Life stressors, anger and internalization, and substance abuse among American Indian adolescents in the Midwest: an empirical test of general strain theory

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Life stressors, anger and internalization, and substance abuse among American Indian adolescents in the Midwest: An empirical test of general strain theory

by

Xiaojin Chen

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Sociology

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2003
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ABSTRACT

Agnew’s general strain theory (1985, 1989, 1992) has been tested several times since its development in the last decade. This theory, however, has seldom been applied to minority groups, such as American Indian population. Using a sample of 212 American Indian 5th to 8th grade adolescents, this analysis tests general strain theory by tracing the linkage among the measures of perceived discrimination, negative life events, family conflict, anger and internalization, and early onset of substance abuse. Mediating effects of anger and internalization were investigated using structural equation models. In addition, the strength of the stressor-substance abuse relationship was examined across groups with different levels of personal/social resources. High prevalence of substance abuse and life stressors, such as negative life events and perceived discrimination were found among these American Indian adolescents. Multiple indicators of life stressors were found to have positive effects on early onset of substance abuse directly and indirectly through self-reported anger. Specifically, effects of inconsistent parenting on adolescents’ substance abuse were completely mediated through reports of anger. Negative life events directly affected substance abuse and had indirect effects on substance abuse through anger. Perceived discrimination led to negative affects such as internalization symptoms, but did not have significant effects on substance abuse. This study confirmed the mediating role of anger linking stressors and substance abuse; however, no mediating role of internalization was found. Furthermore, there was evidence that the strength of the anger-substance abuse relationship varied across groups with different levels of social/personal resources. With increasing levels of anger, adolescents with high self-esteem, negative attitudes toward deviance, and low levels of association with deviant peers were less likely to engage in...
substance abuse, compared with those with low level of self-esteem, positive attitudes toward deviance, and high levels of association with deviant peers. The relationship of life stressors and negative emotion (anger and internalization) was not moderated by social and personal resource variables. This study provided strong support to general strain theory and broadened its empirical generality to American Indian adolescents.
CHAPTER I
INTRODUCTION

This study is a comprehensive test of Agnew’s (1992, 2001) general strain theory by assessing associations between life stressors and substance abuse among American Indian 5th-8th graders. Since its development in the last two decades, Agnew’s general strain theory has been tested by using data obtained from national youth samples or college student samples (Agnew, 1985; Agnew & White, 1992; Hoffman & Su, 1997; Mazerolle, 1998; Paternoster & Mazerolle, 1994). These empirical tests have provided tentative support for general strain theory. The empirical generality of this theory, however, is limited since very few studies have examined this theory in minorities or certain disadvantaged groups.

General strain theory broadens traditional strain theories by including other sources of strains, including failing to achieve positive goals, removal of positively valued stimuli, and presence of negative stimuli. Experience of these strains may result in delinquent behavior or crime. In addition, Agnew proposes an affective link between strain and deviant behavior. For example, negative life events may indirectly lead to alcohol use through expression of anger, fear, frustration, or depression. Finally, general strain theory takes into account of individuals’ personal/social resources and social context that may influence the strain-deviance relationship.

Our data, obtained from a sample of 212 American Indian 5th-8th graders in the Upper Midwest, may be ideal for testing general strain theory. Previous research has documented high prevalence of alcohol and drug use among American Indian adolescents. Though a lot of social, cultural, and psychological factors are associated with alcohol and substance abuse, the high prevalence of life stressors in families, communities, and schools have been found to
be significant predictors among American Indian adolescents. Compared with majority youths, these adolescents face more severe stressors such as cultural conflict and racial discrimination, much more death and violence in communities, and more academic problems in schools. Their status of being minority and socially and economically disadvantaged provides a unique context for testing general strain theory and replicating previous studies.

Chapter II reviews the existing literature on the prevalence of alcohol and substance use among American Indian adolescents, as well as the prevalence of life stressors in American Indian communities. The associations between these stressors such as broken family, conflict between parents and children, discrimination, and negative life events, and substance abuse among American Indian adolescents are discussed. In addition, the mediating role of negative emotions linking life stressors and alcohol and substance abuse are examined. The final portion of Chapter I focuses on the effects of personal/social resources and social context factors on the stressor-deviance relationship.

The focus of Chapter III is on general strain theory and empirical studies. The concept of strain and the three sources of stress identified by Agnew (1992) are first introduced. In the next section, the mediating role of negative emotions and the moderating role of external factors are discussed. Since only a few empirical studies have applied this theory to explain delinquency and crime, a detailed discussion of these empirical studies are presented. Finally, four major hypotheses derived from general strain theory are presented and discussed at the end of this chapter.

Chapter IV provides a description of the study design and methods. The culturally appropriate data collection procedure and quality control instruments are described. Sample characteristics such as distribution of age, gender, household size, income, and social welfare
information are provided. The following section describes how each variable is measured. A list of variables is presented in terms of types of measurements. For each variable, a list of all questions that were used in computing each measurement is included as well as coding that was utilized. For variables that are created from factor scores, the extraction and rotation methods are described. This chapter ends with a description of analytical procedures and discussion of criteria of model fit index.

In Chapter V, the results of this study are presented. This chapter begins with a review of univariate analysis, including prevalence of substance use and life stressors, and bivariate analysis, such as correlation matrix. The next section presents the results of structural equation modeling. The two major hypotheses are tested using these structural equation models. The chapter ends with a description of results from ordinary least-square regression and interaction analysis. These regression models are used to test the last two hypotheses.

Chapter VI provides a summary of findings and discussions whether our results are consistent with previous research and hypotheses derived from general strain theory. The contributions of this study to general strain theory are discussed. The chapter ends with a discussion of limitations of this study and future research directions.
CHAPTER II
LITERATURE REVIEW

Substance use among American Indian adolescents

The use of alcohol and other substances by American Indian adolescents has received considerable attention for several decades (Beauvais, 1996, 2000). Longitudinal studies have shown similar trends over time for most drug use from the 1970s to the 1990s between American Indian adolescents and national samples (Beauvais, 1996; Beauvais, Thurman, Helm, & Plested, 2000; Benchman, Wallace, O'Malley, Johnson, Kurth, & Neighbors, 1991; Johnston, O’Malley, & Bachman, 1998). Drug use peaked in the beginning of the 1980s, decreased or leveled off until 1992, and increased slightly after this period. Though the trend over time between American Indian adolescents and other majority youths are similar, studies show that American Indian adolescents have considerably higher prevalence of drug use, such as use of alcohol, marijuana, and cocaine (Beauvais, 1996; Beauvais, 2000; Beauvais, Oetting, Wolf, & Edwards, 1989; Benchman et al., 1991; Johnston et al. 1998; May, 1982). Beauvais et al. (2000) compared the 1997-1998 rates of use of individual drugs for Indian and non-Indian youths in 8th, 10th, and 12th grades. The general pattern across these three grades were for high rates of use for most drugs among Indian youths, especially use of alcohol, marijuana, psychedelics, cigarettes, smokeless tobacco, and cocaine. An important exception is the low rates of sedatives, tranquilizers, and inhalants among American Indian adolescents in 1997-1998. The estimated lifetime rates during the period of 1996-1998 for American Indian 7th-12th graders were 68% for alcohol use, 69% for marijuana use, 15% for inhalants, 18% for illicit stimulants, 21% for psychedelics, and 6% for cocaine (Beauvais, 2000).
Compared with the attention paid to life time rates, researchers are more concerned with substance abuse and dependency which cause more health and social problems among American Indian adolescents compared to majority youths. During 1996-1998, 52 percent of 7th-12th graders reported they were drunk at least one time. To capture recent involvement with drugs, intensity of use, and patterns involving multiple drugs, Beauvais et al. (1996, 2000) developed a typology that grouped youths into three categories: high, moderate and low risk. Despite changing prevalence rates, social conditions, and changes in attitudes toward drug harmfulness, about 20% of Indian youths were heavily involved with drugs during the last two decades. In addition, American Indian adolescents were found to have early onset of alcohol and other drugs than their white counterparts (Weibel, 1984). Early onset of substance use may have negative developmental effects during adolescents’ transition to adulthood (Loeber, Farrington, Stouthamer-Lober, & Kammen, 1998). Early experimentation with alcohol and other drugs may result in early transition to regular use of alcohol and other drugs, which in turn, may ultimately lead to alcohol and drug abuse. One example is prevalence of marijuana use. From 1978-1998, prevalence of marijuana use among Indian 7th-12th graders has been consistently higher than that found for older non-Indian high school seniors (Beauvais et al., 2000). Finally, American Indian adolescents are more likely to use polydrugs, such as a combination of alcohol and other substances. Similar to national sample data, age is an important factor predicting alcohol use. For American Indian adolescents, there is a significant amount of alcohol and drug use among 7th graders. Although non-Indian data show higher prevalence rates for males for nearly all drugs, there is no gender difference among Native youths for most drugs.

Prevalence of alcohol use
Due to cultural diversity, reservation size, geographic locations, and degree of isolations, there is no consensus about prevalence of alcohol use among American Indian adolescents. Beauvais and his colleagues' (1989, 1996, 2000) longitudinal survey for two decades seems to give the most reliable estimation. According to this study, life time prevalence of alcohol use among 7th-12th grades increased from 76 percent to 85 percent until 1980. From 1980 to 1998, we saw a gradual decrease of alcohol use among these adolescents. The decrease of alcohol use was reflected in both the prevalence of life time alcohol use and the measures of current involvement (Beauvais, 1996, 2000). Compared with national sample data, it was found that the trend over time was similar, though American Indian youths had a much higher prevalence rate.

While lifetime prevalence rates are useful in that they provide exposure rates of alcohol and other drugs across populations, they do not provide a good estimation of current involvement and related problems. Beauvais (1996) examined rates of alcohol intoxication and found that intoxication rates were between 49% to 62% from 1985 to 1998. Alcohol use is also linked to other problems, such as high mortality rates, high involvement with authorities and arrests, conflicts with parents and other family members, and problems with school such as failing classes, low grades, and dropping out of high school (U.S. Department of Health and Human Services, Public Health Services, 1991).

Prevalence of marijuana use

Similar to the use of alcohol, marijuana use estimations differ greatly from study to study due to differences of sample, culture, and location of tribes. Studies in the 1970s showed that marijuana use ranged from 22% to 66% (May, 1982), though recent data showed an increase to 69% among 7th-12th graders (Beauvais, 2000). Similar to trends of other drugs,
there was a dramatic increase of marijuana use during the 1970s and a steady decline after the beginning of the 1980s. A recent survey, however, showed a dramatic increase of marijuana use from 1992 to 1998, from 50% to 69% among American Indian adolescents. Marijuana use was much higher among American Indian adolescents than the majority youths. For example, life time prevalence was three times higher for American Indian 8th graders compared with Anglo 8th graders, two times higher for 10th graders, and 30 percent higher for high school seniors. Though estimation of marijuana prevalence differs from study to study, it seems there is consensus that Indian youths generally report more use of marijuana at all ages (May, 1982).

**Prevalence of inhalant use**

Inhalant abuse has been seen by many as a critical problem among Native American youths (May, 1982; Oetting & Goldstein, 1979; Schottstadt & Bjork, 1977). Though the damage caused by inhalant use is not very clear, Thruman and Beauvais (1992) reported that inhalant users may experience residual effects from the drugs for a long time. Compared with national samples, inhalant use was much more popular among American Indian adolescents in the 1970s and the 1980s. Oetting and Goldstein (1979) reported that inhalant use prevalence was almost two times higher among American Indians in the 12 to 17 year age group. More importantly, regular or heavy use rate was more than ten times higher (Oetting, Golstein, Beauvais, & Edwards, 1980; Schottstadt & Bjork, 1977). Other researches found the prevalence rates ranged from 17% for adolescents in five Southwestern tribes (Oetting, Edwards, & Goldstein, 1980) to 62% for children 6-12 years old in a Pueblo village (Kaufman, 1973). Beauvais’s (1996) research examined the trend of inhalant use in the last two decades. Similar to other drugs, prevalence rates of inhalants increased almost
two fold (16% to 31%) from 1975 to 1984. The prevalence rates, however, decreased 15 percent in 1996-1998. Thurman, in a presentation at Portland, reported that the most recent data showed inhalant use among American Indian youths was lower than non-Indians (French, 2000). For example, in 8th grade, 21% of Anglo youths reported life time use compared with 14% of Indian adolescents (Beauvais, 2000).

Another characteristic among American Indian adolescents is early onset of inhalant use. Research shows that the average age of onset is the same as that of cigarette use, which is 11.5 years old. In contrast, alcohol intoxication is 12.3 years old, marijuana use is 12.5 years old, and stimulants use is 13.8 years old (Beauvais, Oetting, & Edwards, 1985). Though inhalant use rates decline among Indian youths older than age 13, inhalant users are more likely to be polydrug users than nonusers (Beauvais et al., 1985).

Other substances

Other drugs are less frequently used by American Indian adolescents (May, 1982). According to Beauvais et al. (2000), the most popular drugs after alcohol and marijuana are psychedelics; about 21% of 7th-12th grade adolescents used them in years 1996-1998. Cigarettes and smokeless tobacco were also very popular among American Indian adolescents; 76% reported life time use of cigarettes and 39% smokeless tobacco. Although Oetting and Goldstein (1979) found few differences in use of most drugs by Native majority youths in the United States, recent surveys suggested that Native adolescents reported higher lifetime prevalence and current use in most drug categories ((Beauvais et al., 2000; Johnston, Bachman, & O'Malley, 1987).

In summary, though there is no consensus among researchers on prevalence of alcohol and other drugs among American Indian adolescents, it is clear that compared with
majority youths, American Indian adolescents reported more frequent use of alcohol, marijuana, and most other drug categories. In addition, American Indian adolescents use drugs at an earlier age. More importantly, 20% of American Indian youths have been involved heavily with drugs and this number has not changed in the last two decades, despite the change of prevalence, social conditions, and attitudes towards drug use. This group of youths may have more personal and social problems and require more efforts to reduce substance abuse. The combination of high prevalence, early onset of use, and a large percentage of youths heavily involved with substances causes a series of health and social problems such as high mortality rates, law violation, and academic problems among adolescents.

Life stressors and substance use and abuse

American Indian adolescents face enormous amounts of stressors in their daily lives. Years of poverty, prejudice, and cultural breakdown lead to other life stressors such as economic depravation, broken homes, conflict with parents, occurrence of negative life events (e.g., accidents, moving, school problems, and injury), high violence rates in American Indian reservations, cultural conflict, and discrimination by the majority culture. Bechtold, Manson, and Shore (1994) discussed these numerous life stressors facing American Indian youths today and how those stressors lead to diagnosable psychopathology. Early onset of substance use has been connected to these life stressors in the general population (Conger, Reuter, & Conger, 1994; Dishion & Loeber, 1985; McGonalge & Kessler, 1990; Jackso, Brown, Kirby, 1998; Jesssor, Donovan, & Costa, 1991; Jessor & Jessor, 1977). As suggested by Beauvais et al. (Beauvais, 1996; Beauvais et al., 2000; Gray, 1998), similar associations linking life stressors to alcohol and substance use have been
found among American Indian adolescent populations. For example, King, Beals, Manson, and Trimble (1992) found that the greater the life stress, the more likely adolescents would feel depressed and/or use drugs.

Stressors related with family

American Indian families are generally larger, more inclusive, and more flexible in structure than non-Indian nuclear families. The traditional support from family, however, has been greatly weakened with the increasing number of broken families. In one study, Fleming, Manson, & Bergeisen (1995) found that American Indian students were much less likely compared with white students to live with their biological parents (44% vs. 84%), two times more likely to live in a single-parent household, and ten times more likely to live without a parent. The rapid change of family structure may lead to other stressors such as economic problems, tension/conflict between parents and children, and alcohol or drug use for parents to cope with daily stress, which in turn, increases the probability that adolescents will use alcohol and other drugs.

Adolescent alcohol and drug use are typically related to disrupted family structure and tension/conflict between parents and children. Though extended families could fill in the gap, Oetting, Beauvais, & Edwards (1988) found that American Indian youths from broken families were still more likely to be involved with alcohol than others. For example, among youths who were involved with alcohol, about half of them (43.8% for females, 54.2% for males) had intact families, compared with more than two thirds (62.5% for females, 70.8% for males) of those not involved with alcohol.

Family intactness and tension/conflict between parents and children was measured by the family strength scale in two studies (Oetting & Beauvais, 1987; Swaim, Oetting,
Thurman, Beauvais, & Edwards, 1993). This scale consists of eight items including family intactness, whether the family is perceived as caring, and family economic status. Similar results were found in these two studies. For example, Swaim et al. (1993) found family strength affected drug use indirectly through other measurements, such as family sanctions, school adjustment, and association with deviant peers. Specifically, family strength directly increased positive school adjustment and family sanctions against drug use, which in turn, decreased affiliation with deviant peers and decreased drug use. Though not testing effects of single-parent household status on drug use, Novins & Mitchell (1998) found among male youths, high-frequency of drug use was negatively associated with living with both biological parents.

As suggested in the literature, effective parenting is essential for preventing or delaying alcohol and other drug use among adolescents. Though this problem is more serious in single-parent households due to economic difficulties and conflict of time, the tradition of laissez-faire child-rearing practices among American Indian families may provide more opportunities for adolescents to experiment with alcohol and other drugs. Oetting et al. (1988) found that effective parenting had negative relationship with adolescents' alcohol involvement. For example, the mean value for family sanctions against alcohol, family sanctions against drug use, and family cares were significantly higher for youths who were not involved with alcohol. Swaim et al. (1993) found direct and indirect effects of effective parenting on drug use. Specifically, effective parenting, which was measured by family sanctions, decreased association with drug using peers. Affiliation with drug using peers, in turn, was positively associated with drug use. At the same time, family sanctions decreased drug use directly. Other research has found that adolescents who have good relationships
with their parents were less likely to use alcohol, tobacco, and cannabis (Longclaws, Barnes, Grieve, & Dumoff, 1980).

**Stressors related with community and school**

The most common life stressors facing American Indian adolescents in their everyday lives are stressful life events in schools and reservations. American Indian adolescents are frequently exposed to injury and death through accidents, suicide, homicide, alcohol use and abuse, and other health problems. According to Indian Health Service (1991), mortality rates were considerably higher for all reservation states in 1988 than for the U.S. population for tuberculosis (400% greater), alcoholism (438% greater), accidents (131% greater), diabetes mellitus (155% greater), homicide (57% greater), and suicide (27% greater). The death rate for Indian youths 15-24 years of age was 1.6 times higher than that for the U.S. general population (U.S. Department of Health and Human Services, Public Health Services, Indian Health Service, 1991). Injuries, primarily as a result of motor vehicle accidents, were highly prevalent among these youths; about 45% and 34% of males and females in grade 10-12, respectively, indicated they drink and drive (Blum., 1992). In addition, fighting may also be a cause for injuries. According to IHS, fighting is common among Indian adolescents with almost one quarter of them reporting participation in a group fight within the last year. Other mental health problems such as depression also showed higher prevalence among American Indian adolescents compared to non-Indians (Fleming et al., 1995). Furthermore, American Indian adolescents may experience more stressful life events in schools due to academic problems or conflict with other students and teachers. Though Indian children begin school with comparable academic achievement to the cultural majority, their academic scores begin to drop by the fourth grade and continue to decline until high school, resulting in a drop-out
rate of 60% (Wise, F. & Miller, N., 1983). Academic problems may lead to dislike of school, classmates, or teachers and become a major life stressor for these youths.

The effects of community and school stressors on early alcohol and other substance use and abuse have been examined mainly through negative life events measurement in the literature (Dinges, M. G., Tran, Q. D, 1993; Gray, 1998; Novins & Mitchell, 1998; Oetting et al., 1988). A few articles have discussed the effects of school problems on alcohol and other substance use (Novins et al., 1998; Oetting et al, 1988). For example, Novins et al. (1998) found a negative association between school performance and marijuana use among male youths; similarly, Oetting et al. (1988) found a negative relationship between liking for schools and heavy drinking among adolescents.

Dinges et al. (1993) examined the effects of different combination of stressful life events on substance abuse and dependency, such as alcohol and marijuana abuse/dependence, and other combinations of comorbidity by examining 124 American Indian adolescents in boarding schools. Stressful life events included items such as family/parent conflict, school environment, interpersonal conflicts/tensions, loss of cultural supports, marital/pregnancy fears, academic demands, social rejection, and death of family/friends. The discriminant function for marijuana abuse/dependence was largely contributed by three negative life events: academic demands, social rejection by peers, and marital/pregnancy fears. Interpersonal conflicts, academic demands, and school environment made the largest contribution to discriminant function for alcohol and marijuana abuse/dependence. Four life events, interpersonal conflict, family/parent conflicts, marital pregnancy fears, and rejection by peers contributed to the discriminant function for marijuana abuse/dependence, and suicide ideation. Finally, a combination of family conflicts,
interpersonal conflicts/tensions, death of family/friends, and negative school environment predicted comorbidity of alcohol, marijuana abuse/dependence, and suicide ideation.

Novins et al. (1998) examined the effects of negative life events on heavy use of marijuana in the previous month. Stressful life events were measured with two individual items and two inventories: family had difficulty paying bills, family member had alcohol problems, historical life events inventory, and six month life events. Both adolescent males and females with a family member having alcohol problems reported high frequency of marijuana use. The occurrence of historical events such as death or injuries of family members had a significant association with high frequency of marijuana use among girls, but not boys; occurrence of negative life events in the last six months had significant association with low-frequency of marijuana use among females, and high-frequency of marijuana use among both girls and boys. In sum, negative life events seemed to have higher impacts on marijuana use among females, though recent events and living with a family member with alcohol problems increased the probability of high-frequency of marijuana use for both girls and boys.

Furthermore, the association between stressful life events and alcohol use was examined in specific populations, such as American Indian students in boarding school and children of alcoholics (Dick, Manson, & Beals, 1993; Husson & Chassin, 1994). Dick et al. (1993) reported a statistically significant positive correlation between stressful life events and self-perception of alcohol use. Similarly, Husson and Chassin (1994) reported a positive association between stress and quantity and frequency of alcohol use and heavy alcohol use in multiple regression models.

Stressors related with discrimination
Though discrimination is not always considered as a potential stressor by researchers, there is abundant research indicating that discrimination harms adults (Kessler, Mickelson, & Williams, 1999). Kessler et al. (1999) ranked discrimination the same as major negative life events such as death of a loved one, divorce, and job loss. Research on discrimination has linked it to physical health (Anderson, 1989; Krieger & Sidney, 1996; Williams, Spencer, & Jackson, 1999), psychological distress (Williams, Yu, Jackson, & Anderson, 1997; Vetta, 1996), depression (Noh, Beiser, Kaspar, Hou, & Rummens, 1999; Whitbeck, McMorris, Hoyt, Stubben, & LaFromboise, 2002), and substance abuse (Whitbeck, Hoyt, McMorriss, Chen, & Stubben, 2001).

Very few studies have examined the effect of perceived discrimination on alcohol and substance use and abuse among American Indian adolescents. Using 195 American Indian 5th-8th graders from three reservations that share a common culture, Whitbeck et al. (2001) investigated internalizing and externalizing symptoms as potential mediators of the relationship between perceived discrimination and early substance abuse. The findings revealed a positive association between perceived discrimination and early onset of alcohol and substance abuse. Although perceived discrimination contributed significantly to internalizing symptoms among the adolescents, internalizing symptoms were unrelated to early substance abuse. Rather, the effects of perceived discrimination on early substance abuse were mediated by adolescent anger and delinquent behavior. Early onset of substance abuse and delinquent behaviors may seriously affect later life chances through their consequences for academic failure, school dropout, family, and relationship problems.

Barrett, Joe, and Simpson (1991) assessed the relationship between perceived discrimination and substance use in a study of 110 Mexican American youths who had drug
use problems. No statistical significant correlation was found between perceived discrimination and three scales of substance use measures: lifetime inhalant use, drug use severity, and drinking severity.

In summary, American Indian adolescents today face numerous life stressors such as rapid change of family structure, death or injuries of family members/friends, high prevalence of alcohol and drug use, school problems, and discrimination, largely due to years of poverty, prejudice, and cultural breakdown among American Indian reservations. Compared with majority youths, Indian adolescents are more likely to live in single-parent households, experience more negative events in communities such as fighting, death and injury of family members or friends, and more academic problems in school. In addition, they also have to deal with discrimination in their daily lives. The experience of life stressors may lead to some harmful behaviors, including heavy involvement with alcohol and other drugs, as evidenced in the general population. The abundance and high intensity of life stressors facing American Indian adolescents everyday may lead more of them to use alcohol and other substances as a coping strategy, especially when they have very limited legitimate sources to escape or solve these problems.

**Life stressors and substance abuse: mediators and moderators**

The relationship between stressors such as negative life events, perceived discrimination, conflict with parents with mental health problems including alcohol and other substance abuse is neither direct nor inevitable. This procedure is mediated through other linking mechanism such as expression of anger or depression, and conditioned on social context factors and personal/social resources (Agnew, 1992). Several mediating and moderating variables are discussed in the literature. A mediating variable explains part or all
of the relationship between an independent and dependent variable, while a moderating
variable affects the direction and/or the strength between an independent and a dependent
variable (Baron & Kenny, 1986). Personal resources such as self-esteem and self-efficacy or
mastery, perception toward deviance, and social support are the most common moderator
between life stressors and substance abuse are moderated by self-esteem, social support, and
perception toward deviance. The higher the self-esteem, the higher the social support, and
the more negative toward deviance, the weaker association between life stressors and alcohol
and drug use among adolescents. Social context also plays an important role in moderating
this relationship. Association with deviant peers is the most examined moderator variable
(Beauvais, 1986). The relationship between life stressors and use of alcohol and other drugs
will be stronger among adolescents with more deviant peer affiliations. Aside from these
commonly used variables, culture plays an important role in understanding problem drinking
Though results are inconclusive, it seems plausible that stronger identification with American
Indian culture, or enculturation, weakens the relationship between life stressors and
substance abuse. Very few researches in American Indian literature, however, have
examined mediating and moderating effects between life stressors and substance abuse. The
next section will provide a detailed review on some key moderating and mediating variables
regarding their association with alcohol and drug use.

Deviant peer association

Many researchers have found strong associations between peer group encouragement
and alcohol and other drug use and abuse among adolescents. Similar to general population,
peer influence has shown to be an important, if not a primary factor leading to alcohol and other drug use among American Indian adolescents. Except for a few studies (Bates, S.C., Beauvais, F., & Trimble, J. E., 1997; Beauvais, 1986; Oetting, Swain, Edwards, & Beauvais, 1989) that treated deviant peer association as a mediating variable, however, no research on American Indian adolescents has examined the moderating effects of deviant peers on stress and substance abuse.

Beauvais (1986) presented a model called “peer cluster theory” to explain the effects of peers on alcohol and substance use among American Indian adolescents. Based on Beauvais and his colleagues (1986), family strength affects attachment with school, traditional values, family sanctions, and opportunity, which in turn affect adolescents’ choice of affiliation with deviant peers and actual alcohol and drug use. Oetting et al. (1989) provided support for this model by examining mediating effects of association with deviant peers. They found that emotional distress, such as anxiety, indirectly increased alcohol involvement through peer alcohol association. In a recent study, Bates et al. (1997) found that association with deviant peers directly predicted alcohol involvement for both girls and boys in the sample, the effects of ethnic identity, however, were not mediated through affiliation with deviant peers.

Most research has examined the direct association between peer affiliation and substance use and abuse. Oetting et al. (1988) examined psychosocial correlates of heavy drinking and implications for prevention. As expected, there was a strong relationship between peer associations and alcohol involvement; adolescents who had stronger peer encouragement and weaker sanctions were more likely to use alcohol and other drugs. Roski, Perry, McGovern, Mortenson, & Farbakhsh (1997) assessed risk factors leading to
past-year and heavy alcohol use among American Indian and white 6th and 8th graders. Peer pressure was one of the common factors that were significantly and positively associated with past-year alcohol use, as well as heavy use in the last two weeks. Novins & Mitchell (1998) examined the association between peers and marijuana use among 1464 American Indian high school students in four communities west of the Mississippi. Along with other factors, peer encouragement was found to be statistically significant in predicting low frequency of marijuana use among female adolescents; however, no significant relationship between low frequency marijuana use among males, as well as high-frequency marijuana use and peer encouragement among both males and females were found.

Self-esteem

Numerous researchers have found a negative relationship between self-esteem and alcohol and other drug use in the general population (Carvajal, Clair, Nash, & Evans, 1998; Harlow, Newcomb, & Bentler, 1986). The same protective effect of self-esteem is also found among American Indian adolescents (Moncher, Holden, & Trimble, 1990; Oetting, Beauvais, & Edwards, 1988; Oetting, Swaim, Edwards, & Beauvais, 1989). Adolescents with high self-esteem are less likely to report more alcohol and drug involvement. Similar to research on association with deviant peers, however, no research used self-esteem as a moderator variable to explain the relationship between stressors and distress.

Roski and her colleagues (1997) compared risk factors leading to past year and heavy alcohol use among 6th and 8th grade white and American Indian adolescents. Similar to previous studies, they found protective effects of high self-esteem. For example, past year alcohol use was significantly and negatively associated with increased self-esteem among both American Indian and white 6th and 8th graders. However, increased levels of self-
esteem acted as a protective factor against heavy alcohol use for American Indian 8th graders compared with their white peers.

Similar protective effects were found by Novins et al. (1998). High frequency of marijuana use among American Indian adolescents was negatively associated with self esteem among males and females, though no significant relation between low frequency of marijuana use and self-esteem was found among these adolescents. In addition, in multivariate analysis, the significant association disappeared when other variables such as peers encouragement, antisocial behavior, and alcohol use were included in the models.

An early study by Oetting et al. (1989), however, did not provide support for the hypothesized positive association between self-esteem and alcohol and other drug use. Oetting et al. (1989) tested peer cluster theory by comparing two adolescent groups: 327 American Indians and 524 Anglo youths from Midwest high schools. American Indian adolescents with higher self-esteem were more likely to associate with peers which may provide more opportunity for alcohol use. These effects might be offset by the positive association between self-esteem and anger, which had negative effects with alcohol use.

Enculturation

Enculturation refers to the process by which individuals learn about and identify with their traditional ethnic culture. Enculturation is especially important for American Indian adolescents since it may serve as a resiliency factor that decreases problem behaviors such as alcohol and substance use (Zimmerman et al., 1994).

Zimmerman and his colleagues (1994) tested the enculturation hypothesis in a study of 121 American Indian adolescents aged seven through eighteen years. They argued enculturation is one of the resiliency factors that could protect American Indian adolescents
from risky behaviors such as alcohol and drug use, early sexual behaviors, and delinquency. The results, however, provided mixed support for their hypothesis. The main effect of enculturation was not statistically significant. The interaction between self-esteem and enculturation significantly predicted use of alcohol and other substances. Adolescents with strongest enculturation levels and highest self-esteem were the least likely to use drugs. However, at the low level of self-esteem, adolescents with strongest enculturation levels reported most use of alcohol and other substances. This result was contrary to the enculturation hypothesis.

Other researchers have tried to identify direct effects of enculturation on substance abuse without too much success. Bates et al. (1997) explored American Indian ethnic identification and alcohol involvement using structural equation models. Though measures such as peer alcohol association and family sanction against alcohol significantly predicted alcohol involvement, ethnic identity did not predict alcohol involvement directly or indirectly for either boys or girls. Novins et al. (1998) who tested the association between bicultural ethnic identity and marijuana use among 1464 Indian adolescents in four communities west of the Mississippi found no association between bicultural identity and use of marijuana among male and females. Though Oetting (1993) proposed that the breakdown of culture identification may lead to alcohol and substance abuse, researchers have been unable to identify direct effects of measures of enculturation on alcohol and drug use (Beauvais, 1998).

Tolerance of deviance

Only one study has been found to examine the effect of tolerance of deviance on drug use in American Indian research. Research by Oetting et al. (1988) showed a strong association between alcohol involvement and deviant behavior and tolerance of deviance.
Adolescents with higher tolerance of deviance (e.g., it's ok to cheat) were more likely to be heavy drinkers.

**Emotional distress: depression and anger**

Numerous researchers have found that emotional distress such as depression and anger play an important role in linking stressors and deviant behavior in the general population (Agnew, 1985, 1994; Mazerolle & Piguero, 1997, 1998). Life stressors are likely to cause emotional distress among individuals, which in turn, lead to deviant behavior including alcohol and substance abuse. The study of the mediating role of emotional distress among American Indian adolescents, however, is very limited. I was able to locate only one study (Oetting et al., 1989) that tested mediating effects of emotional distress on alcohol use.

Based on peer cluster theory, Oetting et al. (1989) tested the association between emotional distress and alcohol involvement among American Indians and Anglo youths, especially the mediating effects of anger on alcohol use. Though some emotional distress indicators such as anxiety increased alcohol involvement indirectly through affiliation with deviant peers, other indicators such as blame/alienation and depression decreased alcohol involvement indirectly through expression of anger. In turn, anger was negatively associated with alcohol involvement. This result was different from that for Anglo youths where emotional distress such as anxiety and blame/alienation increased alcohol involvement through expression of anger, which was positively associated with alcohol involvement.

A few studies have examined direct associations between emotional distress and alcohol and substance abuse (Dick et al., 1993; Hussong et al., 1994; Novins et al., 1998; Oetting et al., 1988; Vega, Zimmerman, Warheit, Apospori, & Gil, 1993). Most of these studies found a positive association between emotional distress and alcohol and other
substance use. For example, Dick and his colleagues (1993) assessed the relationship
between depressive symptoms and alcohol use, and found a positive association between
depression and alcohol use and heavy alcohol involvement. Husson and Chassin (1994)
reported similar results. Frequency of alcohol use, as well as heavy alcohol use was
predicted by depressive symptoms in regression models. Vega et al. (1993) found the same
association among white adolescents, however, they did not find the same relationship
among other minority groups, such as Cuban, non-Cuban Hispanic, and African American
youths. A few studies, however, could not find any significant association between
emotional distress and alcohol and other substance use (Novins et al., 1998; Oetting et al.,
1988).

In summary, the effects of life stressors on substance use and abuse may be mediated
by negative emotional feelings such as depression and anger. Experience of depressive
symptoms or anger may increase alcohol and substance abuse. In addition, the strength of
the association between depression/anger and substance abuse could be affected by social
context or personal/social resource factors. Association with alcohol peers, for example,
exacerbates use of alcohol among American Indian adolescents. High self esteem and lower
tolerance toward deviance weakens the association between stressors and alcohol and
substance abuse. High enculturation, though not conclusively supported by the literature,
may be a protective factor for American Indian adolescents. Research on the mediating
effects of emotional feelings, and conditional effects of social context and personal/social
resources factors, however, is very limited in American Indian alcohol and substance use and
abuse research.
CHAPTER III

GENERAL STRAIN THEORY: DEVELOPMENT AND EMPIRICAL ASSESSMENT

Classical strain theory

Strain theories are one of many types of theories that researchers have utilized to explain the occurrence of deviance and criminal activity. Since Merton’s (1938) seminal article, “Social Structure and Anomie,” strain theories have dominated sociological research on deviance and criminality for more than three decades. One of the major assumptions for Merton’s anomie theory is that an integrated society maintains balance between social structure (approved social means) and culture (approved goals). Delinquency results when individuals are unable to achieve universally held success goals through approved social means. Later strain theories followed Merton by emphasizing disjunction between conventional goals, including monetary success (Cloward & Ohlin, 1960), education achievement (Elliott & Voss, 1974), middle-class status (Cohen, 1955), and structural sources.

The influence of strain theory waned gradually in the 1970s because of its narrow scope and limited empirical support. Merton’s anomie theory was primarily designed to explain concentration of crime in lower classes. The scope of strain theory was further narrowed when Cohen (1955) and Cloward and Ohlin (1960) used strain theory to explain delinquency among lower class males, and subcultural groups. Except for a few studies (Bordua 1961; Hirschi 1969; Short and Strodtbeck 1965; Quicker 1974), empirical support for classical strain theory was limited. Measured disjunction between traditional aspirations and expectations was usually found to be unrelated to delinquent acts. On the contrary, possession of conventional aspirations was inversely related to self-reported delinquency.
Revised strain theories in the 1970s tried to meet the challenge of empirical studies without departing entirely from classical theories. These revised theories adopt the classical assumption that youths are motivated to commit delinquent acts when they fail to achieve desired goals through legitimate channels. However, instead of focusing on long-range (educational/occupational) goals, these theories assert that adolescents are more concerned with satisfaction of more short-term and immediate wants, such as athletic success, good grades, and popularity with peers (Elliott & Voss 1974; Greenberg 1977; Quicker 1974). Strain or stress is produced when short-term and immediate needs are not met. Though a few studies provided weak support for the assumption that adolescents who failed to achieve these immediate goals were more likely to be delinquent (Agnew 1984; Elliott & Voss 1974; Greenberg 1977; Reiss & Rhodes 1963), the empirical support for these revised strain theories was limited.

**Development of general strain theory**

Recognition of these limitations, such as a narrow theoretical scope and limited empirical support, has led to major revisions of strain theories, represented by Agnew’s general strain theory. In a series of papers, Agnew (1985, 1992, 1994, 2001) argued that more general sources of strain should be included and, in doing so, he expanded the conceptualization of strain and developed a more comprehensive version of strain theory. The focus of general strain theory (GST) is on negative relationships with others, that is, a “relationship in which others are not treating individuals as he or she would like to be treated” (Agnew, 1992, p. 48). Such relationships may result in negative affective states, such as anger, anxiety, and depression, which may pressure adolescents into delinquency if no other coping strategies are present or, if present, not utilized or effective.
The concept strain has been used inconsistently by researchers. To further clarify this concept, Agnew (2001) grouped strain into three categories: objective strains, subject strains, and the emotional response to an event or condition related with subjective strain. Objective strains refer to "events or conditions that are disliked by most members of a given group" (Agnew, 2001, p. 320), such as physical assault, lack of food and shelter. Subjective strains refer to events or conditions that are disliked by the people who are experiencing them. For example, Wheaton (1990) found that people’s evaluation of divorce depended on quality of ones’ prior marriage. Emotional response is closely linked to subjective strain, however, if two individuals have the same subjective evaluation of certain events, their emotional responses may differ. Broidy and Agnew (1997) provided support for this argument in their research which showed that males and females often differed in their emotional response to the same subjective strain.

Unlike classical strain theory which focused on one type of strain (i.e., the failure to achieve positively valued goals), Agnew (1992) recognized three major sources of strain: strain as the failure to achieve positively valued goals, strain as the removal of positively valued stimuli, and strain as the presentation of negative stimuli. The first source of strain, strain from failing to achieve desired and valued goals, is divided into three categories: (1) disjunction between aspirations and expectations/actual achievements, (2) disjunction between expectations and actual achievements, and (3) disjunction between just/fair outcomes and actual outcomes. Classical strain theory focused on the effects of strains from disjunction between aspirations and expectations/actual achievements on delinquency, however, Agnew suggested (1992) that more weight should be given to strains from disjunction between expectations and just/fair outcomes.
The second major source of strain suggested by Agnew (1992) is the removal of positively valued stimuli. The loss of something of value, for example, loss of a boy friend or girl friend, death of close relatives or family members, changing schools or being suspended from school, may produce strain in adolescents. This type of strain may lead to delinquency as adolescents try to prevent the loss, seek revenge against the source, or manage the loss by using alcohol and drugs.

The third major source of strain is the presentation of negative or noxious stimuli such as presence of violence in the community, discrimination by majority culture, and tension/conflict between children and parents. The presence of negative or noxious stimuli may lead to delinquency when adolescents try to escape or alleviate the negative stimuli, or seek revenge against the source of negative stimuli.

One important contribution by Agnew (1992) in GST is the introduction of negative affective states, which refers to disappointment, depression, resentment, or anger. Agnew (1992) states that each type of strain increases the likelihood that individuals will experience one or more of a range of negative emotions; these negative emotions, especially anger, will pressure individuals to take corrective actions to alleviate or eliminate the negative effects of strain. Anger is of special importance in GST. The experience of anger is conducive to delinquency since it increases individuals’ level of felt injury; as a result, they feel pressure to take corrective actions. To cope with negative emotions, especially anger, adolescents may employ different methods to avoid these negative effects. Some of these methods may be delinquent. For example, they may try to escape (run away from home, skip school, use drugs and alcohol), seek revenge against source of the negative affect (fighting), or seek compensation through stealing or property damage.
Research on the relationship between negative relations and delinquency in criminology focuses on the cumulative effects of negative relations (Linsky & Straus, 1986). Though stressful events may have additive or interactive effects on negative affective states and deviant behavior (Thoits, 1983), most researchers use the additive models assuming that stressors are independent from each other. Agnew (1992) adopted the same assumption. Though he suggested that adverse events were more influential when they were (1) greater in magnitude or size, (2) recent, (3) of long duration, and (4) clustered in time, he assumed that each type of strain had the same likelihood of leading to crime. In a recent paper, however, Agnew (2001) argued that some strains might be more likely to lead to crime than others, despite individual characteristics. Strains were most likely to result in crime when they (1) were seen as unjust, (2) were seen as high in magnitude, (3) were associated with low social control, and (4) created some pressure or incentive to engage in criminal coping. Based on these four criteria, Agnew concluded that ten types of strain were more strongly related to crime. These types of strain were: (1) the failure to achieve core goals that can be easily achieved through crime, (2) parental rejection, (3) strict, erratic, and/or excessive supervision/discipline, (4) child neglect and abuse, (5) negative secondary school experience, (6) work in the secondary labor market, (7) homelessness, especially homeless youths, (8) abusive peer relations, (9) criminal victimization, and (10) experiences with prejudice and discrimination based on ascribed characteristics.

To cope with these strains and negative emotions, individuals may employ different strategies to deal with strains and negative emotional response. Agnew (1992) identified three additional schemes for adapting to strain, including cognitive, emotional, and behavioral coping strategies. First, individuals may use psychological techniques of
downplaying the value of desired goals, maximizing positive outcomes by lowering standards or distorting one's estimate of current and/or expected outcomes, and accepting responsibility for the adverse experience. Second, individuals may directly deal with negative emotions by using drugs, doing physical exercise, meditation, and other playacting or “expression work”. Individuals may also use behavioral coping strategies, such as seeking revenge when adversity is blamed on others, seeking, protecting positively valued goals, and/or escaping from negative stimuli. Individuals may use more than one of the adaptive strategies; only some of them are delinquent acts.

The three types of strains, including goal blockage, the loss of positive stimuli, and the presentation of negative stimuli are likely to lead to crime. Consistent with other strain theorists, Agnew (1992) acknowledged that only some strained individuals turn to delinquent acts. Drawn from aggression, equity, and the stress literature, Agnew (1992) suggested that individuals might differ in their dispositions to engage in delinquent versus non-delinquent behavior or are constrained in their choice by various internal and external factors. A partial list of these factors included importance of desired goals in the culture, individual coping resources, social support, and association with delinquent peers. Macro-level factors, such as social environment might also affect the choice of coping strategies (1992). Adolescents, Agnew (1985) argued, were more likely to use delinquent acts to cope with negative affects since they found it difficult to avoid or escape from adverse stimuli legally, and lacked the resources to achieve positively valued goals. For example, adolescents often found it difficult to escape from negative relations with family or school (Agnew, 1985).

In sum, Agnew’s (1992) version of strain theory differs substantially from the classical strain theory. The major contribution of Agnew’s GST is to broaden the scope of
strain theory to include three major categories of sources of stress: the goal blockage, the removal of positively valued stimuli, and the presence of noxious stimuli. In addition, Agnew proposed a link between experience of stress and delinquency by introducing negative affective states, especially anger. Finally, Agnew identified three major coping strategies that individuals used to deal with stress and a list of factors that influenced choice of delinquent versus non-delinquent coping strategies.

Empirical assessment of general strain theory

General strain theory (GST) has been tested by using samples from general populations or student samples since its development in the 1980s. The extant studies have provided tentative support for many aspects of this theory. In these studies, Agnew and other researchers tested three dimensions of general strain theory: (1) strong and positive association between strains and deviant behavior, especially with other social control and differential association variables controlled in the model (Agnew, 1985; Agnew & White, 1992; Hoffman & Su, 1997; Mazerolle, 1998; Paternoster & Mazerolle, 1994); (2) mediating effects of negative affective states, such as anger, depression, and anxiety (Agnew, 1985, 1989; Brezina, 1998; Mazerolle & Piquero, 1997, 1998); (3) and moderating effects of individuals' personal/social resources and social context constraints (Hoffmann & Cerbone, 1999; Hoffman & Miller, 1998; Mazerolle & Piquero, 1997; Paternoster & Mazerolle, 1994).

Association between strains and deviant behavior

Most of research focused on testing positive relationships between various strains identified in GST and delinquency/crime and the contribution of GST variables compared with social control and social learning theories (Agnew, 1985; Agnew & White, 1992; Hoffman and Su, 1997; Mazerolle, 1998; Paternoster and Mazerolle, 1994). Agnew (1985)
examined the effects of presence of noxious stimuli on delinquency, interpersonal aggression, and escape attempts using data from a national survey of male adolescents. Specifically, he examined the effects of aversive school and family environment on male adolescent delinquent behavior. GST theory was partially supported as he found a positive relationship between presence of negative stimuli and delinquency even with social control and social learning variables, including family attachment, school attachment and grades controlled. In a following longitudinal study (Agnew, 1989), the same relationship was found to support conclusions from cross-sectional data. Aversive environment was found to have causal effects on delinquency, but delinquency did not have an effect on adversity.

Agnew and White (1992) tested the effects of a range of negative relationships on delinquency and drug use. Using data from a sample of 1,380 New Jersey adolescents, Agnew and White (1992) provided support for certain aspects of general strain theory. Specifically, a range of noxious stimuli suggested in the theory, such as negative life events, life hassles, negative relationship with adults, parental fighting, and neighborhood problems had a relatively substantial effect on delinquency and drug use in both cross-sectional and longitudinal data. In addition, even when other social control and social differential variables were controlled, the strain variables still contributed to the explanation of delinquency and drug use among adolescents.

A replication from Paternoster and Mazerolle (1994) also provided partial support for general strain theory. Using data from the first and second waves of the National Youth Survey (NYS), Paternoster and Mazerolle (1994) conducted a more comprehensive test and provided some support for the theory. Presence of negative stimuli, such as negative life
events, problems with schools and friends, and living in an unpleasant neighborhood was found to have a positive relationship with involvement in a wide range of delinquent acts.

Almost all studies used sample data from general populations or college students. Two studies, however, tried to generalize GST to a different culture set or another specific population. Piguero and Sealock (2000) tried to test GST in an offending population, youths who have been adjudicated for a variety of offenses. They examined the relationship between strain, a composite measure of physical abuse directed at them and others, and two types of deviant behavior, interpersonal aggression and property offending. As expected, the composite scale of strain had strong positive effects on these two deviant behavior measures. Another study by Maxwell (2001) tested GST in a sample of 961 grade school students surveyed in the Philippines. Familial strains, such as physical harm and witnessing violence between parents/caregivers were predicted to affect children’s self-reported and teachers’ predictions of antisocial behavior. The studies supported GST by showing significant associations between familial strains, especially witnessing violence at home, and children’s self reported antisocial behavior, as well as teachers’ prediction of antisocial behavior.

The application of general strain theory on both males and females was examined by Agnew and Brezina (1997). By examining the effects of peer relation problems, Agnew and Brezina found that contrary to their theoretical hypothesis, peer relationship problems is an important predictor of certain types of delinquency for female adolescents as well as for male adolescents. Studies by Mazerolle (1998), Hoffman and Su (1997) also provided support for the application of general strain theory to both males and females. In both cross-sectional and longitudinal studies, Mazerolle (1998) found evidence of a positive relationship between various strains and delinquency. The difference between genders for most predictors,
however, was not statistically significant except for one exception. Hoffman and Su (1997) reported similar results in a cross-sectional study. A positive relationship between negative life events and delinquent behavior was found in both males and females. These results, however, did not hold in longitudinal data.

In sum, by using cross sectional and longitudinal data, Agnew and others have found positive associations between stressors and a range of deviant behaviors and provided strong support for general strain theory. Stressors such as family strains, school problems, and peer tensions led to deviant behavior including interpersonal aggression, delinquency, escape from school, and use of alcohol or drugs. General strain theory was applied to specific groups such as males, females, problem youths, and different cultures. However, most studies used samples drawn from national youths or college students. To date, no study has specifically examined application of general strain theory in minority groups in the United States, such as African American and American Indian populations.

Mediating effects of negative affective states

One of the essential tasks for researchers testing general strain theory is to detect the mediating effects of negative affective states on a range of deviant behaviors. An intervening process, suggested by Agnew (1985, 1994) such as negative affects, is supposed to mediate relationships between various strains and delinquency/crime. Negative affects include emotional problems such as depression, resentment, frustration, with anger to be the most important in the theory. Most of the empirical research, however, has ignored or failed to test this central hypothesis. Only five studies directly testing this intervening process were found. Agnew (1985, 1989) tested the mediating role of anger in both cross-sectional and longitudinal data. Effects of aversive school and family environments had indirect effects on
delinquency through anger. A test of competing criminological theories, specifically social learning theory, social control theory, and social-psychological strain theory, also provided support for anger as a significant mediating variable in strain/delinquency relationship (Brezina, 1998). Similarly, Mazerolle and Piquero (1997, 1998) reported that strain was significantly related to anger, which increased intention to commit a delinquent act, even when moral constraints and exposure to deviant peers were controlled. Besides anger, a more general test of effects of negative emotions was examined by Brezina (1996). He reported that strain led to a range of negative affective states, including feelings of anger, resentment, anxiety, and depression in both cross-sectional and longitudinal data. In addition, the most recent work by Broidy (2001) revealed the mediating role of anger and other negative emotions. Though results of her study were mixed, she found that various types of strains, such as feelings of unfair outcomes, stress, led to anger and other types of delinquency and crime.

**Moderating effects of individuals' personal/social resources and social context**

As Agnew (1994) and other criminologists suggested, not everyone who experience strain commits delinquent acts and crime. Delinquency and crime is just one way to cope with strain and negative emotional responses. Some efforts have been made to identify factors that determine whether one adapts strain through delinquent acts and crime. Factors suggested by Agnew (1994) included conventional social support, association with deviant peers, self esteem, coping resources, and other social-environment variables. However, contrary to what general strain theory predicted, most studies (Hoffmann & Cerbone, 1999; Hoffman & Miller, 1998; Mazerolle & Piquero, 1997; Paternoster & Mazerolle, 1994) could not find evidence that these factors interact with strains to affect choice of legitimate means
and delinquency/crime coping strategies. For example, Mazerolle and Piquero (1997) found that the basic form of GST model held across groups regardless of their level of moral constraints and exposure to deviant peers. Hoffmann & Miller (1998) tested the "coping strategies" hypothesis among 800 adolescents. Specifically, they assessed the conditional effects of self-efficacy, self-esteem, and peer delinquency on delinquent behavior over a 3-year period by using a latent variable analysis. Though results indicated that strain had a negative effect on delinquency among those high in self-efficacy, self-esteem, or delinquent peers over the initial two years, effects of strain on delinquency were not conditioned by self-efficacy or self-esteem. Changes in strain during a 3-year period affected changes in delinquency only among those who reported no delinquent peers. Overall, the "coping strategies" hypothesis was not supported. Using a hierarchical growth-curve model, Hoffmann and Cerbone (1999) found that the effects of life events on delinquency were not moderated by sex, income, mastery, or self-esteem.

In summary, the mediating hypothesis, a central one in Agnew’s general strain theory, has been tested by few researchers. Five studies were found to directly test this central hypothesis. Limited support was provided by these studies. The relationship between stressors and delinquency was mediated through negative emotional feelings, such as anger, depression, anxiety, and resentment. The additional hypothesis, that is, moderating effects of social context and individuals’ personal/social resources on the relationship between stressors and delinquent behavior, was also tested by a few studies, providing inconsistent results at best. Most of these studies failed to find any significant moderating effects; the direction or strength between stressors and delinquent behavior were similar across groups differing in
self-esteem, self-efficacy, and association with deviant peers. More detailed tests of moderating effects should be addressed in future research.

**Current research and hypothesized models**

Recent research has examined the relationship between various types of strain and delinquency/crime, and the intervening role of anger and other negative emotions in this strain/delinquency relationship in national youth and college student samples. Most of these studies used cross-sectional data or models without considering measurement error and autocorrelations. Though these data are useful to validate the application of general strain theory in general populations, it's not appropriate to generalize these results to other cultural contexts or high-risk groups. To date, only two studies (Maxwell, 2001; Piquero & Sealock, 2000) examined GST in other cultural contexts or specific groups. However, no study has been located to test GST in minorities in the United States, such as African American or American Indian populations.

The current study is a first test of general strain theory in an American Indian adolescent population. Using a sample of American Indian 5th to 8th grade adolescents, this analysis will attempt to test general strain theory by tracing the linkage among the measures of perceived discrimination, negative life events, family conflict, anger and depression, and early onset of substance abuse. This study will contribute to general strain theory from three aspects:

First, as noted above, this is the first study to apply general strain theory in American Indian population. The high prevalence of life stressors such as occurrence of negative life events, discrimination, and economic deprivation and delinquent behavior including alcohol and substance abuse among American Indian adolescents may provide an ideal set to test
general strain theory. For example, will the same association between stressors and delinquent behavior persist in this high-risk group? Will the same moderating factors affect the direction or strength of this association? What are the unique resiliency factors?

Second, this study will investigate the central hypothesis in general strain theory, namely the intervening linkage between strains and delinquent behavior. Only a few studies tested this hypothesis directly (Agnew, 1985, 1989, 1994; Brezina, 1996, 1998; Broidy, 2001; Mazerolle & Piguero, 1997, 1998) in general populations or college student samples. To my knowledge, no one has tested this hypothesis in specific populations, such as minority or other high-risk groups. Two negative emotion constructs, anger and depression, were used to examine if strains have indirect effects on delinquent behavior through these two constructs.

Third, this study tried to detect moderating effects of social context and personal/social resources on association between stressors and negative emotional feelings, as well as the association between negative emotional feelings and delinquent behavior. Very few researches have tested the moderating hypothesis. Of those who examined this hypothesis, most of them focused on the association between stressors and delinquent behavior. To test the moderating effects on the linkage between stressors and negative emotions, and negative emotions on delinquency may help us understand more about the mechanism of stressors and delinquency. For example, will individuals with higher self-esteem be less likely to feel anger or depression when they face the same stressors? Or will stressors have the same effects on negative emotional feelings, but individuals with high self-esteem are more likely to deal with anger in a more non-delinquent way?
Fourth, this study uses structural equation modeling to test general strain theory, which has the advantage of using multiple indicators to represent latent constructs and reduces measurement errors. As discussed before, strains and delinquent behavior are measured by using single indicators in most research. Use of multiple indicators in this study will improve accuracy of measurements. Perceived discrimination, as an indicator of strain, anger and depression, and early onset of drug abuse were latent constructs measured by observable indicators.

**Hypothesis**

Based on general strain theory (Agnew, 1985, 1989, 1994), a general hypothesis model is presented in Figure 3.1. As suggested by GST, I hypothesize that stressors have positive effects on delinquent behavior through negative affective states, such as anger and depression. Negative affective states, as well as early onset of substance abuse, are conditioned by social context (exposure to delinquent peers) and individuals’ personal and social resources, including self esteem, attitudes toward drug use, and enculturation level. Specifically, I hypothesize that:

**Hypothesis 1:** The total effects of stressors on adolescents’ early onset of substance abuse are positive and strong, such that higher levels of strain are associated with increased use and abuse of substances among American Indian 5th through 8th graders.

In this hypothesis, I will examine directions and magnitudes of total effects of each of the four stressors, including single-parent household status, inconsistent parenting, negative life events, and perceived discrimination on early onset of substance abuse among American Indian adolescents. As evidenced in the literature, living in single-parent households, having conflict/tension with parents, frequent occurrence of negative life events and experience of
discrimination in school and communities may lead adolescents to alcohol or other substance use (Dinges et al., 1993; Novins et al., 1998; Oetting et al., 1998; Swaim et al., 1993; Whitbeck et al., 2002). It is hypothesized that each of these four stressors will have significant and positive total effects on early onset of substance abuse among American Indian adolescents.

**Hypothesis 2:** The total effects of single-parent household status, perceived discrimination, negative life events, and family conflict on adolescents’ early onset of substance abuse will be explained by their indirect effects on substance abuse through the measures of anger and depression, especially anger.

This is a central hypothesis proposed based on Agnew’s (1992) general strain theory. One important difference between Agnew’s general strain theory and other strain theory is the introduction of negative emotional feelings linking stressors and deviant behavior. The mediating hypothesis has been supported by a few studies (Agnew, 1985; 1989; Brezina, 1998) in data obtained from general populations. The only study that examined mediating effects of anger on alcohol use (Oetting et al., 1989) in American Indian literature, however, provided at best inconsistent results. In hypothesis 2, I hypothesize the overall effects of each stressor, including single-parent household status, inconsistent parenting, negative life events, and perceived discrimination on substance abuse will be explained by its indirect effects through measurement of depression and/or anger.

**Hypothesis 3:** The associations between strain and negative affective states (anger and depression) will be moderated through measures of social context (exposure to deviant peers), and personal resources (self esteem, tolerance of deviance, enculturation level), such that stronger effects of strains on negative emotions will be observed among those with low
self esteem, high tolerance of deviance, high exposure to deviant peers, and low identification with American Indian culture.

This hypothesis is not clearly stated in Agnew’s general strain theory; however, the stress literature shows abundant evidence that negative emotional feelings such as depression and anger are moderated by social context and personal/social resources (Aseltine and Kessler, 1993; Harnish, Aseltine, & Gore, 2000; Lazarus & Folkman, 1984; Mattlin, Wethington, & Kessler, 1990; Wheaton, 1990). Literature on American Indian research also provides support for this hypothesis (Dick et al., 1993; Hussong et al., 1994). In hypothesis 3, I hypothesize the interaction effects between stressors (single-parent household status, inconsistent parenting, negative life events, and perceived discrimination) and moderator variables (association with deviant peers, self esteem, tolerance of deviance, and enculturation level) will be statistically significant in multiple regression models so that there will be weak associations between stressors and substance abuse among groups of high self-esteem, low tolerance of deviance, low exposure to deviant peers, and high identification with American Indian culture.

*Hypothesis 4:* The associations between negative emotional feelings (anger and depression) and deviance will be moderated through measures of social context (exposure to deviant peers) and personal resources (self esteem, tolerance of deviance, enculturation level), such that stronger effects of negative emotional feelings on early abuse of substances will be observed among those with low self esteem, high tolerance of deviance, low identification with American Indian culture, and high exposure to deviant peers.

As noted by strain theorists, only some individuals who experience life stressors will commit crimes or engage in deviant behavior. Agnew argues that some individuals may be
better equipped to cope with negative emotional feelings so that they do not lead to crime or deviant behavior. In hypothesis 4, I hypothesize that the interaction effects between negative emotional feelings (e.g., anger, depression) and moderator variables (association with deviant peers, self esteem, tolerance of deviance, and enculturation level) will be statistically significant in multiple regression models so that weak associations between negative emotional feelings and substance abuse among groups of high self-esteem, low tolerance of deviance, low exposure to deviant peers, and high identification with American Indian culture can be found.
Personal/social resources and social context

Life stressors

Negative affective states

Early onset of substance abuse

Figure 3.1. Hypothesized model
CHAPTER IV
SAMPLE AND METHODS

Sample

The Three Villages Project, conducted between 1998-1999 on three American Indian reservations in the Upper Midwest, is a research and prevention partnership between each of the reservations and the research team. The purpose of the baseline survey was to (1) establish baseline prevalence for alcohol and drug use on the reservations among the 5th through 8th grade American Indian adolescents, and (2) identify precursors to early onset of use and protective factors associated with non-use or delayed onset of use.

The project was designed in partnership with the participating reservations. Prior to the application funding, the research team was invited to work on the three reservations, and tribal resolutions were obtained. In each participating reservation, an advisory board was established, which consisted of members from all reservation districts and was approved by tribal councils. The size of the advisory boards ranged from 5 people to 10 people. The advisory boards were responsible for handling difficult personnel problems, approving focus group questions, suggesting focus group members, and advising on questionnaire development. The advisory boards were also responsible for reading and approving reports written by the research team before submitting them for publication.

To ensure quality of data collection, almost all the interviewers were tribal members trained by the research team. Families were recruited using methods recommended by tribal elders that were based on cultural values and traditions involving asking for help. The recruitment process was approved by tribal advisory board. Before the interview, the interviewers or staff members met with each family individually and offered tobacco to the
primary caretakers, discussed the project, and left information in the form of a brochure. This was followed with a return visit or call back to those who did not immediately agree to participate. Using this elder’s suggestion, 212 (83.5%) of the eligible families completed the baseline survey.

The data for the current paper were collected through interviews with 212 American Indian children (115 boys and 97 girls) who participated in the baseline survey in the Three Villages Project in the Upper Midwest. To be eligible to participate in this study, the children had to be enrolled tribal members and in the 5th through 8th grades. The sample frame, a list of all enrolled families with a child in the eligible age range, was provided by each of the participating tribes. All of the children’s families lived on or near their respective reservations. Tribal families living on, or within 50 miles of one of the reservations were included in the sampling frame. In households where there were two or more eligible children, the target child was selected at random. The other grade-eligible children were recruited as siblings and also interviewed. The data of these siblings, however, were not included in this research. The baseline sample for recruitment consisted of 286 families. Thirty-two (11.2%) of them were found to be ineligible to participate because either the family or the target child had moved out of the area. Of the remaining 254 families, 212 were recruited and interviewed. All interviews were conducted in home visits by one or two interviewers.

**Sample Characteristics**

The sample of 212 American Indian adolescents was made up of 97 girls and 115 boys. Their ages ranged from 9 years to 16 years with an average age of 12.1 years for girls
and 12.2 years for boys. The sample was well distributed across grade levels with about one-fourth of the children in each grade.

Household size ranged from two to twelve people with an average of five people per household. Based on parents’ reports, over one-third (38%) of the children lived in single-parent households that were predominantly female-headed. Specifically, 26% were single mothers, four percent were single fathers and eight percent were “other single parents”, including single grandparent, other relative or foster parent. Though the majority of the children (62%) lived in dual-parent households, one-third of the children had never lived with their biological fathers; 32% had lived with their biological father at some point in their lives but not present; and 34% currently lived in a household with their biological fathers. Due to this distribution of family structure, much of the family data was collected from mothers or female heads of households.

Typical of the demographics of American Indian Reservations (Sandefur & Liebler, 1997), many of the children live in low-income homes. Predictably, the distribution of income in this sample varies greatly according to family structure. On the whole, the median income level reported was $15,000 to $20,000. However, dual parent households were three times as likely to report incomes of $35,000 or more as compared to single parent households (24% vs. 7%). In contrast, half (52%) of single parent homes reported incomes less than $15,000, compared to only a quarter (24%) of two-parent homes. Financial assistance was also common, where 4 out of 10 households reported receipt of some form of aid. Specifically, over half of single parent households and a third of two-parent families received food stamps or family assistance of some type (AFDC-TANG) in the past year.

**Measurements**
Based on Agnew's general strain theory and previous literature of American Indian adolescent studies, four types of measurements were identified in this paper: life stressors (e.g., negative life events) as exogenous variables, negative affect (e.g., anger and internalization) as mediating variables, personal and social resources (e.g., affiliation with deviant peers) as moderator variables, and substance abuse as outcome variables. In addition, control variables including age, gender, and household income were also included in the analysis.

Control variables

Three variables were controlled in the model, age, gender, and income. The age of adolescents was measured by asking respondents how old they were at the time of the interview. The range of age was 9 to 16 years. The average age of the target adolescents was of 12.1 years. Gender was coded as a dummy variable (0=female, 1=male). There were nearly equal numbers of boys and girls (54% male, 46% female).

Household income per capita was created through a two-step process. First, our ordinal measure of household income was recoded to the midpoints of 10 categories ranging from 1 “below $5,000” to 10 “$75,000 or more”. Second, the recoded income variable was divided by the total number of people living in the household to produce a per capita income figure. Because of the skewed distribution of this measurement, a logarithm transformation was performed to create a more normally distributed variable. On average, Native American families in our sample reported an income of $5,413 per family member.

Life stressors

Four life stressor measurements were included in this model: single-parent household status, perceived discrimination, negative life events, and inconsistent parenting.
Single parent household status was coded as a dummy variable (0=single parent, 1=dual parents). Over one-third (38%) of the children lived in single-parent households that were predominantly female-headed. Specifically, 26% were single mothers, four percent were single fathers and eight percent were “other single parents”, including single grandparent, other relative or foster parent.

Negative life events is a standard measure in the stress literature and have their most consequential effects when they are uncontrollable and undesirable (Mirowsky and Ross, 1989; Pearlin, 1989; Turner, Wheaton, and Lloyd, 1995; Wheaton, 1990). They were measured by summing up eleven negative events experienced by American Indian adolescents in the last twelve months. Items included whether a friend died, moved to a different house, a close relative died, a pet died, a close friend moved away, someone close seriously ill or injured, failed a class in school, being seriously ill or injured, close relatives committing suicide, and family members being victims of crime were asked. Each item was coded as a dummy variable with 0 = no and 1 = yes.

Table 4.1 showed that these American Indian 5th to 8th graders had experienced a large amount of negative life events. Death and injury of family members or respondents themselves were reported mostly frequently by these adolescents. More than half of these youths reported death of a pet (58%). Almost half of them reported death of a close relative (45.8%), and a close person being hurt or injured (42.9%). One out of five (18.9%) of them reported being seriously ill or injured, and more than one-quarter of these adolescents (26.9%) reported that a family member was a victim of a crime. Negative experience in school, such as failing a class, was also reported by almost half of the respondents (42.9%).
Table 4.1. Frequency distribution for negative life events scalea

<table>
<thead>
<tr>
<th>Item b</th>
<th>Percentc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Did a friend die?</td>
<td>87.3</td>
</tr>
<tr>
<td>Did you move to a different house?</td>
<td>65.6</td>
</tr>
<tr>
<td>Did a close relative die?</td>
<td>48.1</td>
</tr>
<tr>
<td>Did a pet die?</td>
<td>41.0</td>
</tr>
<tr>
<td>Did you have a close friend move away?</td>
<td>59.9</td>
</tr>
<tr>
<td>Did you break up with a close friend?</td>
<td>73.6</td>
</tr>
<tr>
<td>Was a person close to you hurt or injured?</td>
<td>55.2</td>
</tr>
<tr>
<td>Did you fail a class in school?</td>
<td>61.8</td>
</tr>
<tr>
<td>Were you seriously ill or injured?</td>
<td>80.2</td>
</tr>
<tr>
<td>Did a close relative commit suicide?</td>
<td>96.2</td>
</tr>
<tr>
<td>Was a family member a victim of a crime?</td>
<td>68.4</td>
</tr>
</tbody>
</table>

aN=212
bQuestion stem was worded as follows: “Please tell me if the following things have happened to you in the past 12 months.”
cPercentages may not sum to 100% due to rounding.
<table>
<thead>
<tr>
<th>Variable and Response Categories(^b)</th>
<th>Percent(^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Life Events</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>5.2</td>
</tr>
<tr>
<td>1</td>
<td>9.9</td>
</tr>
<tr>
<td>2</td>
<td>17.5</td>
</tr>
<tr>
<td>3</td>
<td>22.6</td>
</tr>
<tr>
<td>4</td>
<td>19.8</td>
</tr>
<tr>
<td>5</td>
<td>12.3</td>
</tr>
<tr>
<td>6</td>
<td>5.2</td>
</tr>
<tr>
<td>7</td>
<td>4.2</td>
</tr>
<tr>
<td>8</td>
<td>2.8</td>
</tr>
<tr>
<td>9</td>
<td>0.5</td>
</tr>
</tbody>
</table>

\(^a\)N=212.

\(^b\)Distribution of the final computed subscale.

\(^c\)Percentages may not sum to 100% due to rounding.
More than one-third reported moving to a different house (34.0%) or close friends moving away (39.2%) in the last 12 months.  

The scale was created by summing the eleven individual items, with high values indicating more negative life events. The frequency distribution of this scale is presented in Table 4.2. The majority of youth (95%) had experienced at least one of the eleven negative life events. More than two-thirds of them (67.5%) experienced two or more events, and one quarter of them (25%) experienced five or more events. In the present analysis, Cronbach’s $\alpha$ for the scale was .47. Small values of Cronbach’s $\alpha$ for negative life event scale is typical in the literature (Wills, 1988) since negative life events do not necessarily occur at the same time for every respondent in a given sample.

*Perceived discrimination* was created as a latent construct made up of three factors derived from factor analysis of a eleven-item discrimination scale. Response categories for the eleven-item scale ranged from 0 = never to 2 = always. Cronbach’s alpha for the full scale was .80. *Global discrimination* was a five item measure consisting of general experiences such as being ignored because of ethnicity, being excluded from activities, verbal insults, threats of harm and hearing racial slurs. *Authority discrimination* was made up of three items that included being treated disrespectfully by a store clerk, hassled by police because of ethnicity, or having adults suspect them of doing something wrong because they were American Indian. *School discrimination* consisted of two items concerning whether the adolescents’ teachers had acted surprised when they did well or expected them not to do well because of their ethnicity. Detailed description of frequency distribution is presented in the results section (see Table 5.3).
Inconsistent parenting is a two-item scale which measured the inconsistency of mother’s discipline. The respondent was asked how often his/her mother punished him/her one time, and did not punish at other time for the same thing, and how much did the punishment depend on her mood. Response categories were recoded so that 1=never, 2=sometimes, and 3=always. The correlation between these two items was 0.27. A mean procedure was performed to create a composite scale for inconsistent parenting. About one quarter of adolescents (23.5%) reported that their mom had a consistent discipline, two thirds (65.2%) said their moms sometimes punish them inconsistently, and approximately one out of ten (11.3%) reported their moms always punished them inconsistently. The pattern was similar when asked if the punishment depended on mom’s mood. Approximately one quarter of them (22.8%) reported their moms never punished them on their mood, less than two thirds (59.4%) said sometimes their moms did, and others (17.8%) reported their moms always punished them on their mood.

Negative affect

The latent construct, adolescents’ feeling of anger, was made up of three items in which the respondents were asked the degree to which they were quick tempered, were hotheaded, and flied off the handle. The response categories were recoded so that 1=none of the time, 2=some of the time, 3=most of the time. Cronbach’s alpha for the anger scale was .65. Table 4.3 shows the frequency distribution for anger items. Less than half of the adolescents reported that they would fly off the handle some of the time or most of the time (47.7%), and were hotheaded some of the time or most of the time (42.9%). A surprisingly high percentage of American Indian adolescents reported that they were quick tempered most of the time (23.1%), or some of the time (38.7%). Principal component analysis indicated
there was only one factor with an eigenvalue higher than 1, which explained 58.7% of the variance of these three component items.

*Internalizing symptoms* was measured with the internalization subscales from the Youth Self-Report (Achenbach, 1991). A latent construct was developed consisting of the three subscales: withdrawn symptoms, somatic symptoms, and anxiety/depression. For each component, a number of questions were asked. These included items such as feeling lonely, dizzy, unloved, fearful, worthless, sad, shy, pain in the eyes, skin, stomach, etc. The response categories for all of the Youth Self-Report items were 0 = not true, 1 = somewhat true, 2 = very true. Cronbach’s alpha for this scale was .83.

*Withdrawn symptoms* consists of seven items, including rather being alone, refusing to talk, being secretive, shy, lack of energy, sad or depressed, and keeping from getting involved with others. Cronbach’s alpha for this scale was .52. A sum procedure was performed to create a composite variable for withdrawn symptom scale. Table 4.4 shows the frequency distribution of these seven items. About one-third of youth reported that they would rather be alone, lack energy, unhappy or sad. Half of them reported that they were shy, kept from getting involved with others, and was secretive or keep things to himself/herself. In addition, more than one quarter of them (27.8%) reported that it was true or somewhat true that they refused to talk.

*Somatic symptoms* consists of nine items, including feeling dizzy, overtired, having pains, headaches, nausea, having problems with eyes, having rashes or other skin problems, getting stomachaches, and vomiting. Cronbach’s alpha for this scale was .68. A sum procedure was performed to create a composite variable for somatic symptom scale. Table 4.5 shows the frequency distribution of these nine somatic symptom items. Most of the
Table 4.3. Frequency distribution for anger scale items

<table>
<thead>
<tr>
<th>Item</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>None of the time</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am quick tempered</td>
<td>23.1</td>
<td>38.7</td>
<td>35.4</td>
<td>2.8</td>
</tr>
<tr>
<td>I am hotheaded</td>
<td>7.5</td>
<td>35.4</td>
<td>50.9</td>
<td>6.1</td>
</tr>
<tr>
<td>I fly off the handle</td>
<td>8.5</td>
<td>39.2</td>
<td>47.2</td>
<td>5.2</td>
</tr>
</tbody>
</table>

\(^a\)N=212

\(^b\)Question stem was worded as follows: “Please tell me if the following things have happened to you in the past 12 months.”

\(^c\)Percentages may not sum to 100% due to rounding.

Table 4.4 Frequency distribution for withdrawn symptom items\(^a\)

<table>
<thead>
<tr>
<th>Item</th>
<th>Not true</th>
<th>Somewhat true</th>
<th>Very true</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would rather be alone than with others</td>
<td>66.51</td>
<td>27.36</td>
<td>4.72</td>
<td>1.42</td>
</tr>
<tr>
<td>I refuse to talk</td>
<td>72.17</td>
<td>23.11</td>
<td>3.30</td>
<td>1.42</td>
</tr>
<tr>
<td>I am secretive or keep things to myself</td>
<td>43.40</td>
<td>40.57</td>
<td>14.62</td>
<td>1.42</td>
</tr>
<tr>
<td>I am shy</td>
<td>46.23</td>
<td>38.68</td>
<td>13.21</td>
<td>1.89</td>
</tr>
<tr>
<td>I don't have much energy</td>
<td>66.51</td>
<td>24.53</td>
<td>6.60</td>
<td>2.36</td>
</tr>
<tr>
<td>I am unhappy, sad, or depressed</td>
<td>66.04</td>
<td>27.83</td>
<td>4.25</td>
<td>1.89</td>
</tr>
<tr>
<td>I keep from getting involved with others</td>
<td>55.66</td>
<td>33.96</td>
<td>8.49</td>
<td>1.89</td>
</tr>
</tbody>
</table>

\(^a\)N=212

\(^b\)Percentages may not sum to 100% due to rounding.
<table>
<thead>
<tr>
<th>Item</th>
<th>Not true</th>
<th>Somewhat true</th>
<th>Very true</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel dizzy</td>
<td>81.13</td>
<td>14.62</td>
<td>2.83</td>
<td>1.42</td>
</tr>
<tr>
<td>I feel overtired</td>
<td>62.74</td>
<td>28.77</td>
<td>5.66</td>
<td>2.83</td>
</tr>
<tr>
<td>I have aches or pains</td>
<td>59.43</td>
<td>32.55</td>
<td>6.60</td>
<td>1.42</td>
</tr>
<tr>
<td>I get headaches</td>
<td>24.53</td>
<td>52.36</td>
<td>21.23</td>
<td>1.89</td>
</tr>
<tr>
<td>I have nausea, feel sick</td>
<td>76.89</td>
<td>19.81</td>
<td>2.36</td>
<td>0.94</td>
</tr>
<tr>
<td>I have problems with my eyes</td>
<td>52.83</td>
<td>35.85</td>
<td>10.38</td>
<td>0.94</td>
</tr>
<tr>
<td>I have rashes or other skin problems</td>
<td>82.08</td>
<td>12.26</td>
<td>4.25</td>
<td>1.42</td>
</tr>
<tr>
<td>I get stomachaches or cramps</td>
<td>48.11</td>
<td>40.09</td>
<td>10.85</td>
<td>0.94</td>
</tr>
<tr>
<td>I have vomiting, throwing up</td>
<td>77.36</td>
<td>17.45</td>
<td>3.77</td>
<td>1.42</td>
</tr>
</tbody>
</table>

aN=212

bPercentages may not sum to 100% due to rounding.
adolescents reported certain physical symptoms. For example, more than half reported that
they had headaches, about 40% reported they got stomachaches or cramps, and about one-
third reported they had aches or pains, or had problems with eyes.

*Anxiety/depression symptoms* is a 15-item scale, including statements such as I feel
lonely, cry a lot, try to hurt or kill myself, might do something bad, I feel that I have to be
perfect, I feel that no one loves me, others are out to get me, worthless, nervous or tense,
fearful, guilty, self-conscious, suspicious, suicide ideation, and worry a lot. Cronbach’s
alpha for this scale was 0.78. Table 4.6 shows the frequency distribution of these fifteen
items. More than half of these adolescents reported that it was true or somewhat true that
they worried a lot, about 40% reported that they were afraid they might do something bad,
they were suspicious, or they felt worthless or inferior. About one tenth of these adolescents
reported that they tried to hurt or kill themselves (8%), or thought about killing themselves
(9.4%).

**Moderating variables**

Four moderating variables were included in this paper: affiliation with deviant peers,
adolescent self-esteem, tolerance of deviance, and enculturation. To simplify interpretation
of interaction effects in later analysis, all these four variables were dichotomized into dummy
variables.

*Affiliation with deviant peers* consists of 5 items. Respondents were asked how much
of their three closest friends smoke, drink alcohol, have sexual intercourse, and have trouble
with their parents and in school. The response category was 0 = not at all, 1 = one or more.
A count procedure was then performed to create this scale. This measurement was
dichotomized into a dummy variable, with 1 indicating high association with deviant peers,
Table 4.6. Frequency Distribution for Anxiety/depression Scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Not true</th>
<th>Somewhat</th>
<th>Very true</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel lonely</td>
<td>69.3</td>
<td>25.9</td>
<td>3.3</td>
<td>1.4</td>
</tr>
<tr>
<td>I cry a lot</td>
<td>75.5</td>
<td>19.3</td>
<td>4.2</td>
<td>0.9</td>
</tr>
<tr>
<td>I try to hurt or kill myself</td>
<td>91</td>
<td>7.1</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>I am afraid I might think or do something bad</td>
<td>57.1</td>
<td>37.3</td>
<td>4.7</td>
<td>0.9</td>
</tr>
<tr>
<td>I feel I have to be perfect</td>
<td>60.4</td>
<td>32.1</td>
<td>6.6</td>
<td>0.9</td>
</tr>
<tr>
<td>I feel that no one loves me</td>
<td>82.5</td>
<td>13.7</td>
<td>2.8</td>
<td>0.9</td>
</tr>
<tr>
<td>I feel that others are out to get me</td>
<td>74.1</td>
<td>20.8</td>
<td>4.2</td>
<td>0.9</td>
</tr>
<tr>
<td>I am nervous or tense</td>
<td>87.3</td>
<td>8.5</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td>I feel worthless or inferior</td>
<td>61.3</td>
<td>34.4</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td>I am too fearful or anxious</td>
<td>69.8</td>
<td>25.9</td>
<td>2.8</td>
<td>1.4</td>
</tr>
<tr>
<td>I feel too guilty</td>
<td>78.3</td>
<td>19.3</td>
<td>1.4</td>
<td>0.9</td>
</tr>
<tr>
<td>I am self conscious or easily embarrassed</td>
<td>55.2</td>
<td>35.4</td>
<td>8.5</td>
<td>0.9</td>
</tr>
<tr>
<td>I am suspicious</td>
<td>61.3</td>
<td>33</td>
<td>3.8</td>
<td>1.9</td>
</tr>
<tr>
<td>I think about killing myself</td>
<td>89.6</td>
<td>8</td>
<td>1.4</td>
<td>0.9</td>
</tr>
<tr>
<td>I worry a lot</td>
<td>40.1</td>
<td>46.7</td>
<td>12.3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

aN=212

bQuestion stem was worded as follows: “Please tell me if the following things have happened to you in the past 12 months.”

cPercentages may not sum to 100% due to rounding.
and 0 indicating low association. About 44% of these adolescents were categorized as high association with deviant peers. Cronbach’s alpha for the affiliation with deviant friend scale was .72.

Adolescent self-esteem was a 11-item scale. Respondents were asked if they were proud of themselves, liked themselves, were lucky, got along well with others, did things well, smart, good at games, good looking, and were liked by others. The response categories were 0=none of the time, 1=some of the time, 2=most of the time. A mean procedure was first performed to create this scale. Similar to affiliation with deviant friends scale, this scale was dichotomized into a dummy variable, with 0 indicating low self-esteem and 1 indicating high self esteem. About 53% of these adolescents were categorized as high self-esteem. Cronbach’s alpha for this scale was .76.

Adolescent tolerance of deviance was a 5-item scale. Respondents were asked if they thought it was bad to cheat, to tell a lie, to steal, to skip school, and to do things that parents don’t want them to do. Response categories were 1 = always bad, 2 = sometimes bad, 3 = never bad. A mean procedure was first performed to create this scale and then dichotomized into a dummy variable, with 0 indicating low tolerance of deviance and 1 indicating high tolerance. About one-third of adolescents were grouped into the high tolerance category. Cronbach’s alpha for this scale was .49.

Enculturation was assessed as a factor score that factored three basic elements: 1) participation in traditional activities, 2) identification with American Indian culture, and 3) traditional spirituality. The traditional activities scales were developed through focus groups with elders and consisted of three dimensions: participation in traditional pow-wow
activities, knowledge and use of the tribal language, and involvement in 12 types of
traditional activities. Cultural identification was measured with the Oetting and Beauvais
(1991) American Indian cultural identification items. These six questions address the degree
to which adolescents participated in American Indian culture, how much they live by
American Indian culture, and the degree to which they feel successful in their culture. Items
were re-worded to fit the specific tribal group. Response categories ranged from 1 = a lot to
4 = none. The scale scores were computed by taking the mean response to the six items. As
has been demonstrated in other work with this scale, it had high internal consistency
(Cronbach’s alpha=.81). Traditional spirituality was assessed by three global items (the only
ones approved by tribal advisors for use in the survey). The adolescents were asked if they
participated in traditional spiritual activities (0 = no, 1 = yes), how often they participated in
such activities (1 = everyday; 7 = never), and the importance of traditional spiritual values
for how they led their lives (1 = very important and 4 = not at all important). The mean value
of the three standardized values indicated levels of spirituality. The overall enculturation
scale was developed by factoring these three dimensions. The scale was then dichotomized
into two groups, with 0 indicating low level of enculturation and 1 indicating high level of
enculturation. The 212 adolescents in this study were split into these two groups evenly.

Outcome variable: substance abuse

Substance abuse was assessed as a latent construct made up of three dimensions
representing behaviors that are both normatively and legally sanctioned for children and
adolescents. The term “abuse” referred to the prohibited behavior of alcohol and other drug
use and associated problems among this targeted age group. Alcohol problems were assessed
by an index of the number of problems experienced in the past year by the adolescents due to alcohol use. These included problems at school, with family, drinking enough to get a hangover, becoming depressed or sad when drinking and if they had to drink more to get drunk. The index ranged from 0-5 problems. Cronbach's alpha was .79. *Alcohol use and abuse* was measured with items that characterized drinking patterns. The adolescents were asked whether they drank, got drunk, or binged (drank more than five drinks at one time). The response categories for these three items were 0 = no, 1 = lifetime, 2 = past year, 3 = past month. The composite alcohol use and abuse measurement was computed based on these three items such that 0 = never drink alcohol in lifetime, 1 = has ever been drunk in lifetime but no binge drinking, 2 = binge drinking and drunk in lifetime but not in the last 30 days, 3 = binge drinking and drunk in the last 30 days. *Substance use* was assessed by a count of the number of substances the adolescent reported using in the last six months. The measure ranged from 0-11 substances and included inhalants, depressants, stimulants, and hallucinogens as well as tobacco, alcohol, and marijuana. Factor loadings for the three measures were .73 for alcohol problems, .97 for alcohol use and abuse and .73 for number of substance used.

**Analytic procedure**

Structural equation models were used to examine effects of negative stressors on early onset of substance abuse, as well as mediating effects of negative emotional feelings such as anger and depression. In contrast to more traditional regression analysis, structural equation models provide a mechanism for explicitly taking into account measurement errors in the observed variables. In addition, SEM models enable researchers to study both direct and indirect effects of various variables included in the model.
To test associations between stressors with early substance abuse, a baseline model was first fit to the data. This baseline model included only negative stressors such as perceived discrimination, negative life events, inconsistent parenting, and the outcome variable substance abuse, with age, gender, household per capita income, and single parent household status controlled. The second and the third models were mediating models that examined intervening processes between stressors and substance abuse. In the second model, YSR internalization was placed into the model as a mediating variable. In the third one, anger was used as a mediating variable. The fourth model combined model two and model three to analyze effects of stressors on substance abuse directly or indirectly through anger and internalization.

For these structural equation models, model chi-square and other fit indices, such as Comparative Fit Index (CFI), standardized root mean squared residual (SRMR), and root mean squared error of approximation (RMSEA) were used to examine model fit. Model modification indices, as well as a residual correlation matrix, were used as a guide to improve model fit. Model chi-square is a simultaneous test to assess whether model covariance matrix is the same as covariance matrix generated from sample data, and is the typical statistic to assess model fit in structure equation models. This statistic, however, almost always leads to model rejection when sample size is large or when the model has many parameters (Hayduk, 1987; Wheaton, 1987). In this study, the Chi-square statistic was mainly used to examine whether model improvement was significant among hierarchical models due to the approximate chi-square distribution of chi-square difference between models (Bollen, 1989). However, there is a lot of debate about Chi-square and other fit indexes to assess model fit. Some researchers suggested using CFI, SRMR, RMSEA, and
other goodness of fit indexes to supplement chi-square statistic (Bollen, 1989; Hu & Bentler, 1999). Following Hu & Bentler (1999), models with a value for CFI close or higher than .95, a value for SRMR close or lower than .08, and a value for RMSEA close or lower than .06 were considered relatively good fit between the hypothesized model and the observed data.

Two approaches frequently used by researchers to analyze moderating effects when using covariance structural models include stacked models, which compare covariance structural models across different groups, and a more traditional manner by including product terms for the two-way interaction in regression/logistic regression models. Because of the small sample size of this data, the second approach was used in this analysis. As mentioned in the previous section, moderating variables (such as affiliation with deviant peers) were dichotomized into dummy variables to simplify interpretation. The cutoff points were set at approximately mean level if no natural gaps in these variables were found (Aiken & West, 1991). Multiplicative interaction terms between moderating variables and stressor indicators, and moderating variables and negative affective states were created to test the moderating effects of social context and personal/social resources on anger/depression and early onset of substance abuse. All component variables were standardized before creating product terms to rid the measures of nonessential ill-conditioning, such as multicollinearity (Aiken & West, 1991). Two sets of interactions were created, stressors and moderating variable interactions to predict anger and depression, and negative affective states (anger and depression) and moderating variables interaction to predict early substance abuse. Overall, forty interactions were tested.
In order to help interpret the interactions, the ordinary least square regression was used to graph interactions at several levels of a particular variable (i.e., anger). The values of a particular variable were set at two standard deviations below the mean, one standard deviation below the mean, mean, one standard deviation above the mean, and two standard deviations above the mean. These values were then substituted into the regression equation (Aiken & West, 1991). Substance abuse at these different levels of a particular variable was plotted for certain groups, for instance, adolescents with high self-esteem versus adolescents with low self-esteem.

Residual analysis was used to examine whether certain assumptions for ordinary linear regression were violated (Ott, 1993). A check of the constant variance assumption was addressed with a plot of the residuals versus independent variables. The normality of errors was tested by using a normal probability plot of the residuals. In order to determine whether any influential data point existed, Cook’s distance, Leverage values, and DBeta were used. The most influential data point was deleted and the model was re-fitted to check if there was any difference. This data point was kept if no significant difference was found.
CHAPTER V
RESULTS
Descriptive Analysis

Early onset of substance abuse

Substance use and abuse among American Indian adolescents has been reported by many researchers (Beauvais, 1992, 2000; Beauvais et al., 1996; Oetting et al., 1989). In a national study conducted by PRIDE (Bureau of Justice Statistics, 1998), 41.8 percent of 6th to 8th graders reported using alcohol in the past year. The number of current drinkers in our sample was almost the same (43%). Forty seven percent of young adolescents reported ever having a drink of any type of alcohol beverages, which is similar to the 44 percent of American Indian 4th and 5th graders who reported lifetime use in a study by Moncher, Holden, and Trimble (1990). Although slightly more girls than boys reported initiation in our sample (49% of girls vs. 45% of boys), this difference is nonsignificant and, boys start drinking at a slightly younger age than girls (9.67 v. 10.31, p<.08). Heavy involvement in alcohol and substance use was also reported by adolescents. Twenty nine percent reported being drunk before, about 9% reported binging drinking and drunk in the last 30 days, and 12% reported to have at least one alcohol problem, including problems with school, family, getting drunk, getting a hangover, and drinking when depressed. In addition, adolescents reported using on average two substances such as alcohol, marijuana, or cigarettes in the last six months.

Figure 5.1 shows alcohol use and abuse, alcohol problems, and substance use among these adolescents across ages 10-15 years. Similar to the general population, alcohol and other substance use, and problems that resulted from alcohol use increased with age among
American Indian adolescents in the Midwest. Alcohol use and substance abuse increased dramatically when adolescents reached age 12. The amount of alcohol and substance use was similar for adolescents at age 10 and 11. These numbers doubled when they reached age 12, and increased dramatically from ages 12 to 15. For example, youths reported using one substance at age 10 and 11, 1.87 at age 12, 2.7 at age 13, and more than 3 substances at age 14 and 15. Problems related to alcohol use were highly prevalent; 4% to 12% percent of youths aged 10 to 13 reported alcohol problems. The prevalence more than doubled for youths aged 14 (27%) and tripled for youths aged 15 (33%).

Table 5.1 shows alcohol and other substance use and abuse among these 212 American Indian adolescents in terms of gender, income, and single parent household status. No significant differences of alcohol use and abuse, substance use, and alcohol problems was found between boys and girls. Adolescents living in single parent households were more likely to use and abuse alcohol than those living with dual parents. The difference of substance use and alcohol problems, however, showed no statistical significance. Income also affects alcohol and other substance use. Youths living in families with less than $15,000 household income were more likely to use and abuse alcohol than those with higher household income. Again, the difference of substance use and alcohol problems was not significant across different household income levels.

Prevalence of stressors among American Indian Adolescents

The adverse environment such as being poor, a minority, and living in a single parent household presented some other negative stressors, which are experienced by these American Indian adolescents in their daily lives. These negative stressors include discrimination experienced in school and other public places, occurrence of negative life events such as
Figure 5.1 Substance use across age among American Indian adolescents
Table 5.1. Frequency distribution of alcohol use and abuse, substance use, and alcohol problems

<table>
<thead>
<tr>
<th></th>
<th>Alcohol use and abuse</th>
<th>Substance use</th>
<th>Alcohol problems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.75</td>
<td>1.81</td>
<td>0.11</td>
</tr>
<tr>
<td>Female</td>
<td>0.70</td>
<td>2.16</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Single parental status</strong></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single parent</td>
<td>0.90</td>
<td>2.35</td>
<td>0.13</td>
</tr>
<tr>
<td>Dual parent</td>
<td>0.64</td>
<td>1.78</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 15,000</td>
<td>0.15</td>
<td>1.00</td>
<td>2.22</td>
</tr>
<tr>
<td>15,000-30,000</td>
<td>0.09</td>
<td>0.54</td>
<td>1.37</td>
</tr>
<tr>
<td>30,000</td>
<td>0.12</td>
<td>0.48</td>
<td>2.00</td>
</tr>
<tr>
<td>Above 30,000</td>
<td>0.11</td>
<td>0.76</td>
<td>2.34</td>
</tr>
</tbody>
</table>

*N=210
* p<.05 **p<.01
death and injury of family members, friends, and themselves. The high percentage of single parent households also makes parenting a more difficult task, thus causing tensions between parents and children.

**Negative life events.** Negative life events were very prevalent in American Indian adolescents' daily lives. To examine prevalence of negative life events, I compared these 5-8th graders in our data with 7th graders from the Iowa Youth and Families Project data. Ten items regarding negative life events were the same in these two projects. Table 5.2 shows the percentage of these American Indian 5th-8th graders and rural Iowa 7th graders that experienced these negative events in the last 12 months. Out of the ten items, eight of them were statistically significant. Compared with rural Iowa 7th graders, American Indian adolescents reported much higher occurrences of negative life events. About one-third (34.1%) of them reported that they moved to a different house, compared with 18.8% among Iowa 7th graders. More American Indian adolescents (40.1%) reported that a close friend moved away, versus 27.3% among Iowa 7th graders. More importantly, many more American Indian adolescents reported serious negative life events such as violence, death and serious illness than Iowa youths. One-fourth of American Indian adolescents (26.2%) reported that a family member was a victim of a crime compared to 0.9% of Iowa youths. Eighteen percent of American Indian youths reported that they were seriously ill or injured, twice that of Iowa rural youths (9.1%). American Indian adolescents also reported more deaths of close relatives (45.7% versus 37.7%) and pets (52.0% versus 37.9%). In terms of school performance, 40% of American Indian youths reported that they failed a class in school, versus 15% of Iowa youths. Surprisingly, more Iowa youths reported that someone close to them were seriously ill or injured, 48.8% versus 38.7%. Overall, compared with
Table 5.2. Adolescent Negative Life Events: Three Villages and Iowa Youth and Families Project

<table>
<thead>
<tr>
<th>Life Events</th>
<th>Three Villages 5-8&lt;sup&gt;th&lt;/sup&gt; graders said “YES”</th>
<th>IYFP 7&lt;sup&gt;th&lt;/sup&gt; graders said “YES”</th>
</tr>
</thead>
<tbody>
<tr>
<td>“In the past 12 months …”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Did a friend die?</td>
<td>12.9%</td>
<td>11.8%</td>
</tr>
<tr>
<td>2. Did you move to a different house?</td>
<td>34.1</td>
<td>18.8 **</td>
</tr>
<tr>
<td>3. Did a close relative die?</td>
<td>45.7</td>
<td>37.7 *</td>
</tr>
<tr>
<td>4. Did a pet die?</td>
<td>52.0</td>
<td>37.9 **</td>
</tr>
<tr>
<td>5. Did you have a close friend move away?</td>
<td>40.1</td>
<td>27.3 **</td>
</tr>
<tr>
<td>6. Did you break up with a close friend?</td>
<td>23.8</td>
<td>27.7</td>
</tr>
<tr>
<td>7. Was someone close to you seriously ill or injured?</td>
<td>38.7</td>
<td>48.8 **</td>
</tr>
<tr>
<td>8. Did you fail a class in school?</td>
<td>40.1</td>
<td>15.3 **</td>
</tr>
<tr>
<td>9. Were you seriously ill injured?</td>
<td>17.9</td>
<td>9.1 **</td>
</tr>
<tr>
<td>10. Was a family member a victim of a crime?</td>
<td>26.2</td>
<td>0.9 **</td>
</tr>
</tbody>
</table>

* p-value less than .05  
** p-value less than .01
Iowa youths, American Indian youths reported more negative life events, especially those related with more serious events such as violence, serious injury, and crime related to themselves, family members, and relatives.

**Perceived discrimination.** Even though our sample included adolescents aged from 10 to 15 years, they reported high rates of discrimination. Table 5.3 shows frequency distributions of perceived discrimination items. Approximately half of the youths have been insulted by other kids (47.2%) or someone else yelled a racial slur or racial insult at them (50.0%). More than half of the adolescents (51.5%) reported that teachers were surprised when they did something really well. Around one-quarter to one-third of these youths reported that they had been ignored by other kids, been treated unfairly, had teachers who had low expectations of them, been suspected by adults, or been treated disrespectfully by business. Around 10 to 15 percent of them reported that someone threatened to harm them physically or the police hassled them because they were American Indians.

**Correlation matrix**

Bivariate correlations of the scales that made up the latent constructs for the model suggested some interesting patterns in the data (see Table 5.4). As expected, age was strongly positively correlated with each of the measures of substance abuse indicating a strong age effect among the 5th-8th graders. Age was also moderately correlated with negative stressors, such as the occurrence of negative life events and discrimination items. With the increase of age, these adolescents are more likely to hang around with deviant peers and have higher tolerance of deviance. Compared with males, female adolescents were more likely to report somatic and anxiety symptoms, as found in other studies. However, gender was not significantly correlated with any of substance abuse indicators, indicating the same
Table 5.3. Frequency Distribution for Discrimination Scale Items\(^a\)

<table>
<thead>
<tr>
<th>Item(^b)</th>
<th>Never</th>
<th>A few times</th>
<th>Always</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global discrimination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being ignored</td>
<td>64.6</td>
<td>34.0</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Being excluded</td>
<td>75.9</td>
<td>22.2</td>
<td>1.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Verbal insults</td>
<td>51.4</td>
<td>43.4</td>
<td>3.8</td>
<td>1.4</td>
</tr>
<tr>
<td>Threat of harm</td>
<td>85.8</td>
<td>11.3</td>
<td>1.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Racial slurs</td>
<td>48.6</td>
<td>47.6</td>
<td>2.4</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Authority discrimination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being treated disrespectfully by a store clerk</td>
<td>68.9</td>
<td>27.8</td>
<td>2.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Hassled by police</td>
<td>90.6</td>
<td>6.1</td>
<td>2.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Having adult suspect of doing something wrong</td>
<td>71.7</td>
<td>25.5</td>
<td>0.9</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>School Discrimination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers act surprisingly when they do well</td>
<td>43.9</td>
<td>39.2</td>
<td>12.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Teachers not expect to do well</td>
<td>69.8</td>
<td>25.9</td>
<td>1.9</td>
<td>2.4</td>
</tr>
</tbody>
</table>

\(^a\)N=212

\(^b\)Question stem was worded as follows: “I want to ask you some questions about whether or not you have experienced racial discrimination. For each statement, tell me if this situation has happened to you never, a few times, or if it always happens to you.”

\(^c\)Percentages may not sum to 100% due to rounding.
Table 5.4. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.06</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>0.10</td>
<td>0.07</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single parent</td>
<td>0.04</td>
<td>0.02</td>
<td>0.10</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative life</td>
<td>0.16*</td>
<td>-0.05</td>
<td>-0.25**</td>
<td>-0.14</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Global</td>
<td>0.16*</td>
<td>-0.05</td>
<td>-0.16*</td>
<td>-0.12</td>
<td>0.45**</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Institutional</td>
<td>0.19*</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.10</td>
<td>0.42**</td>
<td>0.56**</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>discrimination</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>0.13</td>
<td>-0.04</td>
<td>-0.06</td>
<td>-0.14</td>
<td>0.23**</td>
<td>0.27**</td>
<td>0.28**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>discrimination</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Inconsistent</td>
<td>0.04</td>
<td>-0.18*</td>
<td>-0.07</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.17*</td>
<td>0.16*</td>
<td>0.11</td>
<td>1.00</td>
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</tr>
<tr>
<td>parenting</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick tempered</td>
<td>0.11</td>
<td>-0.11</td>
<td>0.02</td>
<td>0.01</td>
<td>0.23**</td>
<td>0.24**</td>
<td>0.22**</td>
<td>-0.06</td>
<td>0.24**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Hotheaded</td>
<td>0.11</td>
<td>-0.02</td>
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*N=179  **p<.01  *p<.05
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risk of substance abuse among female and male American Indian adolescents. One of the most interesting patterns in the correlation matrix is, consistent with Agnew's general strain theory, the occurrence of negative life events such as death of close relatives and friends moving away, was significantly correlated with indicators of anger and depression measurements. The negative life events indicator was also strongly correlated with each substance use and abuse indicators. Self-reported occurrence of negative life events was also highly correlated with perceived discrimination. Similar to the measurement of negative life events, perceived discrimination was moderately correlated with most anger and substance abuse items. Adolescents with higher perceived discrimination were also more likely to join deviant peers. The measurement of inconsistent parenting had similar associations with anger and substance abuse. Almost all indicators of anger and depression were significantly correlated with each other, indicating strong correlations between negative emotional feelings. Anger items were found to be strongly associated with substance use and abuse, however, there were very few significant associations between depression and alcohol and substance use and abuse items.

In summary, the correlation matrix showed some interesting patterns for further analysis. As expected, age was an important factor for substance use and abuse. With the increase of age, adolescents experienced more life stressors such as negative life events and perceived discrimination, had more contact with deviant peers and higher tolerance of deviance. As a result, older adolescents had higher prevalence of alcohol and substance use and abuse. Stressors such as negative life events, perceived discrimination, and inconsistent parenting were significantly associated with negative emotional feelings such as anger and depression, and early substance use and abuse. Consistent with Agnew's general strain
theory, anger items were strongly associated with use and abuse of alcohol and other substances. In contrast, most depression items were not significantly associated with measurement of substance abuse.

**Structural Equation Model**

**Life Stressors and Early Onset of Substance Abuse**

Structural equation modeling (Muthen & Muthen, 1998) was used to investigate potential mediators of the relationship between stressors and substance abuse. A baseline model (Figure 5.2) was first run to establish the relationship between the two constructs.

The baseline model controlled for age, gender, family per capital income, and single-parent household status. Two of the three stressor variables, negative life events, and inconsistent parenting were strongly associated with early substance abuse. As expected, negative life events was positively associated with use of alcohol and other drugs ($\beta = .59$, $p < .01$), as well as inconsistent parenting ($\beta = .18$, $p < .01$). Age was also strongly positively associated with substance use ($\beta = .28$, $p < .01$). Compared with females, males were much more likely to use alcohol and other illicit drugs ($\beta = .28$, $p < .01$). Family per capita income and single mom status were included in the model but had no statistically significant effects.

The perceived discrimination construct, unexpectedly, was not significantly associated with substance abuse in this model. The lack of significant association may be due to the strong correlation between perceived discrimination and other stressors, such as experience of negative life events and erratic parenting. For example, there was a strong positive association between perceived discrimination and negative life events ($\gamma = .59$, $p < .01$), as well as inconsistent parenting ($\gamma = .18$, $p < .05$). Perceived discrimination was also strongly correlated with age and single mom household status; the older the child, the more
Figure 5.2. The baseline model

\[ R^2 = .44 \]

* \( p < .05 \)

** \( p < .01 \)

\( N = 177 \)

\( \chi^2 = 33.12, df = 31, p = .36 \)

CFI = .99, RMSEA = .02

SRMR = .04
likely they would report higher levels of discrimination ($\gamma = .28, p < .05$). Children living in single mother households also reported higher levels of discrimination ($\gamma = -.16, p < .05$). The effects of perceived discrimination on early onset of substance abuse may be partly explained by these highly correlated variables.

The baseline model fit the data very well. The chi-square value was non-significant ($\chi^2 = 33.12, df = 31, p = .36$), with CFI = .99. The root mean square of approximation is .02, and the standardized root mean square residual is .04. Forty-four percent of the variance of early onset of substance abuse was explained by this baseline model.

Life Stressors, Internalization, and Early Onset Substance Abuse

The first mediating model examined the effects of stressors on internalizing symptoms and early onset of substance abuse. As in the baseline model, age, gender, per capita income, and single mother household were controlled (Figure 5.3). Among the three life stressor indicators, negative life events was positively associated with internalization symptoms among the 5th through 8th grade adolescents ($\beta = .19, p < .05$). Negative life events and inconsistent parenting were also positively associated with early substance abuse ($\beta = .29, p < .01; \beta = .22, p < .01$). Similar to the baseline model, there was no statistical significant association between perceived discrimination and internalization symptom and early substance abuse, due to strong correlation between perceived discrimination with other life stressors and control variables. The association between internalization symptoms and early substance abuse, however, was not statistically significant. Our basic assumption based on general strain theory was not supported. When age, gender, income, single mother household status and various stressors such as negative life events, perceived discrimination, and inconsistent parenting were controlled, internalization symptoms did not lead to
substance abuse among this age group. Age was negatively associated with internalizing symptoms ($\beta = -.18, p < .05$). Younger children were more likely to report internalizing symptoms than older children. Age was positively associated with early substance use ($\beta = .29, p < .01$); the older the child, the more likely they were abusing substances. As expected, girls were more likely to report symptoms of internalization than were boys ($\beta = -.28, p < .01$). Compared with girls, boys were also more likely to use alcohol and other illicit drugs ($\beta = .33, p < .01$). Per capita income and single mom household status were controlled in the model, however, no significant effects were found.

The internalization model fit the data well. Though the chi-square value was close to statistical significance ($\chi^2 = 77.47, df = 59, p = .05$), other fit indexes revealed that this model fit the data well. The CFI is .96, the root mean square of approximation is .04, and the standardized root mean square residual is .05. The model explained 19 percent of the variance of internalization symptoms and 45 percent for early onset of substance abuse.

In summary, although one of the stressor indicators, negative life events increased the likelihood of internalization symptoms among 5th through 8th grade American Indian children, internalization symptoms did not mediate the relationship between early onset of substance abuse and stressors, such as negative life events and erratic parenting. Perceived discrimination did not lead to higher levels of internalizing symptoms and use of alcohol and other illicit drugs, due to strong correlation between perceived discrimination and other stressors, especially the experience of negative life events. Girls and younger children were more likely to report higher level of internalizing symptoms than were boys and older children. Older children were more at risk for substance abuse.

Stressors, Anger, and Early Onset Substance Abuse
Figure 5.3. The depression model
The second mediating model investigated one of the central hypotheses proposed in terms of general strain theory. In this model, another negative affect variable, anger, was introduced and tested whether anger mediated the effects of life stressors such as negative effects, inconsistent parenting, and perceived discrimination on early substance abuse (Figure 5.4). As in earlier models, age, gender, per capita income, and single mom household status were controlled in the model.

The model as specified in Figure 5.4 is acceptable. The goodness-of-fit chi-square test yields 108.25 (59 degrees of freedom), with $p<0.01$. The chi-square test, however, almost always leads to model rejection in large samples (Hayduk, 1987; Wheaton, 1987). Though the goodness-of-fit chi-square is significant, other fit indexes revealed that this model was acceptable. The CFI is .89, the root mean square of approximation is .07, and the standardized root mean square residual is .06. These indexes, however, also indicate lack of fit somewhere in this model.

Diagnostic information provided by the M-Plus program indicated that lack of fit of this model could primarily be attributed to the absence of correlated measurement errors among the observed variables. First, the disturbance terms among items of one latent constructs may be correlated. Second, certain disturbance terms between latent constructs could be correlated. These correlations may be due to the fact that the variables in question share certain unknown influences that have been omitted from the model.

Using M-plus modification indexes as a guide, the model was modified to allow for several correlated disturbance terms and was re-estimated. The model modification index suggested that two residual correlations, the correlation between alcohol problems and two other anger items, being hotheaded, and flying off the handle, could be freed (Figure 5.5).
The correlation matrix (Table 5.4) also showed the same pattern. The correlations between these two anger items, being hotheaded and flying off the handle, and two substance abuse items, alcohol abuse and number of substance abuse, were similar to each other, ranging from .21 to .29. The correlations between being hotheaded and alcohol use problem (γ = .30, p < .01), and between flying off the handle and alcohol use problem (γ = -.39, p < .01), however, were much higher. After these two residual correlations were freed, the model improved significantly (Δχ² = 21.9, Δdf = 2, p = .00). The CFI is .94. The root mean square error of approximation was .05, and the standardized root mean square residual was .06. Based on these fit indexes, it is concluded that this more constrained model had a good fit with the data (Hu & Bentler, 1999). The estimates of factor loadings and structural coefficients, and significance level, at the same time, were almost the same with the more parsimonious anger model (See Figure 5.4).

Since the substantive findings were the same between the more restrained model and the modified model allowing for correlated measurement errors, the results are discussed in terms of the more parsimonious model (Figure 5.4). The results indicated that there was a strong positive association between experience of negative life events and anger (β = .26, p < .01), as well as erratic parenting (β = .29, p < .01). Surprisingly, there was a positive association between single-parent household status and anger, which indicated that children who lived in the dual parents family were more likely to report higher level of anger (β = .26, p < .01). As hypothesized, there was strong positive association between anger and early onset of substance use (β = .59, p < .01). Our research hypothesis was supported in this model. Effects of life stressors on early substance abuse among these American Indian 5th through 8th graders were completely mediated through anger. Specifically, except for a
Figure 5.4. The anger model

* p < .05 ** p < .01
N = 177
χ² = 108.25 df = 59 p = .00
CFI = .89 RMSEA = .07
SRMR = .06
Figure 5.5. The anger model (less constrained)
significant association between age and alcohol and drug use ($\beta = .29$, $p < .01$), and gender and alcohol and drug use ($\beta = .16$, $p < .05$), there was no statistical significant association between early onset of substance use and other endogenous variables. Similar to the baseline model and internalization model, the perceived discrimination scale was not significantly associated with anger and substance abuse. The model explained 27 percent of the variance of adolescents’ feeling of anger and 62 percent of the variance of early onset substance abuse.

Stressors, Anger, Depression, and Early Onset Substance Abuse

In the final model, the anger model and depression model were combined to predict early onset of substance abuse among American Indian 5th to 8th grade adolescents (Figure 5.6). Similar to the anger model, the fit of this final model was acceptable. Though the chi-square value was statistically significant ($\chi^2 = 170.11$, df = 98, $p = .00$), other fit indexes show this model was acceptable. The CFI is .89, the root mean square of approximation is .06, and the standardized root mean square residual is .06.

The same strategy employed in the anger model was used to improve the full model. Using M-plus modification indexes as a guide, the model was modified to allow for several correlated disturbance terms and was re-estimated. As suggested by the anger model, two residual correlations, alcohol problems with being hotheaded, and alcohol problem with flying off the handle, were freed to improve the model fit. The model improved significantly ($\Delta \chi^2 = 21.1$, $\Delta$df = 2, $p = .00$). The CFI is .92. The root mean square error of approximation was .06, and the standardized root mean square residual was .06. Though the Comparative Fit Index was below .95, a cutoff value suggested by Hu & Bentler (1999), the combination of RMSEA and SRMS indicated this model had a good fit. The estimates of factor loadings
Figure 5.6. The full model

* p < .05  ** p < .01
N=175
\( \chi^2 = 170.11, \text{df}=98, p=.00 \)
CFI = .89  RMSEA = .06
SRMR = .06
and structural coefficients, at the same time, were almost the same with the more parsimonious full model (See Figure 5.7). For example, the association between adolescents’ feeling of anger and early onset of substance abuse was .62 in the less constrained model, and .63 in the more parsimonious model. The significance level remained the same for all factor loadings and estimates of structural coefficients.

Results were discussed in terms of the more parsimonious models (Figure 5.6) since the substantive findings were the same. The results were consistent with what the previous two models suggested. Adolescent’s feeling of anger predicted higher level of alcohol and other illicit drug use ($\beta = .63, p < .01$); internalization symptoms, however, was not significantly associated with early onset of substance abuse. Similar to the anger model, two out of the three life stress indicators, experience of negative life events ($\beta = .24, p < .01$), and erratic parenting ($\beta = .30, p < .01$) were positively associated with adolescents’ feeling of anger. Only negative life events was weakly associated with internalization symptoms ($\beta = .20, p < .05$). Age was negatively associated with internalization symptom scale ($\beta = -.18, p < .05$); the younger the adolescents, the more they reported higher levels of internalization symptoms. Compared with boys, girls reported higher level of internalization ($\beta = -.28, p < .01$). As shown in the anger model, living in single mother household was positively associated with adolescents’ feeling of anger ($\beta = .26, p < .01$); adolescents who lived with dual parents families were more likely to report feelings of anger than those who only live with their single parents. Perceived discrimination, like the previous models, was not associated with the two negative affect variables, anger and internalization, and early onset of substance abuse. This model explained 28 percent of the variance of adolescents’ feeling of
Figure 5.7. The full model (less constrained)
anger, 19 percent of the variance of internalization symptoms, and 62 percent of the variance of early onset of substance abuse.

In summary, consistent with general strain theory proposed by Agnew, I found stressors such as negative life events and erratic parenting predicted delinquent behavior such as increasing use of alcohol and other drugs. More importantly, the mediating models showed that most of these effects were indirect through expression of anger. For example, the effects of inconsistent parenting on early onset of substance abuse were completely mediated through expression of anger. Another negative emotional feeling measurement, internalization, however, did not mediate the effects of stressors on early substance abuse.

**Moderating effects of personal/social resources and social context**

As shown in the overall hypothesized model, a key aspect of GST is its acknowledgement of social context and personal/social resources that have the potential to either exacerbate or alleviate the effects of stressors on delinquency, such as early substance abuse. Two approaches frequently used by researchers to analyze moderating effects when using covariance structural models include: stack models which compare covariance structural models across different groups, and a more traditional manner, which includes product terms for the two-way interaction in regression/logistic regression models. Because of the small sample size of this data, the second approach was used in the analysis. To examine moderating effects predicted by general strain theory, association with deviant peers, self esteem, tolerance of deviance, and enculturation level were introduced into the analysis as moderator variables. Multiplicative interaction terms between these moderating variables and stressor indicators, and moderating variables and negative affective states were
created to test the moderating effects of social context and personal/social resources on anger/depression and early onset of substance abuse.

Before creating these multiplicative interactions, a composite scale for each of these latent variables, such as perceived discrimination, anger, depression, and early substance abuse used in previous structural equation models was created. Perceived discrimination was re-created by averaging the 10 items used in previous analysis. The anger measure was created by averaging the three indicators used in the structural equation models: I am quick tempered, I am hotheaded, and I fly off the handle. Depression was measured with the adolescent YSR internalization scale which was created by averaging YSR internalizing items including symptoms of withdraw, depression, and somatic. Substance abuse was a factor score created by factoring the three items, alcohol problems, alcohol abuse, and substance abuse used in the structural equation models. Principal component method was used and only one factor was obtained. Seventy-six percent of the variance was explained by this factor.

One problem of testing interaction effects in ordinary least-square regression model is multicollinearity between component variables and their product terms. Following Aiken & West (1991), I first created interaction terms by standardizing component variables to rid the measures of nonessential ill-conditioning, such as multicollinearity. All continuous stressor measurements including perceived discrimination, negative life events, and inconsistent parenting, and negative affective state measurement, such as anger and depression, were standardized before creating product terms. Two sets of interactions were created, stressors and moderating variable interactions to predict anger and depression, and negative affective
states (anger and depression) and moderating variables interaction to predict early substance abuse. Overall, forty interactions were tested.

The first set of interactions was to test moderating effects on negative affect, such as expression of anger and depression. Similar to the first part of structural equation model in the previous section, in the ordinary least-square regression models predictors such as occurrence of negative life events, perceived discrimination, inconsistent parenting, single parent household status, and one moderating variable (such as affiliation with deviant peers) were included, with age, gender, and household income controlled. One different interaction term was added in each of these regression models. Table 5.5 shows the significance level of these interactions. They provided little support for Hypothesis 4. Out of the thirty-two interactions that were tested, only four were significant at the .05 level or marginally significant at the .10 level. Out of these four significant interactions, two were contrary to the effects that would be predicted by general strain theory. For instance, perceived discrimination in the context of high levels of peer delinquency predicted less expression of anger. Similarly, occurrence of negative life events in adolescents with higher tolerance of deviance predicted lower level of depression. The two interactions significant at 0.5 level were consistent with the effects that general strain theory predicted. Inconsistent parenting in the context of high levels of peer delinquency predicted higher level of depression, as well as among adolescents with higher tolerance of deviance. Overall, the first set of interactions provided little support for our Hypothesis three and general strain theory.

The second set of interactions tested interaction effects of anger/depression and moderating variables such as affiliation with deviant peers, self esteem, tolerance of deviance, and enculturation to predict early abuse of substances. Similar to the first set of
Table 5.6. Significance level of interactions predicting early substance abuse

<table>
<thead>
<tr>
<th>Interaction terms</th>
<th>Early substance abuse</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Beta</td>
<td>Significance Level</td>
<td></td>
</tr>
<tr>
<td>Deviant peers*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.51</td>
<td>0.35</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-0.07</td>
<td>-.05</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Self esteem*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>-0.25</td>
<td>-0.17</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>0.09</td>
<td>0.07</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Tolerance of deviance*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.3</td>
<td>0.17</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-0.01</td>
<td>-0.01</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Enculturation*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.02</td>
<td>0.01</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-0.17</td>
<td>0.014</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05  **p<.10; N not significant
interaction tests, the ordinary least-square regression models included predictors such as occurrence of negative life events, perceived discrimination, inconsistent parenting, single parent household status, anger or depression, and one moderating variable (such as affiliation with deviant peers), with age, gender, and household income controlled. One different interaction term between anger/depression and moderating variables was added in each of these regression models. Table 5.6 showed significance levels of these interaction effects.

Overall, Table 5.6 provided strong support for general strain theory. Out of eight interactions tested, three were statistically significant at .05 level. As expected from analysis of a previous section, interactions between depression and other moderating variables did not have significant effects on early substance abuse; none of the interactions related to depression were significant. However, one noteworthy finding that emerged from this analysis was that all of the significant interaction effects were associated with our anger measurement. Out of four interactions that were tested, three were statistically significant at 0.05 level.

Table 5.7 shows results of regression models predicting early onset of substance abuse among these 5th-8th grade adolescents. Similar to structural equation models discussed before, these regression models included stressors, such as perceived discrimination, negative life events, inconsistent parenting, single parent household, and other control variables. In particular, these regression models tested interaction effects of anger/depression and social context and personal/social resources measurements.

Model 1 tested the interaction between anger and affiliation with deviant peers. Though our measure of anger was not statistically significant, affiliation with deviant peers and the interaction had strong effects on early onset of substance abuse. Figure 5.8 plots
Table 5.6. Significance level of interactions predicting early substance abuse

<table>
<thead>
<tr>
<th>Interaction terms</th>
<th>Early substance abuse</th>
<th></th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Beta</td>
</tr>
<tr>
<td>Deviant peers*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.51</td>
<td>0.35</td>
<td>**</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.07</td>
<td>-0.05</td>
<td>N</td>
</tr>
<tr>
<td>Self esteem*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>-0.25</td>
<td>-0.17</td>
<td>*</td>
</tr>
<tr>
<td>Depression</td>
<td>0.09</td>
<td>0.07</td>
<td>N</td>
</tr>
<tr>
<td>Tolerance of deviance*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.3</td>
<td>0.17</td>
<td>*</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.01</td>
<td>-0.01</td>
<td>N</td>
</tr>
<tr>
<td>Enculturation*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>0.02</td>
<td>0.01</td>
<td>N</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.17</td>
<td>0.014</td>
<td>N</td>
</tr>
</tbody>
</table>

*p<.05 **p<.10; N not significant
Table 5.7. Ordinarily least square regression model predicting early onset of substance abuse among American Indian adolescents (N=210)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
<th>Model 3</th>
<th></th>
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</thead>
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<td>Beta</td>
<td>B</td>
<td>Beta</td>
<td>B</td>
<td>Beta</td>
</tr>
<tr>
<td>Constant</td>
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<td>***</td>
<td>-2.78</td>
<td>***</td>
<td>-2.97</td>
<td>***</td>
</tr>
<tr>
<td>Age</td>
<td>0.14</td>
<td>0.19</td>
<td>0.17</td>
<td>0.24</td>
<td>0.17</td>
<td>0.23</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.13</td>
<td>-0.07</td>
<td>-0.09</td>
<td>-0.04</td>
<td>-0.12</td>
<td>-0.06</td>
</tr>
<tr>
<td>Household income</td>
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<td>0.05</td>
<td>0.10</td>
<td>0.07</td>
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<td>0.07</td>
</tr>
<tr>
<td>Single parent household</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.03</td>
<td>-0.02</td>
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<td>0.01</td>
</tr>
<tr>
<td>Perceived discrimination</td>
<td>0.15</td>
<td>0.14</td>
<td>0.11</td>
<td>0.10</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Negative Life events</td>
<td>0.16</td>
<td>0.16</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
<td>0.23</td>
</tr>
<tr>
<td>Inconsistent parenting</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.02</td>
<td>-0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Anger</td>
<td>-0.02</td>
<td>-0.02</td>
<td>0.39</td>
<td>0.38</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Deviant peers</td>
<td>0.51</td>
<td>0.25</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self esteem</td>
<td></td>
<td></td>
<td>-0.11</td>
<td>-0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolerance of deviance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.32</td>
<td>0.15</td>
</tr>
<tr>
<td>Anger*deviant peers</td>
<td>0.51</td>
<td>0.35</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger*self esteem</td>
<td></td>
<td></td>
<td>-0.25</td>
<td>-0.17</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Anger*tolerance of deviance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.30</td>
<td>0.17</td>
</tr>
<tr>
<td>Model R²</td>
<td>0.29</td>
<td>0.35</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.10  **p<.05  ***p<.01
the interaction to aid interpretation. Following Aiken & West (1991), I used five points to indicate anger level: 2 standard deviations (SD) below the mean, 1 standard deviation below the mean, mean, 1 standard deviation above the mean, and 2 standard deviations above the mean. Since substance abuse measurement was centered and standardized before running regression models, the measurement of substance abuse stands for number of standard deviations below or above mean 0.

Figure 5.8 shows substance abuse for two groups, adolescents with high deviant peer affiliation and adolescents with low deviant peer affiliation at different anger levels. Substance abuse was very low, ranging from .23*SD below mean to .33*SD below mean, for individuals who did not have strong associations with deviant peers, regardless of anger level. High level of affiliation with deviant peers, however, strongly predicted increasing substance abuse with the increase of anger level. Substance abuse increased from .74SD below the mean when anger level is extremely low to 1.2SD above the mean when anger level is extremely high. The average substance abuse was .23SD above mean for adolescents with strong association with deviant peers and .28SD below mean for those without.

Model 2 in Table 5.7 tested interaction between anger and adolescent self-reported self-esteem in predicting early onset of substance abuse. Self-esteem measurement was not statistically significant, however, the anger measure had a positive effect on early substance abuse, and the interaction had a negative effect. Similar to model 1, the interaction was plotted (Figure 5.9) to aid interpretations. With the increase of anger, substance abuse increased for both groups: adolescents with high self reported self-esteem, and adolescents with low self reported self-esteem. The increase of substance abuse, however, was much steeper for adolescents with low self-esteem. The use of substance abuse increased from
Figure 5.8. Interaction between anger and affiliation with deviant peers predicting early onset of substance abuse.
Figure 5.9. Interactions between anger and self-esteem predicting early onset of substance abuse
.32SD below the mean to .22SD above the mean for adolescents with high self-esteem; for adolescents with low self-esteem, substance abuse jumped from .71SD below the mean to .83SD above the mean when anger level increased from -2SD to 2SD.

Model 3 in Table 5.7 tested the interaction between anger and adolescents’ tolerance of deviance. Anger and tolerance of deviance, and the interaction between these two measurements were statistically significant at .05 level. Adolescents with high tolerance of deviance were more likely to use and abuse substances. Figure 5.10 plotted the interaction to aid interpretations. Substance abuse increased when anger increased from 2SD below the mean to 2SD above the mean for both groups: adolescents with high tolerance of deviance and adolescents with low tolerance. Similar to the interaction between anger and self-esteem (Figure 5.9), the increase of substance abuse was much steeper when individuals had high tolerance. For example, substance abuse increased from 0.67SD below the mean to 1.06SD above the mean for adolescents with high tolerance; the increase was only from .39SD below the mean to 0.14SD above the mean for adolescents with low tolerance.

The test of moderating effects has mixed support for general strain theory. On the one hand, there is not much support for the hypothesis that social context and personal/social resources affect the direction or strength of relationship between experience of negative relationship with others and negative emotional feelings such as anger and depression. In addition, no significant interaction effects between depression scale and other moderating variables such as affiliation with deviant peers were found. However, the core hypothesis derived from general strain theory is strongly supported. Though anger leads to delinquent behavior such as substance abuse, the strength of this relationship is affected by other external factors. Adolescents with high self-esteem, low tolerance of deviance, and low
Figure 5.10. Interaction between anger and tolerance of deviance predicting early onset of substance abuse.
association with deviant peers are more likely to choose non-delinquent ways versus delinquent ways to cope with stressors.

Another concern is the weak statistical power for interaction terms in multiple regression, particularly when the interactions involve one or more continuous variables (Aiken & West, 1991). The power of a statistical test is the probability that the test will detect an effect in a sample when a true effect exists in the population. It depends on several parameters, such as sample size, the magnitude of the true effect, the level of significance, and the specific statistical test. In this study, because of the small sample size ($n = 212$), it is possible that some small or medium effect size interactions can not be detected.
Prevalence of substance abuse and life stressors

Consistent with previous research, this study found a high prevalence of alcohol and other substance use and abuse among American Indian 5th-8th graders (Beauvais et al., 1989; Beauvais, 1996, 2000; Benchman et al., 1991; Johnston et al., 1998). Forty-seven percent reported ever having a drink of any type of alcohol beverage, 43 percent were current drinkers, and 29 percent had been drunk at some time. Though it’s difficult to compare prevalence rates with other studies due to differences of geographical locations, culture, and sampling methods, these numbers are comparable with similar age groups in previous research (Bureau of Justice Statistics, 1998; Moncher, Holden, & Trimble, 1990).

Beauvais (1996, 2000) reported alcohol use and heavy alcohol involvement among American Indian 7th-12th graders. He estimated that 68 percent of them used alcohol in their lifetime, and about 20% were heavily involved with alcohol and other drugs. Though this sample had a younger age group which consisted of 5th-8th graders, it was clear that a large number of these adolescents were heavily involved with alcohol and other drugs. About 9 percent reported binging drinking and drunk in the last 30 days. In addition, alcohol was used in combination with other drugs, such as marijuana, cocaine, and psychedelics, with a mean of two substances used in the last six months. Twelve percent reported alcohol problems, such as being drunk, drinking when depressed, getting a hangover, and having problems with school and family. Though the measurement is different, this 10 percent 5th-8th graders may share a lot of similarities with the heavy use of substance group discussed by Beauvais (1996, 2000). Considering the age of this sample, these adolescents may be the
core of an alcohol-drug subculture and consist of the major component of the heavy use group in the future.

Consistent with the literature in the general population and American Indian adolescent studies (Benchman et al., 1991; Johnston et al., 1998; Mitchell, Douglas, Novins, & Holmes, 1999), age was significantly associated with alcohol and drug use. Alcohol and substance abuse increased dramatically when these adolescents reached age 12. Alcohol problems reported by these adolescents doubled when they reached age 14, and tripled when they were 15 years old. Frequent alcohol and other substance abuse for the older youths may be explained by Oetting and his colleagues’ (1989) peer cluster theory, which argues that peer association is a main cause for binge drinking and other substance abuse. When adolescents reach puberty, they may spend more time hanging around with their friends, which provides more positive attitudes toward alcohol use and more opportunities to drink alcohol and use other substances.

Surprisingly, there was no gender difference in bivariate analysis in terms of substance abuse. Though the prevalence of alcohol and almost all other drug categories is higher for boys in general population (Johnston et al., 1998), it is not the case in this sample. No significant difference was found between boys and girls in terms of alcohol use and abuse, substance use, and alcohol problems, which indicated that American Indian girls had the same risk of becoming alcohol and drug users as boys. Other factors also affected alcohol and substance use among American Indian adolescents. Adolescents living in single-parent households reported more alcohol use and abuse, as well as youths living in low income families. In summary, bivariate analysis revealed that older youths, youths living in
single-parent households, and/or youths living in low income families had high risk of using
and abusing alcohol.

Research has documented a list of factors that are associated with alcohol and other
substance use among American Indian adolescents, including rapid change of family
structure, poverty, violence, school problems, and cultural conflict (Bechtold et al., 1994;
Gray, 1998). The high prevalence of these life stressors may lead adolescents to use alcohol
and other drugs to cope with the pressure. Though high prevalence of poverty and broken
families was well known among American Indian reservations, it was still a surprise when I
found the highly frequent occurrence of negative life events facing American Indian
adolescents. Comparison of stressful life events occurring to Iowa 7th graders and this
sample showed that American Indian adolescents had many more stressful life events,
ranging from one time to thirty times higher. More importantly, the big differences came
from serious events such as academic problems, self-reported illness or injury, and family
member being a victim of a crime. Furthermore, American Indian adolescents encountered
frequent racial discrimination in schools and other public places, even though our sample
consisted of very young adolescents. For example, almost half of them reported being
insulted by other kids verbally or someone yelled a racial slur or racial insult at them; more
than half of the teachers were surprised when they did well in school.

Agnew (1992) proposed three strategies to cope with strain: cognitive, behavioral,
and emotional coping strategies. Only some of them were delinquent. American Indian
adolescents, however, may be more likely to choose delinquent coping strategies such as use
of alcohol or drugs. Bivariate analysis showed strong association between experience of
stressors with use and abuse of alcohol, alcohol problems, and substance abuse. For
example, experience of negative life events, a major source of stressors for American Indian adolescents, was highly correlated with alcohol problems, alcohol abuse, and substance abuse. Though it is not clear about the underlying mechanism under this stress–deviance relationship, I believe that the combination of large amounts of stressors, long duration, and lack of legitimate coping strategies may limit alternative non-delinquent coping strategies. In addition, the highly availability of drugs, especially marijuana in reservations may also provide adolescents a convenient way to escape.

**Major findings**

*Association between stressors and early onset of substance abuse*

The basic component of general strain theory is to hypothesize positive associations between life stressors and delinquent behavior (Agnew, 1992, 2001). A lot of studies have provided support to this hypothesis (Agnew, 1985; Agnew and White, 1992; Hoffman and Su, 1997; Maxwell, 2001; Mazerolle, 1998; Paternoster and Mazerolle, 1994). In Hypothesis 1, I hypothesized that there were positive associations between life stressors and early onset of substance abuse. The findings from baseline model provided strong support to this hypothesis. Consistent with previous research (Agnew et al., 1992; Hoffman & Su, 1997; Huffman et al., 1999; Paternoster et al., 1994) and our hypothesis, experience of a relatively high amount of negative life events increased abuse of alcohol and other drugs. In addition, inconsistent parenting was also significantly associated with early onset of substance abuse. Adolescents who have negative relationship with parents are more likely to report delinquent behavior (Paternoster et al., 1994). As expected, older adolescents were more likely to use and abuse substances. Different from bivariate analysis, boys used alcohol and other
substances at a higher rate compared for females, with other demographic and strain variables held constant.

Contrary to what was hypothesized, two chronic stressors, perceived discrimination and single-parent household status were not significantly associated with substance use and abuse. The lack of association may due to causal relationships between chronic stressors and more recent stressful life events (Pearlin, Lieberman, Menaghan, & Mullan, 1981). Though Wheaton (1999) suggested that chronic stressors and recent life events had independent effects on mental health, our data showed there were strong associations between these two chronic stressors and negative life events and inconsistent parenting. In baseline model there was a significant positive association between perceived discrimination and negative life events, as well as inconsistent parenting. The significant associations among perceived discrimination, single-parent household status, and other life stressors were also shown in the bivariate correlation table. Negative life events was moderately correlated with all three discrimination components: global discrimination, institutional discrimination, and school discrimination. The strong associations may be the result that individuals who have experienced racial discrimination tend to report more negative life events (Kessler et al., 1999). Similarly, adolescents living in single-parent households reported more negative life events. Strong associations between these two chronic stressors and age were also found. Older adolescents were more likely to report experience of discrimination. Given the highly significant associations between age and substance abuse, and occurrence of negative life events, inconsistent parenting, and substance abuse, it is possible that some of the effects of perceived discrimination and family structure on early onset of substance abuse were
explained by these highly correlated variables. The causal order of this relationship, however, could not be substantiated due to the nature of the cross-sectional data.

In summary, this study provided strong support to the basic component of Agnew’s general strain theory (1992, 2001). Positive associations between life stressors, such as experience of negative life events and inconsistent parenting and early onset of substance abuse were found. Though some chronic stressors, including perceived discrimination and broken families did not have direct association with substance abuse, they might lead to more recent stressors and indirectly lead to substance abuse.

Linking life stressors and early onset of substance abuse: internalization and anger

A core hypothesis proposed by Agnew and his colleagues in general strain theory was the presence of negative affective states, which link negative relationship with others and delinquent behavior. The mediating hypothesis, Hypothesis 2 was tested in three models, the internalization model, the anger model, and the combined model.

The internalization model examined the link between negative relationship with others and substance abuse through internalization symptoms. Contrary to previous research and our hypothesis (Sharp, Terling-Watt, & Gilliam, 2001; Timothy 1996), findings from the internalization model did not provide any support for general strain theory. Though there were direct effects of negative life events on internalization symptoms, there was no significant association between internalization and other life stressors. In addition, there were no direct associations between internalization symptoms and adolescent substance abuse. In other words, though experience of negative life events increased internalization symptoms, adolescents did not drink alcohol or use drugs to reduce their depression levels.
Similar to baseline model, I found direct associations between negative life events and early substance abuse, as well as inconsistent parenting.

To further examine mediating roles of negative affective states, anger, which served an important part in Agnew's general strain theory, was examined. Agnew (1992) argued anger was conducive to delinquent behavior since it would increase individuals' level of felt injury and pressure individuals to take corrective actions to alleviate or eliminate the negative effects of strain. Consistent with previous research (Mazerolle et al., 1997, 1998; Timothy, 1998), the findings provided strong support to the hypothesis that strain was related to substance abuse through anger. As hypothesized, I found negative life events, as well as inconsistent parenting, were significantly associated with anger. Anger was strongly associated with early onset of substance abuse. Increase of anger levels predicted higher levels of substance use and abuse. As expected, no direct associations between life stressors and early onset of substance abuse were found among these 5th-8th graders, which suggested that total effects of life stressors on substance abuse were completely mediated through anger measurement. Experience of negative relationship with others, such as occurrence of negative life events and tension/conflict with parents increased adolescents' feeling of anger, which in turn, increased adolescents' use and abuse of alcohol and other drugs. The results confirmed the role of anger in mediating the impact of stressors on delinquent behavior.

There was a notable exception in this anger model. Single-parent household status, which was treated as a life stressor in this study, was positively associated with anger. The positive association indicated that children living with their dual parents were more likely to express feeling of anger. This result was in contrary to the hypothesis suggested by Agnew and previous studies. Similar to the baseline model and the internalization model, age and
gender significantly predicted substance abuse among American Indian adolescents; boys and older youths were more likely to use and abuse alcohol and other drugs than girls and younger adolescents.

The full model combined internalization model and anger model. The substantive findings were similar to those derived from each model individually. Negative life events was significantly associated with internalization symptoms. The association between internalization symptoms and early onset of substance abuse, however, was not statistically significant. Negative life events was significantly associated with anger measurement, as well as inconsistent parenting and single-parent household status. Anger measurement was strongly associated with early onset of substance abuse, as shown in the anger model. No direct association between single-parent household status and substance abuse was found, neither did inconsistent parenting. However, a direct association between negative life events and early onset of substance abuse was found.

In summary, consistent with hypothesis derived from general strain theory and previous research, our hypothesis of anger as a mediating variable for stress-deviance relationship was supported. Life stressors affected adolescents' early onset of substance abuse indirectly through their expression of anger. The mediating role of anger was supported in both anger model and combined model. Effects of conflicts between parents and children on substance abuse were completely mediated through anger. Effects of negative life events were completely mediated through anger in the anger model, but partly mediated in the combined model. These results were consistent with Agnew and his colleagues' previous research (Agnew, 1985; Mazerolle et al., 1997, 1998; Timothy, 1998). Unexpectedly, no association between internalization symptoms and early onset of substance
abuse was found; hence, no mediating role of internalization symptoms was found by this study. The path from life stressors to early substance abuse seems to go through expression of anger, instead of expression of internalization symptoms.

**Moderating factors affecting strength of stressor-substance abuse association**

Similar to other strain theorists, Agnew (1992) noticed only some individuals who experienced strain would commit crime or engage in delinquent behavior. The strength of association between stressors and coping them in delinquent way varies across individuals in terms of their personal and social resources, and the social environment they are embedded. Although Agnew (1992) delineated the mediating role of negative emotions, he did not specify how these external factors affect the relationship of stressors and delinquent coping. From strain literature, it seems external factors can affect this relationship in two ways (Aesltine and Kessler, 1993; Harnish, Aseltine, & Gore, 2000; Lazarus & Folkman, 1984; Mattlin, Wethington, & Kessler, 1990; Wheaton, 1990). First, stressors-negative emotions relationship could be exacerbated or alleviated by external factors such as self-esteem or self-efficacy. Second, the association between negative emotions and early onset of substance abuse could also be affected by personal/social resource factors. For example, individuals with more social support may have more alternatives to cope with anger and depression. Based on general strain theory and previous literature, I hypothesized that associations between strain and negative affective states (anger and internalization) could be moderated through measures of social context and personal resources (Hypothesis 3). In addition, I hypothesized that the associations between negative emotions and substance abuse could also be moderated by these external factors (Hypothesis 4).
To examine moderating effects, I tested whether significant interactions between moderators and stressors/negative emotions were present in multiple regression analysis. The first set of interaction tested whether there were interactions between life stressors and moderating variables when predicting anger and internalization. The results provided little support to Hypothesis 3. Out of thirty-two interactions tested, only four of them were statistically significant, and only two of the significant interactions were in the right direction predicted by general strain theory. Since these interactions might happen by chance (four out of thirty-two), I concluded that there was no evidence that these external factors, including association with deviant peers, self-esteem, attitude toward deviant peers, and enculturation level affected direction or strength of relationships between life stressors and negative emotional feelings. Due to the small size of current sample, however, it is possible that some interaction effects can not be detected.

The second set of interactions tested whether there were significant interactions between negative emotions (anger and internalization) and life stressors when predicting substance abuse. This set of interactions provided strong support to general strain theory. Since there was no direct association between internalization and early substance abuse in this sample, no significant interactional effects of depression*moderators predicting substance abuse were found. However, our results revealed that the strength of association between anger and early substance abuse could vary in terms of personal/social resources and social context.

Consistent with Beauvais's peer cluster theory (1986) and empirical research (Agnew et al., 1992), it was found that affiliation with deviant peers conditioned the effects of anger on early onset of substance abuse. With the increase of anger levels, adolescents who were
more associated with deviant peers were more likely to use alcohol and other drugs as a coping method. In addition, though strains may induce anger or depression symptoms, a strong sense of self reduced the likelihood that anger would be acted out in a deviant fashion. With the increase of anger, individuals with low self-esteem were more likely to use alcohol and other drugs, instead of non-delinquent coping. Furthermore, positive attitudes toward deviance increased the likelihood of delinquent behavior. With the increase of anger levels,
different groups. The emergence of these significant interactions may be the results of more detailed analysis. Most of the previous research ignored the moderating role of anger or other negative emotions and assumed a linear relationship between stress and deviance, and tested moderating factors on this direct relationship. As Agnew (192) suggested, no direct associations between stress and deviance was proposed; thus, conditional effects on associations between stressors and negative emotions, as well as negative emotions and substance abuse were tested. When facing a large amount of life stressors, adolescents will experience negative emotions such as anger, depression, anxiety, or fear, regardless of their personal or social resource levels. However, individuals with higher sense of self, lower tolerance of deviance, and less association with deviant peers may be more likely to employ a non-delinquent versus a delinquent way to deal with high level of anger.

Theoretical implications

This study contributed to general strain theory from two aspects. First, this study is the first one to apply general strain theory in American Indian population. Since its development, general strain theory has been tested using national youth samples or college student samples. Only two studies have been found to test this theory in disadvantaged groups or other cultural sets (Maxwell, 2001; Piquero et al., 2000). These two studies, however, did not test the central hypotheses proposed by Agnew and his general strain theory (1992). Though general strain theory has gained tentative support from studies in general populations and college samples, the empirical generality of this theory to specific populations, especially socially or economically disadvantaged groups such as minority or homeless adolescents, is limited. This study filled the gap by applying general strain theory to American Indian adolescents in the upper Midwest.
Second, this study was a comprehensive test of general strain theory. As discussed in the previous section, most studies focused on one or two hypotheses derived from general strain theory. By examining four major hypotheses, this study provided a comprehensive test of general strain theory in American Indian adolescents. Though there was only one delinquent behavior scale, this latent substance abuse construct included three dimensions: alcohol use and abuse, alcohol problems, and number of substances used. Multiple indicators of stressors such as negative life events and negative relationships with others, as well as negative affections, were used to reduce measurement errors. This study provided strong support to general strain theory by confirming the mediating role of anger in the stress-deviance relationship. In addition, previous research failed to find evidence of moderating factors such as self-esteem, social support, and deviant peer context. This study, though, failed to find moderating factors producing differences on negative emotions and suggested that the association between anger and substance abuse could be exacerbated or alleviated across groups differing in personal and social resources. This finding could be an important contribution to general strain theory since most studies have ignored the complexities of the stress-deviance association when examining the moderating effects.

More empirical studies regarding general strain theory testing may be needed in the future in minorities or specific groups, especially disadvantaged populations such as homeless adolescents. Empirical generalization concerning the association between strain, anger, and delinquent behavior may be strengthened by replications of this study in diverse population of youths. In addition, though this study includes several unique stressors and cultural-specific protective factors, such as racial discrimination and enculturation scale, these variables do not show significant associations with substance abuse or moderate the
association between anger and substance abuse. However, this does not imply that these
culture-specific factors do not account for the delinquency or affect the relationship of strain-
deviance. Instead, effects of more culture specific stressors and protective factors on a range
of deviant behavior should be examined.

Limitations of this study

It would be prudent at this point to acknowledge the limitations of this study. First,
this study is based on data collected from three American Indian villages in the Midwest,
which share the same culture. Though I believe the sample is a good representation of
reservation and near reservation families in the upper Midwest, it is not appropriate to infer
these results to other American Indian cultures.

Second, the data are retrospective and cross-sectional. The causal arguments cannot
be substantiated since the reverse direction may also be appropriate. For example, in our
structural equation model, I hypothesized that life stressors affected experience of negative
emotions and substance abuse. However, substance abuse could be treated as a stressor
which leads to negative emotions and other negative events, such as injury or family conflict
related with substance abuse. The inclusion of a controllable negative life event scale, failing
a class in the last 12 months, may also confound the causal directions since substance abuse
may contribute to academic failure in schools. The key hypothesis that anger mediates the
link of stressors-deviance could also be questioned since it is possible that substance abuse
leads to anger, not the opposite. The causal relationship can be only established when
longitudinal data are present. Future research may need to use longitudinal data to test
general strain theory.
Third, our data consist of very young American Indian adolescents in 5th-8th grade, ranging from 9 years old to 16 years old with an average age of 12.1 for girls and 12.2 for boys. It is unknown whether the results would hold for older adolescents who are generally at higher risk for alcohol and other substance abuse, and report more life stressors than younger adolescents. In addition, a small number of adolescents older than 14 years in this data may be different from other 5th-8th graders in terms of their family background, academic status, and involvement with alcohol and other drugs. The residual analysis, however, did not reveal any significant outliers.

Fourth, the power of interaction analysis could be a concern because of the small sample size in our data (n = 212). The small or medium effect size of interactions may not be detected in this study. Due to the use of listwise deletion approach, about 16% cases were also deleted in structural equation models, which may further decrease the power of detecting a true medium or small size effect.

Fifth, general strain theory purports to be a general theory in that it can explain a range of deviant behavior, ranging from minor delinquency to serious crime. This study, however, only examined one type of deviant behavior, substance abuse, which could weaken our empirical support to general strain theory. On the other hand, our substance use measure consisted of three dimensions: alcohol use and abuse, alcohol problems, and number of substance used. Use of multiple indicators will decrease measurement errors and make the model more robust.

Sixth, Agnew (1992) identified three sources of strain: goal blockage, presence of negative stimuli, and removal of positive stimuli. In this study, our measurement of stressors focused on presence of negative stimuli, and tapped the concept of removal of positive
stimuli in some items in the negative life event scale and the single-parent household status variable. However, there is no measurement of the first source of strain, goal blockage. As Agnew (2001) argued, certain specific stressors may result in specific delinquent behavior or crime. Further analysis using more comprehensive measures of strain and delinquency and crime might provide more support to general strain theory.

Finally, the choice of stressor and moderating variables may also be a concern in this study. Numerous stressors could lead to negative emotions and alcohol and drug involvement. Similarly, researchers have identified a long list of variables in terms of individuals’ personal/social resources and social context that may moderate the stressor-deviance associations. Based on previous research and our data, only a few stressors and moderating variables were examined in this study. Future studies may need to explore effects of other moderating variables on alcohol and drug involvement, such as identification with mainstream religion versus enculturation.

**Conclusion**

Consistent with previous research (Beauvais, 1996, 2002), a high prevalence of alcohol and substance abuse among American Indian 5th-8th graders in the Midwest three villages was found. Though our sample consisted of very young adolescents, about half of them had already begun to use alcohol, and around 10 percent of them were highly involved with alcohol and other drugs.

Effects of life stressors on delinquent behavior such as substance abuse have been discussed by applying Agnew’s general strain theory (1985, 1989, 1992, 2001). This theory, however, has seldom been applied to minority groups including American Indian adolescents. This study tested general strain theory by tracing the linkage among the
measures of perceived discrimination, negative life events, family conflict, anger and depression, and early onset of substance abuse in a sample of 212 American Indian adolescents. Mediating effects of anger and depression was tested using structural equation models. High prevalence of life stressors, such as negative life events and perceived discrimination was found. Multiple indicators of life stressors were found to have positive effects on early onset of substance abuse directly or indirectly through expression of anger. Specifically, effects of inconsistent parenting on adolescents’ substance abuse were completely mediated through expression of anger. Negative life events affected directly on substance abuse and indirectly through expression of anger. Perceived discrimination, though resulting in negative affects such as depression, did not have significant effects on substance abuse. Frequent encountering of discrimination, however, may lead to more recent life stressors that have impacts on substance abuse. This study confirmed the mediating role of anger linking stressors and substance abuse, which was suggested by Agnew’s general strain theory. In addition, this study tested the moderating factors affecting negative emotions and early substance abuse and provided support to general strain theory. Though there was no evidence for moderating effects on anger and internalization, I found the strength of the association between anger and substance abuse was exacerbated or alleviated across groups with different levels of personal/social resources. This study provided strong support to general strain theory.
APPENDIX

DESCRIPTION OF MEASURES

Negative Life Events

Please tell me if the following things have happened to you in the past 12 months.

1. Did a friend die?
2. Did you move to a different house?
3. Did a close relative die?
4. Did a pet die?
5. Did you have a close friend move away?
6. Did you break up with a close friend?
7. Was someone close to you seriously ill or injured?
8. Did you fail a class in school?
9. Were you seriously ill or injured?
10. Did a close relative commit suicide?
11. Was a family member a victim of a crime?

Perceived Discrimination

Global Discrimination

1. How often have other kids said something bad or insulting to you because you are Native American?
2. How often have other kids ignored you or excluded you from some activities because you are Native American?
3. How often has someone yelled a racial slur or racial insult at you?
4. How often has someone threatened to harm you physically because you are
Native American?

5. How often have other kids treated you unfairly because you are Native American?

Authority Discrimination

1. How often has a store owner, sales clerk, or person working at a place of business treated you in a disrespectful way because you are Native American?

2. How often have adults suspected you of doing something wrong because you are Native American?

School Discrimination

1. How often have you encountered teachers who are surprised that you as a Native American person did something really well?

2. How often have you encountered teachers who didn’t expect you to do well because you are Native American?

Substance Abuse

Alcohol Problems

1. Has your drinking caused you any problems with your family?

2. Did you drink enough to get a hangover?

3. Do you ever get sad or depressed when you are drinking?

4. Has your use of alcoholic beverages caused you any problems in school?

5. Do you find you have to drink more to get drunk?

Alcohol Abuse

1. Not counting any religious ceremonies, have you ever, even once, had a drink of any type of alcoholic beverage?

2. Have you ever gotten drunk?
3. During the past month, on how many days did you have five or more drinks at one time?

4. During the past 12 months, on how many days did you have five or more drinks on the same occasion?

5. Have you gotten drunk in the past year?

Substance use

For the following measures, the youth was asked, “Please indicate how often you have used each of the following substances during the last six months.”

1. Cigarettes or chewing tobacco.

2. Beer.

3. Wine.


5. Prescription drugs.

6. Acid, LSD, mescaline, Peyote, or other hallucinogens.

7. Grass, pot, weed, or other names for Marijuana.

8. Downers, Quaaludes, sopers, reds or other barbiturates.

9. Librium, valium or other tranquilizers.

10. Speed, crystal, nose candy.

11. Crack, cocaine, powder.

12. Crank or other Methamphetamines.

13. Huffing or Inhalants like gasoline, solvents, or glue.

Internalizing symptoms

Withdrawn
1. I would rather be alone than with others.
2. I refuse to talk.
3. I am secretive or keep things to myself.
4. I am shy.
5. I don’t have much energy.
6. I am unhappy, sad, or depressed.
7. I keep from getting involved with others.

_Somatic_

1. I feel dizzy.
2. I feel overtired.
3. I have aches or pains (not headaches).
4. I get headaches.
5. I have nausea, feel sick.
6. I have problems with my eyes.
7. I have rashes or other skin problems.
8. I get stomachaches or cramps.
9. I have vomiting, throwing up.

_Anxiety/depression_

1. I feel lonely.
2. I cry a lot.
3. I deliberately try to hurt or kill myself.
4. I am afraid I might think or do something bad.
5. I feel that I have to be perfect.
6. I feel that no one loves me.
7. I feel that others are out to get me.
8. I feel worthless or inferior.
9. I am nervous or tense.
10. I am too fearful or anxious.
11. I feel too guilty.
12. I am self-conscious or easily embarrassed.
13. I am suspicious.
15. I worry a lot.

**Anger**
1. I am quick tempered.
2. I fly off the handle.
3. I am hotheaded.

**Self-esteem**
1. I am proud of myself.
2. I like myself.
3. I am lucky.
4. Other people my age like to be with me.
5. I am able to do things well.
6. I am smart.
7. I am good at games.
8. I am good looking.
9. Other people my age ask me to do things with them.

10. Other people my age like me.

11. People like me.

Tolerance of deviance

1. Is it bad to cheat?

2. Is it bad to tell a lie?

3. Is it bad to steal?

4. Is it bad to skip school?

5. Is it bad to do things that parents don’t want you to do?

Deviant peers

As far as know, have any of your friends

1. Run away from home?

2. Taken something worth more than $50 that didn’t belong to them?

3. Carried a gun, knife, or other kind of weapon (other than for hunting, camping, or fishing)?

4. Taken something from a person by force (other than just “horsing around”)?

5. Been placed in detention or jail?

6. Cut classes, or stayed away from school without permission?

7. Taken a car without the owner’s permission, just to drive it around?

8. Had to go to court for something they have done?

9. Beat up on someone or fought someone physically if they provoked them (other than just playing around)?

10. Bought or received something that was stolen by somebody else?
11. Broke into a place and stolen something?
12. Taken something from a store when a clerk wasn’t looking?
13. Been placed on court probation?
14. Injured someone by shooting, cutting, hitting, or stabbing them just because they felt like it?
15. Snatched someone’s purse or wallet from them without hurting them in order to take their money or credit cards?
16. Intentionally damaged or messed up something in a school or some other building?

Enculturation

Culture identification

1. How many of these special activities (holiday parties, special meals, religious activities, trips or visits) are based on Ojibwe culture?
2. When you are an adult and have your own family, how much will you do special things together that are based on Ojibwe culture?
3. How much does your family live by or follow Ojibwe culture?
4. How much do you live by or follow Ojibwe culture?
5. How much is your family successful in the Ojibwe culture?
6. When you are an adult, how much will you be successful in Ojibwe culture?

Traditional spirituality

1. Do you participate in any traditional spiritual activities?
2. How often do you participate in traditional spiritual activities?
3. How important are traditional spiritual values to the way you lead your life?
Traditional activities

Pow-wow involvement
1. Have you been to a pow-wow in the past year?
2. Have you danced at any of these pow-wows?
3. Have you participated in a drum group or sang at any of these pow-wows?

Knowledge and use of Ojibwe language
1. Can you understand some Ojibwe?
2. Can you understand spoken Ojibwe?
3. Do you speak some Ojibwe?
4. Can you speak Ojibwe fluently?

Involvement of traditional activities

In the past year have you
1. Done any beading?
2. Gone ricing?
3. Gone spear fishing?
4. Made pow-wow outfits?
5. Gone to sugar bush?
6. Picked berries?
7. Gone hunting?
8. Played Ojibwe games?
9. Made blankets?
10. Peeled birch bark?
11. Made Ka-nik-a-nik?
12. Tanned hide?
REFERENCES


