation procedure was completed, and some had more than others. These variables were not deleted from the study entirely, because it was determined there were not enough missing cases in each variable for this to be necessary (Allison & Gorman, 1993). However, if each case with missing values was deleted from the regression analyses, the sample size would be dramatically reduced in some instances, depending on the variables being used. To overcome this, Pearson's correlations were run individually between each predictor variable at Time 1 and the criterion variable at Time 2 with missing cases excluded in each separate correlation to determine if there was a relationship. Based on these correlational analyses, only those independent variables that had a significant relationship (probability was set at .05 or less) with the dependent variable were included in the MLR. This procedure helped maintain an acceptable sample size while reducing the number of unnecessary predictor variables included in each MLR analysis.

Because multiple correlations capitalize on chance (i.e., fitting errors and sampling errors), and are often biased toward yielding the highest possible correlation, the R^2 obtained in a multiple regression is systematically too large. To counter this positive bias, the commonly accepted rule of having at least 10 subjects per predictor variable was used, thus the reason adequate *n* size had to be maintained and unnecessary predictors needed to

be deleted. To further reduce the positive bias of the correlations, the adjusted R^2 ($_{adj}R^2$) is reported instead of the R^2. The $_{adj}R^2$ was automatically figured by SPSS 10.0 during the multiple regression analysis, using a common "shrinkage" formula (equivalent to the Olkin-Pratt and Wherry formulas) which reduces the positive bias (Glass & Hopkins, 1996). For the purposes of this paper, the $_{adj}R^2$ score is reported in the results section as the percentage of variance accounted for by the predictor variables in the MLR model.

The stepwise technique was chosen to be used for the regression analyses, because it establishes the best predictor that is entered in the equation first. Additional predictors are then entered into that equation only if they provide unique and relevant variance. This pattern of establishing the regression equation was determined to be the best for answering the research questions, especially those that were assumed to have an additional independent variable moderating the best predictor variable. With stepwise analysis, a single best predictor can be determined from those available, as well as a best predictive model that includes the independent variables interacting and providing unique contributions to the model. For all MLRs, each variable was added in a stepwise manner according to the probability of its F ratio (it had to be .05 or less to be entered and .10 or more to be excluded from the final analysis). The results of the MLRs were considered significant if the probability of beta (the multiple correlation score) was .05 or less.

CHAPTER IV

RESULTS

Introduction

At least three MLRs were calculated for each behavior: one for all adolescents, one for females only, and one for males only. For cigarettes, alcohol, and illicit drug use, six MLRs were calculated. This was done because initiation of substance use at Time 1 was a significant predictor for each substance, and it was necessarily included in order to study the gateway theory. However, it was also a somewhat redundant criterion, especially for cigarette and alcohol use at Time 2, because cigarettes and alcohol were the substances measured for initiation of use at Time 1. Therefore, it was included in the first analyses to determine if initiation of cigarette and alcohol use predicted increased use of these substances, or use of additional drugs; but it was excluded in the remaining analyses because it did measure some of the same drug usage. The analysis of variance (ANOVA) statistics for each MLR can be found in Appendix D. Before the MLR analyses were calculated, Pearson correlations were figured between the independent variables at Time 1 and the behaviors at Time 2 for all adolescents, and males and females separately. These results can be found in Appendix B. Also in Appendix B is a summary table that includes each dependent variable and the significant predictors for those variables. Males only, females only, and all adolescents are combined in this table so that a brief summary of significant predictors is presented across sexes and behaviors. Additional Pearson correlations were calculated between each of the relevant independent variables at Time 1, for all adolescents, males and females separately, and those results are presented in Appendix C.

Alcohol Use

Two MLRs were conducted for all youth with adolescent alcohol use at Time 2 as the criterion variable. The predictor variables (those found to be significantly correlated with the behavior at Time 2) used in the first analysis were grades, school adjustment, depression, relationship with mother, relationship with family, in home access to drugs/guns, perceived peer behavior, neighborhood involvement, future orientation, and initiation of substance use. The second MLR excluded initiation of substance use as it may be a redundant measure of alcohol use. The Pearson correlations indicated these variables were significantly correlated with alcohol use (see Appendix B), whereas the remaining possible predictor variables had no significant relationship with this behavior.

The results of the first regression analysis show that the combination of initiation of substance use with depression and perceived peer behavior, accounted for 20% of the variance (see Table 1).

Remember, as stated above, the adjusted R^2 is reported as the percent of variance accounted for, so in this case ${}_{adj}R^2 = .197$ ($p = .047$, $n = 260$).

Initiation of substance use alone accounted for 15% of the variance ($p < .001$, $n = 260$). Grades, school adjustment, relationship with mother, relationship with family, in home access to drugs/guns, neighborhood involvement, and future orientation were excluded from the MLR analysis by the stepwise procedure; indicating they did not add significantly or uniquely to the prediction. Although they did not enter the final model,

Table 1

Alcohol with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Initiation of substance use	.149		.390	6.803	< .001
Depression	.188	.039	.210	3.647	< .001
Perceived peer behavior	.197	.009	.128	1.997	= .047

relationship with mother and relationship with family were correlated with alcohol use at Time 2 ($r(278) = .233$ and $r(294) = .295$, respectively, $p < .001$ for both: Appendix B). However, these two variables were moderately correlated (strength of correlations are based on Cohen, 2001) with each other when all adolescents were included ($r(182) = .528$, $p < .001$). Both were also correlated with depression ($r(182) = .354$ or above, $p < .001$) and with perceived peer behavior ($r(182) = .153$ or above, $p = .039$ or less; Appendix C). Thus, these were significant predictors of alcohol use at Time 2, but did not contribute uniquely to the regression.

The second regression analysis used all the above predictor variables except for initiation of substance use. The results showed that relationship with family was the best predictor, accounting for 11% of the variance ($p < .001$, $n = 254$; see Table 2).

The final model in this analysis included relationship with family with perceived peer behavior and depression. This model accounted for 19% of the variance ($p = .003$, $n = 254$).

The total amount of variance accounted for by the two separate MLRs was very similar (20% and 19%, respectively). This is most likely due to the significant correlations found between the independent variables entered in the final models. For example, although initiation of substance use accounted for the most variance in the first model, it was correlated with depression ($r(255) = .255$, $p < .001$), relationship with family ($r(255) = .195$, $p = .002$), and moderately correlated with perceived peer behavior ($r(255) = .504$,

Table 2

Alcohol Use with All AI Adolescents: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Relationship with family	.106		.331	5.570	< .001
Perceived peer behavior	.166	.060	.245	4.110	< .001
Depression	.195	.029	.185	3.021	= .003

$p < .001$). Therefore, when initiation of substance use was removed from the second analysis, the remaining variables accounted for a similar amount of variance, because they were not unique measures.

Four more multiple regressions were calculated: two for female adolescents only and two for male adolescents only. For female AI adolescents the following predictor variables were found to be significantly correlated with alcohol use at Time 2 (Appendix B), and were used in the regressions: school adjustment, depression, relationship with mother, relationship with family, perceived peer behavior, neighborhood involvement, future orientation, and initiation of substance use. The results of the first analysis indicate that initiation of use with relationship with mother, future orientation, and neighborhood involvement was the combination that accounted for the most variance (30%: $p = .020$, $n = 157$). The best predictor, initiation of substance use, accounted for 15% of the variance ($p = .001$, $n = 157$). Initiation of substance use also had the highest correlation with alcohol use ($r(176) = .366$; Appendix B). School adjustment, depression, perceived peer behavior, and relationship with family were not entered in the final model; indicating they did not add uniquely to the prediction. That is, although they were correlated with the behavior in question, they were also correlated with each other to various degrees (see Table 3 and Appendix C). The second regression analysis with female AI adolescents and alcohol use excluded initiation of substance use as a predictor variable.

The results of this MLR showed that relationship with family, depression, perceived peer behavior, relationship with mother, and future orientation were entered into the final model (in that order) and accounted for 27% of the variance ($p = .021$, $n = 157$). This analysis indicated that relationship with family was the best predictor of those used, accounting for 14% of the variance ($p < .001$, $n = 157$).

As with the two MLR analyses ran with all youth, the two regressions calculated for females only accounted for similar amounts of variance (15% and 14%, respectively).

Table 3

Alcohol with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Initiation of substance use	.147		.390	5.281	< .001
Relationship with mother	.235	.088	-.311	-4.334	< .001
Future orientation	.273	.038	-.215	-3.028	= .003
Neighborhood	.294	.021	.163	2.345	= .020

Again, this is most likely due to the intercorrelation of the independent variables (see Table 4).

For example, initiation of substance use was correlated with perceived peer behavior, $r(156) = .467$, $p < .001$, and depression, $r(156) = .272$, $p = .001$; see Appendix C for additional correlations. This indicates that the remaining variables may not have accounted for unique variance within the regressions for only females when initiation of substance use was entered into the regression.

For male adolescents the following were included as predictor variables for alcohol use: age, grades, relationship with family, perceived peer behavior, and initiation of substance use. The first analysis showed that the combination of initiation of substance use with relationship with family and age accounted for 21% of the variance ($p = .038$, $n = 116$). The best predictor was initiation of use, and it alone accounted for 14% of the variance ($p < .001$, $n = 116$; see Table 5). Grades and perceived peer behavior did not uniquely add to the prediction. Although perceived peer behavior had a low correlation with alcohol use among males, $r(117) = .351$, $p < .001$, it was also moderately correlated with initiation of use, $r(120) = .530$, $p < .001$. Therefore, it did not add unique variance to the model and initiation of substance use had a stronger correlation with alcohol use than perceived peer behavior, $r(117) = .394$, $p < .001$.

See Appendices B and C for more information on the correlation values.

Table 4

Alcohol Use with AI Adolescent Females: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Relationship with family	.144	--	.387	5.222	< .001
Depression	.206	.092	.275	3.626	< .001
Perceived peer behavior	.227	.021	.167	2.279	= .024
Relationship with mother	.245	.018	.182	2.141	= .034
Future orientation	.267	.022	.185	2.340	= .021

Table 5

Alcohol with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Initiation of substance use	.143	--	.387	4.485	< .001
Relationship with family	.183	.04	.221	2.589	= .001
Age	.207	.024	.179	2.105	0.04

The second analysis, which excluded initiation of substance use, indicated that perceived peer behavior alone was the best predictor of those used (see Table 6). This variable accounted for 12% of the variance ($p < .001$, $n = 107$). Neither age nor relationship with family added significantly or uniquely to this prediction when initiation of use was excluded, although they were entered in the final model when this variable was added.

The percents of variance accounted for by the two MLRs with only males were not as similar to one another (21% and 12%, respectively) as those calculated for all youth and females only. This is again due to the intercorrelations of the independent variables, except with only males, the results indicate that most of the variables were not significantly correlated with one another. For example, initiation of substance use was not significantly correlated with relationship with family, $r(106) = .126$, $p = .197$, or age, $r(106) = .153$, $p = .117$. Initiation of substance use along accounted for 14% of the

Table 6

Alcohol Use with AI Adolescent Males: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.132		.364	4.002	< .001

variance in the first MLR, and perceived peer behavior accounted for 13% of the variance in the second MLR. This is interesting in that initiation of substance use and perceived peer behavior are moderately correlated with one another for only males, $r(106) = .578$, $p < .001$.

Cigarette Use

The multiple regression analyses done with all youth for cigarette use at Time 2 included the following predictor variables: grades, school adjustment, relationship with father, parental monitoring, initiation of substance use, perceived peer behavior (see Appendix B for correlation values). The results of the first analysis indicate that initiation of substance use was the best predictor and accounted for 11% of the variance ($p = .001$, $n = 17$). However, the combination of initiation of substance use with parental monitoring was the full model and accounted for 14% of the variance ($p = .017$, $n = 172$; see Table 7). The remaining variables were excluded, as they were not found to add unique variance to the model. Perceived peer behavior was correlated more highly with cigarette use than parental monitoring ($r = .263$ and $r = .156$, respectively; Appendix B); however it is also moderately correlated with initiation of substance use, $r(182) = .538$, $p < .001$. Similar results were found for grades and school adjustment (see Appendices B and C).

The second MLR done, excluding initiation of substance use, showed that school adjustment with perceived peer behavior was the best model and accounted for 10% of the

Table 7

Smoking with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
Initiation of substance use	.111	--	.341	4.724	< .001
Parental monitoring	.135	.024	.172	2.412	0.02

variance ($p = .004$, $n = 186$; see Table 8). School adjustment alone accounted for 6% of the variance ($p = .001$, $n = 186$).

The MLRs done with smoking behavior at Time 2 with only female youth included the following Time 1 predictor variables: grades, school adjustment, depression, relationship with father, perceived peer behavior, and initiation of substance use (see Table 9). The results of the MLR including initiation of substance use show that it with school adjustment was the best model found from these predictors and accounted for 15% of the variance ($p = .039$, $n = 111$) while initiation of substance use alone was the best predictor, accounting for 12% of the variance ($p < .001$, $n = 111$). The remaining variables did not add uniquely to the model and were excluded. As with the model found when all adolescents were included and initiation of use was used, the correlation between perceived peer behavior and cigarette use was higher than that of school adjustment and cigarette use ($r = .296$ and $r = .220$, respectively; Appendix B). But again, perceived peer behavior was moderately correlated with initiation of substance use, $r(122) = .502$, $p < .001$, among the female adolescents.

When initiation of substance use was excluded, the MLR with only females use focused on cigarette use showed that school adjustment was the best predictor, accounting for 8% of the variance ($p = .002$, $n = 107$). Perceived peer behavior added to this predictor and together they accounted for 13% of the variance ($p = .009$, $n = 107$; see Table 10).

Table 8

Smoking with All AI Adolescents: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
School adjustment	.055		.244	3.415	= .001
Perceived peer behavior	.092	.037	.206	2.921	= .004

Table 9

Smoking with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Initiation of substance use	.120		.357	3.996	< .001
Perceived peer behavior	.146	.026	.191	2.090	= .039

Table 10

Smoking with AI Adolescent Females: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
School adjustment	.077	--	.293	3.138	= .002
Perceived peer behavior	.127	.050	.241	2.654	0

The first multiple regression done with male youth only used parental monitoring, perceived peer behavior, initiation of substance use, and parental smoking as the Time 1 predictor variables (see Appendix B for correlation values). The results indicate that initiation of substance use with parental monitoring accounted for 17% of the variance ($p = .01$, $n = 102$; see Table 11).

Initiation of substance use alone accounted for 12% of the variance ($p < .001$, $n = 102$). Parental smoking and perceived peer behavior were excluded from the final model after the stepwise procedure, indicating a lack of unique variance.

Table 11

Smoking with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Initiation of substance use	.116		.354	3.779	< .001
Parental monitoring	.166	-0.05	.241	2.642	= .010

The second multiple regression for male adolescents only and smoking behavior used the above predictor variables, excluding initiation of substance use. This analysis showed that parental monitoring with parental smoking status was the best model, accounting for 8% of the variance ($p = .045$, $n = 103$; see Table 12). Parental monitoring alone accounted for 6% of the variance ($p = .010$, $n = 103$) and was the single best predictor of those used.

Illicit Drug Use

The predictor variables used in the MLRs with all adolescents for illicit drug use were: sex, grades, relationship with family, in home access to drugs/guns, perceived peer behavior, and initiation of substance use (see Appendix B for values). Perceived peer behavior with in-home access and grades were retained in the final model and the combination accounted for 12% of the variance ($p = .03$, $n = 272$). The best predictor, perceived peer behavior, alone accounted for 10% of the variance ($p < .001$, $n = 272$). Initiation of substance use was correlated with drug use, $r(292) = .233$, $p < .001$, but its correlation with perceived peer behavior prevented it from being included in the final model due to the stepwise procedure (see Table 13 and Appendix C). Sex and relationship with family were also excluded.

When initiation of substance use was excluded and the analysis was calculated again for all adolescents, perceived peer behavior with in home access to drugs/guns and grades was still the final model (see Table 14). This model accounted for 12% of the

Table 12

Smoking with AI Adolescent Males: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Parental monitoring	.055		.253	2.631	= .010
Parental smoking	.083	.028	.193	2.026	= .045

Table 13

Drug Use with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.096	--	.316	5.460	< .001
In home access to drugs/guns	.107	.011	.121	2.060	= .040
Grades	.120	.012	.132	2.187	= .030

Table 14

Drug Use with All AI Adolescents: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.096		.316	5.470	< .001
In home access to drugs/guns	.108	.012	.122	2.092	= .037
Grades	.120	.012	.132	2.185	= .030

variance ($p = .030$, $n = 272$). Perceived peer behavior alone was the best predictor and accounted for 10% of the variance ($p < .001$, $n = 272$). As with the above analysis, sex and grades were excluded from the final model.

For drug use at Time 2 with female youth only, the following were included as the Time 1 predictor variables in the first analysis: depression, relationship with mother, relationship with family, parental monitoring, in home access to drugs/guns, perceived peer behavior, religiosity, and initiation of substance use (see Table 15 and Appendix B for values). Perceived peer behavior with in home access to drugs/guns remained in the

Table 15

Drug Use with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.101		.327	4.279	< .001
In home access to drugs/guns	.163	.062	.259	3.498	= .001

final regression model and the combination accounted for 16% of the variance ($p = .001$, $n = 155$). The best predictor, perceived peer behavior, alone accounted for 10% of the variance ($p < .001$, $n = 155$). The remaining variables were excluded, because they did not add unique variance to the model. However, initiation of substance use and relationship with mother both had significant correlations with drug use ($r = .226$ and $r = .219$, respectively; Appendix B).

In the second MLR with female youth and illicit drug use (see Table 16), initiation of use was excluded. The results of that analysis showed that perceived peer behavior and in home access to drugs/guns was still the best model. The full model accounted for 16% of the variance, and perceived peer behavior alone accounted for 10% ($p < .001$, $n = 160$ for both models; see Table 16).

For the first regression analysis with male youth only that focused on their drug use at Time 2; grades, perceived peer behavior, and initiation of substance use were used as the Time 1 predictors. Even though these were all found to have strong correlations with drug use (Appendix B), only perceived peer behavior was entered in the final model and accounted for 12% of the variance ($p < .001$, $n = 106$; see Table 17). The remaining variables did not add significantly to the model due to being interrelated with perceived peer behavior (Appendix C) and were excluded by the stepwise procedure.

The second MLR calculated, which excluded initiation of substance use, showed similar results (see Table 18). Only perceived peer behavior was included in the final

Table 16

Drug Use with AI Adolescent Females: Initiation of Substance Use Excluded

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.099		.323	4.293	< .001
In home access to drugs/guns	.162	.063	.262	3.586	< .001

Table 17

Drug Use with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.124		.364	3.989	< .001

Table 18

Drug Use with AI Adolescent Males: Initiation of Substance Use Excluded

Variables Entered	*Adj* R^2	Change in *Adj* R^2	Standardized Beta	*t*	*P*
Perceived peer behavior	.123		.362	3.982	< .001

model and accounted for 12% of the variance ($p < .001$, $n = 107$).

Delinquency

The Time 1 predictive variables found to be significantly correlated with delinquency at Time 2 (see Appendix B) were used in the regression analysis for all the youth and included: grades, school adjustment, depression, relationship with mother, relationship with family, in home access to drugs/guns, perceived peer behavior, future orientation, and initiation of substance use. School adjustment with initiation of substance use and in-home access was retained in the final model and the combination accounted for

20% of the variance ($p < .001$, $n = 252$). School adjustment alone accounted for 15% of the variance and was the single best predictor ($p < .001$, $n = 252$; see Table 19). Grades, depression, relationship with mother, relationship with family, perceived peer behavior, and future orientation did not add significantly or uniquely to the final model and were excluded.

The regression analysis focusing on delinquency with just female adolescents included the following predictors: grades, school adjustment, depression, relationship with mother, relationship with family, parental monitoring, in home access to drugs/guns, perceived peer behavior, neighborhood involvement, religiosity, future orientation, and initiation of substance use (see Appendix B for correlation values). The best predictive model found was school adjustment with relationship with mother, in-home access, and perceived peer behavior.

The full model accounted for 30% of the variance ($p = .024$, $n = 154$). As with the analyses performed with all adolescents, school adjustment was the best predictor of delinquent behavior for female adolescents, accounting for 15% of the variance ($p < .001$, $n = 154$). Initiation of substance use was significantly correlated with delinquency as was depression, relationship with family, and future orientation (see Table 20 and Appendix B). However they were all interrelated with one another and the predictor included in the final model (see Appendix C) so they were excluded. The remaining excluded variables has lower correlations than these presented above and did not contribute unique variance. When male adolescents only were included, and the focus was on delinquency at Time 2, the following were used as predictors: school adjustment, and initiation of substance use (see Table 21 and Appendix B for values).

Both variables were retained in the final model, and the combination accounted for 16% of the variance ($p = .029$, $n = 112$). School adjustment was the best predictor and accounted for 13% of the variance ($p < .001$, $n = 112$).

Table 19

Delinquency with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
School adjustment	.149		.390	6.699	< .001
Initiation of substance use	.184	.035	.206	3.452	< .001
In home access to drugs/guns	.199	.015	.137	2.366	< .001

Table 20

Delinquency with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
School adjustment	.152		.397	5.339	< .001
Relationship with mother	.243	.091	.313	4.371	< .001
In home access to drugs/guns	.278	.035	.202	2.890	= .004
Perceived peer behavior	.298	.02	.158	2.287	= .024

Table 21

Delinquency with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
School adjustment	.125		.364	4.103	< .001
Initiation of substance use	.155	.03	.201	2.219	0.03

Self-Protection

When focused on self-protection, the MLR with all the youths used the following Time 1 predictive variables, that were found to be significantly correlated with self-protective behavior at Time 2: sex, grades, school adjustment, initiation of substance use, and parental seatbelt use (see Appendix B for values). Four of these variables were included in the final model with sex being the best predictor and accounting for 5% of the variance ($p < .001$, $n = 248$; see Table 22). The final model included sex with parental

Table 22

Self-Protection with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Sex	.049		-.229	-3.698	< .001
Parental seatbelt use	.096	.047	.227	3.725	< .001
School adjustment	.132	.036	.198	3.325	= .001
Grades	.142	.001	.123	1.981	= .049

seatbelt use, school adjustment, and grades (in that order); and the combination accounted for 14% of the variance ($p = .049$, $n = 248$).

When only the female youth were analyzed with regard to their self-protective behavior the following were used as Time 1 predictor variables: parental SES, school adjustment, and parental seatbelt use (see Table 23 and Appendix B for values). Only parental seatbelt use with school adjustment was retained in the model and the combination accounted for 8% of the variance ($p = .007$, $n = 145$). Parental seatbelt use was the best predictor, and accounted for 4% of the variance ($p = .01$, $n = 145$). Parental SES did not add significantly to the model and was excluded.

For males only grades, perceived peer behavior, and parental seatbelt use were found to be significantly correlated with self-protective behavior at Time 2 (Appendix B). When used as the predictor variables in this MLR, parental seatbelt use with grades were the only variables remaining in the final model and accounted for 24% of the variance ($p < .001$, $n = 95$; see Table 24). Parental seatbelt use was the single best predictor and accounted for 16% of the variance ($p < .001$, $n = 95$). Peer behavior were excluded from the final model after the stepwise procedure probably because it was significantly correlated with grades, $r(93) = .440$, $p < .001$; Appendix C, and not as highly correlated with self-protective behavior as the other two variables (see Appendix B).

Table 23

Self-Protection with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Parental seatbelt use	.158		.409	4.302	< .001
Grades	.232	.074	.284	3.129	= .002

Table 24

Self-Protection with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Parental seatbelt use	.039		.213	2.604	=.010
School adjustment	.080	.041	.219	2.914	= .007

Suicidality

A regression analysis was done with all adolescents who had data regarding suicidality at Time 2 (i.e., they answered yes or no to having suicidal thoughts or attempts instead of leaving the question blank). The predictor variables found to be significantly correlated with this behavior were used in this regression and included: school adjustment, depression, perceived peer behavior, neighborhood involvement, future orientation, suicidality at Time 1, and knowing a suicide attempter at Time 2 (see Appendix B for values). After the multiple regression, previous suicidality (Time 1 measure) with depression were retained in the final model (see Table 25). The combination of these variables accounted for 23% of the variance ($p < .001$, $n = 272$). Previous suicidality was the best single predictor and alone accounted for 19% of the variance ($p < .001$, $n = 2.72$).

Suicidality at Time 2 was also examined with just female adolescents. The predictive variables used in this regression were: school adjustment, depression,

Table 25

Suicidality with All AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
Suicidality, Time 1	.191		.441	8.065	< .001
Depression	.225	.034	.213	3.571	< .001

with previous suicidality (at Time 1) were the only two variables retained in the final model, and the combination accounted for 31% of the variance ($p < .001$, $n = 164$; see Table 26). Depression alone with the best predictor and accounted for 24% of the variance ($p < .001$, $n = 164$). Knowing a friend or family member who had attempted suicide in the past 12 months (Time 2 measure) was also highly associated with suicidality at Time 2 (see Appendix B), but was significantly correlated with school adjustment, $r(221) = .174$, $p = .01$, depression, $r(221) = .220$, $p = .001$, and suicidality at Time 1, $r(221) = .187$, $p = .005$, as well. The remaining variables were also excluded due to lesser correlational values or intercorrelations with the other predictor variables (see Appendix C).

Suicidality at Time 2 was examined with only male adolescents as well. School adjustment, perceived peer behavior, and previous suicidality (Time 1) were all found to be significantly correlated with suicidality at Time 2 (see Appendix B for values). However, when entered into the regression analysis, only previous suicidality was retained in the final model and it accounted for 13% of the variance ($p < .001$, $n = 112$; see Table 27). Interestingly, previous suicidality was not significantly correlated with school adjustment or perceived peer behavior (see Appendix C).

Table 26

Suicidality with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Depression	.238		.493	7.206	< .001
Suicidality, Time 1	.311	.073	.317	4.270	< .001

Table 27

Suicidality with Male AI Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Suicidality, Time 1	.132		.374	4.230	< .001

All Health-Compromising Behaviors

When the sum of all HCBs at Time 2 was analyzed for all youth, the following were found to be the best predictor variables (see Appendix B for correlation values) and were used for the regression equation (see Table 28): sex, grades, school adjustment, relationship with family, initiation of substance use, in home access to drugs/guns, perceived peer behavior, and knowing a friend or family member who attempted suicide at Time 1 (12 to 24 months before the Time 2 measures). After the stepwise technique was utilized, perceived peer behavior was found to be the best predictor and accounted for 13% of the variance ($p < .001$, $n = 269$). Initiation of substance use, sex, and in home access to drugs/guns, were added to the variable (in that order) of perceived peer behavior. Together, the full model accounted for 17% of the variance ($p = .046$, $n = 269$; see Table 28). Grades were significantly correlated with all HCBs, $r(279) = .129$, $p < .001$; Appendix B, but were also correlated with initiation of substance use, perceived peer behavior, and sex (see Appendix C for more information on correlation values). It

Table 28

All HCBs with All Adolescents

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*P*
Perceived peer behavior	.133	--	.369	6.478	< .001
Initiation of substance use	.146	.013	.149	2.270	= .024
Sex	.157	.011	.119	2.110	= .036
In home access to drugs/guns	.166	.009	.115	2.009	= .046

was also found that in home access to drugs/guns was not significantly correlated with any other independent variable for all youth.

The Time 1 predictor variables used to analyze only female youth's total HCBs were: school adjustment, depression, relationship with mother, relationship with family, parental monitoring, in home access to drugs/guns, perceived peer behavior, religiosity, future orientation, initiation of substance use, suicidality at Time 1, and knowing someone who attempted suicide at Time 1. Perceived peer behavior with in home access, school adjustment, and relationship with mother comprised the final regression model and the combination accounted for 27% of the variance ($p = .024$, $n = 153$). Perceived peer behavior was the single best predictor, accounting for 14% of the variance alone ($p < .001$, $n = 153$). The remaining variables were excluded due to being interrelated with each other (see Appendix C). However, knowing someone who attempted suicide within the last 12 months (Time 2 measure), depression, initiation of substance use, previous suicidality, and future orientation were all significantly correlated with HCBs among these female AI adolescents (see Table 29 and Appendix B for correlation values).

When focusing on the sum of HCBs with male AI adolescents only, the following were found to be the best Time 1 predictors (see Appendix B for values): grades, perceived peer behavior, and initiation of substance use (see Table 30). Only perceived peer behavior was retained in the final regression model and accounted for 16% of the

Table 29

All HCBs with AI Adolescent Females

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.144		.387	5.162	< .001
In home access to drugs/guns	.216	.072	.277	3.836	< .001
School adjustment	.248	.032	.196	2.742	= .007
Relationship with mother	.269	.021	.166	2.282	= .024

Table 30

All HCBs with AI Adolescent Males

Variables entered	*Adj* R^2	Change in *Adj* R^2	Standardized beta	*t*	*p*
Perceived peer behavior	.164		.413	4.655	< .001

variance ($p < .001$, $n = 106$). Grades and initiation of substance use were not found to provide unique variance to the model, although they were both strongly correlated with HCBs among the male youth.

Because there were numerous multiple regressions done for each behavior, across sexes, and with different predictors for most regressions, Table 31 was constructed to provide readers with a brief summary of which variables were entered in the multiple regression models for all youth, males only, and females only. The actual scores from these calculations are presented above and in Appendix D; therefore, they will not be presented here.

Table 31

Summary of Significant Variables Entered in Final MLRs

	Dependent variables: Behaviors at Time 2						
Predictor variables	Alcohol use	Cigarette use	Illicit drug use	Delinquency	Suicidality	Self-protection	All HCBs
Age	[a] Males						
Sex						All Youth	All Youth
Grades			[c] All Youth			All Youth Males	
School adjustment		[b] All Youth [b] Females		All Youth Females Males		All Youth Females	Females
Depression	[c] All Youth [b] Females				All Youth Females		
Relationship with mother	[c] Females			Females			Females
Relationship with family	[b] All Youth [a] Males [b] Females						
Parental monitoring		[a] All Youth [c] Males					
In home access to drugs/guns			[c] All Youth [c] Females	All Youth Females			All Youth Females
Perceived peer behavior	[c] All Youth [b] Male [b] Females	[b] All Youth [c] Females	[c] All Youth [c] Males [c] Females	Females			All Youth Males Females
Neighborhood involvement	[c] Females						
Future orientation	[c] Females						
Initiation of substance use	[a] All Youth [a] Males [a] Females	[a] All Youth [a] Males [a] Females		All Youth Males			All Youth
Suicidality at Time 1					All Youth Males Females		
Parental smoking		[b] Males					
Parental seatbelt use						All Youth Males Females	

For the variables of alcohol, cigarette, and drug use, [a] indicates significant findings when initiation of substance use was included, whereas [b] indicates initiation of substance use was excluded. [c] indicates that variable was significant, and entered into the regression when initiation of substance use was included and excluded.

CHAPTER V

DISCUSSION

Findings Regarding PST and Gateway Theory

Support was found across behaviors and with both sexes for PST. As detailed in Chapter II, PST notes that school, family, and peer groups are the only socialization areas that directly teach adolescents to accept or reject deviant behaviors (Oetting & Donnermeyer, 1998). Of the 21 regression analyses calculated, all but three included either peer group behavior; school adjustment or grades; or relationship with family members, parental monitoring or modeling; or in home access to drugs/guns as primary predictors of the HCBs. All of these constructs fall within the realm of socialization with one of the primary sources. Interestingly, the findings from this study also indicate that direct modeling, or explicitly showing acceptance of deviant behavior, by these social groups may be more influential than the quality of the relationships the AI youth have with their members. For example, parental modeling of a HCB or providing easy access to substances or weapons, thus implicitly stating that engaging in selected HCBs is normal, were found to be significant in more regressions than the measures of relationship quality with all family members, mothers or fathers (12 and 7, respectively). Also, school adjustment was a significant predictor in twice as many regression models than grades (8 and 4, respectively). This indicates that how close the youths feel to others at school, and how safe and connected they feel there, may be more closely associated with HCBs than grades, which is a more objective measure of one aspect of their schooling. If this is true, it is supportive of PST in that the youths have to be connected with others at school before it can become an area for positive socialization with the participating AI adolescents (Oetting & Donnermeyer). Conversely, if they do not form attachments to

others at their schools, these youth may then seek socialization from others who have rejected school-based norms, and this likely increases their risk of engaging in HCBs.

Detailed in the results section are those variables which did not enter the final regression analyses. Remember from the methods discussion that a Pearson correlation was calculated for each predictor at Time 1 with each criterion variable at Time 2, and only those correlations found to be significant were entered into the final regression calculations. The findings indicate that many variables were not included in the MLR analyses, and the majority of these were not measures of PST. For example, future orientation and SES of the parents were not found to be highly correlated with many HCBs across genders. Conversely, perceived peer behavior and in home access to drugs/guns was found to be predictive of many HCBs, were included in the majority of MLRs, and are supportive of PST.

Little support was also found for the gateway theory of substance use (Dupont, 1984; Kandel et al., 1992). The results indicate that if AI youths had experimented with cigarettes or alcohol at Time 1, they were more likely to progress to regular use of these substances. However, the findings are not as clear when illicit drug use was the behavior being studied. Because initiation of substance use was measuring experimentation with cigarettes and alcohol at Time 1, it was deemed somewhat redundant with the criterion variables of cigarette and alcohol use at Time 2. When it was excluded from the MLR analyses, the results were very supportive of PST. Regarding gateway theory, initiation of substance use at Time 1 was found to be predictive of illicit drug use when Pearson correlations were calculated (see Appendix B); however, it was not included in any of the final regression models. When initiation of use was excluded from entry in the analyses with illicit drug use, there was almost no change in the results or amount of variance accounted for by the model. This suggests that experimentation with cigarettes and alcohol by AIs may lead to increased use of these substances, but does not lead to a

progression of stages of substance use. The results also suggest that any progression into less common drug use, such as crack or methamphetamine, is strongly influenced by associating with a deviant peer group. This would actually provide support for PST, not gateway theory, in that socialization factors, more than previous use or various intrapersonal factors, are most predictive of drug use (Oetting, Deffenbacher, & Donnermeyer, 1998).

Findings Regarding Alcohol Use

As noted above, when initiation of use was included in the regression it was the best Time 1 predictor variable of alcohol use at Time 2. Recall that this independent variable measured if the youths had sampled either cigarettes, alcohol or both at Time 1, whereas the dependent measure focused on regular (chronic) use or bingeing use. The regression results of initiation of substance use as the best predictor held true for both sexes, combined and separately. This is mildly supportive of the gateway theory of drug use in that experimentation with cigarettes or alcohol predicted more severe and chronic use of alcohol later (Kandel, 1980; Oetting & Beauvais, 1990). The regression excluding initiation of substance use showed poorer relationships with family as being most predictive of higher alcohol use at Time 2. In both MLR analyses, for all youth combined, depression and perceived peer behavior were entered in the full regression model, indicating they are significantly correlated with alcohol use as well. That is, the more depressive symptoms endorsed and higher perceived deviant behavior of peers (which focuses on peer substance use) reported by the target youth, the more likely it was that youth engaged in regular alcohol use at Time 2. This is supportive of PST in that family and peer groups are two of the three primary socialization sources that directly provide information regarding normative or deviant behaviors to the adolescents (Oetting & Donnermeyer, 1998). By examining the regression data, it appears that peers are more

influential than family or school with all AI adolescents with regard to the acceptance or rejection of alcohol use when initiation of substance use is included in the prediction. However, the second MLR showed strong correlations between relationship with family and alcohol use. Pearson correlations also showed a strong correlation between relationship with mother and alcohol use, which should not be ignored. The results of all these analyses indicate that initiation of substance use is the most predictive variable of alcohol use at Time 2 (Appendix B). However, when this variable is excluded, perceived peer behavior and relationship with family are most predictive. Initiation of substance use was also found to be highly correlated with perceived peer behavior, relationship with family and depression. Depression was also included in both analyses and added to the prediction of alcohol use. Relationship with mother and future orientation was also highly correlated with alcohol use at Time 2 (Appendix B), but were correlated with each other, relationship with family, and depression (Appendix C) so they were not included in the MLR models. Within the PST framework, depression may be preventing certain youths from making strong connections with family or school, or previously broken ties with these groups may be causing the depressive symptoms (Oetting, Deffenbacher, & Donnermeyer, 1998). With the short time span of one year in this longitudinal study, it was impossible to tell which came first; however, the socialization factors were found to account for more variance in the regression analyses than depression. Either way, the lack of strong bonds with the two groups that are most likely to influence decreased use (Coker et al., 2001; Kosterman et al., 2000) conversely increased their chances of bonding with members of a deviant peer group. Thus, depression, poor relationship quality with family, and associating with peers who use drugs, greatly increases AI youths' risk of engaging in chronic or binge drinking alcohol use.

For female adolescents only, as with all youth, initiation of substance use was most predictive of alcohol use at Time 2 in the first analysis. Again, this is somewhat supportive

of gateway theory (Dupont, 1984; Kandel, 1980). However, unlike the results found for all youth, relationship with mother, future orientation, and neighborhood involvement were all significant predictors of alcohol use at Time 2 in the regression. Primary socialization theory is supported in that the quality of their relationship with a family member, their mother, is highly predictive of use. Further, it should be noted that parental use of alcohol was not significantly predictive, but the quality of the relationship between the AI girls and their mothers was. This is counter to previous findings that parental modeling of use is a primary predictor of use by adolescents, both concurrently and longitudinally (Ary et al., 1993; Coker et al., 2001). It does fit the explanation put forth above, that youth with poor family relationships may turn to their peers who are more likely to normalize and support alcohol use.

This explanation was further supported in the analysis excluding initiation of substance use. In this regression, relationship with family and relationship with mother were both included as significant predictors, and both were found to be significantly correlated with initiation of substance use. Depression, future orientation, and perceived peer behavior added to this. The combination of depression, low relationship quality with family members (especially mothers), and the perception that their close peers were drug users appears to increase the risk of later alcohol use among female AI adolescents.

The intrapersonal factor of having a negative future orientation was also included in both final regression models and found to be significantly predictive of alcohol use among AI female youth. This adds to previous research that suggests those youth who have nothing to lose, or hold a fatalistic view of life are more likely to engage in deviant behaviors (Harris et al., 2002; Ramirez et al., 2002). Also, with AIs in particular, many tribes were historically matriarchal, and only among AI women low self-efficacy was related to higher HCBs (Bond-Maupin, 1996; Novins et al., 1999). The finding that negative future orientation is predictive of alcohol use could be related to these previous

studies, in that AI female adolescents who have broken connections with their mothers in particular, may have less of a sense of control over their lives. They may feel like nothing they do will change the "fact" that they will die young or not have a positive future. This, in turn, is significantly predictive of the AI female youth using substances such as alcohol. Among many AI tribes, close community or neighborhoods may consist of extended family, or clans. This may be part of the reason low neighborhood involvement is predictive of higher alcohol use among AI female youth, while still being supportive of PST (Oetting, Donnermeyer, & Deffenbacher, 1998). That is, the neighborhood may be viewed as family and may then communicate norms directly to the youths that drinking is acceptable (Oetting & Donnermeyer, 1998). However, it may also be that the communities in which these girls live are unsafe, not supportive of healthy lifestyles, and interfere with the bonding between the AI females and their families, school teachers or positive students. This has been suggested as a possible cause for drug use by the authors of PST (Oetting, Donnermeyer, & Deffenbacher).

When the male AI adolescents were studied separately, initiation of substance use at Time 1 was again the best predictor of alcohol use at Time 2 in the first analysis. Similar to the findings with female adolescents, male adolescents' relationships with their family was also predictive of alcohol use. Although not focused specifically on mothers, as it was with only females when initiation of use was included, the better the quality of the family relationships the less likely the AI male youths were to drink alcohol one year later. This fits PST very well, in that family connections are one of the primary ways rejection or acceptance of drug use is taught to adolescents (Oetting & Donnermeyer, 1998). This also indicates that even if the male youth has initiated use, the subsequent use of alcohol may be decreased if the quality of familial relationships remain positive. However, this will only hold true if the family is openly rejecting towards alcohol use (Ary et al., 1993). Finally, age was found to add to the predictive strength in this regression model, with alcohol use

increasing with age. This trend may be due to the young AI male's belief in stereotypes about AI drinking which in turn leads them to engage in alcohol use as they age in an attempt to establish an AI identity (Moran & Reaman, 2002; Zitzow & Desjarlait, 1994).

When initiation of substance use was excluded, however, the results appeared very different. In this analysis, only perceived peer behavior was included in the final model. This is also supportive of PST in that peer groups are one of the three primary socialization sources, and it indicate that peer behavior may be more influential on the HCB of alcohol use with AI male adolescents than family behavior or relationship quality. This idea is supported further in that peer behavior and initiation of substance use are significantly correlated with one another, and both were found to be highly predictive of alcohol use.

Additionally, for all adolescents combined, for males only, and for females only; it appears that initiation of substance use was highly correlated with perceived peer behavior. This may be indicating another way the peer group is the most influential of the primary socialization sources with regard to alcohol use at Time 2 with AI adolescents. That is, the target youths appear to be engaging in deviant or normative behavior in such a way as to match the types of behavior their peers are displaying, and this is more true for the male AI youths. Monitoring and regulation of peer associations may then be a very effective place for intervention efforts with AI adolescents and alcohol use. With AI female youth, however, this relationship is not as clear. Family relationships may also need to be targeted for intervention efforts with AI females with regard to drinking behaviors.

Findings Regarding Cigarette Use

The first MLR with all adolescents yielded some interesting results. Initiation of substance use was the best predictor, as it was with alcohol use, and provides the same limited support for gateway theory (Kandel, 1980; Recio Andrados, 1995). Parental

monitoring added to the predictive power of the regression model and indicates that the more parents are involved and directly monitor their children, the less likely these youths will use cigarettes regularly. It may be assumed that most parents express negative views of smoking, and this may become a primary place adolescents learn to reject smoking behaviors. This scenario would be supportive of the hypotheses expressed in PST (Oetting & Donnermeyer, 1998). However, one of the interesting results of this analysis was that peer behavior at Time 1 was highly correlated with both cigarette use at Time 2 and initiation of substance use at Time 1 (see Appendix C). Therefore the inclusion of parental monitoring and initiation of use may indicate a moderating effect between parental monitoring (which includes a measure of control over the target youths' peer associations) and cigarette use, with the monitoring reducing associations with deviant peers. This, in turn, would reduce the likelihood their AI youths would engage in deviant behaviors such as cigarette use.

Different results were found when initiation of substance use was excluded from the analysis with all AI adolescents. This regression indicates that school adjustment was most predictive of later cigarette use. That is, the more AI adolescent students felt comfortable, accepted and safe at school, the less likely they were to smoke. Perceived peer behavior added to this, suggesting that those AI adolescents who were socially well adjusted at school and had friends who did not use substances were least likely to use cigarettes at Time 2. These findings are supportive of PST, but counter previous findings that mother's use of cigarettes was most predictive of youths' cigarette use in longitudinal studies (e.g., Øygard et al., 1995). However, the current study was over only one year, and this may not have been enough time to show this same phenomenon. Other studies indicated peer use was most predictive of concurrent cigarette use among adolescents (Epstein et al., 1999). This dissertation is supportive of the latter finding that peer

behavior is more predictive of cigarette use by the target youths than family use of cigarettes when all AI adolescents were included.

As with all adolescents, when the AI adolescents were separated by sex and analyzed, initiation of substance use was the best predictor of cigarette use at Time 2. For females, school adjustment added to this prediction, whereas with males, parental monitoring added to it. These findings are supportive of both gateway theory and PST (Kandel, 1980; Oetting & Donnermeyer, 1998). That is, those who experimented with substances at Time 1 were more likely to use these substances regularly at Time 2 (Kandel, 1975). Also, the primary socialization areas of family and school relationships appear to be influential in the youths accepting or rejecting the behavior of cigarette use. This is shown by parental monitoring and feeling safe and accepted at school being significant predictors of use. These are two areas where the adolescents are more likely to hear positive messages about abstaining from cigarette use as compared to peer friendship relationships (Crosnoe et al., 2002). However, as previous research has shown these positive messages need to be explicitly shared with the youths prior to them experimenting with substances (Ennett et al., 2001; Ramirez et al., 2002). This is especially true in light of the current finding that initiating substance use is highly correlated with perceived peer behavior across sexes for these AI youth. Parental monitoring and strong bonds with school may help the adolescents keep from regular smoking even if they initiate substance use of have a deviant peer group. This finding has been discussed and supported previously in the literature (Crosnoe et al.; Moran & Reaman, 2002).

When initiation of substance use was excluded, the findings for males no longer included school adjustment or peer behaviors. Parental monitoring and parental use of cigarettes were found to the best combination of available independent variables in predicting cigarette use among AI males. This indicates that low monitoring combined with parental modeling of use increases the likelihood that AI adolescent males smoked

cigarettes regularly one year later. Contrary to the findings of the MLR with all adolescents, this one is supportive of previous findings that mother's use of cigarettes is the best predictor of adolescent smoking behavior in longitudinal studies (Epstein et al., 1999; Øygard et al., 1995). The specific focus on mothers is due to the fact that mothers were much more likely to complete the parental questionnaire than fathers. Therefore, mothers' reports of parental smoking was included more than fathers' in this analysis. This MLR result also suggests that in order to prevent cigarette use in this population, close monitoring by parents, combined with modeling abstinence should both be present. For females only, when initiation of substance use was excluded, the findings were similar to the same regression for all adolescents. That is, school adjustment and peer behavior were most predictive of cigarette use at Time 2. This supports previous findings that suggest female youth may be more invested in school than male youth, and this bond may serve as a protective factor against engaging in deviant behaviors among the AI females (Harris et al., 2002).

Another interesting finding is that parental smoking was only significantly correlated with regular cigarette use for male adolescents. This may contradict previous findings that suggest parental modeling of use is a more significant predictor of cigarette use among their children then monitoring or communication (e.g., Ennett et al., 2001; Epstein et al., 1999; Sutherland & Shepard, 2001). The reason for this finding is not clear, but may be due to AI culture. Historically, many AI tribes used tobacco well before contact with Europeans, and the use of tobacco products may be culturally approved for certain tribes (Myers et al., 1995; Novins et al., 2001). Therefore, if tobacco use is ubiquitous within a tribe, the use of it by parents may not be as strong a predictor as it would be among a culture that sanctions its use. If this is the case, prevention could be difficult because experimenting with cigarettes may be very easy for AI youth. Intervention efforts focusing on education and parental monitoring would then be most

important to keep the adolescents from progressing to regular use. School-based interventions might be very effective with female AI youth, given the findings in this study. This is also supportive of PST in that culture may affect the norms that are taught to the adolescent by the primary socialization sources (Oetting, Donnermeyer, Trimble & Beauvais, 1998).

Findings Regarding Illicit Drug Use

Most notable in the findings of which combination of variables accounted for the most variance with regard to drug use at Time 2, was that initiation of substance use at Time 1 was not included in the final regression model for either sex, separately or combined. Its exclusion from the MLR analyses did not change the findings of which combinations of variables were most predictive. Initially, this would appear to contradict the gateway theory of substance use in that experimentation with "lesser," or more commonly abused, substances did not predict the use of "harder," or more rarely used substances (Kandel, 1975; Kandel et al., 1992). However, initiation of substance use was a strong predictor for both sexes, but was so highly correlated with peer behavior that it was excluded from the final MLR model (see Appendix C). Therefore, the gateway theory of substance use gained some support in that those youth who experimented with substances at Time 1 were indeed more likely to use illicit drugs at Time 2.

More support was found for PST in that associating with a deviant peer group appeared to be the main way the target adolescents began experimenting with substance use (Oetting & Donnermeyer, 1998). The peer group, therefore, may be the primary way AI adolescents develop a normative attitude towards illicit drug use. However, the results from all youth combined, and females only, indicate that if the parents also create an atmosphere that is accepting of drug use by having drugs accessible in the home, the youth are even more likely to use drugs. These findings have been supported in the previous

literature regarding antecedents to drug use (e.g., Okwumabua & Duryea, 1987; Young, 1991). This study also supports the hypothesis that youth who come from a home where substances are easily obtainable may form a positive opinion toward drug use, and then seek out peer associates who have similar attitudes (Crosnoe et al., 2002).

This was the only individual HCB that had sex as a significant correlate, with males being more likely to engage in illicit drug use than females. Previous findings of gateway drug use among AIs indicate that male AI youth are more likely to initiate substance use with marijuana or inhalants, whereas female AI youth are more likely to initiate with alcohol (Novins et al., 2001). Additionally, prior research indicates that males, across cultures, are more likely to use harder drugs than females on average (Beauvais, 1992; Neumark-Sztainer et al., 1996; Oetting & Beauvais, 1990), and the findings of this study supports these conclusions. With female youth only, there was a much larger number of significant predictors for drug use than with the male youth, many of which focused on relationships with others. Previous research indicates this may be due to males using harder drugs due to intrapersonal factors, whereas females were more likely to use drugs if others around them use (Andrews et al., 2002). However, the AI males in the current study did not indicate any intrapersonal factors as significant predictors, so that hypothesis can not be supported.

The idea that females use drugs mostly when those around them use as well was supported somewhat for the female youth in this study. Relationships with family (especially mothers), parental monitoring, in home access to drugs/guns, peers' behavior, and religiosity were all socially based predictors of drug use at Time 2 (see Appendix B). Although in home access to drugs/guns and perceived peer behavior were the only variables included in the final analysis, by looking at all the ways the additional family and household factors are predictive of female adolescents' drug use, effective interventions may be found for the female AI youth. One intrapersonal factor found to be predictive of

drug use with the adolescent AI females was depression. However, it was strongly correlated with relationship with mother and may, therefore, be more of a socialization factor. This indicates another avenue where PST is supported in that depression have effected the relationship quality with family members (or vice versa) which in turn increased the risk of drug use (Oetting, Deffenbacher, & Donnermeyer, 1998).

Only three factors were predictive of drug use for the male adolescents: peer behavior, grades, and initiation of substance use (see Appendix B). None of them was an intrapersonal factor, and they were all highly correlated with one another (see Appendix C). For the male AI youth, associating with drug using peers was highly predictive of that youth also using drugs. In fact, it was the only predictor variable included in the regression model. As noted above, this variable is highly correlated with initiation of substance use, which was also predictive of drug use at Time 2. Grades was also predictive of drug use among AI adolescent males, indicating that those AI males who were not doing well in school at Time 1 were more likely to use drugs at Time 2. Although grades are not a social measure directly, it may indicate that these youths were not socially well adjusted in school. It may also suggest that AI males who were not invested in school, did not value a school-based education, might have learning disabilities, or might be less intelligent were more likely to use drugs at Time 2 and associate with peers who used drugs at Time 1. Future research might focus on what is lowering these youths' grades, and why this is predictive of drug use.

With regard to intervention, based on the literature and current results, clearly communicating norms against use with younger children may prevent associations with delinquent peers and reduce the likelihood of drug use (Ennett et al., 2001). However, intervening with adolescents who are already using drugs may have to include removing the target youths from their peer groups. On isolated reservations this may be very difficult and intervening with the entire peer group (through education or community

monitoring) may be necessary. Increasing positive ties to school and demonstrating the value of an education to AI children and adolescents may also reduce their risk of using illicit drugs.

Findings Regarding Delinquency

All three of the MLRs calculated for delinquency indicate that school adjustment is the best predictor of this HCB with AI adolescents. That is, the better these youth get along with others at school, students and teachers; the better they keep up with their studies; the more they feel safe and they feel like they are being treated fairly; the less likely they are to engage in a number of delinquent activities one year later. This same finding was reported by Crosnoe and colleagues (2002), and suggests that adolescents who are happy and doing well in school may not want to risk school suspension by getting caught engaging in delinquent activities. This finding adds more support to PST in that school relationships are one of the primary ways adolescents learn to accept or reject deviant behaviors, according to this theory (Oetting & Donnermeyer, 1998). These results may indicate that AI students who do not feel socially accepted may turn to deviant peer groups for acceptance, and this increases their risk for engaging in delinquent behavior. The MLRs with all adolescents, males, and females lend more support to this idea in that perceived peer behavior or initiation of substance use (which is strongly correlated with peer behavior) were included in all three models. This indicates that experimenting with substances or associating with peers who use substances, in conjunction with having few healthy relationships at school, increases the risk of AI youths engaging in delinquent activities.

Additionally, for all youth combined and for females only, having access to substances in the home at Time 1 also increased the chance of delinquency at Time 2. Again PST was further supported in that having substances in the home explicitly or

implicitly normalizes the use of substances for the adolescents (Oetting & Donnermeyer, 1998). For AI females specifically, the quality of the relationship with their mothers further moderated the predictive strength of school adjustment. Thus, with female adolescents in particular, all three of the primary socialization sources (i.e., family, peer groups, and school) influenced whether or not these youths engaged in delinquent behaviors one year later. It should be noted however, that the female youth also had a high number of other predictor variables which were significantly correlated with delinquency (Appendix B). Two of these were intrapersonal, factors: depression and future orientation. Further social factors were significant for female AIs such as: religiosity, parental monitoring and neighborhood involvement. These variables were intercorrelated and, therefore, not all could be included in the final model (see Appendix C). However, they do indicate that for AI female youth, a variety of social factors and intrapersonal factors were influencing their acceptance of deviant behaviors (Oetting, Deffenbacher, & Donnermeyer, 1998).

For AI males, school adjustment and peer relationships appear to be the primary influences related to delinquency. Unlike the findings with female youth, these were the only two factors found to be significantly correlated with delinquency with AI males, and they were both entered in the final regression model. This is supportive of PST in that two of the three primary socialization sources are predictive of deviant behaviors with these AI youth (Oetting & Donnermeyer, 1998). This is similar to the current findings with AI male adolescents and drug use. That is, the AI males may not be invested in school, so they do not have this as a protective factor against HCBs. Those youths who do not have acceptance at school may then form relationships with peers who also are not bonded to school. This, in turn, would increase the likelihood of AI adolescent males engaging in delinquent behaviors.

In terms of intervention and prevention efforts, previous findings suggest that programs targeting socialization and mental health within the school systems may be

helpful in reducing delinquency for both sexes (Harris et al., 2002). This may be especially true for the male AI youth. Interventions with females in particular, however, may be more complex. Their home environments and mental health needs may need to be targeted as well. Therefore, community based intervention programs that include family members, school administrators, and peer groups may be the most successful at reducing delinquency among AI youth, especially females.

It was interesting that initiation of substance use at Time 1 by all adolescents, and for the males only, was predictive of delinquent behavior at Time 2 in this study. This may be indicative of a different type of gateway theory in that cigarette and alcohol use by adolescents are deviant behaviors in themselves. Thus, by initiating use, the AI youths are engaging in a common delinquent behavior that may make them more likely to engage in other deviant behaviors as they age and become more internally accepting of delinquent activity. This may be another area where future research is warranted.

Findings Regarding Suicidality

Across both sexes and in all three MLRs, previous suicidality (Time 1 measure) was most predictive of the same behavior at Time 2. For all youth combined and for females only this was combined with depression in the final regression model. Unfortunately, due to the design of this study it is impossible to determine which factor was present first, suicidality or depression.

Suicidality at Time 2 was significantly correlated with school adjustment at Time 1 (Appendix B). Although this was not included in any of the final models, it does indicate an area of socialization where intervention may help reduce the risk of suicide among AI adolescents. Support for this has been found in the literature in that the mental health of the target participants' student body was predictive of HCBs among the target youth (Harris et al., 2002).

Current results showed additional social factors may be influencing the suicidal thoughts of these AI youths. For example, with all youths, and for males in particular, perceived peer behavior at Time 1 was related to suicidal thoughts and behaviors at Time 2. For female youth, and all youths combined, neighborhood involvement at Time 1 and knowing a friend or family member who attempted suicide in the last 12 months (Time 2 measure) were also predictive of suicidality at Time 2. These findings indicate that stronger relationships with healthy peers, family members, and the community may serve as prevention against suicidality. Within the PST framework, depression and already feeling suicidal or hopeless (having a negative future orientation) may interfere with these youths' abilities to form meaningful protective relationships (Oetting, Deffenbacher, & Donnermeyer, 1998). As with delinquency and other HCBs, intervention may then need to be community based in order to increase the mental health functioning of all involved in the socialization process (Oetting, Donnermeyer, & Deffenbacher).

Many AI adolescents who reported suicidality at Time 1 did not participate in the Wave II interviews. An attempt was made to determine if these youths actually committed suicide before the second interviews were conducted. Unfortunately, consistent records were not kept regarding the reason for withdrawal from the Add Health study. If it was reported that a youth died between Wave I and Wave II, the cause of death was not recorded (J. Tabor, personal communication, April 21, 2003). This is a major drawback in the current study in that determining which variables were most predictive of actual suicide would be very helpful in guiding future prevention efforts.

Findings Regarding Self-Protection

The results for the MLR analysis, with all adolescents, indicates that females use their seatbelts and helmets more often than males regardless of the influence of other

predictors. However, sex as the best predictor only accounted for 5% of the variance, so the difference between the sexes may not be practically meaningful.

Previous research has indicated that modeling of seatbelt use by others in the car, education regarding healthy behaviors, and SES are probably the most influential factors related to self-protective behavior (Nocks & Howell, 1993; Schichor et al., 1990; Shin et al., 2000). These results were supported by the current study in that parental modeling of seatbelt use and grades or school adjustment were related to self-protective behaviors with all AI youth (males and females). Parental SES was only found to be a significant predictor of self-protection among the AI female youth, but was not included in that final regression model. For the adolescent AI males only, perceived peer behavior was also a significant correlate of self-protection, but was also not included in the final model. Although this measure of peer behavior focused specifically on drug use, it may give an indication as to the overall health-related behaviors of their peers. This may, then, be indicating that peers who engaged in more HCBs, were less likely to use their seatbelts or helmets. This modeling of non-use by peers may then reduce the likelihood of the target AI male using his.

Findings from the current study are supportive of PST in that parental modeling of use or non-use was predictive of the same type of protective behavior with the adolescents. School adjustment for female youth and peer behavior for male youth were also predictive of self-protective behavior. These three areas of socialization are the primary ways adolescents are taught to accept or reject certain behaviors according to PST (Oetting & Donnermeyer, 1998). In terms of prevention or intervention efforts, this may be why seatbelt use laws are effective in increasing use. That is, the adults are legally forced to wear their seatbelts, and to make sure their children and other passengers in the car wear their restraints as well. This, then increases the use by other passengers in the car (Field, 2003).

Education has previously been found to be predictive of self-protective behavior (Nelson et al., 1998). The MLR with all youth supported this finding in that grades were a mediating variable to sex, parental seatbelt use and school adjustment; indicating that education is a strong predictor of self-protection among AI youth. For males in particular, grades and parents' seatbelt use were the only predictors included in the final regression model. Prevention efforts may then need to be school based and start with much younger children, focusing on the necessity of self-protective equipment use.

Encouraging strict mandatory seatbelt use laws on Indian reservations may be another area for increasing HPB. All states have some form of vehicle restraint law, with some being more strict than others (Field, 2003). However, the law on Indian reservations takes precedence over state laws, and some states have specifically noted they have no civil jurisdiction over this behavior by AIs within the borders of their reservations (Minnesota State Senate, 2001). The National Highway Traffic Safety Administration (NHTSA) reported that seatbelt laws vary widely by reservation (NHTSA, 2003). This study also noted that reservations with stricter laws concerning automobile restraints have fewer vehicle fatalities than reservations with more lax laws. Getting stricter laws passed on reservations may first include educating tribal members about the need for, and effectiveness of, seatbelt use.

Findings Regarding All HCBs

When the sum of all HCBs was analyzed for all AI youth, associating with deviant peers at Time 1 was the most significant predictor of these youth engaging in HCBs one year later. Even though peer behavior and initiation of use were correlated with one another (see Appendix C), they were both included in the regression model for all HCBs. This suggests that the more the AI youths associated with a deviant peer group, the more likely they were to use substances and to engage in HCBs, in general. These variables

were mediated by in home access to drugs/guns, which suggests that AI youths who live in homes which normalize deviant behaviors are also more likely to engage in HCBs. Finally, this regression indicates that the AI adolescent males in this sample were more likely to participate in HCBs overall than were the female AI youth.

All three of the primary socialization sources were included as predictors of HCB among the female AI adolescents (Oetting & Donnermeyer, 1998). That is, deviant peer behavior, poor relationships with their mothers and access to drugs in the home, and low social adjustment at school were all predictive of increased HCBs among the female AI youth. Although not included in the final regression model, depression, future orientation and suicidality at Time 1 were all intrapersonal factors significantly predictive of all HCBs among the AI females. This may indicate that negative intrapersonal factors are reducing the ability of the AI female adolescents to form meaningful relationships with others, or that poor relationships earlier in these young women's lives lead to depression, hopelessness, and suicidality (Oetting, Deffenbacher, & Donnermeyer, 1998). In terms of intervention or prevention efforts with AI females, it is possible community based interventions that include school-based peer and administration relationships, other peer groups, family members, and the neighborhood may be warranted. Within this global program, education clearly focused on increasing HPBs such as seatbelt use, abstinence from drugs, and gaining a school-based education may help reduce HCBs. Ways to increase and maintain a positive view of the future and adequate mental health are important, but may be impossible in certain tribal communities without the involvement of the entire community (e.g., Dressler et al., 1996; Novins et al., 1999; Young & French, 1997).

With male AI youth, the areas of intervention may be more clear. Only perceived peer behavior was included in the regression analysis, although initiation of substance use and grades were also predictive of HCBs. These variables were found to be correlated

with each other (see Appendix C). Therefore, finding ways to reduce the male youths from associating with deviant peer groups would be a primary way to reduce their HCBs. It may be that by the time these adolescents have a deviant peer group, interventions will not be very effective. In fact, previous research suggests that, interventions at that time may actually increase HCBs (Ennett et al., 2001). It is suggested then, that prevention efforts must start when the males are younger than adolescent age and may consist of parental monitoring and school-based programs that focus on clearly communicating norms against HCBs. School-based programs may also be more difficult with the AI male adolescents because the results from this study indicate the males receive significantly lower grades than the females (see Appendix C) and may be less invested in school. This also indicates that the importance of a formal education should be clearly communicated to male AI children before they reach adolescence.

The importance of a formal education and the difference between this and AI traditional ways of learning should be discussed briefly. An AI teacher illustrated the difference between these styles of learning in an article he wrote about his son who was raised traditionally among the Cherokee/Seneca before attending a "whiteman" school (Medicine Grizzlybear Lake, 1990). Medicine Grizzlybear detailed the education his son had before attending kindergarten, such as learning about nature by fishing and hunting; learning math through the stick game; learning science and medicine by watching herbs being used and gathered; theology was taught him through the oral rendition of their creation account; and he learned fine arts through traditional music and dance. This author further noted that most of his son's learning had been experiential and tied to practical needs of the tribe, which is quite different from the formal, abstract, internally driven teachings of "whiteman" schools. He concluded by stating that his son was labeled "a slow learner," was teased for having long hair, and punished for not asking questions in class. Another author interviewed AI adolescents attending an off reservation boarding school to

determine why they were not doing as well as the tribe thought they should (Peshkin, 1997). He noted that most AI adolescents reported that they thought they should be doing better than they were, but they had no intention of doing better and were not puzzled or bothered by this phenomenon. Some of the reasons given him by the students included that learning the Kiva (spiritual learning) always came before the school learning, there was an overarching philosophy of "you live what you live" which accepted the status quo, and due to the interdependent nature of the tribe no students wanted to single themselves out. Peshkin reported that one student summed up the difference between "whiteman" education and traditional education by stating, "It's like comparing an eagle and computers." Based on these readings, it is clear the idea of a formal "whiteman" education may not be palatable to many AI youth, and this paper is in no way suggesting that a formal education is better than more traditional ways of learning, just different, and more marketable (monetarily) in the dominant culture. The law requires some attendance of formal schools by AI youth, and the capitalist system of the US is currently set up to recognize and reward formal education above experiential studies. This paper is suggesting that this information be adequately disseminated to AI youth at an early age. When it is not, the students see no reason to excel in, or even attend, school which can be a punishing experience. One AI woman noted that attending "whiteman" schools may also be punished by the tribal members. She noted that some young people from her South Dakota reservation were encouraged to attend school and then mocked when they brought back alternative ways of doing or thinking about things (Tessa, personal communication, 09/24/03). She also noted that most members who left the reservation to obtain a degree in higher education were women, because the men were socialized to rely on the women and not work. She attributed this to the historical roles of men in the tribe, they were the hunters and gatherers, and this role did not exist among them anymore, but

the women's roles of being educated and dealing with the logistics of the tribe were still intact. Therefore, the men have no motivation to change the status quo.

Whatever programs are instated within tribal communities they should take into account the culture and traditional roles of males and females within the tribe. For example, tribes that are traditionally matriarchal may place different pressures and expectations on female youth, such as the situation discussed above, and interventions must respond to this (Novins et al., 2001). Conversely, some tribes may encourage young males to engage in risk taking behavior as a sign of being a man or a warrior (Dressler et al., 1996). Finding alternative ways for these youths to obtain a respected place within their tribe or community, ways that reduce the risk of them being injured or killed, are suggested.

Further, there was a noticeable difference in the amount of variance accounted for among the female AI adolescents than the males. This may be due in part to the above discussion, but it is also seen among this age group across cultures (Henrich, Kuperminc, Sack, Blatt, & Leadbeater, 2000; Williams & Best, 1994). Part of this may be because peers become central to the life of adolescents, they spend much more time with peers than with parents during this stage of development (Shaffer, 2002). In fact, by early adolescence, young people spend more time with peers in small cliques than with parents, siblings, or any other socializing group (Shaffer). Research also indicates that the peer cliques are smaller and more closely knit for females than males, and more emphasis is placed on interdependence and homogeneity among females than males. Partly due to this phenomenon, grade point averages, disciplinary actions at school, and externalizing disorders have been found to be highly correlated among female cliques but not among male cliques (Henrich et al.). Part of the homogeneity among female cliques may be due to a process of gender intensification which begins in early adolescence (Owens, 2002). During gender intensification, adolescents identify more with the stereotypical roles

assigned their sex. Gender intensification for males involves becoming more independent, more aggressive or dominant, engaging in more exhibitionist activity, and displaying less emotional ways of responding to a variety of situations. For females, this process may include becoming more dependent on others, especially older significant others; and being more deferent, nurturing, and verbally expressive of feelings (Owens). The gender intensification theory has been supported in crosscultural studies (although not specifically with AIs: Williams & Best, 1994). As per the above discussion, gender intensification in matriarchal societies may mark a time of withdrawal by male AIs from education or occupational planning and a time of intensification of accepting responsibility among AI women. This may partially explain why this dissertation found higher levels of HCBs among male AI adolescents, as well as lower correlations between their HCBs and their relationships with parents or school. Conversely, it may help explain why the female AI adolescents had high correlations with HCBs and their relationships with parents, peers, and school.

Limitations of Current Study and Directions for Future Research

One of the main limitations of this study is that all information gathered was based on self-report. Thus, youth included in the study did not have to provide any proof of tribal affiliation through decendency or blood quantum. Because of this, there was no way to conclusively know that the adolescent participants were actually Native American Indian. There was also no way to determine which specific tribal nations were included in this study, and generalizability, along with specificity, is thus reduced. Degree of acculturation, adherence to traditional values, or bicultural competence were not included in this study due to the limitations of the Add Health design. This again reduces the generalizability of the results to specific AI populations.

Another problem with self-report measures could be that certain adolescents or adults answered the questions falsely, intentionally or unintentionally, to make themselves look better or worse. However, one meta-analytic study indicated that there is little evidence to suggest that youth erroneously report drug use (Oetting & Beauvais, 1990). This same study found sufficient reliability and validity for self-reports of income, criminal behavior, mental illness, or embarrassing medical conditions. The authors did warn, however, that minority youth may exaggerate HCBs more than White youth (up to 3% above actual use), but the results are still adequately reliable for research purposes. Further, the design of the Add Heath questioning procedures was intended to lower false reporting (Bearman et al., 1997). Questions that were deemed sensitive were not asked the respondents directly by the interviewer. Instead, the parent or youth listened to prerecorded questions through a headset and entered their responses directly into a laptop computer, out of sight of the interviewer or any significant others who may have been in the house. However, it must be noted that the health-related behaviors of the youths, their peers, or their parents were never directly observed for the purposes of collecting data, so caution should be awarded these results.

An additional area of concern involves the strength of the obtained correlations. Although the goal of this study was to find the best combination of independent variables that predicted a specific behavior, the total variance accounted for by some of the models was quite small. Although all the correlations discussed in this paper are statistically significant, they may not be practically meaningful. For example, the full MLR model with all youth focused on cigarette smoking only accounted for 14% of the variance. However, research in public health has noted that small effect sizes in a limited population can be translated into large effects across the population as a whole. For example, only 298 AI adolescents were included in any given analysis, and if only 5% of the variance is accounted for by the selected predictor variables, this is not much meaningful finding.

However, if 5% of the variance of the given HCB can be accounted for by these predictor variables across all 1,874,282 AI adolescents (United States Census Bureau, 2002b), this becomes a much more meaningful finding. Another problem with this research, is that there may be variables that were not included in this study that are more predictive of the HCBs in question. By using the extant Add Health dataset, limits were placed on what could be included in the analyses. Undoubtedly, better measures of PST could be created if that was the primary reason for data collection from the outset, and better measures would probably provide more support for PST. For example, if alcohol use by peers, parents, teachers, religious leaders, etc. were measured directly and correlated with the AI youth's use, it may help clarify where exactly these adolescents are being socialized to drink. Further, some of the predictor variables included in this study may not have been assessed in ways that apply adequately to AIs cultures. An example of one variable where this might be the case is religiosity. The Judeo-Christian, Islamic, or Tao-Buddhist concepts of prayer and attending religious services may not adequately measure the AI concept of spirituality. Although a Native American may routinely attend sweat lodges, personally communicate with the Creator, or go to other culturally religious ceremonies, the religiosity questions asked by the Add Health team probably do not cover these concepts sufficiently. That said, even with these limitations, PST was supported, suggesting that PST is a viable theory for use among AI adolescents.

To further support PST, future research, should focus on specific tribes, and the degree to which the youths identify as being a traditional, bicultural, or marginalized member of that tribe. The questions asked these youths should be tailored more directly to those tribes' concepts of religion, delinquency, law, gender identity, family, education, and so forth, in order to make the research and prevention efforts more applicable and effective. This may lead to identifying other predictor variables that are better at accounting for the HCBs among AI youth than those used in the current study.

Further, a replication of this study across ethnicities and cultures is suggested. This will give added support to PST as a multicultural theory which can serves as a predictor for HCBs or HPBs among youth of all ethnic/cultural backgrounds. Future research into PST will also provide external validity to the current and previous studies (Barker, Pistrang, & Elliot, 1994).

Finally, the results of this exploratory study can be used to guide future research and prevention or intervention efforts with AI youth. Generally, the results indicate that community based intervention programs are necessary with AI adolescents. By including teachers or other school administrators, peer groups and fellow students, and family members in a global, community based intervention program, all the primary socializing areas (Oetting & Donnermeyer, 1998) of the adolescents' lives would be giving these youth consistent, health-promoting messages. Because of the historical mistrust between "White" schools and AI communities, however, the adults in some tribes may not value a school-based education. If this is the case, educating the entire tribe about the importance of education (i.e., what it can do for them in the long run) may need to happen first. The best type of approach to community intervention will probably vary by the tribe, and the urbanicity of the youths' locations. Prevention efforts may need to include the community, and must start with young children and preadolescents. If clear communication of norms against HCBs are combined with the modeling of HPBs by family members, before the children reach adolescence, then it is much less likely AI teens will engage in HCBs. Also, if the AI children can be carefully monitored and steered away from deviant peer groups prior to adolescence, the risk of engaging in HCBs is again reduced.

Another reason the intervention and prevention efforts need to be community based, in addition to the cultural norms of the particular tribes, is that the entire tribe may be struggling with depression, substance abuse, poverty, unemployment, undereducation, chronic illness, and a variety of HCBs itself. Most of this may be due to the historical

mistreatment and forced assimilation of the AI Nations by the U.S. government. Whatever the reason, however, the community as a whole may need to be "treated" in order to break the cycle of ill health and poverty currently plaguing them. Previous research has indicated that AI youth who know they need help and actively seek it out, turn to peers or elders within their community more often than "professional" mental or medical health providers (Bee-Gates et al., 1996). Thus, by educating the whole community about the difference in HCBs and HPBs, and giving them ways to help each other, the tribal community can then become effective at engaging in healthy behavior without additional interference from outside sources. Such interference may actually be counterproductive if it is not seen as necessary or culturally appropriate by the tribe (Bond-Maupin, 1996).

For professional health care workers to overcome this mistrust, and obtain a position where their help is accepted, patience must be exercised. Trained professionals who are also a member of the tribe probably present the best scenario; however, professionals from other cultures can be effective if they spend enough time with the tribe. Time is necessary to determine what the tribe needs and wants, to gain the trust of tribal members, and to learn what interventions are culturally appropriate. There has also been a history of high turnover among teachers and helping professionals within Indian communities, and this has sent a message to many tribes that the professionals are not fully invested in the tribal community. Notably, the finding by Bee-Gates and colleagues (1996) was from a tribe that still has very traditional members. Other tribes that have had longer contact with Euro-Americans, and are more assimilated, may not have the same level of distrust of professionals from other cultures. Generally, health care workers will probably be most effective in assisting AI nations once they establish a strong relationship with the tribal members, show they are addressing the tribe's reported needs, and are willing to stay long enough to complete the intervention tasks.

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APPENDICES

Appendix A:

Instrument

Predictor Variables: Demographic Information

General Information, Wave I

Age

1. What is your birthdate?

The adolescent's birthdate was subtracted from the interview date to calculate age.

Sex

1. What is your sex?

Answers: 1 = male, 2 = female

Race

1. What is your race? You may give more than one answer.

2. Which one category best describes your racial background?

Answers: 1= White, 2 = Black or African American, 3 = American Indian or Native American, 4 = Asian or Pacific Islander, 5 = Other

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Urbanicity

1. How would you describe the immediate area or street (one block, both sides), where the respondent lives?

Answers: 1 = rural, 2 = suburban, 3 = urban

Socioeconomic Status (SES)

1. Does {your mother} receive public assistance, such as welfare?

2. Does {your father} receive public assistance, such as welfare?

Answers: 0 = no, 1 = yes

Predictor Variables: Youth Reported Behavior and Perception Scales

Depression (CES-D), Wave I

	Question	Factor Loading
How often was each of the following things true during the past week?		
1.	You were bothered by things that usually don't bother you.	.991
2.	You felt that you could not shake off the blues, even with help from your family and your friends.	.993
3.	You felt that you were just as good as other people.*	.981
4.	You had trouble keeping your mind on what you were doing.	.990
5.	You felt depressed.	.993
6.	You felt that you were too tired to do things.	.988
7.	You felt hopeful about the future.*	.981
8.	You thought your life had been a failure.	.995
9.	You felt fearful.	.993
10.	You were happy.*	.991
11.	You talked less than usual.	.988
12.	You felt lonely.	.993
13.	People were unfriendly to you.	.992
14.	You enjoyed life.*	.989
15.	You felt sad.	.995
16.	You felt that people disliked you.	.993
17.	It was hard to get started doing things.	.991
18.	You felt like life was not worth living.	.995

Answers: 0 = never or rarely, 1 = sometimes, 2 = a lot of the time, 3 = most of the time or all of the time

*items were reverse scored
Cronbach's alpha = .863, n = 397
Factor analysis extracted one component accounting for 93.06% of the scale's variance.
Scale eigenvalue = 17.681

Future Orientation, Wave I

What do you think are the chances that each of the following things will happen to you?

1.	You will live to age 35.*	.662
2.	You will be married by age 25.*	.876
3.	You will be killed by age 21.	.755
4.	You will get HIV or AIDS.	.902

Answers: 1 = almost no chance, 2 = some chance, but probably not, 3 = a 50-50 chance, 4 = a good chance, 5 = almost certain

* items were reverse scored
Cronbach's alpha = .807, n = 395
Factor analysis extracted one component accounting for 66.13% of the scale's variance.
Scale eigenvalue = 2.5

Grades, Wave I

1.	At the most recent grading period/last grading period in the Spring, what was your grade in English or language arts?	.836
2.	And what was your grade in mathematics?	.797
3.	And what was your grade in history or social studies?	.751
4.	And what was your grade in science?	.775

Answer choices: 0 = A, 1 = B, 2 = C, 3 = D or lower, 7 = didn't take the subject, or subject was not graded this way.

Cronbach's alpha = .70, n = 285
Factor analysis extracted one component accounting for 62.49% of the scale's variance.
Scale eigenvalue = 2.5

In Home Access, Wave I

1.	Are cigarettes easily available to you in your home?	.831
2.	Is alcohol easily available to you in your home?	.871
3.	Are illegal drugs easily available to you in your home?	.901
4.	Is a gun easily available to you in your home?	.859

Answers: 0 = no, 1 = yes, 8 = don't know

Cronbach's alpha = .867, n = 398
Factor analysis extracted one component accounting for 74.97% of the scale's variance.
Scale eigenvalue = 3.0

Initiation of Substance Use, Wave I

1.	Have you ever tried cigarette smoking, even just one or two puffs?	.852
2.	Have you had a drink of beer, wine, or liquor - not just a sip or a taste of someone else's drink - more than two or three times in you life?	.852

Answers: 0 = no, 1 = yes

Cronbach's alpha = .65, n = 396
Factor analysis extracted one component accounting for 72.65% of the scale's variance.
Scale eigenvalue = 1.45

Neighborhood Involvement, Wave I

1.	You know most of the people in your neighborhood.	.654
2.	In the past month, you have stopped on the street to talk with someone who lives in your neighborhood.	.794
3.	People in this neighborhood look out for each other.	.645
4.	Do you use a physical fitness or recreation center in your neighborhood?	.601
5.	Do you usually feel safe in your neighborhood?	.482

Answers for 1-5: 1 = true or yes, 2 = false or no

6.	On the whole, how happy are you with living in your neighborhood?	.870

Answers: 1 = very much, 2 = quite a bit, 3 = somewhat, 4 = very little, 5 = very much

7.	If, for any reason, you had to move from here to some other neighborhood, how happy or unhappy would you be?	.783

Answers: 1 = very unhappy, 2 = a little unhappy, 3 = wouldn't make any difference, 4 = a little happy, 5 = very happy

---

Cronbach's alpha = .70, n = 392
Factor analysis extracted one component accounting for 52.39% of the scale's variance.
Scale eigenvalue = 1.13

Parental monitoring, Wave I

1.	Do your parents let you make your own decisions about the time you must be home on weekend nights?	.909
2.	Do your parents let you make your own decisions about the people you hang around with?	.822
3.	Do your parents let you make your own decisions about what you wear?	.922
4.	Do your parents let you make your own decisions about how much television you watch?	.938
5.	Do your parents let you make your own decisions about which television programs you watch?	.895
6.	Do your parents let you make your own decisions about what time you go to bed on week nights?	.911
7.	Do your parents let you make your own decisions about what you eat?	.867

Answers: 0 = no, 1 = yes

Cronbach's alpha = .96, n = 398
Factor analysis extracted one component accounting for 80.19% of the scale's variance.
Scale eigenvalue = 5.6

Perceived Peer Behavior, Wave I

1.	Of your 3 best friends, how many smoke at least one cigarette a day?	.819
2.	Of your 3 best friends, how many drink alcohol at least once a month?	.854
3.	Of your 3 best friends, how many smoke marijuana at least once a month?	.830

Answers: 0 = no friends, 1 = one friend, 2 = two friends, 3 = three friends, 8 = don't know

---

Cronbach's alpha = .78, n = 397
Factor analysis extracted one component accounting for 69.63% of the scale's variance.
Scale eigenvalue = 2.09

Relationship with Family, Wave I

1.	How much do you feel that adults care about you?	.990
2.	How much do you feel that your parents care about you?	.135
3.	How much do you feel that you and your family have fun together?	.992
4.	How much do you feel that your family pays attention to you?	.993

Answers: 1 = very much, 2 = quite a bit, 3 = somewhat, 4 = very little, 5 = not at all

---

Cronbach's alpha = .884, n = 398
Factor analysis extracted one component accounting for 74.21% of the scale's variance.
Scale eigenvalue = 3.0

Relationship with Father, Wave I

1.	Most of the time, your father is warm and loving towards you.	.960
2.	You are satisfied with the way your father and you communicate with each other.	.977
3.	Overall, you are satisfied with your relationship with your father.	.980

Answers for 12-14: 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree, 7 = no father

---

Cronbach's alpha = .862, n = 260
Factor analysis extracted one component accounting for 94.55% of the scale's variance.
Scale eigenvalue = 2.8

Relationship With Mother, Wave I

1. Most of the time, your mother is warm and loving towards you. .903

2. You are satisfied with the way your mother and you communicate with each other. .927

3. Overall, you are satisfied with your relationship with your mother. .951

Answers for 12-14: 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree, 7 = no mother

---

Cronbach's alpha = .86, n = 372
Factor analysis extracted one component accounting for 85.96% of the scale's variance. Scale eigenvalue = 2.58

Religiosity, Wave I

1. What is your religion? .957

Question coded as: 1 = endorses a religion, 9 = endorses no religion

2. In the past 12 months, how often did you attend religious services? .996

3. Many churches, synagogues, and other places of worship have special activities for teenagers - such as youth groups, Bible classes or choir. In the past 12 months, how often did you attend such youth activities? .997

Answers for 2-3: 1 = once a week or more, 2 = once a month or more, but less than once a week, 3 = less than once a month, 4 = never, 9 = no religion

4. How important is religion to you? .995

Answers: 1 = very important, 2 = fairly important, 3 = fairly unimportant, 4 = not important at all, 9 = no religion

5. How often do you pray? .995

Answers: 1 = at least once a day, 2 = at least once a week, 3 = at least once a month, 4 = less than once a month, 5 = never, 9 = no religion

---

Cronbach's alpha = .98, n = 391
Factor analysis extracted one component accounting for 97.64% of the scale's variance. Scale eigenvalue = 4.88

School Adjustment, Wave I

Since school started this year, how often have you had trouble

1.	getting along with your teachers?	.800
2.	paying attention in school?	.820
3.	getting your homework done?	.731
4.	getting along with other students?	.754

Answers for 1-4: 0 = never, 1 = just a few times, 2 = about once a week, 3 = almost everyday, 4 = everyday

How much do you agree or disagree with the following statements:

5.	You felt close to people at your school.	.746
6.	You feel like you are a part of your school.	.776
7.	You are happy to be at your school.	.793
8.	The teachers at your school treat children fairly.	.736
9.	You feel safe in your school.	.760

Answers for 5-9: 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly disagree

---

Cronbach's alpha = .795, n = 387
Factor analysis extracted one component accounting for 59.12% of the scale's variance. Scale eigenvalue = 5.32

Suicidality, Wave I

1. During the past 12 months, did you ever seriously think about committing suicide? .996

Answers: 0 = no, 1 = yes

2. During the past 12 months, how many times did you actually attempt suicide? .996

Answers: 0 = never, 1 = 1 time, 2 = 2 or 3 times, 3 = 4 or 5 times, 4 = 6 or more times

Cronbach's alpha = .91, n = 386
Factor analysis extracted one component accounting for 99.25% of the scale's variance. Scale eigenvalue = 1.99

Knows Suicidal Other, Wave I

1. Have any of your friends tried to kill themselves during the past 12 months? .859
2. Have any of your family tried to kill themselves during the past 12 months? .859

Answers for 1-5: 0 = no, 1 = yes

Cronbach's alpha = .65, n = 387
Factor analysis extracted one component accounting for 73.76% of the scale's variance. Scale eigenvalue = 1.48

Knows Suicidal Other, Wave II

1. Have any of your friends tried to kill themselves during the past 12 months? .922

2. Have any of your family tried to kill themselves during the past 12 months? .922

Answers for 1-5: 0 = no, 1 = yes

Cronbach's alpha = .821, n = 297
Factor analysis extracted one component accounting for 85.04% of the scale's variance. Scale eigenvalue = 1.7

Predictor Variables: Parent Reported Behaviors

Parent Self-report, Seatbelt Use, Wave I

1. When you drive or ride in a car, how often do you wear a seatbelt?

Answers: 1 = never, 2 = rarely, 3 = sometimes, 4 = most of the time, 5 = always

---

Parent Self-report, Alcohol Use, Wave I

1. How often do you drink alcohol?

Answers: 1 = never, 2 = once a month or less, 3 = 2 or 3 days a month, 4 = once or twice a week, 5 = 3 to 5 days a week, 6 = nearly every day

2. How often in the last month have you had five or more drinks on one occasion?

Answers: 1 = never, 2 = once, 3 = twice, 4 = three times, 5 = four times, 6 = five or more times

---

Cronbach's alpha = .70, n = 337
Factor analysis extracted one component accounting for 75.35% of the scale's variance. Scale eigenvalue = 1.51

Parent Self-report, Cigarette Use, Wave I

1. Do you smoke?

Answers: 0 = no, 1 = yes

Dependent Variables: Youth Reported Behaviors

Self protection, Wave II

1.	How often do you wear a helmet when you ride a bicycle?	.773
2.	How often do you wear a seatbelt when you are riding in or driving a car?	.773

Answers: 0 = always, 1 = most of the time, 2 = sometimes, 3 = rarely, 4 = never

---

Cronbach's alpha = .63, n = 294
Factor analysis extracted one component accounting for 53.45% of the scale's variance. Scale eigenvalue = 1.3

Smoking, Wave II

1. Since {MOLI}, have you smoked cigarettes regularly, that is, at least once cigarette every day for 30 days?**	.970

Answers: 0 = no, 1 = yes

2. During the past 30 days, on how many days did you smoke cigarettes?	.918

Answers: Range from 0 to 30

3. During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?	.809

Answers: Range from 0 to 95

**MOLI = Month/year of last interview
Cronbach's alpha = .883, n = 294
Factor analysis extracted one component accounting for 81.31% of the scale's variance. Scale eigenvalue = 2.44

Alcohol Use, Wave II

1. Since {MOLI}, did you drink beer, wine, or liquor when you were not with your parents or other adults in your family?**	.958

Answers: 0 = no, 1 = yes

2. During the past 12 months, on how many days did you drink alcohol?	.976

Answers: 1 = never, 2 = 1 or 2 days in the past twelve months, 3 = once a month or less (3-12 times in the past 12 months), 4 = 2 or 3 days a month, 5 = 1 or 2 days a week, 6 = 3 to 5 days a week, 7 = every day or almost every day

3. Think of all the times you have had a drink in the past 12 months. How many drinks did you usually have each time? A "drink" is a glass of wine, a can of beer, a wine cooler, a shot glass of liquor, or a mixed drink.*	.967

Answers: 1 = over 30 times in the past 12 months, 2 = 21 to 30 times, 3 = 15 to 20 times, 4 = 10 to 14 times, 5 = 6 to 9 times, 6 = 3 to 5 times, 7 = once or twice

4. Over the past 12 months, on how many days did you drink five or more drinks in a row?	.986
5. Over the past 12 months, on how many days have you gotten drunk or "very, very high" on alcohol?	.982

Answers for 4-5: 1 = never, 2 = 1 or 2 days in the past 12 months, 3 = once a month or less (3-12 times in the past 12 months), 4 = 2 or 3 days a month, 5 = 1 or 2 days a week, 6 = 3 to 5 days a week, 7 = every day or almost every day

---

* item was reverse scored
**MOLI = Month/year of last interview
Cronbach's alpha = .93, $n = 294$
Factor analysis extracted one component accounting for 94.84% of the scale's variance. Scale eigenvalue = 4.74

Suicidality, Wave II

1. During the past 12 months, did you ever seriously think about committing suicide?	.819

Answers: 0 = no, 1 = yes

2. During the past 12 months, how many times did you actually attempt suicide?	.819

Answers: 0 = never, 1 = 1 time, 2 = 2 or 3 times, 3 = 4 or 5 times, 4 = 6 or more times

---

Cronbach's alpha = .66, n = 294
Factor analysis extracted one component accounting for 67.102% of the scale's variance. Scale eigenvalue = 1.34

Illicit Drug Use, Wave II

1. Since {MOLI}, how many times have you used marijuana?**	.639
2. Since {MOLI}, how many times have you used cocaine?**	.683
3. Since {MOLI}, how many times have you used inhalants?**	.738
4. Since {MOLI}, how many times have you used any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills without a doctor's prescription?**	.801

**MOLI = Month/year of last interview
Cronbach's alpha = .60, n = 294
Factor analysis extracted one component accounting for 58.23% of the scale's variance. Scale eigenvalue = 1.76

Delinquency, Wave II

	In the past 12 months, how often did you...	Factor loading
1.	Paint graffiti or signs on someone else's property or in a public place?	.852
2.	Deliberately damage property that didn't belong to you?	.812
3.	Lie to your parents or guardians about where you had been or whom you were with?	.656
4.	Take something from a store without paying for it?	.750
5.	Run away from home?	.853
6.	Drive a care without its owner's permission?	.872
7.	Did you steal something worth more than $50?	.887
8.	Go into a house or building to steal something?	.865
9.	Use or threaten to use a weapon to get something from someone?	.884
10.	Sell marijuana or other drugs?	.779
11.	Steal something worth less than $50?	.799
12.	Act loud, rowdy, or unruly in a public place?	.667
13.	Take part in a fight where a group of your friends was against another group?	.732

Answers to 1-14: 0 = never, 1 = 1 or 2 times, 2 = 3 or 4 times, 3 = 5 or more times

14.	Have you been initiated into a named gang?	.887

Answers: 0 = no, 1 = yes, 8 = don't know

Cronbach's alpha = .95, n = 294
Factor analysis extracted one component accounting for 65.67% of the scale's variance. Scale eigenvalue = 9.19

All HCBs, Wave II

1.	Sum of Alcohol Use	.988
2.	Sum of Cigarette Use	.993
3.	Sum of Illicit Drug Use	.708
4.	Sum of Self protection	.991
5.	Sum of Delinquency	.979
6.	Sum of Suicidality	.991

The sum of each scale was taken to form the Sum of HCBs scale

---

Cronbach's Alpha = .60, n = 291
Factor analysis extracted one component accounting for 89.79% of the scale's variance. Scale eigenvalue = 5.39

Appendix B:

Pearson Correlations of Predictor Variables with the Dependent Variables

The following information includes the statistically significant correlations found when the independent variables at Time 1 were correlated with the dependent variables at Time 2. The lack of an asterisk indicates the correlation is significant at $p = .05$, one asterisk indicates the correlations are significant at $p = .01$, and two asterisks indicate the correlation is significant at $p = .001$.

Table B1

Dependent Variable: Alcohol Use at Time 2--with All AI Adolescents

Independent variable	*R*	*p*	*n*
Grades	.148	.013	280
School adjustment	.171*	.004	288
Depression	.258**	<.001	295
Relationship with mother	.233**	<.001	278
Relationship with family	.295**	<.001	294
In home access to drugs/weapons	.120	.041	292
Perceived peer behavior	.310**	<.001	290
Neighborhood involvement	.116	.047	294
Future orientation	.187**	.001	292
Initiation of substance use	.375	<.001	293

Table B2

Dependent Variable: Alcohol Use at Time 2--with Female AI Adolescents Only

Independent variable	*R*	*p*	*n*
School adjustment	.262**	<.001	174
Depression	.341**	<.001	176
Relationship with mother	.364**	<.001	165
Relationship with family	.318**	<.001	175
Perceived peer behavior	.279**	<.001	173
Neighborhood involvement	.182	.016	176
Future orientation	.280**	<.001	173
Initiation of substance use	.366**	<.001	176

Table B3

Dependent Variable: Alcohol Use at Time 2--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
Age	.217	.018	119
Grades	.244	.011	109
Relationship with family	.272*	.003	119
Perceived peer behavior	.351**	<.001	117
Initiation of substance use	.394**	<.001	117

Table B4

Dependent Variable: Cigarette Use at Time 2--with All AI Adolescents

Independent variable	*R*	*p*	*n*
Grades	.175*	.003	279
School adjustment	.193**	.001	287
Relationship with father	.161	.022	202
Parental monitoring	.156*	.008	289
In home access to drugs/weapons	.120	.040	291
Perceived peer behavior	.263**	<.001	289
Initiation of substance use	.363**	<.001	292

Table B5

Dependent Variable: Cigarette Use at Time 2--with Female AI Adolescents Only

Independent variable	*r*	*p*	*n*
Grades	.181	.018	170
School adjustment	.220*	.004	173
Depression	.171	.024	175
Relationship with father	.195	.038	113
Relationship with family	.159	.037	174
Perceived peer behavior	.296**	<.001	172
Initiation of substance use	.370**	<.001	175

Table B6

Dependent Variable: Cigarette Use at Time 2--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
Parental monitoring	.193	.036	118
Perceived peer behavior	.214	.021	117
Initiation of substance use	.352	<.001	117
Parental smoking	.236	.015	106

Table B7

Dependent Variable: Illicit Drug Use at Time 2--with All AI Adolescents

Independent variable	*R*	*p*	*n*
Sex	-.135**	.001	279
Grades	.195**	.001	279
Relationship with family	.120	.040	293
In home access to drugs/weapons	.151*	.010	291
Perceived peer behavior	.302**	<.001	289
Initiation of substance use	.233**	<.001	292

Table B8

Dependent Variable: Illicit Drug Use at Time 2--with Female AI Adolescents Only

Independent variable	*R*	*p*	*n*
Depression	.176	.020	175
Relationship with mother	.219*	.005	164
Relationship with family	.153	.044	174
Parental monitoring	.170	.026	171
In home access to drugs/weapons	.196	.010	174
Perceived peer behavior	.307**	<.001	172
Religiosity	.186	.014	173
Initiation of substance use	.226*	.003	175

Table B9

Dependent Variable: Illicit Drug Use at Time 2--with Male AI Adolescents Only

Independent variable	*r*	*p*	*n*
Grades	.244	.011	109
Perceived peer behavior	.328**	<.001	117
Initiation of substance use	.267*	.004	117

Table B10

Dependent Variable: Delinquency at Time 2—with All AI Adolescents

Independent variable	*r*	*p*	*n*
Grades	.185*	.002	278
School adjustment	.383**	<.001	286
Depression	.243**	<.001	293
Relationship with mother	.179*	.003	276
Relationship with family	.196**	.001	292
In home access to drugs/weapons	.172*	.003	290
Perceived peer behavior	.206**	<.001	288
Future orientation	.172*	.003	290
Initiation of substance use	.307**	<.001	291

Table B11

Dependent Variable: Delinquency at Time 2--with Female AI Adolescents Only

Independent variable	*R*	*p*	*n*
Grades	.192	.012	169
School adjustment	.392**	<.001	173
Depression	.345**	<.001	174
Relationship with mother	.368**	<.001	163
Relationship with family	.329**	<.001	173
Parental monitoring	.155	.043	170
In home access to drugs/weapons	.242**	.001	173
Perceived peer behavior	.254**	.001	171
Neighborhood involvement	.169	.026	174
Religiosity	.163	.033	172
Future orientation	.274**	<.001	171
Initiation of substance use	.316**	<.001	174

Table B12

Dependent Variable: Delinquency at Time 2--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
School adjustment	.369**	<.001	114
Initiation of substance use	.294**	.001	117

Table B13

Dependent Variable: Self-protection at Time 2--with All AI Adolescents

Independent variable	*r*	*P*	*n*
Sex	-.263**	<.001	294
Grades	.171*	.004	279
School adjustment	.203**	.001	287
Initiation of substance use	.132	.024	292
Parental seatbelt use	.247**	<.001	262

Table B14

Dependent Variable: Self-protection at Time 2--with Female AI Adolescents Only

Independent variable	*r*	*P*	*n*
SES	.168	.032	163
School adjustment	.224*	.003	173
Parental seatbelt use	.213*	.008	156

Table B15

Dependent Variable: Self-protection at Time 2--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
Grades	.252*	.008	109
Perceived peer behavior	.206	.026	117
Parental seatbelt use	.436**	<.001	106

Table B16

Dependent Variable: Suicidality at Time 2--with All AI Adolescents

Independent variable	*R*	*p*	*n*
School adjustment	.181*	.002	287
Depression	.293**	<.001	294
Perceived peer behavior	.153*	.009	289
Neighborhood involvement	.126	.031	293
Future orientation	.171*	.003	291
Suicidality at Time 1	.355**	<.001	290
Know suicide attempter at Time 2	.159*	.007	290

Table B17

Dependent Variable: Suicidality at Time 2--with Female AI Adolescents Only

Independent variable	*R*	*p*	*n*
School adjustment	.181	.017	173
Depression	.356**	<.001	175
Neighborhood involvement	.171	.024	175
Future orientation	.206*	.007	173
Suicidality at Time 1	.340**	<.001	173
Know suicide attempter at Time 2	.245**	.001	171

Table B18

Dependent Variable: Suicidality at Time 2--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
School adjustment	.193	.040	114
Perceived peer behavior	.193	.037	117
Suicidality at Time 1	.384**	<.001	117

Table B19

Dependent Variable: Sum of All HCBs--with All AI Adolescents

Independent variable	*R*	*p*	*n*
Sex	-.150*	.010	294
Grades	.225**	<.001	279
School adjustment	.172*	.003	287
Relationship with family	.166*	.004	293
In home access to drugs/weapons	.164*	.005	291
Perceived peer behavior	.353**	<.001	289
Initiation of substance use	.309**	<.001	292
Know suicide attempter at Time 1	.151*	.010	288

Table B20

Dependent Variable: Sum of All HCBs--with Female AI Adolescents Only

Independent variable	*R*	*p*	*n*
School adjustment	.242**	.001	173
Depression	.255**	.001	175
Relationship with mother	.295**	<.001	164
Relationship with family	.232*	.002	174
Parental monitoring	.175	.022	171
In home access to drugs/weapons	.223*	.003	174
Perceived peer behavior	.359**	<.001	172
Religiosity	.198*	.009	173
Future orientation	.202*	.008	172
Initiation of substance use	.318**	<.001	175
Suicidality at Time 1	.282**	<.001	173
Know suicide attempter at Time 1	.343**	<.001	172

Table B21

Dependent Variable: Sum of All HCBs--with Male AI Adolescents Only

Independent variable	*R*	*p*	*n*
Grades	.269*	.005	109
Perceived peer behavior	.377**	<.001	117
Initiation of substance use	.331**	<.001	117

Appendix C:

Personal Correlations of relevant Independent Variables with One Another

Table C1

All AI Adolescents

		Sex	Age	Grades	School adjustment	Depression	SES	Relationship w/ mother	Relationship w/ father	Parental monitoring	Initiation of substance abuse	Perceived peer behavior	In home access to drugs/guns	Suicidality, wave 1	Knows suicidal other, wave 1	Relationship w/ family	Neighborhood involvement	Religiosity	Future orientation	Parental seatbelt use	Parental smoking
Sex	*r*	1.000																			
	p																				
Age	*r*	.144	1.000																		
	p	.052																			
Grades	*r*	.212**	.126	1.000																	
	p	.004	.090																		
School adjustment	*r*	.106	.028	.261**	1.000																
	p	.155	.708	.000																	

(table continues)

Depression	*r*	.093	.056	.191**	.349**	1.000															
	p	.213	.452	.010	.000																
SES	*r*	.046	.025	.093	.033	.084	1.000														
	p	.537	.739	.210	.662	.258															
Relationship with mother	*r*	.141	.045	.017	.135	.354**	.048	1.000													
	p	.058	.543	.819	.070	.000	.516														
Relationship with father	*r*	.032	.146	.078	.240**	.326**	.019	.396**	1.000												
	p	.665	.049	.295	.001	.000	.795	.000													
Parental monitoring	*r*	.031	.327	.059	.011	.022	.059	.105	.087	1.000											
	p	.676	.000	.428	.880	.766	.429	.159	.241												
Initiation of substance use	*r*	.093	.163*	.224**	.251**	.225**	.072	.242**	.232**	.007	1.000										
	p	.212	.028	.002	.001	.002	.332	.001	.002	.925											
Peer behavior	*r*	.030	.257**	.263**	.156*	.092	.069	.158*	.181	.169*	.538**	1.000									
	p	.686	.000	.000	.035	.217	.355	.033	.014	.023	.000										
In home access to drugs/gun	*r*	.050	.009	.106	.089	.163*	.066	.173*	.226**	.133	.176*	.125	1.000								
	p	.499	.907	.156	.232	.028	.375	.020	.002	.073	.018	.092									

(table continues)

Suicidality, Time 1	*r*	.113	.031	.002	.102	.365**	.043	.134	.244**	.037	.169*	.167*	.175*	1.000						
	p	.129	.676	.981	.172	.000	.560	.072	.001	.616	.023	.024	.018							
Knows suicidal other, Time 1	*r*	.027	.014	.005	.074	.006	.055	.042	.081	.080	.159*	.199**	.066	.041	1.000					
	p	.715	.853	.950	.324	.938	.459	.577	.274	.285	.032	.007	.379	.580						
Relationship with family	*r*	.055	.077	.053	.288**	.428**	.004	.528**	.471**	.015	.298**	.153*	.231**	.237**	.025	1.000				
	p	.458	.299	.476	.000	.000	.956	.000	.000	.839	.000	.039	.002	.001	.740					
Neighborhood involvement	*r*	.105	.015	.018	.308**	.190*	.015	.016	.072	.004	.165*	.124	.131	.114	.053	.159*	1.000			
	p	.158	.836	.812	.000	.010	.842	.825	.333	.956	.026	.095	.078	.124	.480	.032				
Religiosity	*r*	.212	.166*	.172*	.068	.013	.052	.020	.061	.078	.114	.025	.102	.007	.072	.093	.052	1.00		
	p	.004	.025	.020	.363	.861	.485	.787	.410	.293	.125	.734	.172	.930	.334	.211	.488	0		
Future orientation	*r*	.084	.143	.117	.293**	.397**	.023	.206**	.150*	.015	.151*	.071	.139	.215**	.163*	.273**	.258**	.092	1.000	
	p	.259	.054	.114	.000	.000	.762	.005	.043	.837	.042	.341	.061	.004	.028	.000	.000	.216		
Parental seatbelt use	*r*	.118	.049	.091	.039	.046	.047	.068	.078	.067	.012	.041	.120	.100	.045	.062	.066	.042	.075	1.000
	p	.114	.513	.222	.598	.539	.526	.364	.297	.367	.870	.582	.107	.178	.545	.405	.379	.569	.315	
Parental smoking	*r*	.108	.024	.050	.067	.078	.169*	.019	.083	.045	.145	.135	.232**	.112	.118	.009	.053	.125	.079	.198**
	p	.148	.749	.501	.366	.297	.022	.800	.263	.551	.051	.070	.002	.132	.111	.902	.478	.093	.291	.007

* correlation is significant at the 0.05 level (2-tailed).

** correlations is significant at the 0.01 level (2-tailed).

N size for all correlations = 182.

Table C2

Female AI Adolescents

		Grades	School adjustment	Depression	SES	Relationship w/ mother	Relationship w/ father	Parental monitoring	Initiation of substance abuse	Perceived peer behavior	In home access to drugs/guns	Suicidality, wave 1	Knows suicidal other, wave 1	Relationship w/ family	Neighborhood involvement	Religiosity	Future orientation	Parental seatbelt use
Grades	*r*	1.000																
	p																	
School adjustment	*r*	.155	1.000															
	p	.110																
Depression	*r*	.207*	.362**	1.000														
	p	.032	.000															
SES	*r*	.162	.030	.089	1.000													
	p	.096	.757	.361														
Relationship with mother	*r*	.082	.120	.413**	.080	1.000												
	p	.399	.219	.000	.412													

(table continues)

Relationship with father	*r*	.116	.229*	.357**	.009	.290**	1.000											
	p	.233	.018	.000	.925	.002												
Parental monitoring	*r*	.045	.037	.042	.155	.105	.072	1.000										
	p	.642	.708	.671	.110	.284	.460											
Initiation of substance use	*r*	.285**	.270**	.258**	.060	.247*	.169	.052	1.000									
	p	.003	.005	.007	.542	.010	.082	.597										
Peer behavior	*r*	.197*	.115	.033	.071	.088	.056	.141	.526**	1.000								
	p	.042	.237	.737	.468	.370	.570	.147	.000									
In home access to drugs/guns	*r*	.070	.077	.160	.117	.181	.119	.150	.111	.015	1.000							
	p	.473	.432	.100	.229	.062	.223	.122	.255	.875								
Suicidality, Time1	*r*	.015	.167	.413**	.043	.147	.285**	.042	.161	.150	.195*	1.000						
	p	.878	.086	.000	.660	.130	.003	.671	.098	.122	.044							
Knows suicidal other, Time1	*r*	.019	.002	.018	.074	.006	.074	.119	.152	.260**	.044	.041	1.000					
	p	.848	.981	.850	.447	.951	.448	.222	.117	.007	.654	.679						
Relationship with family	*r*	.088	.282**	.444**	.031	.544**	.397**	.103	.335**	.113	.251**	.297**	.036	1.000				
	p	.366	.003	.000	.754	.000	.000	.292	.000	.248	.009	.002	.709					

(table continues)

Neighborhood Involvement	*r*	.016	.180	.092	.073	.086	.044	.028	.228*	.077	.027	.082	.035	.074	1.000			
	p	.873	.063	.344	.452	.378	.656	.776	.018	.433	.780	.404	.723	446				
Religiosity	*r*	.101	.141	.074	.206*	.069	.001	.190	.072	.054	.102	.070	.043	.130	.087	1.000		
	p	.303	.146	.448	.034	.481	.992	.050	.463	.579	.296	.476	.661	.183	.373			
Future orientation	*r*	.003	.253**	.392**	.032	.240*	.136	.017	.199*	.031	.147	.225*	.105	.315**	.168	.028	1.000	
	p	.978.	.009	.000	.747	.013	.162	.861	.040	.754	.131	.020	.281	.001	.083	776		
Parental seatbelt use	*r*	.148	.092	.025	.037	.062	.113	.031	.054	.023	.096	.148	.030	.046	.023	.036	.082	1.000
	p	.127	.346	.798	.709	.525	.248	.751	.578	.815	.327	.128	.762	.640	.812	.711	.402	

* correlation is significant at the 0.01 level (2-tailed).
** correlation is significant at the 0.05 level (2-tailed).
N size for all correlations = 107.

Table C3

Male AI Adolescents

		Age	Grades	School adjustment	Relationship w/ family	In home access to drugs/guns	Perceived peer behavior	Initiation of substance abuse	Parental control	Parental smoking	Parental seatbelt use	Suicidality, wave 1
Estimated age at, wave 1	r	1.000										
	p											
Grades, wave 1	r	.007	1.000									
	p	.939										
School adjustment	r	.112	.276**	1.000								
	p	.223	.002									
Relationship w/family, wave 1	r	.175	.030	.313**	1.000							
	p	.056	.747	.000								
In home access to drugs/guns	r	.170	.075	.117	.167	1.000						
	p	.063	.413	.201	.068							
Perceived peer behavior	r	.281**	.323**	.203*	.106	.318**	1.000					
	p	.002	.000	.026	.251	.000						
Initiation of substance abuse	r	.185*	.147	.254**	.163	.341**	.530**	1.000				

(table continues)

Parental monitoring, wave 1	r	.367**	.015	.092	.016	.136	.234**	.079	1.000			
	p	.000	.873	.319	.864	.138	.010	.394				
	r	.021	.137	.080	.205*	.275**	.159	.216*	.104	1.000		
Does parent smoke	p	.824	.136	.388	.025	.002	.083	.018	.259			
Sum of parent seatbelt use	r	.006	.011	.167	.010	.061	.053	.035	.115	.098	1.000	
	p	.945	.902	.068	.912	.508	.565	.701	.211	.286		
Suicidality, wave 1	r	.019	.086	.002	.151	.014	.122	.133	.097	.037	.072	1.000
	p	.836	.351	.980	.099	.879	.186	.148	.293	.686	.434	

* correlation is significant at the 0.05 level (2-tailed).
** correlation is significant at the 0.01 level (2-tailed).
N size for all correlations = 120.

Appendix D

Analysis of Variance Tables for Multiple Regressions Calculated

Table D1

ANOVAs for Alcohol Use at Time 2 Including Initiation of Substance Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Initiation of substance use	914.298	1	914.298	46.283	<.001
Depression	1165.151	2	582.575	30.897	<.001
Perceived peer behavior	1239.514	3	413.171	22.167	<.001

Table D2

ANOVAs for Alcohol Use at Time 2 Including Initiation of Substance Use--MLR for Male AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Initiation of substance use	483.128	1	483.128	20.113	<.001
Relationship with family	636.446	2	318.223	13.910	<.001
Age	734.809	3	244.936	11.032	<.001

Table D3

ANOVAs for Alcohol Use at Time 2 Including Initiation of Substance Use--MLR for AI Adolescent Females

Variables Entered	SS	df	Mean Square	F	P
Initiation of substance use	509.560	1	509.560	27.888	<.001
Relationship with mother	817.408	2	408.704	24.935	<.001
Future orientation	960.117	3	320.039	20.561	<.001
Neighborhood involvement	1043.285	4	260.821	17.249	<.001

Table D4

ANOVAs for Alcohol Use at Time 2 Excluding Initiation of Substance Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Relationship with family	653.604	1	653.604	31.022	<.001
Perceived peer behavior	988.342	2	494.171	24.934	<.001
Depression	1163.525	3	387.842	20.202	<.001

Table D5

ANOVAs for Alcohol Use at Time 2 Excluding Initiation of Substance Use--MLR for Male AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Perceived peer behavior	376.020	1	376.020	16.016	<.001

Table D6

ANOVAs for Alcohol Use at Time 2 Excluding Initiation of Substance Use--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Relationship with family	499.965	1	499.965	27.271	<.001
Depression	723.498	2	361.749	21.278	<.001
Perceived peer behavior	809.464	3	269.821	16.303	<.001
Relationship with mother	883.615	4	220.904	13.660	<.001
Future orientation	969.600	5	193.920	12.345	<.001

Table D7

ANOVAs for Cigarette Use at Time 2 Including Initiation of Cigarette Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Initiation of substance use	298.648	1	298.648	22.314	<.001
Parental monitoring	374.340	2	187.170	14.381	<.001

Table D8

ANOVAs for Cigarette Use at Time 2 Including Initiation of Cigarette Use--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Initiation of substance use	245.726	1	245.726	14.283	<.001
Parental monitoring	359.010	2	179.505	11.058	<.001

Table D9

ANOVAs for Cigarette Use at Time 2 Including Initiation of Cigarette Use--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Initiation of substance use	191.068	1	191.068	15.968	<.001
Perceived peer behavior	241.779	2	120.889	12.889	<.001

Table D10

ANOVAs for Cigarette Use at Time 2 Excluding Initiation of Cigarette Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
School adjustment	172.813	1	172.813	11.664	<.001
Perceived peer behavior	294.225	2	147.112	10.336	<.001

Table D11

ANOVAs for Cigarette Use at Time 2 Excluding Initiation of Cigarette Use--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Parental monitoring	126.722	1	126.722	6.920	.010
Parental smoking	199.620	2	99.810	5.618	.005

Table D12

ANOVAs for Cigarette Use at Time 2 Excluding Initiation of Cigarette Use--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
School adjustment	126.230	1	126.230	9.849	.002
Perceived peer behavior	211.569	2	105.784	8.728	<.001

Table D13

ANOVAs for Illicit Drug Use at Time 2 Including Initiation of Illicit Drug Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Perceived peer behavior	65119.114	1	65119.114	29.924	<.001
In home access	74526.372	2	37263.186	17.338	<.001
Grades	84648.824	3	28216.275	13.313	<.001

Table D14

ANOVAs for Illicit Drug Use at Time 2 Including Initiation of Illicit Drug Use--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Perceived peer behavior	58670.350	1	58670.350	15.911	<.001

Table D15

ANOVAs for Illicit Drug Use at Time 2 Including Initiation of Illicit Drug Use--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Perceived peer behavior	14551.896	1	14551.896	18.307	<.001
In home access	23613.843	2	11806.922	15.944	<.001

Table D16

ANOVAs for Illicit Drug Use at Time 2 Excluding Initiation of Substance Use--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Perceived peer behavior	65064.372	1	65064.372	29.806	<.001
In home access	74219.853	2	37109.927	17.205	<.001
Grades	84395.590	3	28131.863	13.227	<.001

Table D17

ANOVAs for Illicit Drug Use at Time 2 Excluding Initiation of Substance Use--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Perceived peer behavior	58074.103	1	58074.103	15.860	<.001

Table D18

ANOVAs for Illicit Drug Use at Time 2 Excluding Initiation of Substance Use--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
Perceived peer behavior	14245.398	1	14245.398	18.429	<.001
In home access	23490.844	2	11745.422	16.335	<.001

Table D19

ANOVAs for Delinquency at Time 2--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
School adjustment	1028.692	1	1028.692	44.879	<.001
Initiation of substance use	1290.329	2	645.165	29.376	<.001
In home access	1411.091	3	470.364	21.812	<.001

Table D20

ANOVAs for Delinquency at Time 2--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
School adjustment	467.739	1	467.739	16.834	<.001
Initiation of substance use	599.853	2	299.926	11.180	<.001

Table D21

ANOVAs for Delinquency at Time 2--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*P*
School adjustment	518.934	1	518.934	28.501	<.001
Relationship with mother	829.731	2	414.866	25.499	<.001
In home access	959.282	3	319.761	20.611	<.001
Perceived peer behavior	1038.221	4	259.555	17.202	<.001

Table D22

ANOVAs for Suicidality at Time 2--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Suicidality, Time 1	24.153	1	24.153	65.048	<.001
Depression	28.691	2	14.346	40.317	<.001

Table D23

ANOVAs for Suicidality at Time 2--MLR for AI Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Suicidality, Time 1	7.396	1	7.396	17.895	<.001

Table D24

ANOVAs for Suicidality at Time 2--MLR for AI Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Depression	17.411	1	17.411	51.930	<.001
Suicidality, Time 1	22.935	2	11.468	37.841	<.001

Table D25

ANOVAs for Self-protection at Time 2--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Sex	74.858	1	74.858	13.675	<.001
Parental seatbelt use	147.027	2	73.513	14.132	<.001
School adjustment	202.263	3	67.421	13.493	<.001
Grades	221.642	4	55.410	11.222	<.001

Table D26

ANOVAs for Self-protection at Time 2--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Parental seatbelt use	87.938	1	87.938	19.197	<.001
Grades	130.075	2	65.038	15.587	<.001

Table D27

ANOVAs for Self-protection at Time 2--MLR for AI Adolescents Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Parental seatbelt use	36.233	1	36.233	6.780	<.001
School adjustment	73.908	2	36.954	7.223	<.001

Table D28

ANOVAs for All HCBs--MLR for All AI Adolescents

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Perceived peer behavior	112434.94	1	112434.940	41.969	<.001
Initiation of substance use	126033.24	2	63016.618	23.889	<.001
Sex	137625.10	3	45875.033	17.616	<.001
In home access	148017.68	4	37004.420	14.373	<.001

Table D29

ANOVAs for All HCBs--MLR for AI Adolescent Males

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Perceived peer behavior	91127.468	1	91127.468	21.671	<.001

Table D30

ANOVAs for All HCBs--MLR for AI Adolescent Females

Variables entered	*SS*	*df*	*Mean Square*	*F*	*p*
Perceived peer behavior	29760.560	1	29760.560	26.643	<.001
In home access	44825.961	2	22412.980	21.887	<.001
School adjustment	52202.460	3	17400.820	17.731	<.001
Relationship with mother	57171.912	4	14292.978	14.975	<.001

CURRICULUM VITAE

Amy Jo Williams, MS
(June 2003)

Education

Doctor of Philosophy, in Combined Clinical/Counseling/School (Professional-Scientific) Psychology, (APA-accredited), Utah State University, Logan, UT, expected May, 2004

Master of Science, in Counseling Psychology, Utah State University, Logan, UT, 2001

Bachelor of Arts Degree, in Psychology, (with honors), Montana University, Missoula, MT, 1998

Academic Positions

Instructor, for interdisciplinary graduate workshop targeting gay and lesbian issues in counseling, Summer 2002. Prepared lesson plans, taught all sessions, lead discussions and lectures, evaluated students' oral and written reactions, and entered grades into the university database.

Instructor, for undergraduate developmental psychology, Summer 2001, via Distance Education satellite. Duties: Prepared lesson plans, taught all sessions, prepared tests from a standardized test bank, answered student questions, graded tests and papers, and entered grades into the university database.

Teaching Assistant, for Dr. Keith Checketts, Professor, Department of Psychology, Utah State University, 1999. Duties: Graded papers, met with students, led study

groups and taught a section on test bias for *psychometrics* (combined graduate/undergraduate level).

Teaching Assistant, for Dr. Carolyn Barcus, Director, American Indian Support Project (AISP), Utah State University, 1998-1999. Duties: Graded tests, projects, and journals. Proctored classes and led study groups. Graded papers and projects, recorded grades and dealt with individual students' concerns. Established a coding system for the AISP library.

Research Positions

Independent Research, supervised by Dr. Carolyn Barcus, Department of Psychology, Utah State University, 2001-2002. Researched and designed a workshop regarding the special counseling needs of gay, lesbian, bisexual, and transgendered clients. The workshop was aimed at graduate students in psychology and related fields. It was offered at Utah State University in the Summer Semester, 2002.

Research Assistant, for Dr. Xitao Fan, Assistant Professor, Department of Psychology, Utah State University, 2000. Duties: Conducting research on adolescent health using data provided by the Adolescent Health Study supported by the National Institute of Mental Health. Assisting in preparing papers for publication and presentation.

Research Assistant, for Brenda Roche, MA, Director, Building Skills for Adulthood, University of Montana, 1997-1998. Duties: Performed pre- and post-assessments of troubled teenagers who had been placed in the foster care system. Assessments

consisted of asking teenagers questions from the Daniel Memorial Questionnaire, by phone, that pertained to a variety of life skills such as: hygiene, job skills, household maintenance, and interpersonal relationships. Contacted their mentors, caseworkers and probation officers to schedule appointments and monitor their progress. Entered data into computer system using SPSS-7.

Professional Experience

Faculty Advisor, to Pride! Alliance, the Utah State University student support group for gay, lesbian, bisexual, transgendered students and their supporters. Provided guidance to the board members concerning restructuring their organization and constitution.

Graduate Assistant - Student Therapist, at the Utah State University Counseling Center, supervised by Beverly Williams, Ph.D., and Mary Doty, Ph.D., licensed psychologist. Duties: Provided individual adult counseling, crisis, intake, consultation, and evaluation sessions, and co-led a group for men with sexual/gender identity issues. Attended professional development seminars, led a seminar in GLBT counseling issues, and was the liaison to the GLBT student organization at USU. Kept confidential intake, treatment, consultation, disposition, and evaluation records.

Student Therapist, at the Community Clinic at Utah State University, supervised by Kevin Masters, Ph.D., licensed psychologist, 2002. Duties: Provided individual adult and couples psychotherapy. Kept intake, daily, and disposition records.

Student Therapist, at the Counseling Center at Utah State University, supervised by Mark Nafziger, Ph.D., licensed psychologist, 2000-2001. Duties: Assessed clients'

needs through brief intakes. Provided individual adult and couples psychotherapy and crisis intervention. Kept intake, daily, and disposition records.

Student Therapist, supervised by Dr. Patricia Truhn, Director, Clinical Services, at the Center for Persons with Disabilities, Utah State University, 1999-2000. Duties: Administering and interpreting achievement, intelligence, and personality/psychopathology tests with children and adolescents, and writing clinical reports. Direct client contact included individual, family, and group therapy.

Student Therapist, supervised by Dr. Susan Crowley, Associate Professor, Department of Psychology, at the Community Clinic, Utah State University, 1998-1999. Duties: Provided individual therapy with adolescents and adults. Kept intake, daily, and disposition records which were shared with local psychiatric professionals. Administered personality/ psychopathology assessments and interpreted results.

Assistant to Dr. Carolyn Barcus for the 11th and 12th Annual Convention of American Indian Psychologists and Psychology Graduate Students, Utah State University, June, 1998 and 1999. Duties: Travel arrangements, lodging preparations, contacted possible presenters, and coordinating events.

Systems Coordinator for the Montana Coalition Against Domestic and Sexual Abuse, Helena, MT, 1996-1997. Duties: Liaison between the Coalition and the public regarding issues of domestic and sexual abuse. Developed and taught modules of assistance specifically pertaining to the special needs of lesbians and American Indian women.

Thesis

Williams, A.J. (2001). *The effects of parental modeling on the health compromising behaviors of American Indian adolescents: A culturally specific investigation of social learning theory.* Unpublished master's thesis, Utah State University, Logan.

Papers Submitted for Publication

Williams, A.J. (2002). *Is gender identity disorder a valid diagnosis with American Indians?* Manuscript submitted for publication.

Williams, A.J., Masters, K. S., & Miller, B.C. (2002). *Parental modeling and health related behaviors of American Indian adolescents: A study of social learning theory.* Manuscript submitted for publication.

Presentations

Williams, A.J. (2003, June). *Predicting risk of health compromising behaviors among American Indian adolescents: Longitudinal findings.* Poster session presented at the 16th annual meeting of the American Indian Psychologists and Psychology Graduate Students, Logan, UT.

Williams, A.J. (2002, November). *Risk factors for heath compromising behaviors among American Indian adolescents.* Paper presented at the 2002 Annual Convention of the Utah Counseling Center Association.

Williams, A.J. (2002, June). *Gender identity and American Indians.* Poster session presented at the 15th annual meeting of the American Indian Psychologists and Psychology Graduate Students, Logan, UT.

Williams, A.J. (2001, June). *The effects of parental modeling on American Indian adolescents.* Poster session presented at the 14th annual meeting of the American Indian Psychologists and Psychology Graduate Students, Logan, UT.

Research Interests

Health compromising behavior of American Indian adolescents

The effects of role modeling of health behaviors on youth from various ethnic groups

Multicultural counseling

Health Psychology

Counseling and health issues of those with a sexual or gender minority status, or a multiple minority status

Conferences Attended

9th Annual Counseling Center Conference. Utah State University, Logan, Utah, April, 2003.

The 2002 Annual Convention of the Utah Counseling Center Association. Park City, Utah, November, 2002.

14th Annual Convention of American Indian Psychologists and Psychology Graduate Students, Utah State University, Logan, Utah, June, 2001.

The First National Native American Prevention Convention, University of Oklahoma, Norman, Oklahoma, June, 1999.

12th Annual Convention of American Indian Psychologists and Psychology Graduate Students, Utah State University, Logan, Utah, June, 1999.

11th Annual Convention of American Indian Psychologists and Psychology Graduate Students, Utah State University, Logan, Utah, June, 1998.

Honors and Awards

1999, National Dean's List

1999, Utah State University Dean's List

1997-1998, University of Montana Dean's List

1997-present, National Honor Society in Psychology (Psi Chi)

Fellowships and Scholarships

2002-2003, Dell and Adale Young Scholarship for Academic Achievement and Integrity

1999, 2000, & 2001, American Psychological Association, Minority Fellow

1998-1999, Utah State University, American Indian Support Project Scholarship

1998-1999, Utah State University, Presidential Fellowship

Association Memberships

1999-present, American Psychological Association, Division 45 Fellow

1999-present, Society for the Psychological Study of Social Issues, Student Affiliate

1999-present, Society of Indian Psychologists of the Americas, Student Affiliate