The Development of Drinking in Urban American Indian Adolescents: A Longitudinal Examination of Self-Derogation Theory

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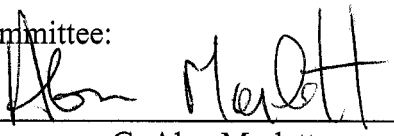

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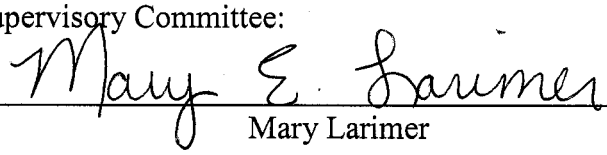

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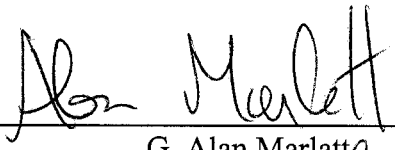

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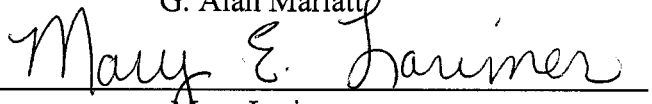

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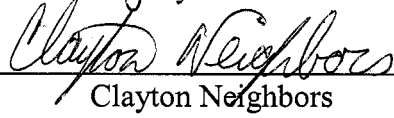

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Abstract

The Development of Drinking in Urban American Indian Adolescents:
A Longitudinal Examination of Self-Derogation Theory

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This study examined the development of problem drinking and the relative contributions of several background variables to problem drinking in a sample of 290 urban-dwelling, American Indian* adolescents. The primary aim was to evaluate Self-Derogation Theory (SDT) and its tenets in understanding and explaining the development of adolescent problem drinking through perceived lack of success in conventional pursuits, effects on self-worth, subsequent associations with deviant peers, development of problem drinking, and countervailing effects on self-worth. Data were collected annually over nine years from 1988 to 1997, measuring family cohesion, family conflict, cultural identification, sociocultural alienation, scholastic competence, global self-worth, peer deviance, and problem drinking. Latent variable growth curve modeling (LGM) was utilized to examine longitudinal changes at both group and individual levels. Results generally supported SDT, however, problem drinking did not affect self-worth in the direction predicted by the theory. Possible explanations for and implications of these findings are discussed in terms of developmental changes during adolescence.

* Throughout this paper, the terms American Indian, Native American, Indian, and Alaska Native and their initials will be used interchangeably to indicate the many peoples of native origin on this continent. This unfortunately does not reflect the heterogeneity between tribes and within tribes. Furthermore, the terms White, Caucasian, and Anglo will be used to indicate European descendents who make up the current majority population.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I: INTRODUCTION

Description of the Problem

Kaplan's self-derogation theory (SDT; 1982, 1995), as it has come to be called in the literature, incorporates social, familial, cultural, and intrapersonal variables in explaining the mechanisms by which peers play a vital role in the development of teen drinking. It also captures the common beliefs that kids get involved with drugs/alcohol because of "peer pressure" and low self-esteem. SDT suggests that adolescents are more susceptible to the influences of deviant peers if they do not fit well into conventional society, lack commitment and attachment to conventional role models, and perceive failure in conventionally valued activities, such as academic pursuits. These individuals experience low self-worth, which in turn leads them to seek out peers who also might feel alienated, as well as opportunities for alternative means of enhancing positive self-evaluations and social comparisons. Teens with low self-worth are more susceptible to deviant peer influences, engage in delinquent behaviors, and through acceptance by the peer group the theory proposes that their self-worth is bolstered. In this process, many teens experiment with or regularly use alcohol or other substances, some in an unhealthy and harmful manner.

The purpose of this study was to explore the development of Native youth drinking and related problems in the context of self-derogation theory and factors that have continued to surface in the literature as important determinants, specifically peer and family influences. Furthermore, building upon the extant literatures and two earlier studies conducted with the same data set, this study also contributes to mixed and

limited findings regarding self-worth and cultural factors influencing drinking. The earlier studies are described below.

One study (Walker et al., 1996) provided longitudinal data for two research projects which examined psychosocial variables and their long-term influences on the development of alcohol problems in urban Native teens. These projects and their outcomes and limitations form the basis for the current research proposal. In the first, Radin et al. (in press) tested whether affiliation with deviant peers mediated the effects of self-worth on future alcohol-related problems through its relationship with peer deviance. They found that younger teens (ages 13 to 15) were more influenced by their deviant peers and low self-worth indirectly affected alcohol problems. However, in older teens (ages 16 to 18), the mediation effect linearly weakened over time, and both self-worth and peer deviance directly affected drinking problems. These results suggest that the relationships between self-worth, peer deviance and alcohol problems change over time as a function of age. Although interesting, these analyses leave a number of unanswered questions. For example, do all individuals follow this same pattern of changing influence of peers, or is there individual variability in these changes? The cross-sectional analyses performed and limited number of variables included in the model did not address this type of question. Furthermore, although the sample was comprised of Native American youth, the study did not take cultural/ethnic factors into account.

Another study conducted with the same data set (Walker, et al., 1996) looked closely at both white and American Indian cultural identification and their relationships to alcohol problems. Hawkins (2002) found that white ethnic identification and Indian

identification were negatively associated. Furthermore, white identification was positively associated with scholastic competence and self-worth, whereas Indian identification was not. In the cross-sectional prediction of alcohol problems, teens with higher white identification tended to have fewer problems than Indian-identifying youth. In longitudinal analyses, however, cultural identification no longer predicted alcohol problems directly. Hawkins suggested that perhaps peer-related and ethnic identity developmental issues differentially influenced younger versus older adolescents. This study, however, did not incorporate peer variables and utilized only two time points of data, limiting interpretations.

Taken together, these studies provide clues about relevant and important psychosocial variables in the development of alcohol use and misuse in Native teens. They also highlight the challenges and complexities in assessing these factors and in describing and understanding the underlying processes of change. An additional goal of this study was to employ a contemporary analytical approach to the assessment of individual and group-level change. Latent variable growth curve modeling (LGM) is a structural equation modeling (SEM) technique that enables one to test the assumptions of an a priori model. LGM helps to determine whether the observed data fit the proposed model of variables and relationships, as well as to evaluate group and individual rates of change within constructs, changes between constructs, and individual variability.

Native Americans and Alaska Natives – Background.

Historical overview. The original inhabitants of North America, ranging from what is now Canada, Alaska, and the United States to parts of Mexico, have a long

history dating to prehistoric times. The "Indians," as they came to be called, knew how to cultivate and live harmoniously with nature, believing that all belonged to no one, and that no one could truly lay claim to what the Great Spirit had created (Nies, 1996; Walker & Maynard, 1995). With the arrival of European settlers came devastation to their established ways of life, future, and culture (Nies, 1996).

Very early in Native history, hard alcohol distilled from grain was introduced to the Indians. Although some Indian peoples had incorporated alcoholic beverages into ceremonial events which were shared as sacraments by entire communities, it was uncommon for Indians to use alcohol or even tobacco for personal use or recreation (Beauvais, 1996e; Mail & Johnson, 1993; Nies, 1996; Walker & Maynard, 1995). Therefore, the native peoples were unprepared for the style of heavy drinking that the colonists introduced, and they, along with the colonists, drank heavily to intoxication. Alcohol was also used by colonists to gain unfair advantages over Native peoples during trades and other negotiations. Over time, alcohol became highly sought after by native peoples, and they gained a reputation for rowdy drinking behavior and were believed to be genetically inferior to whites because they could not "hold their liquor" (Mail & Johnson, 1993; Nies, 1996).

Description of the current population. American Indians (AI) and Alaska Natives (AN) are a diverse group comprised of over 250 federally recognized tribes, 209 Alaska Native villages, 65 communities that have not been recognized by the federal government but have been assigned tribal status by state governments in which they live, and several dozen communities that have not been formally recognized in any manner (Norton & Manson, 1996). Many have maintained their traditional culture,

family structure, social and religious functions, language, and health practices, however, there is great tribal diversity (Norton & Manson, 1996). Despite this diversity, all AI/AN people share a history of loss of ancestral lands, restriction of their traditional means of securing food, shelter, clothing, intrusion by external governments, forced education in White schools, and the destruction of their culture (Hawkins & Blume, 2002; Nies, 1996; Walker & Maynard, 1995; Walters, 1999).

At the turn of the millennium, 4.1 million people reported as AI or AN alone or in combination with one or more other races, making up 1.5 percent of the total U.S. population (U.S. Bureau for the Census, 2002). The AI/AN population is younger than the total U.S. population and, as a group, their numbers are growing faster. The median age of the AI and AN population at the time of the 2000 Census was 28.7 years, compared with 35.3 years for the total U.S. population. In census 2000, people who chose AI and AN as their only race showed an increase of 26 percent since 1990, compared to a 13 percent increase in the total U.S. population.

In terms of general health, research suggests that the health of Native Americans is worse than that of the general population (Bagley, Angel, Dilworth-Anderson, Liu, & Schinke,1995). AI and AN people have recognized this. For example, in one survey, AI/AN respondents were more likely to report that they were of fair or poor health (23.8%) compared with respondents from other racial/ethnic groups (14.6%) (Denny, Holtzman, & Cobb, 2003). Native peoples are also more likely to report that they are obese, smoke more tobacco, spend less time in physical activity, binge drink, and drink while driving (Denny, Holtzman, & Cobb, 2003). Compared to the general population, they suffer inordinately from cancers linked to behavioral and lifestyle patterns,

including poor diet and nutrition (Beauvais, Oetting, Wolf, & Edwards, 1989), and the death rates for Native youth and young adults are two to three times those of other ethnic-racial groups (Bagley, et al., 1995).

Alcohol abuse continues to be a prominent factor in Native morbidity and mortality and effects huge damage upon communities, families, and individuals. The consequences of alcohol abuse are far-reaching, and include alcohol-related illnesses, deaths, and accidents, as well as social and cultural difficulties. The average life expectancy for Native Americans is lower than for the general population and rates of accidental death are higher (Moncher, Holden, & Trimble, 1990; U.S. Indian Health Service, 1997). The National Center for Health Statistics (NCHS, 1997) estimated the 1992-94 mortality rate for American Indians as 35% higher than the average for all U.S. races combined, deaths resulting from illnesses related to alcohol abuse (e.g., liver disease/cirrhosis) were seven times greater, and fetal alcohol syndrome tends to afflict AI and AN peoples at elevated rates (Young, 1994). Additionally, it is important to consider other forms of AI/AN alcohol-related mortality. It has been estimated that 65 percent of motor vehicle deaths among AIs and ANs and 25% of deaths related to unintentional injury are related to alcohol (May, 1996). 80 percent of suicides and 93 percent of homicides have also been associated with alcohol (Welty, 2002). Although these statistics are alarming, they may underestimate the problem, given the miscoding of Indian race that often occurs on death certificates (Welty, 2002).

Furthermore, alcohol abuse might be particularly harmful for Indian youth, as they face the developmental challenges of transitioning from childhood to adulthood. As a maladaptive coping strategy, alcohol use may interfere with the normal social,

emotional, cognitive and learning processes associated with adolescent development (Bagley et al., 1995; Beauvais, 1992b).

Alcohol Use and the Indian Adolescent.

Over the past few decades along with a growing recognition of adolescent alcohol use and misuse and its many personal and societal costs, there has been increased focus on adolescents in substance use research. For developing youth, drug and alcohol abuse undermine motivation, interfere with cognitive processes, contribute to debilitating mood disorders, and increase the risk of accidental injury or death (Hawkins, Catalano, and Miller, 1992). For society, costs include health care, educational failure, mental health services, drug and alcohol treatment, and juvenile crime. As adults, detrimental effects may include low productivity, loss of life, destruction of families, and a weakening of bonds that hold society together (Hawkins et al., 1992).

It is important to keep in mind that as there is great heterogeneity among people, there is also great diversity in alcohol use, ranging from abstinence to heavy drinking. This is true for adolescents, both in the general population (Johnston et al., 2000) and among Indian youth (Beauvais, 1992a). The majority of youth in the general population do not use alcohol or other drugs on a regular basis, although some experimentation appears normative. Indeed, a relatively small proportion of adolescents are frequent or problem users (Johnston et al., 2000). The 1999 Monitoring the Future national survey of secondary school students revealed that, among adolescents, alcohol is the most commonly used psychoactive substance (Johnston et al., 2000). Approximately 52 percent of students in the 8^{th} grade, 71 percent of 10^{th} graders, and 80 percent of 12^{th}

graders had used alcohol in their lifetimes. For some adolescents, moderate alcohol use has been positively associated with psychosocial adjustment and functioning (Maggs, 1997), however, others develop serious alcohol abuse and dependence beginning in adolescence and continuing into adulthood (Beauvais, 1996; Maggs, 1997).

AI/AN youth also experience consequences of alcohol use that are equally or more serious compared to non-Native adolescents (Novins, Beals, Mitchell, 2001). Native American youth manifest higher rates of substance use, especially of alcohol, tend to begin experimentation earlier, and experience more dire consequences related to use (Oetting et al., 1983; Beauvais, 1992b; Novins, Beals, & Mitchell, 2001). There is wide variation in estimates of alcohol use prevalence among Native youth, however, most estimates suggest use that is higher than that of non-Native youth. In a study of Native teens, surveys completed by 1,562 high school students in 1993 indicated that 73.5% of students reported use of alcohol in their lifetime, and the mean age of first alcohol use was 13.3 years (Novins, Beals, & Mitchell, 2001). Another study estimated that at least 15% of Native youth had tried alcohol or another substance at least once by the age of 12, and about 62% had been intoxicated by the age of 15 (Beauvais, 1996).

Indian youth also tend to use alcohol in ways that increase their risk for harm, such as getting very drunk, drinking and driving, and using other drugs and alcohol together (Beauvais, 1992b). The potential consequences are evident, in terms of accidents, health problems, hindered cognitive, emotional, and social development, and the development of poor coping skills and emotional difficulties (Beauvais, 1992b).

Theories of Indian adolescent drinking. Considering that Native adolescents experience difficulties related to alcohol use that surpass those of the general youth

population, addressing the questions of why and how this is so are not only theoretically interesting, but could also inform the development of interventions which address the relevant and malleable factors. Is there something particular to Native youth or culture that could be identified and targeted in prevention and intervention efforts? Or would the same kinds of interventions that are most efficacious for non-Native youth work just as well?

According to Beauvais (1992e), theoretical explanations of alcohol abuse that apply to all youth also apply to Native youth, however, some theorists have proposed Native-specific explanations for higher rates of alcohol and other drug use. Beauvais (1992e) described some of these theories. First, some have related substance use to traditional culture. Indian peoples have used peyote, tobacco, and even corn beer in ceremonies and as sacraments, however, there is no history of recreational use. Beauvais emphasized that recreational use has been adopted from western culture, so this does not help to explain Native adolescent drug use. Other theories suggest that there are some genetic differences which cause Indian people to be more susceptible to alcohol addiction and misuse, such as "the firewater myth" (LaMarr, 2003). These "evolutionary" theories suggest that since Native peoples had no exposure to hard alcohol before Europeans arrived, they had no resistance. In Beauvais's opinion (1992e), this is unlikely; although some physiological or metabolic difference might exist, social characteristics most likely play a much greater role. Finally, acculturation stress theory suggests that the stress and difficulties of trying to adapt to a majority culture are partly to blame for alcohol misuse. However, research suggests that this adaptation is not necessarily stressful and that most youth are bicultural and skilled at

navigating two cultures (Oetting & Beauvais, 1991; Hawkins, 2002). Other factors specific to Indian youth, which are also implicated in general adolescent substance use, include low family caring (Cummins, Ireland, Resnick, & Blum, 1999), younger age at first drunk episode (Mitchell, Novins, & Holmes, 1999), weak family sanctions about drugs (Oetting, Beauvais, & Edwards, 1988), and positive attitudes toward alcohol use (Hawkins, 2002).

Risk and Protective Factors

Although it is informative to have some knowledge of Native-specific theories regarding substance use etiology, it is also important to have an understanding of the broader approaches in alcohol research. A common approach in alcohol use research is to determine which factors increase or decrease the probability of drinking problems. These are often referred to as "risk" or "protective" factors.

"A risk is an individual attribute or characteristic, situational condition, or environmental context that increases the probability of drug use or abuse or a transition in level of involvement with drugs" (Clayton, 1992). Since characteristics may exist within an individual, high-risk youth may be differentiated from low-risk youth by personal characteristics or conditions that influence how they lead their lives. Clayton (1992) further states that risk factors may have multiple outcomes, serve as both "causes" and "effects," be present or not, and may or may not increase risk for a given individual. In its simplest form, the risk factor model suggests that multiple risk factors may have an additive effect, or a single risk factor may be influential by itself.

Second, protective factors mediate or moderate the effects of exposure to risk (Vakalahi, 2001). Brook et al. (1990) proposed two mechanisms by which protection

occurs: a risk-protective mechanism through which exposure to risk factors is moderated by the presence of protective factors; and a protective-protective mechanism, through which one protective factor potentiates another protective factor, strengthening its effect. Additionally, vulnerability denotes increased susceptibility to risk, and resiliency is the ability to withstand or surmount risk (Rosenblum et al., 2005).

Finally, several risk and protective factors have been identified in the substance use literature. These can be roughly categorized as contextual factors, such as society and culture, and intra- and interpersonal factors, such as families, schools, classrooms, and peer groups (Hawkins, Catalano, & Miller, 1992). Among the numerous factors are norms, availability of substances, economic deprivation, neighborhood disorganization, physiological factors (i.e., biochemical, genetic), family factors such as management practices, conflict, and low bonding to family, early onset of and consistency in problem behaviors, academic failure, low commitment to school, peer rejection, association with drug-using peers, alienation and rebelliousness, attitudes favorable to substance use, and early onset of substance use.

Of the many risk factors considered in adolescent drinking, only the factors relevant to self-derogation theory (Kaplan, 1995) and the current study are considered in more detail below.

Peer Deviance and Family.

Importance of peers. Research with youth from the general population clearly supports a connection between peer influence and substance use. Clayton, Leukefeld, Donohew, Bardo and Harrington (1995) noted that the correlation between self-reported delinquency and number of delinquent friends is one of the strongest and most

consistently reported findings in the literature. Similarly, Oetting and Beauvais (1987) identified peer influence as the single, dominant variable in whether adolescents chose to use substances, including alcohol. Dielman, Campanelli, Shope, and Butchart (1987) likewise found significant influences of peers on adolescents' drug use. In fact, their "susceptibility to peer pressure" index correlated more highly with adolescent substance use, misuse, and intentions to use than did other variables such as self-esteem or locus of control.

Focusing on why Indian people change their drinking behavior, in contrast to why they drink, Spicer (2001) collected the words of Native adults during a field study in Minneapolis which illustrate the importance of peer influences on drinking. Alayna said:

> I have a lot of friends that drink and um – like, I don't know. I know when I'm just scared, it's like if I just quit drinking altogether, I feel like I might not have any friends. Cause most of my friend[s], that's what they do, y'know? … And I don't have any friends that don't, y'know (p. 233)?

Similarly, in response to a question about what was crucial to his early sobriety, Jack stated, "Right at the get-go not associating with people that drinking [*sic*]" (p. 233). Spicer went on to underscore how important were the social consequences of not drinking. Individuals did not want to be tempted by their friends, but also did not want to drink. Distancing themselves from peers who drank alcohol was especially common immediately after quitting.

Peer deviance. But what helps to explain the mechanisms through which peers have such powerful influence? Several studies have narrowed their focus to "peer

deviance." "Deviance" refers to behaviors or attributes in a specific circumstance that violate normative expectations or evaluations about what is appropriate or inappropriate in those circumstances (Kaplan, 1995). Kaplan recognized that competing theories address why some individuals initiate and continue deviant behaviors. Explanatory factors include commitment to a normative system, failure to achieve based on conventional expectations, identification and valuation of others who share similar standards of behavior, motivation, opportunity, positive reinforcement, and weakening of social controls (1995). Kaplan further explains that discontinuation of deviant behavior often is determined by the absence of positive reinforcement, adverse consequences, and changes in a person's needs and opportunities.

Involvement with substance-using peers is a common factor leading to substance use in adolescents (Hawkins, Catalano, & Miller, 1992). Dishion and colleagues have conducted several recent studies of peer deviance and effects on problem behavior in teens. For example, Dishion, McCord, and Poulin (1999) found iatrogenic effects of peers in group interventions, and attributed the harm to "deviancy training," or the tendency of some peers to model problem behaviors, to dominate the groups, and to reinforce deviant conversation (e.g., talk about skipping school or drug use). The researchers also noted that high-risk youth were more susceptible to "deviancy training."

Following this, Dishion set up an experiment where children with externalizing and internalizing disorders, either alone or in combination, were assessed as to the level of peer deviance in their lives when they were younger compared with when they were older (Dishion, 2000). He found that children who had comorbid diagnoses had the

most peer deviance in their lives at both ages (as rated by themselves, teachers, and parents), were more influenced by deviancy training during videotaped experimental sessions, and manifested more problem behaviors as measured by interview and criminal record. Furthermore, internalizing youth were most like the "normal" youth in terms of behaviors problems and substance use. Finally, Dishion and Owen (2002) found a reciprocal relationship between deviant friendships and substance use as measured from early adolescence to young adulthood. They attributed this relationship pattern to the presence of both peer selection (youth select similar others) and peer socialization processes (peers become more similar through socialization).

Family studies. The literature on family factors and the effects on adolescent substance use is extensive. Study results suggest that important factors include parenting style (Brody & Ge, 2001), poor parental monitoring (Galambos, Barker, & Almeida, 2003; Webb, Bray, Getz, & Adams, 2002), parent-child conflict (Wills, Sandy, Yaeger, & Shinar, 2001), parent alcoholism (Chassin, Curran, Hussong, & Colder, 1996), and parental modeling of unhealthy behaviors (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997), to name a few. Family factors have also been found to operate as moderators of risk (Wills, Sandy, Yaeger, & Shinar, 2001). Protective factors, in many cases, are the converse of the risk factors, such as family cohesion instead of conflict, positive/healthy parental modeling, consistent parental monitoring, and two-parent homes. Families have also been implicated in their effects on peer relationships, such as involvement with deviant peers. For instance, positive family relationships, parental support and consistent discipline were negatively associated with

approval of deviance, but older deviant siblings had the strongest effects on adolescent deviance (Ardelt & Day, 2002).

Theories of family influence in adolescent alcohol misuse are relevant to this study not only in their own right, but also as they help to explain peer effects. For example, family interaction theory emphasizes emotional attachment to parents, social learning, and intrapersonal characteristics of adolescents (Petraitis, Flay & Miller, 1995). Most important here is the attachment relationship and affectional bond between parent and child, particularly between mother and child. Furthermore, this attachment is the result of conventional parental values, supportive parenting, paternal psychological adjustment, and control over the child (Petraitis, Flay, & Miller). The consequences of a strong/secure attachment relationship are a well-adjusted adolescent, infrequent involvement with drug-using peers, and less substance use.

An emphasis on the importance of attachment is pertinent to the current study. Although some may not consider peer relationships or friendships to be attachments, seeing them as more affiliative in nature (Weiss, 1986), this notion of attachment with peers, that may be similar to familial attachment, suggests one mechanism through which some teens may be more susceptible to peer influences. If a youth feels unattached to parents, perhaps a stronger than average attachment may develop with a peer.

Additionally, with Native peoples, it may be helpful to consider the extent to which family members are part of daily social interactions in a recreational and peer-like manner, particularly between siblings and cousins during childhood and adolescence. Beauvais (1992e) emphasized that socialization links for Native peoples

include immediate family, extended family, and peers, as well as school, community, and religious affiliations. He also stated that path models for Caucasian and Native youth suggest direct use through peer association, and the two most important factors for involvement with these peers are school adjustment and family messages against drug use. According to Beauvais, "strong family" supports and encourages positive school adjustment and gives youths strong messages opposing drug use (1992e). He also suggested that there is a direct association between peers and drug use in Native adolescents, in contrast to "Anglo" adolescents, because teens are more isolated and spend more time with similar-aged siblings and other relatives (e.g., cousins), especially on reservations. "Strong family" encourages youth to befriend peers who are less likely to use drugs, and this leads to a lower likelihood that youth will use drugs themselves.

Studies of joint peer and family influences. Several recent studies have incorporated both peer and family variables in the prediction of alcohol use in adolescents. A three-year longitudinal study of 6^{th}-8^{th} graders examined the influence of individuation, family conflict and cohesion, and ethnicity on adolescent alcohol use (Bray, Adams, Getz, & Baer, 2001). The major objective was to longitudinally assess a developmental psychosocial model that hypothesized changes in individuation and family factors in the prediction of alcohol use. Results suggested that separation and family conflict were related to increases in alcohol use, and family cohesion predicted decreases in alcohol use. From a family systems perspective, substance abuse is partly the result of problems in the individuation process.

Along these lines, latent growth modeling was used to study longitudinal relationships between individuation, peer alcohol use, and adolescent alcohol use (Bray,

Adams, Getz, & McQueen, 2003). Initial levels of peer alcohol use were found to be significantly related to changes in adolescents' alcohol use, whereas initial adolescent alcohol use was also significantly related to changes in peers' alcohol use, suggesting a bidirectional relationship (Bray, Adams, Getz, & McQueen). The authors suggested that their findings may be due, in part, to an increased susceptibility to contextual effects, such as friends and peers, during what can be an emotional transitional period.

Self-Worth and Peer Deviance.

All of the studies outlined above have contributed important and interesting findings to the peer and/or family influence literatures, yet there are still many variables to consider. In this study, self-worth was also taken into account, per self-derogation theory and inconsistent findings regarding this intrapersonal variable.

The self-esteem literature is quite extensive, but it is more difficult to find studies particularly targeting a very closely related construct, self-worth. Self-esteem is generally viewed as an evaluation of one's self that entails a *judgment of personal worth*, approval or disapproval (Demo & Savin-Williams, 1992; Rosenberg, 1965). This would imply that although the constructs are not identical, they share primary features. For this reason, "self-esteem" and "self-worth" were used interchangeably in this study. In addition, the measure of self-worth used in this study is often referred to as a measure of self-esteem.

For some time there has been a common belief that low self-esteem contributes to youth alcohol or other drug use, however, the research to date has provided mixed support. Some studies have failed to find a relationship between self-esteem and substance use (Jessor, Donovan, & Costa, 1991; McBride, Joe, & Simpson, 1991;

Thompson, 1989). Indeed, Shroeder, Laflin, and Weis (1993) stated that no matter what definition of self-esteem had been used across studies, "no sizeable relationship between SE and drug use has been found" (p. 659). In contrast, other studies have supported an association between low self-esteem and adolescent substance use (Dielman, Shope, Butchart, Campanelli, & Caspar,1989; Stacy, Newcomb, & Bentler, 1992). Low self-esteem has also been prospectively linked to later substance use (Kumpulainen & Roine, 2002; Stein, Newcomb, & Bentler, 1987).

Despite mixed findings, the fact that interest and belief in self-worth as an important factor in the etiology of adolescent substance use persists suggests that dismissing it may be premature or misinformed. Perhaps inconsistencies in the measurement and definition of the construct make it elusive to study. Additionally, self-worth may operate through the effects of other variables, such as peer factors, in their influences on substance use, so examining it alone may not provide a complete picture. Finally, self-worth may change over time along with its relationships to other factors (Radin et al., in press). This can only be adequately studied with longitudinal data.

Role of Culture in Drinking.

Finally, one should consider whether developmental and socialization processes that operate through adolescents in the general population and their peers also apply to Native individuals. These may include individuation, family conflict/cohesion, cultural identity, self-esteem, and gender. How does culture influence these processes? Does cultural identity protect or increase risk for alcohol misuse and related problems?

Culture, as it relates to drinking in Native peoples, has been sparsely studied. Some epidemiologists have suggested that Native American history and the after-effects increase vulnerability to psychological and other problems (Beauvais & LaBoueff, 1985). Alcohol and other substance use may offer a means of coping with these stressors. Specific cultural factors that have been associated with substance use include perceived discrimination, excessive amounts of unstructured time, particularly on reservations, alienation from mainstream culture, acculturation stress, and ethnic dislocation (Hawkins, Huang Cummins, & Marlatt, 2004).

Cultural identification has been proposed as both risk and a protective factor. One would expect that any characteristic that makes an individual stronger and more secure in identity would protect against risk. However, this may or may not be true for Native teens, depending on whether that identification included positive or negative associations with drinking or non-drinking behavior. It has been stated by Native people that alcohol use does not fit with Indian culture, and therefore abstinence is best. While abstinence may be best, it is also possible that beliefs about alcohol and about susceptibility to its effects (e.g., "firewater myth"; LaMarr, 2003) could influence drinking in either a positive or negative direction. Furthermore, how does White cultural identification influence members of this population?

Hawkins addressed some of these questions in her study of bicultural competence using the same data set (2002), however findings were limited. For instance, it appeared that White identification was somewhat protective against present and future alcohol problems, but some effects were direct and others operated through mediational mechanisms. Furthermore, Indian identification did not predict future

alcohol problems, although there was a tendency for teens with higher Indian identity scores to have more alcohol problems. Hawkins (2002) utilized the same data set, incorporating data from two time points and utilizing regression analysis to test associations between White and Indian identification and drinking outcomes. As a result, it is expected that the same relationships will be found in the current study. However, the current study extends Hawkins's findings by placing them in the context of a larger, more comprehensive model of influences on Native teen's drinking. What is of most interest in the current study are the effects of cultural identification and sociocultural alienation on self-worth, which in turn are expected to predict deviant peer associations, and then lead to increases in drinking.

Scholastic Competence.

Finally, scholastic performance and competence were included in the current study's background variables. The literature strongly supports a link between academic factors and substance use (for reviews, see Moncher, Holden, & Trimble, 1990; Petraitis, Flay, & Miller, 1995). For instance, in a study of urban Native teens (Lonczak, Mail, & Marlatt, under review), educational problems were associated with alcohol initiation and alcohol problems. However, there have not been many studies that causally relate academic risk factors to drinking, particularly not in a Native sample. The preponderance of studies only demonstrate that scholastic factors are correlated with substance use (Barrera, Biglan, Ary, & Fuzhong, 2001). Furthermore, academic success has been shown to be a protective factor (McCubbin, Thompson, Thompson, & Fromer, 1998), however, the statistical procedures for the current study take into account academic competence or success, or the lack thereof, in the effects on

self-worth. Unfortunately, only scholastic competence was used in this study, as academic performance data that were available were not suitable for analyses.

Theoretical Perspectives on Adolescent Substance Use

Although a review of salient risk and protective factors is helpful in understanding Native teen's drinking and substance use, this approach to understanding etiology and maintenance of substance use also has limitations. In particular, from this perspective it is difficult to ascertain which risk factors or combinations of risk factors are most powerful out of the many that have been proposed, which are modifiable, which are specific to drug abuse, and which are more generic contributors to adolescent problem behavior. The risk model seems to fall short of what a good theory should be in order to aid our understanding of complex behaviors and to guide prevention interventions. Perhaps in response to this recognized need for more comprehensive theoretical approaches which reflect the complexities of the development of substance use, there has been a proliferation of such theories in the last few decades, along with better identification and explanations of risk and protective variables.

Leonard and Blane (1999) humorously quoted Keller's Law to illustrate the difficulties in studying alcohol misuse: "The investigation of any trait in alcoholics will show that they had either more of it or less of it." They also cited the more "pithy" version, "Alcoholics are different in so many ways that it makes no difference" (p. 3). However, with developing theories, technological advances, and a growth in alcohol studies, it is now possible to more clearly distinguish relationships between these "traits" and differences, predict alcohol-related problems, and possibly prevent them. This is particularly true for adolescents since most alcohol use and related problems

begin in the early teen years. Several broad and specific theoretical perspectives are helpful in conceptualizing the dynamics of drinking etiology, including interactionism (Sadava, 1987) and developmental psychopathology (Windle and Davies, 1999), and more specific theories such as the social development model (Hawkins & Weis, 1985) and self-derogation theory (Kaplan, 1995).

Interactionism and Developmental Psychopathology.

Although parsimony in psychological research is often valued, it has become evident that many behavioral phenomena cannot be adequately understood with simple explanations, as many behaviors are multiply determined through dynamic processes involving complex relationships between variables within the person and the environment. In the 1970s, there was a revival of "interactionism," an approach that emphasized the interaction between person and environment in behavior acquisition, where neither person nor environment alone was the main source of variation (Ekehammar, 1974). Interactionism purported that behavioral outcomes were the result of continuous feedback between the person as an active agent in the process, and an environment that has psychological meaning to the person (Sadava, 1987). Furthermore, the person's representations of the environment included cognitive, affective, and motivational factors, and he/she was not simply the recipient of contingencies or reinforcement schedules. By the 1980s, interactionism was considered a "model but not yet a theory" (Endler, 1983).

The value of interactionism is evident in terms of being a sensible paradigm that more accurately reflects a complex reality. It further allows for the study of behavior patterns and problems that manifest over time, such as alcohol use and misuse.

Variables of interest are classified as either proximal or distal. Proximal variables are more highly predictive and tend to account for much more behavioral variance (Sadava, 1987). Such factors related to drinking include close relationships, availability of alcohol, and beliefs about drinking. Models which include only proximal variables, however, provide incomplete pictures of behavior in that they propose the self-evident. For instance, individuals who drink heavily are generally those who have alcohol more readily available to them. However, the inclusion of distal variables, such as stressful life circumstances (e.g., family conflict) or unconventional attitudes, in a model of alcohol misuse may allow for a richer understanding of individual differences in drinking behavior, as well as other, related behaviors.

Sadava (1987) outlined three theories consistent with interactionism, using them to illustrate both the basic constructs and the heterogeneity of such approaches. Problem behavior theory (Jessor), the domain model (Huba and Bentler), and the developmental model (Zucker) all conceive of problem drinking within a larger context of problem behaviors, consider the entire range of drinking behaviors, and focus on adolescence and the "precursors, sequelae, and developmental stages pertaining to this stage of life" (p. 94). They diverge, however, in the psychosocial variables they specify, the proposed systems of variable relationships, and the kinds of hypotheses generated.

Today, these earlier theoretical constructions are incorporated in more general biopsychosocial approaches such as lifespan developmental psychopathology theory (DPT; Windle and Davies, 1999). A DPT approach incorporates the basic principles of interactionism, but goes further to extend these ideas conceptually and

methodologically. It is wholly consistent with the biopsychosocial paradigm which emphasizes the importance of predictors from many life/developmental domains and their conjoint influences on substance use. As the name suggests, such factors exist within biological, psychological, and social domains, and their interactive effects differ across life stages, such as adolescence and young adulthood.

According to biopsychosocial and DPT perspectives, the expressions of alcohol-related behaviors are probabilistic based on the influences of multiple factors, and the developmental phase of life is key to the strength of those influences. Furthermore, these theories underscore the integral role of factors across the lifespan, as well as the timing of these factors and their influences on various developmental trajectories. Biopsychosocial and DPT theories allow for alcohol-related outcomes that depend upon emerging and interactive variables across individuals and across time. Differential trajectories are a key concept in DPT, where individuals with similar backgrounds follow different paths to different outcomes (i.e., multifinality), or individuals with different backgrounds converge upon a similar outcome (i.e., equifinality).

Finally, although consistent with risk factor models, these approaches do not support a simple accumulation of risk via relevant factors. Instead, risk and protective factors interact in complex and changing relationships, and a behavioral outcome is conditional upon these interrelationships. Conditional relationships between variables exist whereby the effects of a given independent variable are contingent upon the level of another independent variable (Sadava, 1987), setting the stage for multiple mediator and moderator interrelationships.

Theories of Peer Influence.

It is easy to see how these broad theories of behavior apply to the influences of peers on alcohol use and misuse. Peers are more or less important to youth, depending on the developmental phase, with peers becoming more important socializing agents through adolescence (Steinberg, 1985). Also, peers are part of the "environment," interacting with one another, sharing information, reinforcing behaviors, and so on. This picture is incomplete, however, and very general. Some theories consistent with BDT and DPT have attempted to improve upon earlier peer influence research through specifying the mechanisms through which peers play such an influential role in drinking. These include peer cluster theory (Oetting & Beauvais, 1986), the social development model (Lonczak, et al., 2001), and self-derogation theory (Kaplan, Martin, & Robbins, 1982).

Peer Cluster Theory. Peer cluster theory suggests that although there are a number of psychosocial factors that create the potential for drug use, actual involvement is due to the influences of peers (Oetting & Beauvais, 1987). Peer clusters may be dyads or small groups of close friends that spend time together and communicate often, share ideas, and come to have very similar beliefs and attitudes, some of which may be about using substances. Peers also provide opportunities and access to drugs, both important factors in the initiation and maintenance of drug use. Consistent with this theory, after collecting data for ten years, Oetting, Beauvais, Oetting, Wolf, and Edwards (1989) reported higher rates of drug use for Indian youth compared to the general population, and stated that interactions within small groups of peers had the strongest influence on a youth's decision to use or not use drugs.

Social Development Model. The Social Development Model (SDM) is a much richer way of conceptualizing teen substance use etiology and development. It is a general theory of human behavior that applies to both prosocial and problem behaviors (Hawkins & Weis, 1985). SDM emphasizes the role of social attachment and commitment to conventionality in the development of alcohol use by incorporating relationships between risk and protective factors in prediction (Lonczak et al., 2001). The SDM is a dynamic model in which adolescents' individual characteristics simultaneously influence and are influenced by interactions with conventional and deviant role models. Through its emphasis on interpersonal and academic skills, as well as the underlying idea that individuals differ in the extent to which peers may be influential, the SDM implies that nurturing these skills in childhood may deter involvement with substance-using peers (Petraitis, Flay, & Miller, 1996).

The SDM is also a developmental, lifespan perspective that allows for reciprocal causation between predictors and outcomes to span multiple developmental periods (Lonczak et al., 2001). It assumes that the influence of families, schools, and peers on adolescent behavior is related to the individual's particular stage of development (Hawkins & Weis, 1985), and thus, shifts over time. During preschool years, parents are the dominant socialization force, with teachers becoming more influential with the start of school, and peers dominating during adolescence (Lonczak et al., 2001). In particular, the SDM suggests that "adolescents are more likely to become involved with substance-using peers if, during earlier developmental stages, they had (a) infrequent opportunities for rewarding interactions at home and at school, (b) few of the necessary interpersonal and academic skills for successful and rewarding interactions at home and

school, and (c) received little reinforcement during their interactions with parents and teachers" (Petraitis, Flay, & Miller, 1996; p. 73).

Although many studies support the contributions of peers, family, and skills to adolescent substance use, all of which are parts of the SDM, evidence for the model itself can be found in a study by Lonczak et al. (2001). Following 807 youths from age 14 to age 16, study results suggest that SDM processes, including prosocial involvement, influences toward alcohol misuse, skills for interaction, and bonding to problem behavior influences, significantly contributed to alcohol use at age 16. However, the effects of some SDM predictors on age-16 alcohol misuse were found to be mediated through beliefs, highlighting a shortcoming of this model.

It is important to note that the SDM focuses on more long-term and less direct causes of substance use. As such, it is both helpful and limited. Limitations include the lack of consideration of cognitive-affective factors and, although it does address some intrapersonal characteristics, it does not address personality characteristics and affective states (Petraitis, Flay, & Miller, 1995).

Self-Derogation Theory. Self-derogation theory (SDT) shares many characteristics of both peer cluster theory and the SDM. In fact, SDT could be considered an extension or special case of these more general theoretical views. In contrast, however, SDT focuses on both the characteristics of adolescents' social settings (e.g., peers, communities, and families) and the adolescents' characteristics themselves (e.g., their self-esteem and coping skills). SDT assumes that, within a given social situation, individuals' motivation to use substances and their attachment to substance-using peers vary. SDT also assumes that these differences are based in the

individual's personality traits, transient affective states, and behavioral skills (Petraitis, Flay, & Miller, 1996).

SDT asserts that self-esteem is central to an understanding of adolescent substance use (Kaplan, Martin, & Robbins, 1982). It is proposed that adolescents who repeatedly receive negative evaluations from "conventional" others, such as family or community members, or feel that they are lacking in socially desirable traits, such as scholastic success, begin to experience low self-esteem and engage in self-derogation (Kaplan, Martin, & Robbins, 1982). As a defensive strategy, such adolescents become alienated from conventional society and role models and seek self-worth enhancement through alternative interpersonal connections and opportunities. These relationships may be with peers who do not follow or value conventional beliefs, attitudes, and behaviors, and may be considered "deviant" by definition. Associations with deviant peers may boost self-worth by enhancing positive self-evaluation and decreasing self-deprecation, and thus reinforce those associations (Mason, 2001).

Unlike other peer-related theories discussed earlier, SDT incorporates commitment and attachment, self-esteem, *and* involvement with deviant peers in its explanation of adolescent substance use (Petraitis, Flay, & Miller, 1996). It is noteworthy, however, that many studies have failed to demonstrate direct effects of self-esteem on substance use, and instead have only demonstrated correlational relationships. Considering that SDT refers to a developmental process that unfolds over time, it is important to use longitudinal data and appropriate statistical methods to demonstrate this process, as well as to test the model's validity. An exception to the preponderance of cross-sectional studies was carried out by Kaplan et al. (1982). Using

a two-year longitudinal design, the researchers concluded that low self-esteem was directly associated with involvement with substance-using peers and indirectly associated with early experimental substance use.

A more recent study revisited Kaplan's SDT using latent growth methodology to try to capture the dynamic nature of SDT predictions (Mason, 2001). Results were encouraging but limited. Preliminary LGM analyses did not indicate significant changes in delinquency in the sample, therefore it was impossible to examine the reciprocal relationship between within-subject change in delinquency and within-subject change in self-esteem. Instead, analyses focused on delinquency as a predictor and consequence of individual growth in self-esteem. However, findings supported the self-enhancing effects of delinquency, with higher levels of delinquency accelerating growth in self-esteem (Mason, 2001).

Summary and Rationale

In summary, Kaplan's self-derogation theory incorporates variables that have been shown to be important in adolescent substance use etiology and development, such as peers and family, and proposes a way in which understudied variables, such as cultural influences, may influence substance use. It also is an example of an interactional model, where environment and person interact toward a behavioral outcome. Research and methodology to date, however, have not adequately examined SDT. Early study results were consistent with SDT (Kaplan, 1978; Rosenberg & Rosenberg, 1978), however, they were criticized for their statistical and methodological limitations (Wells & Rankin, 1983). Furthermore, studies of Native populations in this

context have been rare. The current study addressed these limitations and gaps in the literature by using longitudinal data and contemporary statistical methodology.

SDT has four primary propositions. First, rejection by conventional society and role models, as well as perceived inadequacy or failure in normative tasks, result in decreased self-worth. In the proposed model, conventional success/failure are operationalized by lower family cohesion, higher family conflict, lower academic competence, lower cultural identification, and higher sociocultural alienation scores. The relationships between these scores and self-worth were assessed. Second, low self-worth and a need for more positive self-evaluation lead some adolescents to seek out an alternative peer group or opportunities for positive social comparison. Group members may be other disenfranchised or deviant youth. This was assessed by evaluating changes in the relationship between self-worth and peer deviance in the proposed model. Third, through socialization processes, adolescents with low self-worth adopt "unconventional"/"deviant" beliefs, attitudes, and behaviors, which may include drinking. This was assessed by examining changes in the relationship between peer deviance and drinking. And, fourth, through acceptance by the new peer group, self-worth and more positive self-evaluations increase. This was evaluated by examining changes in the relationship between peer deviance and self-worth.

Note that changes in one variable are proposed to be associated with changes in other variables within each individual. Evaluation of the relations among changes requires longitudinal data and person-centered statistical approaches. Although previous studies have evaluated individuals longitudinally, designs have typically been limited to 2 or 3 years. More importantly, few studies have used approaches that model

change at the level of the individual, and instead have relied on more traditional approaches that evaluate mean change of the sample.

The SDT conceptual model included exogenous and endogenous variables that were used in this study, as shown in Figure 1. "Exogenous" and "endogenous" are analytic terms used in structural equation modeling, but may also be thought of as representing more distal and more proximal factors in this study. Background factors would be more distal, and peer deviance would be a proximal factor. In words, the model represents the joint influences of family factors, cultural factors, and academic factors. These variables are considered exogenous as their causes are not included in this analytic model. The endogenous variables (i.e., variables that are caused by some other variable in the model) include self-worth, which is causally related to peer deviance, which is, in turn, causally related to drinking. Study hypotheses are described below.

In addition, in order to better evaluate SDT as a valid model which explains the development of drinking and related problems in this sample of Native teens, an additional model was used as a comparison. The revised model (see Figure 2) contains additional paths that are hypothesized based on a preponderance of empirical findings in the established risk factor literature. These are simple, direct relationships between two indicators and outcomes, including causal paths from both family cohesion and family conflict directly to peer deviance and drinking. In comparing theoretical models, a significant difference between the overall model fit for each helped to determine whether the more parsimonious or the more complex model better fit the data. Therefore, if the SDT model fits the data as well or better than the SDT model with the

additional paths, it would be considered the better model of the two due to its parsimony and good fit.

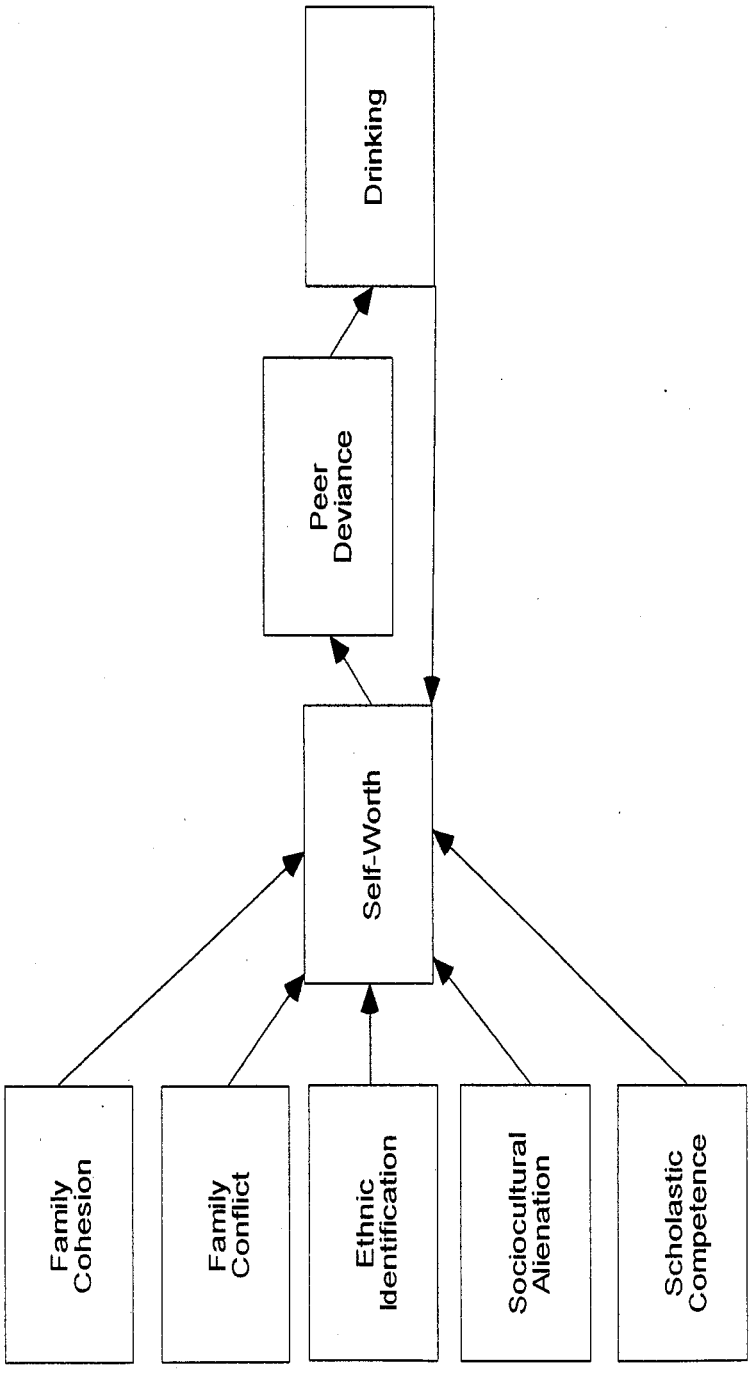

Figure 1: Conceptual Model of Self-Derogation Theory.

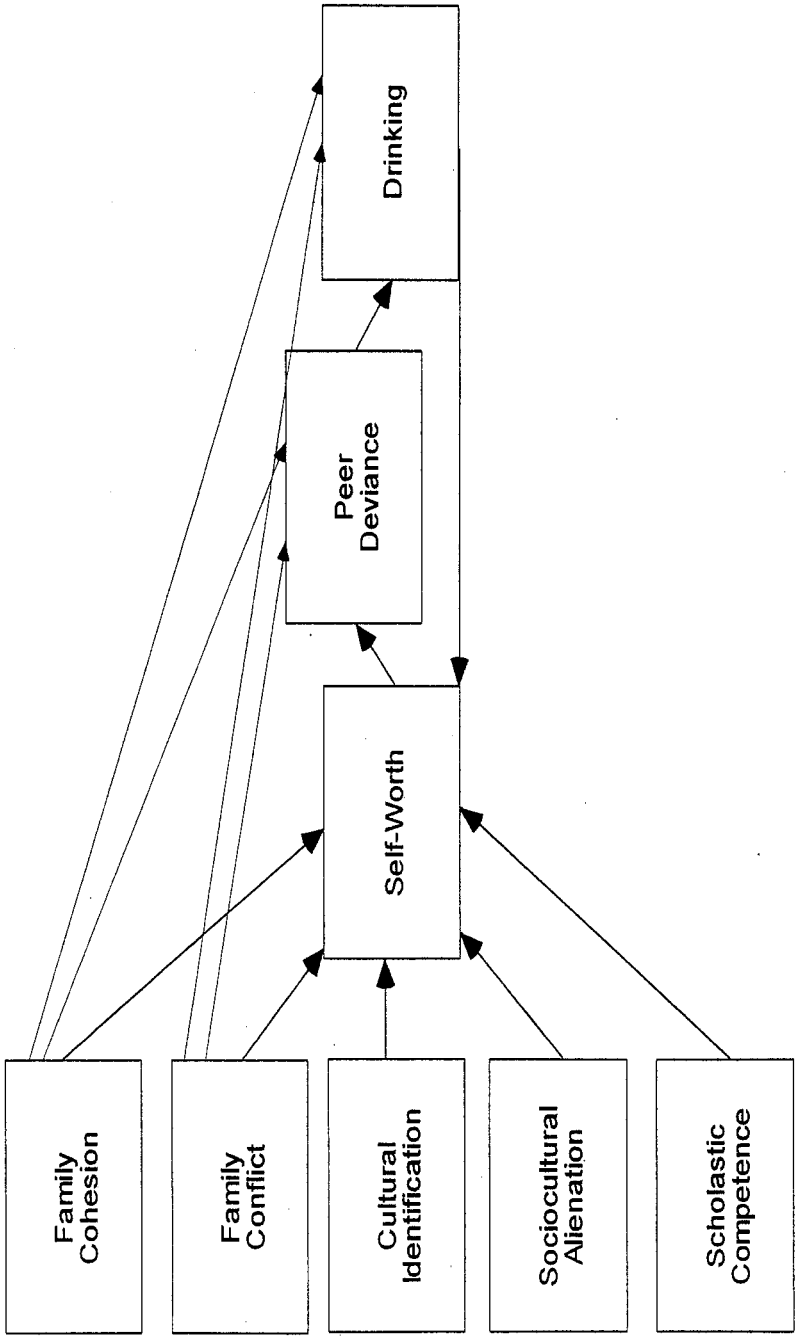

Figure 2: Conceptual Model of Self-Derogation Theory with Additional Relationships.

Hypotheses

Specific hypotheses generated by SDT and tested in this study are:

1. Indicators of attachment to conventional society and conventional competence will predict self-worth, as indicated by changes in individual self-worth scores.
   a. Initial status in family cohesion and changes in family cohesion will be positively associated with initial self-worth and changes in self-worth.
   b. Initial status in family conflict and changes in family conflict will be negatively associated with initial self-worth and changes in self-worth.
   c. Initial status in cultural identification and changes in cultural identification will be positively associated with initial self-worth and changes in self-worth.
   d. Initial status in sociocultural alienation and changes in sociocultural alienation will be negatively associated with initial self-worth and changes in self-worth.
   e. Initial status in scholastic competence and changes in scholastic competence will be positively associated with initial self-worth and changes in self-worth.
2. Initial status in self-worth and changes in self-worth will be negatively associated with initial peer deviance and changes in peer deviance.
3. Initial status in peer deviance and changes in peer deviance will be positively associated with initial drinking and changes in drinking.

4. Self-derogation theory also proposes that increases in peer deviance are associated with increases in self-worth. Thus, latent changes in peer deviance should be positively associated with latent change in self-worth.

CHAPTER II: METHOD

Data for this study were taken from a ten-year prospective longitudinal study of alcohol abuse, drug abuse, and mental health status in a community sample of urban American Indian adolescents. American Indian Research (AIR) conducted the parent project in Seattle, Washington, funded by the National Institute of Alcohol Abuse and Alcoholism (NIAAA, R01 AA07103). The parent study is briefly described below. For additional information, please refer to Walker et al. (1996).

Participants

Participants from two school districts and one health care clinic in the Seattle metropolitan area were recruited for the study. School districts were selected because they had the highest enrollments of Native American students in the area. Through mailed letters of introduction and phone contacts with parents, caretakers, and potential participants, 224 adolescents averaging 11.67 years at time 1 (SD=.61), and 19.68 years at time 9 (SD=.63) were recruited from schools to form cohort 1, and 66 adolescents averaging 11.69 at time 1 (SD=.90) to 19.67 at time 9 (SD=.91) were recruited from an Indian Health Services medical clinic to form cohort 2.

Demographic information for these participants are included in Table 1 and Table 2. It is clear that no age or grade differences distinguish these cohorts, however, further analyses were used to determine whether the two groups could be combined to form this study's sample. Walker et al. suggested that analyses support the combination of these cohorts (Walker, 2001).

Table 1: Cohort 1 - Sample size, mean age, and school grade over nine time points.

	Time 1 1988-89	Time 2 1989-90	Time 3 1990-91	Time 4 1991-92	Time 5 1992-93	Time 6 1993-94	Time 7 1994-95	Time 8 1995-96	Time 9 1996-97
N	224	221	217	218	211	211	211	212	202
Mean Age (SD)	11.67 (.61)	12.70 (.64)	13.69 (.64)	14.66 (.61)	15.74 (.64)	16.66 (.62)	17.55 (.62)	18.62 (.63)	19.68 (.63)
Grade	5/6	6/7	7/8	8/9	9/10	10/11	11/12	12/13	13/14

Table 2: Cohort 2 - Sample size, mean age, and school grade over nine time points.

	Time 1 1988-89	Time 2 1989-90	Time 3 1990-91	Time 4 1991-92	Time 5 1992-93	Time 6 1993-94	Time 7 1994-95	Time 8 1995-96	Time 9 1996-97
N	66	65	66	66	66	64	61	63	62
Mean Age (SD)	11.69 (.90)	12.67 (.90)	13.70 (.93)	14.66 (.90)	15.76 (.92)	16.67 (.92)	17.56 (.89)	18.65 (.92)	19.67 (.91)
Grade	5/6	6/7	7/8	8/9	9/10	10/11	11/12	12/13	13/14

Per Walker et al. (2001), cohorts 1 and 2 did not differ at recruitment in mean age, gender (49.6% versus 53.3% male, respectively), grade in school, degree of Indian blood, Indian lineage, both parents Indian, or welfare subsidy. They did differ, however, in mean household income, per capita income, and poverty status. These economic differences are consistent with a population served by a community health center which serves economically disadvantaged individuals. Additional analyses comparing the two cohorts further supported combining them into one group for this study's analyses.

Data were collected annually at nine time points (i.e., T1 through T9) during the parent project. Based on the nature of this study's analyses, all data available for each variable and year were utilized. Retention rate for the sample was very high for the parent study, with average follow-up rates at 96% for cohort 1 and 98% for cohort 2 across the nine years, and T9 follow-up rates of 90% for cohort 1 and 94% for cohort 2.

Assessment Procedures

Evaluations lasting approximately 2.25 hours were primarily conducted in person. Some instruments were administered by oral interview and some were paper-and-pencil measures completed by participants. Although some interviews were conducted by phone when participants had moved from the immediate study area, phone interviews with adolescents have been found to yield results similar to in-person interviews in mental health and substance use studies (Reich & Earls, 1990). Furthermore, privacy was assured and assessments were conducted by trained research personnel, of whom the majority identified as Native American.

Measures

Participants responded to the following measures as part of a larger assessment battery. Although many of the instruments had not been previously analyzed with Native American samples, all had demonstrated acceptable psychometric properties with general population samples. Measures were also tested for reading level and age appropriateness. All instruments were evaluated for internal consistency using Cronbach's alpha following the conclusion of baseline interviews, and were reevaluated for the combined cohorts. Reliability information for each instrument is presented below with its description.

Demographic Information.

Basic demographic information was collected for cohort 1 and cohort 2. These included birth sex, age, grade in school, mean household income, per capita income, and poverty status. These items were included in the Child Biographical Questionnaire (CBQ; AIR, 1988). Data were obtained at all nine time points. Descriptive information is provided in Results with cohort comparisons.

Outcome Variables.

Global self-worth. Global self-worth was measured with the Self-Perception Profile for Children and the Self-Perception Profile for Adolescents (SPPC, SPPA; Harter, 1985, 1988). Items pertaining to this subscale included: "Some kids like the kind of person they are," versus, "Other kids often wish they were someone else." Responses were coded as "sort of true for me" or "really true for me." At times T1 and T2, the children's version was used, and at times T3-T8, the adolescents' version was used to maintain age-appropriateness per manual instructions. These are parallel

forms of the same measure (Harter, 1988). Norms for the SPPC and SPPA are available by grade level, with an internal consistency of .78. The internal consistency reliability coefficient for our sample was .86. Data were obtained for time points 1 through 8.

Peer Deviance. Peer influence for this study was defined as peer deviant behaviors. It is important to note that this variable did not include sibling-as-peer data. Peer deviant behaviors were measured with six items from the Alcohol and Drug Use Questionnaire (AQ; AIR, 1988). Specifically, the question was designed to identify peer alcohol and drug use, as well as other problem behaviors such as getting into trouble at school or breaking laws. For example, the item inquires about whether close friends of the participant have "smoked cigarettes," "used marijuana or other drugs," or "been suspended from school." Participants were asked to rate their answers on Likert-type scales, specifying whether "none," "some" or "all" of their close friends engaged in these behaviors. For this scale, the internal consistency reliability coefficient was .83. Data were obtained for T1-T8.

Drinking. The Rutgers Alcohol Problems Index (RAPI), which yields a total score reflecting the impact of alcohol on social and health functioning (White & Labouvie, 1989), was considered along with drinking-related items from the Alcohol and Drug Use Questionnaire (AQ) in the formation of a latent construct representing problem drinking. The RAPI contains 23 items and is usually self-administered. Items ask the respondent to indicate how many times he/she has experienced alcohol-related consequences over a specified period of time, such as "not able to do your homework or study for a test," or "had a bad time." The RAPI has been normed on

adolescents aged 12 to18 with an internal consistency of .74 in the combined sample for this study. It has been used successfully with college student populations (Marlatt et al., 1998) and with urban American Indian adolescents (Walker et al., 1996). Because data were collected for the "past year" beginning at time 5, data were utilized from T5 to T9.

Items from the AQ (Walker et al., 1996) included "Have you ever had an alcoholic drink?" "Have you had an alcoholic drink in the last 12 months?" "Have you been drunk in the past 12 months?" and, "On how many days in the last 12 months did you drink 5 or more drinks in a row?" Using a confirmatory factor analysis approach with SEM software, a latent construct called "drinking" was formed from RAPI, the "drunk past year" item, and the "5+ drinks past year" item. This measurement model fit the data well (χ^2/df=1.72, RMSEA=.05 (90%CI: .034; .065), TLI=.974, NFI=.966, CFI=.985, and IFI=.985). A graphical representation of the CFA model is presented in Figure 3. Ovals represent latent (unobserved) factors that are hypothesized to cause the observed measurements represented by rectangles plus some error (small circles). The model tests the latent construct "alc5" through "alc9" representing an underlying "drinking" factor that contributes to the observed RAPI, drunk-past-year, and drank-more-than-5-drinks annual measurements.

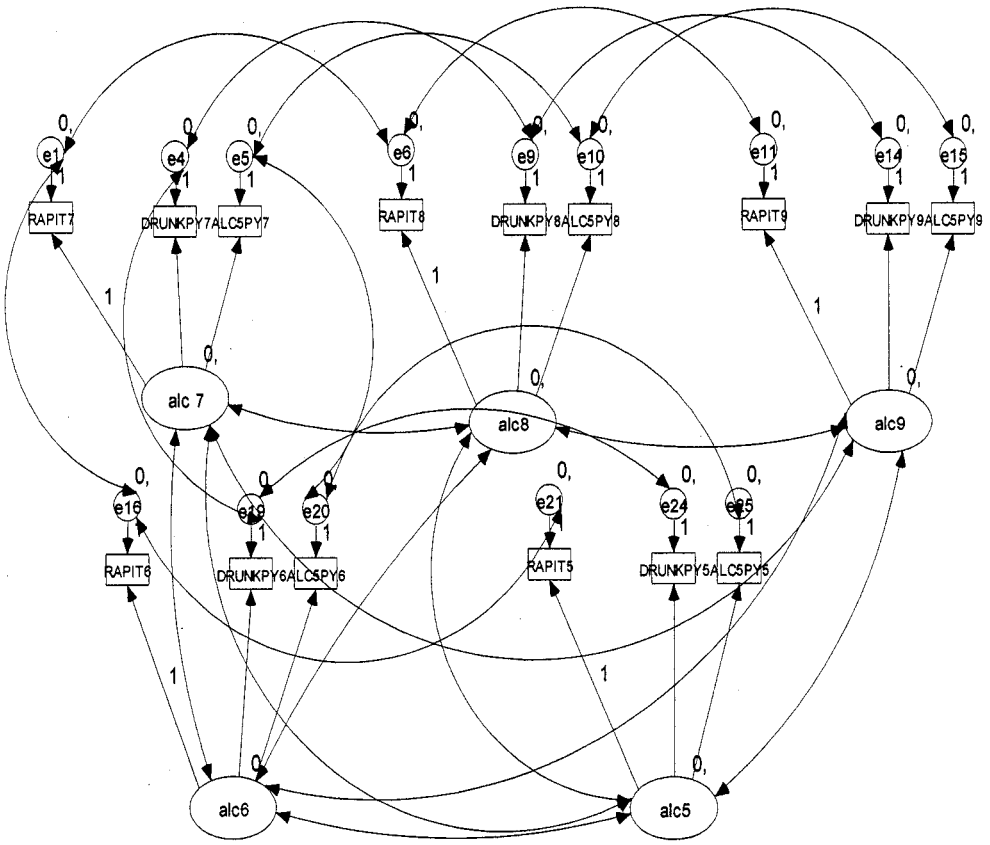

Figure 3: Confirmatory Factor Analysis Model for Drinking Construct.

Indicator Variables.

Family cohesion and family conflict. The Moos Family Relationships Index (Moos & Moos, 1986) provided two scale scores that were used in the current study. The first represents family cohesion, which is the degree of commitment, help, and support family members provide each other. The second measures family conflict, or conflict among family members that is expressed through aggression and expressed anger. The Moos has been used as a self-report measure with adolescents. Parent-child congruence scores may be calculated which indicate perceived alienation from

family, either from a caretaker's point of view, or the adolescent's (P.S. Walker, 1994). Adolescents' responses were used in this study. Internal reliabilities were .84 for cohesion and .85 for conflict. Data were obtained for six time points, T2-T4 and T6-T8.

Ethnic identification. The Oetting and Beauvais Ethnic Identity scale (1991) was used to measure self-identification as an American Indian. The scale is usually administered by interview, and contains seven items. Each item asks about some aspect of ethnic/cultural identity, such as, "How do you see yourself? (What is your ethnic identity?)," and responses range from "Black" to "American Indian/Alaska Native" to "Other." Data were obtained for time points 4 through 9. Reliability coefficient alpha was .93 for this sample for American Indian identification.

Sociocultural alienation. Sociocultural alienation was assessed by items embedded within the Alcohol and Drug Use Questionnaire (AIR, 1988), yielding a total scale score. Items asked how much the respondent felt cared about by others, including parents, tribal leaders, school people, and other adults. Responses were coded on a likert-type scale from "not at all" to "very much." The scale was adapted from "sociocultural alienation" items from the Grossman scale (Grossman, Milligan, & Deyo, 1991; Walker, 2001). To aid interpretation, scores were recoded so that higher scores do indicate higher alienation and less reported "caring" by adults. Data were collected at time points 5 through 9. Reliability of the scale was .85 for this sample.

Scholastic competence. Items from Harter's Self Perception Profile for Children (SPPC; 1985) and for adolescents (SPPA; 1985) provided an academic

competence scale score. The SPPC and SPPA are 45-item scales that measure how youth generally feel about themselves, as well as how competent they feel in specific situations. The 36-item scale called "What Am I Like" is usually self-administered. It yields six subscales including scholastic competence and global self-worth (described below). Items ask respondents to choose one of two statements as being more like them, then to indicate whether the statement is "really true" for them or "sort of true" for them. In the academic competence subscale, items include: "Some kids feel that they are very good at their school work," versus "Other kids worry about whether they can do the school work assigned to them." Data were obtained for time points 1 through 8. At times T1 and T2, the children's version was used, and at times T3-T8, the adolescents' version was used to maintain age-appropriateness per manual instructions. Internal consistency was reliable at .91.

Table 3 summarizes the data that were available for each year along with descriptive statistics.

Table 3: Descriptive statistics for each year of data used in the study.

Variable	T1 Mean (SD)	T2 Mean (SD)	T3 Mean (SD)	T4 Mean (SD)	T5 Mean (SD)	T6 Mean (SD)	T7 Mean (SD)	T8 Mean (SD)	T9 Mean (SD)
Family Cohesion (scale range = 0 to 9)		6.91 (2.11)	6.45 (2.50)	6.32 (2.43)		6.27 (2.53)	6.26 (2.62)	6.34 (2.46)	
Family Conflict (scale range = 0 to 9)		2.74 (2.10)	3.37 (2.33)	3.40 (2.28)		3.35 (2.45)	3.28 (2.49)	3.10 (2.38)	
Ethnic Identification (scale range = 0 to 3)				1.31 (.81)	1.17 (.85)	1.19 (.84)	1.23 (.86)	1.27 (.82)	1.31 (.82)
Sociocultural Alienation (scale range = 0 to 45)					33.53 (7.05)	32.75 (7.43)	32.07 (7.12)	32.06 (7.37)	31.88 (7.47)
Scholastic Competence (scale range = 0 to 4)	2.82 (.70)	2.76 (.71)	2.78 (.66)	2.77 (.69)	2.85 (.65)	2.96 (.67)	2.99 (.64)	3.17 (.59)	
Global Self-Worth (scale range = 0 to 4)	3.28 (.58)	3.25 (.59)	3.22 (.58)	3.17 (.57)	3.13 (.59)	3.16 (.59)	3.16 (.59)	3.23 (.57)	
Peer Deviance (scale range = 0 to 6)	1.39 (1.68)	1.65 (1.85)	2.47 (2.28)	3.18 (2.28)	3.61 (2.08)	3.69 (1.99)	3.57 (2.04)	3.52 (1.76)	
Drinking: Drunk Past Year (scale range = 0 to 1)					.30 (.46)	.36 (.48)	.39 (.49)	.39 (.49)	.40 (.49)
5+ Drinks Past Year (scale range = 0 to 1)					.31 (.47)	.37 (.48)	.44 (.50)	.47 (.50)	.52 (.50)
RAPI (scale range = 0 to 90)					6.20 (11.6)	5.65 (9.99)	6.57 (12)	4.80 (9.79)	5.27 (10)

CHAPTER III: RESULTS

Description of Latent Variable Growth Curve Modeling

Traditional approaches to studying change, including ANOVA and multiple regression techniques, analyze mean changes across individuals and regard individual differences as error variance. Some of the "error variance," however, may be both meaningful and important in assessing change. A more appropriate model for assessing change should capture both an individual's developmental trajectory and individual differences in growth curves, as well as to allow for assessment of group level changes and differences in change (Duncan & Duncan, 2004). One such approach is latent variable growth curve modeling (LGM).

LGM is a structural equation modeling (SEM) technique that uses repeated measures to examine change in constructs over time. It takes into account both between-measurement covariance and observed mean structure so that group growth parameters and individual variation in growth can be examined (Duncan, Duncan, Strycker, Li & Alpert, 1999). Thus, it has advantages over more traditional fixed-effects techniques in studying changes in adolescent alcohol use and related problems over time. This approach is currently considered to be better for examining individual differences in growth and correlates of change. An additional advantage is that this approach is flexible in dealing with unbalanced data, such as when some data are missing (Snidjers & Bosker, 1999).

As an SEM technique, LGM also shares some of the same limitations. For instance, the approach requires a relatively large sample size and an equal number and spacing of assessments for each individual (Duncan, Duncan, Strycker, Li & Alpert,

1999). However, when this requirement is not met, LGM may still be employed with modifications. Furthermore, a central assumption of this technique is that there is change over time in the constructs of interest. If no change is present, LGM would have no advantages over other methods.

LGM may be used to interpret data with only two repeated measurements, however, this is only useful if it is known that growth is linear. Clearly, with additional repeated measurements, the validity of linear growth may be assessed and there is greater precision in parameter estimates (Duncan & Duncan, 2004). With additional measurements, curvilinear growth or change may be evaluated.

There are two steps in the LGM process (Duncan & Duncan, 2004). In the first, a regression curve is fit to the multiple individual measures, yielding two latent factors, intercept and slope. The intercept is simply the starting point of the growth curve where the curve intercepts the vertical axis, and thus it is a constant over time. A relatively high intercept value indicates higher initial status of the construct, while a low value indicates a low initial value. The slope represents an individual's trajectory or change in the studied construct over time. As such, it may vary at each time point. A high slope value indicates steeper growth or faster change over time, and a lower value indicates slower growth or negative growth. In the second step of LGM, interpretation of the growth curve's intercept and slope takes place as these become the targets of analyses (Duncan, Duncan, Strycker, Li & Alpert, 1999). Predictors are added to the analytic model based on a priori hypotheses. With LGM, the relative importance of single predictors and combinations of predictors may be evaluated. Finally, specific to self-derogation theory and the current study's hypotheses about

how changes in one variable affect changes in another, multivariate LGM allows for the evaluation of how development in one behavior covaries with other behaviors (Duncan & Duncan, 2004). Furthermore, because reciprocal relationships between constructs are complex and difficult to assess, Rogosa (1988) has suggested proceeding through a hierarchy of research questions, such as the steps described above.

Analysis of Moment Structures 4.0 software (AMOS; Arbuckle & Wothke, 1999) was utilized for all SEM/LGM procedures. Full Information Maximum Likelihood (FIML) was the SEM/LGM estimation method chosen to make full use of available years of data. FIML is considered a state-of-the-art method for treatment of missing data (Schafer & Graham, 2002). To assess model fit to the data, several fit indices were evaluated and reported. Model chi-square is the most basic fit statistic reported in SEM analyses (Kline, 2005). The higher its value, the worse the model's correspondence to the data. Model chi-square divided by degrees of freedom (χ^2/df) results in a value referred to as normed chi-square. This statistic reduces sensitivity to sample size in more complex models, and is considered a good indicator of model fit when it is less than 5 (Kline, 2005). Root Mean Square Error of Approximation (RMSEA) is a parsimony-adjusted index that has a built-in correction for model complexity. Given two models with similar overall explanatory power for the data, the simpler model is favored (Kline, 2005). A rule of thumb is that RMSEA $\leq$ .05 indicates a close approximate fit, and values between .05 and .08 suggest a reasonable error of approximation (Browne & Cudeck, 1993). With the Tucker-Lewis Index

(TLI) and Normed Fit Index (NFI), Comparative Fit Index (CFI), and Incremental (IFI), values greater than .9 indicate good model fit (Arbuckle & Wothke, 1999). Finally, none of these indices may stand alone but, instead, several should be evaluated together to determine model fit.

Outline of Analytic Steps

Step 1: Determine whether cohort 1 (N=224) may be combined with cohort 2 (N=66) into one group for analyses. Conduct t-tests to determine whether differences between groups (school-based, clinic-based) would preclude their combination. Conduct descriptive analyses to assess sample's demographic characteristics.

Step 2: Construct growth curve models for all variables.

Step 3: Test individual hypotheses using latent variable growth curve modeling.

Step 4: Test the overall fit of the final LGM model for SDT and assess causal relationships between variables. A final model incorporating all intercepts and slopes from prior analyses will be used to test self-derogation theory as a model that adequately explains the dynamic relationships between the various exogenous and endogenous variables, as well as the development of "drinking."

Step 5: Compare the final LGM model for SDT with the revised LGM model which includes additional hypothesized relationships based on existing literature.

Cohort Comparisons and Sample Description

T-tests and LGM were used to compare the school-based (Cohort 1, N=224) and clinic-based cohorts (Cohort 2, N=66). Paired t-tests were first conducted using SPSS to compare the cohorts across all variables. Significant differences were found in poverty level, per capita income, mean household income, and grade in school.

However, given the nature of multiple testing, some differences are expected to be found by chance alone. Using a Bonferroni correction for multiple t-tests, none of the differences were significant. In order to further establish that one combined cohort would be suitable for this study's analyses and hypotheses testing, cohort was included in latent growth models with each of the three primary outcome variables, self-worth, peer deviance, and drinking. Results indicated that the introduction of cohort into the models produced no significant differences in the nested models. For self-worth, $\chi^2(8)=5.88$, $p=0.66$, for peer deviance, $\chi^2(8)=10.03$, $p=0.26$, and for drinking, $\chi^2(5)=4.01$, $p=0.55$.

The combined sample was comprised of 48.6% male participants and 50.4% female participants (reported birth sex). The sample's mean age was 11.67 years at T1 with a standard deviation of .69, and 19.68 at T9 (SD=.71). Mean grade/year in school at T1 was 5.44 (SD=.57). SES differences were noted in the parent study. For this study's sample, mean annual household income was $21,634 (SD=14,004), per capita income was $5,268 (SD=3,928), and 33% of the 277 available responses at T1 indicated poverty status at or below the poverty line.

Growth Models for All Variables

To determine the shape of growth over time for each variable, measurement models were constructed with intercept, linear slope, and quadratic slope factors to assess model fit. As linear models were nested within quadratic models, this allowed comparison of the models to determine which was a better fit to the data. Overall, curvilinear growth best described the changes in every variable over time.

Family Cohesion.

Results for family cohesion (famcoh) indicated that the linear and quadratic models both provided a good fit to the data. However, the quadratic model fit the data significantly better than the linear model ($\chi^2(8)=19.58$, p=.001). Quadratic model fit indices indicated that the model was a good fit to the data (χ^2/df=1.25, RMSEA=.03 (90%CI: .0; .07), TLI=.999, NFI=.996, CFI=.999, and IFI=.999). The measurement model is presented in Figure 4.

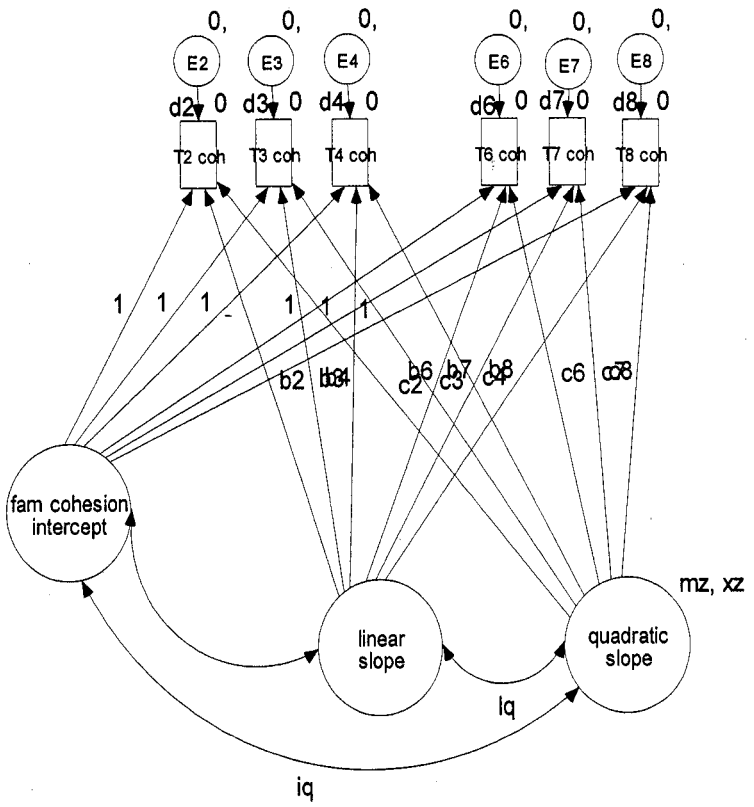

Figure 4: Measurement Model for Family Cohesion.

Representative of all growth models presented here, the rectangles represent the indicators or observed variables. In this case, family cohesion data were collected for years 2 through 4 and years 6 through 8. The circles represent unobserved variables. The large circles represent intercept, linear slope, and quadratic factors, and small circles represent error terms associated with measurement error. One-way arrows indicate causal effects and two-way errors represent covariances. This model measures the effects of intercept and slope on the observed variables. In identifying the model, intercept regression weights are specified to indicate the standard measure of 1 for intercept paths, linear increases in one for linear paths (e.g., 0, 1, 2, 3, etc.), and quadratic increases in 1 for quadratic paths (e.g., 0, 1, 4, 9, etc). Using Full Maximum Likelihood estimation (FIML), AMOS utilizes a variance/covariance matrix to estimate means, variances, regression weights, and errors. The plotted regression line for family cohesion is presented in Figure 5. As illustrated, family cohesion decreased steadily over time from approximately age 12.5 to 16.5, at which point it began to increase until the last data collection at about 18.5 years of age.

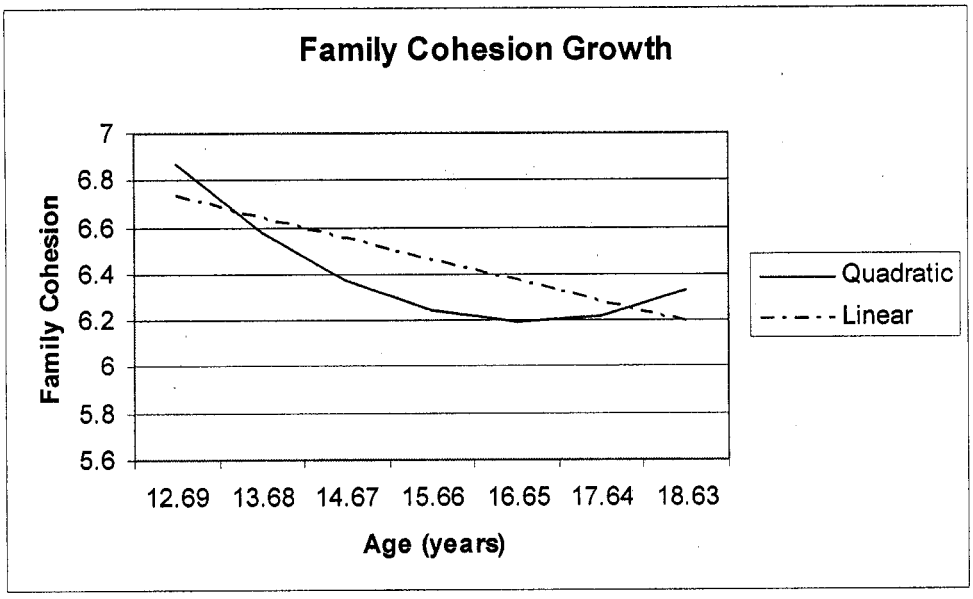

Figure 5: Family Cohesion Growth Curve.

*Note: Data point at 15.66 years was estimated.

AMOS output also provides the means and variances for all factors. Means indicate the group growth parameters and variances represent individual differences in the mean. First, the intercept mean for the start of the family cohesion growth curve was 6.87 ($p<.001$) with a variance of 3.03 ($p<.001$). This suggests that, on average, an individual's initial family cohesion score was 6.87 and there was substantial variability between individuals in this starting point. Second, the linear slope mean was -.33 ($p<.001$) with a variance of .5 ($p=.015$), suggesting that, on average, individuals' family conflict scores decreased each year by -.33 units and there was significant individual variability in this change. Third, the quadratic mean was .04 with a variance of .01 ($p=.05$), indicating an additional effect on change in family cohesion over time, as this contributes to the estimated individual's score at each time point in accordance with the regression equation. Finally, there was a significant

negative covariance between intercept and linear slope (cov=-.06, p=.05), suggesting that higher initial family cohesion had a moderating or slowing effect on change in family cohesion over time.

For the next 7 variables, results will be simplified.

Family Conflict.

Family conflict data were also available for years 2-4 and 6-8. The quadratic model provided a better fit to the data than the linear model ($\chi^2(4)=34.46$, p=.013), and overall fit indices for the quadratic model were consistently good ($\chi^2/df=1.45$, RMSEA=.039 (90%CI: .0; .071), TLI=..996, NFI=.989, CFI=.997, and IFI=.997). The intercept mean was 2.86 (p<.001) with a variance of 2.4 (p<.001), indicating individuals' average initial level of family conflict and significant individual variability in this level. The linear slope mean was .38 (p<.001) with a variance of .42 (p=.017), indicating increasing family conflict over time and significant individual variability in family conflict change. Quadratic slope mean was -.06 (p<.001) with a variance of .006 (p=.167), indicating curvature in the family conflict growth curve that was not significantly different between individuals. Finally, covariances between factors were not significant. The plotted growth curve for family conflict is presented in Figure 6. Family conflict increased steadily from about age 12.5 years and began to decrease around 16.5 years, returning close to initial levels. Interestingly, inspection of the cohesion and conflict curves suggests that conflict began to decrease at about the same time that cohesion began to increase.

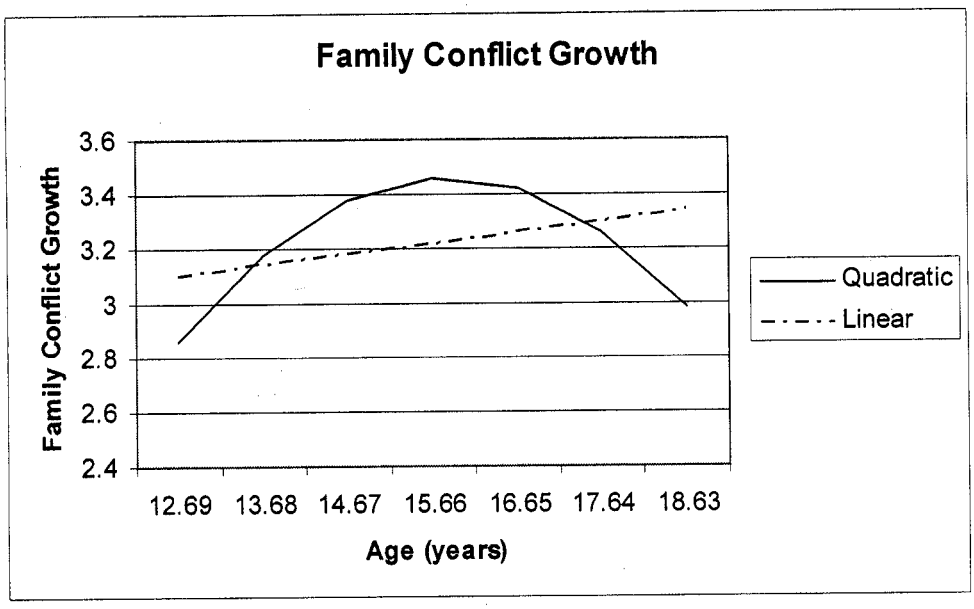

Figure 6: Family Conflict Growth Curve.

*Note: Data point at 15.66 years was estimated.

Ethnic Identification.

Ethnic identification (ethnic ID) as an American Indian also demonstrates quadratic/curvilinear growth as opposed to linear growth ($\chi^2(4)=31.31$, $p<.001$) for the available data (T5-T9). The quadratic model provided a good fit to the data ($\chi^2/df=1.9$, RMSEA=.057 (90%CI: .027; .086), TLI=.994, NFI=.990, CFI=.995, IFI=.995). The intercept mean was 1.29 ($p<.001$) with a variance of .516 ($p<.001$), indicating significant individual variability in initial ethnic ID. The linear slope mean was -.084 ($p=.001$) with a variance of .05 ($p=.002$), indicating a decrease in ethnic ID over time and significant individual variability in this change. The quadratic slope mean was .018 ($p<.001$) indicated a curvature to the growth curve and significant individual variability in this effect with a variance of .001 ($p=.016$). Finally, there was a significant negative covariance between the intercept and linear slope factors (cov=-

0.013, p=.046), suggesting that higher initial ethnic identification had a significant negative or slowing effect on ethnic ID decrease over time. The growth curve for ethnic ID is presented in Figure 7, demonstrating that ethnic ID decreased from age 14.67 to about 16.5, and then increased steadily until the last data were collected at age 19.5. Please note that although a curve is visible, the scale is relatively small. The overall range of scores for ethnic ID was 0 to 3.

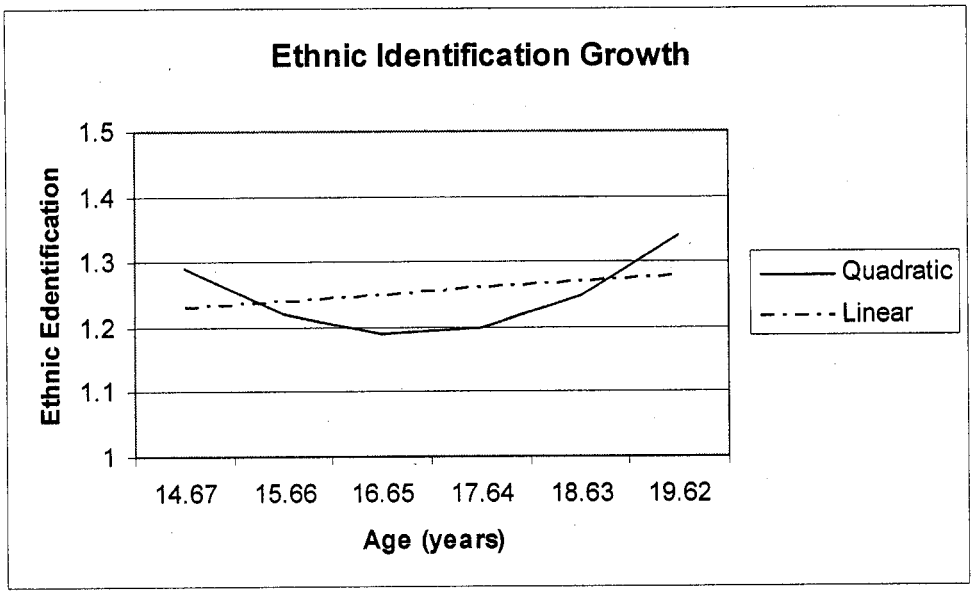

Figure 7: Ethnic Identification Growth Curve.

Sociocultural Alienation.

The quadratic model for social alienation also fit the data significantly better than the linear model ($\chi^2(4)=9.904$, p=.042). The overall model fit was good (χ^2/df=1.19, RMSEA=.026 (90%CI: .0; .072), TLI=.999, NFI=.995, CFI=.995, IFI=.995). The intercept mean was 11.48 (p<.001) with a variance of 32.15 (p<.001), suggesting that there were relatively low initial levels of alienation (range = 0 to 45) and there was substantial individual variability around the start of the growth function.

The linear slope mean was .978 (p=.002) with a variance of 2.531 (p=.37), indicating increasing reported alienation over time across individuals. The quadratic slope mean was -.146 (p=.057) with a variance of .09 (p=.578), suggesting that it was not significantly different than zero and individual variability was non-significant. These results suggest that there was great individual variability in initial levels of reported alienation, but no significant variability in either the rate or the shape of change over time. As shown in Figure 8, there was little change from 15.66 to about age 17, at which point a steady increase in reported alienation began. As noted earlier, higher alienation corresponds with lower perceived caring by adults in the child's life. In addition, there were no significant covariances between slope and intercept factors with results from the quadratic model, but there was a significant negative covariance in the linear-only model between intercept and linear slope (cov=-4.057, p<.001) which also approached significance in the quadratic model, suggesting that higher initial levels of alienation tended to be associated with less change in alienation over time.

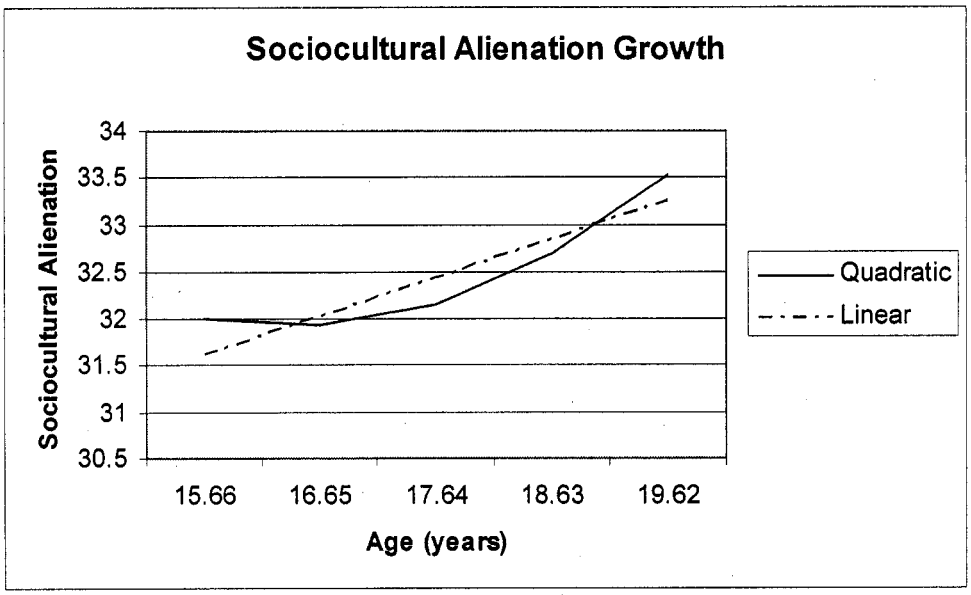

Figure 8: Sociocultural Alienation Growth Curve.

Scholastic Competence.

Scholastic competence over time was also best described by quadratic growth, with this model providing a better fit to the data than the linear model ($\chi^2(4)=38.82$, $p<.001$). Quadratic model fit was good ($\chi^2/df=2.38$, RMSEA=.069 (90%CI: .050; .089), TLI=.993, NFI=.988, CFI=.993, IFI=.993). Intercept mean was 2.81 ($p<.001$) with a variance of .329 ($p<.001$), linear slope mean was -.041 ($p=.017$) with a variance of .022 ($p=.003$), and quadratic slope mean was .012 ($p<.001$) with a variance of 0 ($p=.248$). These results suggest that scholastic competence first measured 2.81 on average with significant individual variation around that point and significant variability around slope factors. Furthermore, there was a significant negative relationship between intercept and linear slope (cov=-.029, $p=.028$), suggesting that higher initial levels of scholastic competence were associated with less change in competence over time. Since change is positive overall, this means that lower initial

scholastic competence was also associated with larger gains over time. Figure 9 graphically illustrates the average growth curve for scholastic competence. As presented, there was a small downward trend from 11.7 to about 13 years of age, and then competence steadily increased until the last data were collected at age 18.63. Please note that although the linear slope mean was negative in the quadratic model, this value is combined with the quadratic mean to form the regression curve. In the linear-only model, the linear slope mean was positive.

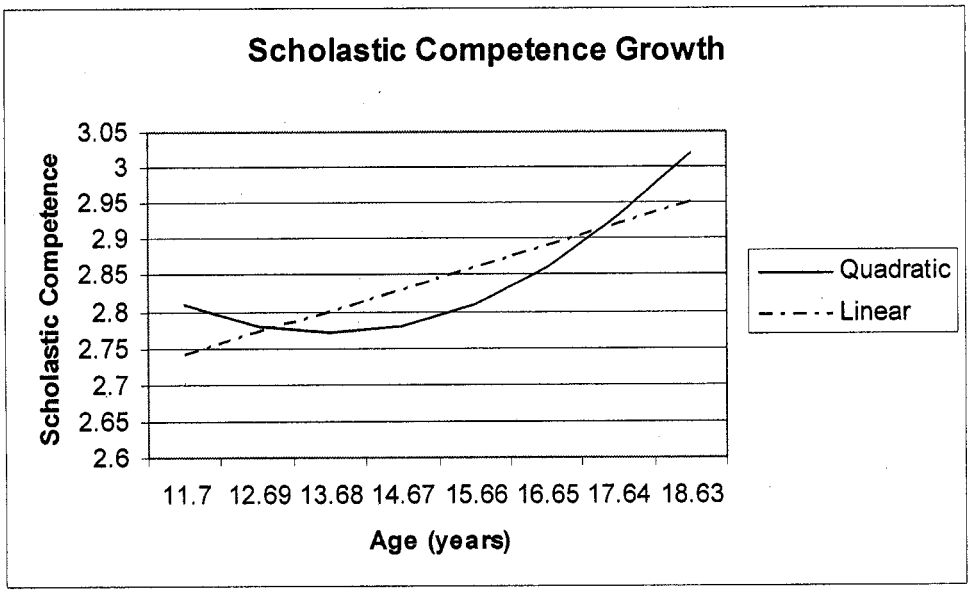

Figure 9: Scholastic Competence Growth Curve.

Global Self-Worth.

The quadratic model provided a better fit than the linear model for one of the primary outcome variables, self-worth ($\chi^2(4)=57.416$, $p<.001$), and model fit was good ($\chi^2/df=1.48$, RMSEA=.041 (90%CI: .011; .063), TLI=.998, NFI=.994, CFI=.998, IFI=.998). Intercept mean was 3.288 ($p<.001$) with a variance of .203 ($p<.001$), linear slope mean was -.063 ($p<.001$) with a variance of .04 ($p<.001$), and

quadratic slope mean was .008 (p=.001) with a variance of .001 (p<.001). These results indicate significant individual variability in all three factors and a U-shaped growth curve. There were significant covariances between intercept and both slope factors (linear slope mean =-.038, p=.001; quadratic slope mean=.003, p=.03), and between linear and quadratic slopes (-.005, p<.001), suggesting that higher initial self-worth was associated with more moderate decreases and greater increases in self-worth over time. The average growth curve is plotted in Figure 10. As shown, self-worth decreased, on average, between the ages of 11.7 and about 15 years, at which point it began to increase and continued to increase until age 18.63.

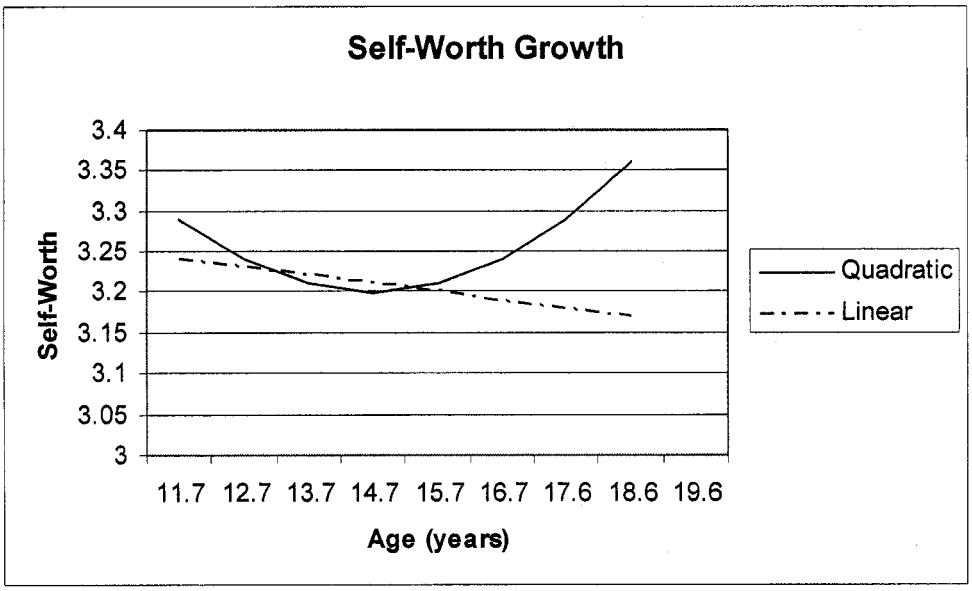

Figure 10: Self-Worth Growth Curve.

Peer Deviance.

Peer deviance, another primary outcome variable, also followed a quadratic growth curve. The quadratic model provided a better fit than the linear model ($\chi^2(4)=217.97$, p<.001) and overall fit was good ($\chi^2/df=3.21$, RMSEA=.087 (90%CI:

.067; .108), TLI=.975, NFI=.973, CFI=.981, IFI=.981). Intercept mean was estimated at 1.195 ($p<.001$) with a variance of 1.461 ($p<.001$), linear slope mean was .867 ($p<.001$) with variance .574 ($p<.001$), and quadratic slope mean was -.076 ($p<.001$) with .011 variance ($p<.001$). These results suggest that there was significant individual variability in initial peer deviance and in peer deviance change over time, although peer deviance increased steadily over time, on average. The plotted regression line is presented in Figure 11. Change in peer deviance increased steadily from age 11.5 to 15.5, when growth slowed and the line flattens out.

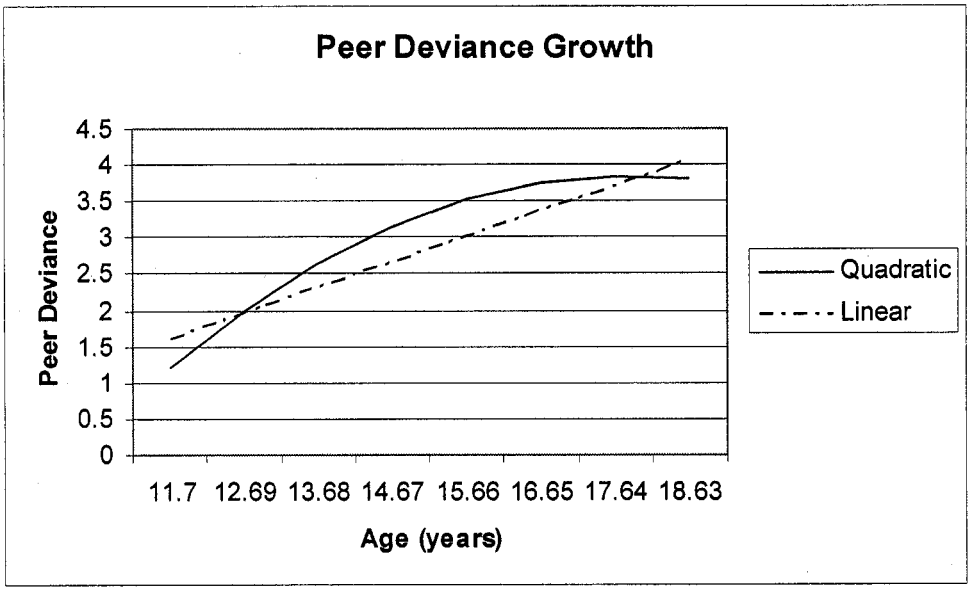

Figure 11: Peer Deviance Growth Curve.

Drinking.

The latent construct "drinking" as described earlier was evaluated for linear or quadratic model fit as were all other variables. The quadratic model provided a better fit to the data ($\chi^2(4)=24.012$, $p<.001$) and overall fit was good ($\chi^2/df=3.2$, RMSEA=.087 (90%CI: .076; .099), TLI=.921, NFI=.921, CFI=.944, IFI=.944).

Intercept mean was 0 (non-significant) with a variance of 49.79 ($p<.001$), linear slope mean was 3.052 ($p<.001$) with variance 13.61 ($p=.012$), and quadratic slope mean was -.469 ($p<.001$) with variance .3 ($p=.188$). These results indicate that drinking increased curvilinearly over time and that there was significant individual variability in initial drinking status and in the overall average drinking growth curve. As intercept and linear slope were significantly negatively associated (cov=-17.504, $p=.006$), higher initial drinking was associated with more moderate changes in drinking over time.

Because this was the only second factor latent growth model for a single variable in this study, the model latent growth model for "drinking" is provided below in Figure 12. The graph illustrates the relationships between the intercept and slope factors to the latent "drinking" construct for years 5 through 9, which in turn are modeled to contribute to the observed measurements of drinking-related problems (RAPI), drunk-ever scores, and drank 5+ drinks scores for each year. Measurement error of observed variables is represented by circles associated with each observed score.

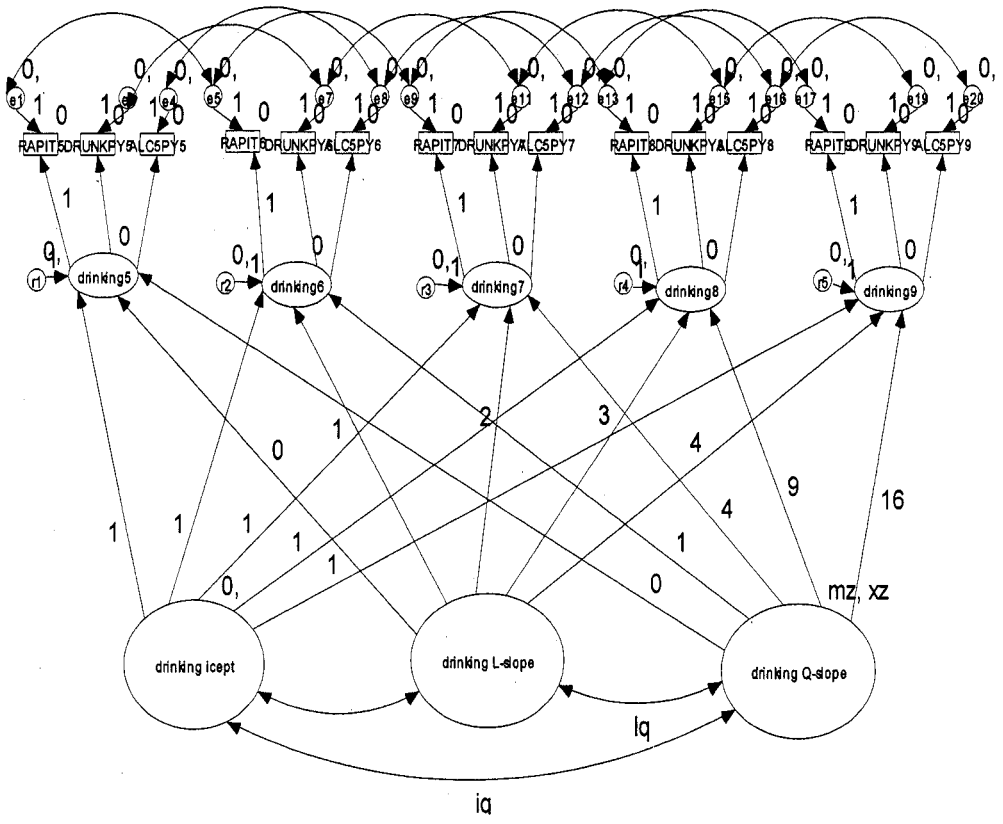

Figure 12: Latent Growth Model for Drinking Construct.

In addition, Figure 13, illustrates the drinking growth curve. The drinking construct followed a change pattern with steady and relatively steep growth from age 15.66 to age 17.64, where growth began to slow down and then began to decrease slightly around age 18.63.

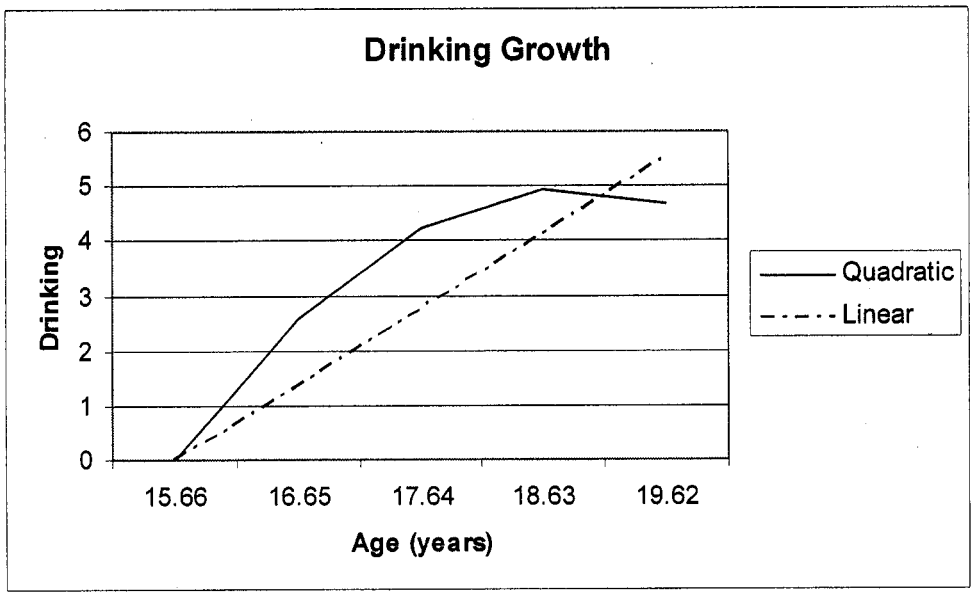

Figure 13: Drinking Growth Curve.

Hypothesis Testing

In the next stage of analyses, growth models were utilized to test hypotheses and relationships between variables generated by Self-Derogation Theory. The first example will be described in detail and subsequent models will be simplified, as all analyses were conducted in the same manner.

Family Cohesion and Self-Worth.

Hypothesis 1 states that indicators of attachment to conventional society and conventional competence will predict self-worth, as indicated by changes in individual self-worth scores. Specifically related to family cohesion, hypothesis 1a proposed that initial status in family cohesion and changes in family cohesion would be positively associated with initial self-worth and changes in self-worth. Figure 14 illustrates the structural model used to test this hypothesis and its components. Latent factors are represented by ovals or circles, observed scores are represented by rectangles, one-

way arrows represent causal influences, and two-way arrows represent covariances or correlations. Famcoh intercept represents the initial status in family cohesion, famcoh slope represents the slope or rate of change/growth in family cohesion, sw intercept represents initial status in self-worth, sw slope represents rate of change/growth in self-worth, and indicators for each year of data are labeled sw1-sw8 and ccoh2-4 and ccoh6-8 with associated error terms for available years of data. Regression weights for intercept paths were set to 1, and slope paths were set to multiples of 1. Factor loadings took years of missing data into account so that each half of the structural model had the same intercept.

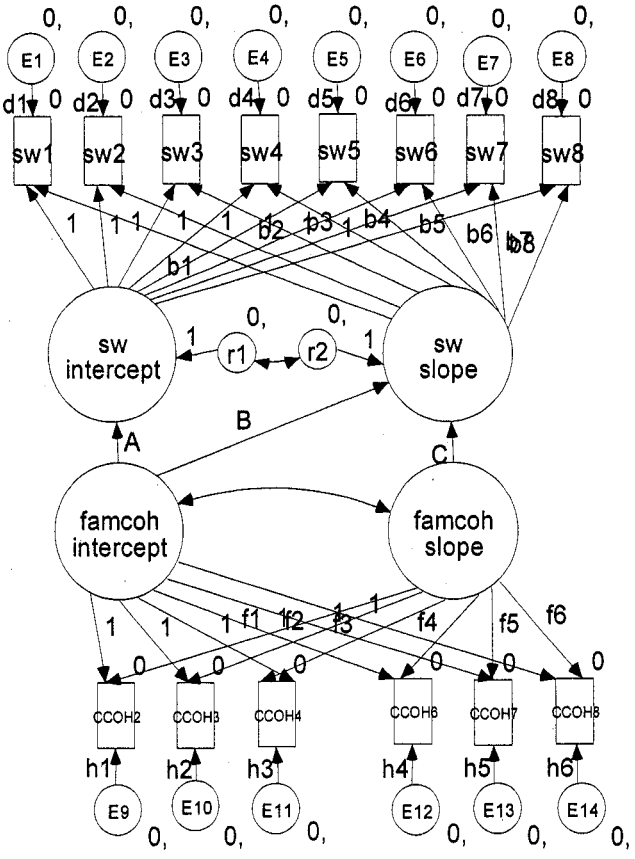

Figure 14: LGM Model for Hypothesis 1a.

The first step was to assess overall model fit with both linear and quadratic factors. A good fit was obtained with the linear model, but not with the quadratic model, thus only the linear model was interpreted. Overall, the linear model fit the data well (χ^2/df=2.24, RMSEA=.066 (90%CI: .054; .078), TLI=.990, NFI=.984, CFI=.991, IFI=.991). The second step was to evaluate the path coefficients for relationships between intercept and slope factors, A, B, and C. As hypothesized, there were positive and significant relationships between initial family cohesion and initial level of self-worth (β=.134, $p<.001$) and between the factors' slopes (β=.09, $p<.001$). This indicates that family cohesion was positively related to self-worth at the start of the growth curve, and that positive changes in family cohesion predicted positive changes in self-worth over time. There was no significant relationship between initial family cohesion status and change in self-worth, although this relationship is not necessary to support the proposed hypothesis.

For all subsequent LGM procedures, AMOS failed to converge upon a unique solution for quadratic models without error for these more complex analyses. This was likely due to the maximum sample size of 290 and the lack of power to sufficiently evaluate the more complex models. Although analyses demonstrated that quadratic models for each variable fit the data better than the linear models, in most cases there were minimal differences between the models and linear models also provided good fits, adequate for additional analyses. Thus, linear models were used in all subsequent hypothesis testing.

Family Conflict and Self-Worth.

Hypothesis 1b proposed that initial status in family conflict and changes in family conflict would be negatively associated with initial self-worth and changes in self-worth. The linear model fit the data well (χ^2/df=2.48, RMSEA=.072 (90%CI: .060; .083), TLI=.986, NFI=.979, CFI=.987, IFI=.987). As hypothesized, there were significant negative associations between initial family conflict and initial level of self-worth (β=-.136, p<.001) and between the slope factors (β=-.084, p<.001). These results suggest that the higher the initial levels of family conflict, the lower were the initial levels of self-worth, and changes in family conflict were negatively associated with changes in self-worth. Family conflict intercept was not significantly related to self-worth slope.

Ethnic Identification and Self-Worth.

Hypothesis 1c proposed that initial status in cultural identification and changes in cultural identification would be positively associated with initial self-worth and changes in self-worth. The linear model fit the data well (χ^2/df=2.33, RMSEA=.068 (90%CI: .056; .080), TLI=.988, NFI=.982, CFI=.990, IFI=.990). Contrary to the hypothesized relationships, there were no significant relationships between these factors.

Sociocultural Alienation and Self-Worth.

Hypothesis 1d proposed that initial status in sociocultural alienation and changes in sociocultural alienation would be negatively associated with initial self-worth and changes in self-worth. The linear model fit the data well (χ^2/df=2.53,

RMSEA=.073 (90%CI: .060; .085), TLI=.987, NFI=.982, CFI=.989, IFI=.989). As hypothesized, there were significant negative associations between initial sociocultural alienation and initial levels of self-worth (β=-.029, p<.001), between the slope factors (β=-.011, p=.044), and between initial level of alienation and self-worth change (β=-.003, p=.024). This suggests that higher initial levels of alienation were related to lower initial self-worth and more negative changes in self-worth, and vice versa, and increases in alienation were related to decreases in self-worth, and vice versa.

Scholastic Competence and Self-Worth.

Hypothesis 1e proposed that initial status in scholastic competence and changes in scholastic competence would be positively associated with initial self-worth and changes in self-worth. The linear model fit the data well (χ^2/df=3.18, RMSEA=.087 (90%CI: .077; .097), TLI=.981, NFI=.975, CFI=.983, IFI=.983). As predicted, there were significant positive associations between initial scholastic competence and initial self-worth (β=.443, p<.001), and between the slope factors (β=.74, p=.044). There was also a positive relationship between initial scholastic competence and changes in self-worth (β=.02, p=.066), although this was not statistically significant. These results indicate that higher initial levels of scholastic competence and increases in scholastic competence were related to higher initial self-worth and increases in self-worth. Similarly, lower competence scores were related to lower self-worth scores.

All but one of the proposed sub-hypotheses above were supported by analyses results and supported Hypothesis 1 overall. Contrary to one sub-hypothesis, however, ethnic identification was not related to self-worth.

Self-Worth and Peer Deviance.

Hypothesis 2 proposed that initial status in self-worth and changes in self-worth would be negatively associated with initial peer deviance and changes in peer deviance. As illustrated in Figure 15, the two measurement models for each variable were combined into this structural model by paths A.B. and C. The regression weights for these paths evaluate hypothesis 2. The linear model fit the data well (χ^2/df=2.80, RMSEA=.079 (90%CI: .069; .089), TLI=.979, NFI=.974, CFI=.983, IFI=.983). As predicted, there were significant negative associations between the intercept factors (β=-1.129, p<.001), and between the slope factors (β=-.78, p=.007). There was no significant relationship between initial self-worth and changes in peer deviance (β=.027, p=.608). Results suggest that lower initial levels of self-worth were causally related to higher initial levels of peer deviance, and decreases in self-worth were related to increases in peer deviance, and vice versa. These results support the proposed hypothesis.

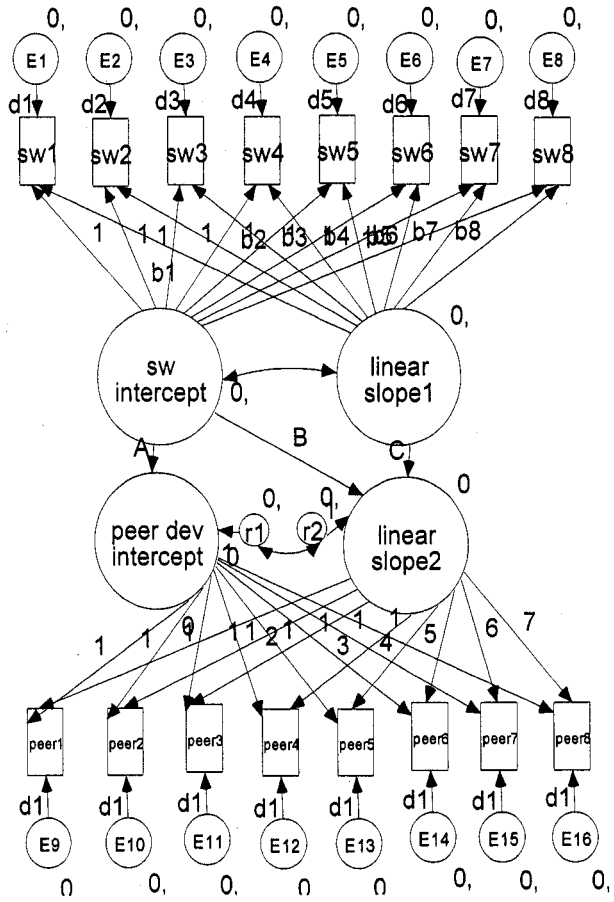

Figure 15: LGM for Self-Worth Effect on Peer Deviance.

Peer Deviance and Drinking.

Next, hypothesis 3 proposes that initial status in peer deviance will be positively associated with initial drinking, and changes in drinking. The linear model fit the data well (χ^2/df=2.90, RMSEA=.081 (90%CI: .074; .088), TLI=.921, NFI=.901, CFI=.932, IFI=.933). As predicted, there were significant positive associations between intercepts (β=2.437, p<.001) and between slopes (β=1.961, p<.001), suggesting that higher initial levels of peer deviance were associated with higher reported drinking, and increases in peer deviance were associated with increases in

drinking. There was also a significant negative relationship between peer deviance intercept and drinking slope (β=-.335, p=.001), suggesting that higher initial status in peer deviance was associated with a milder increase in drinking over time. Results do support the proposed hypothesis. Figure 16 represents the third-factor structural model used to test this hypothesis. It illustrates two LGM models, one for drinking and one for peer deviance, with drinking being a two-factor structural model itself. Arrows linking the intercept and slope factors test the effects of peer deviance on drinking, per the hypothesis.

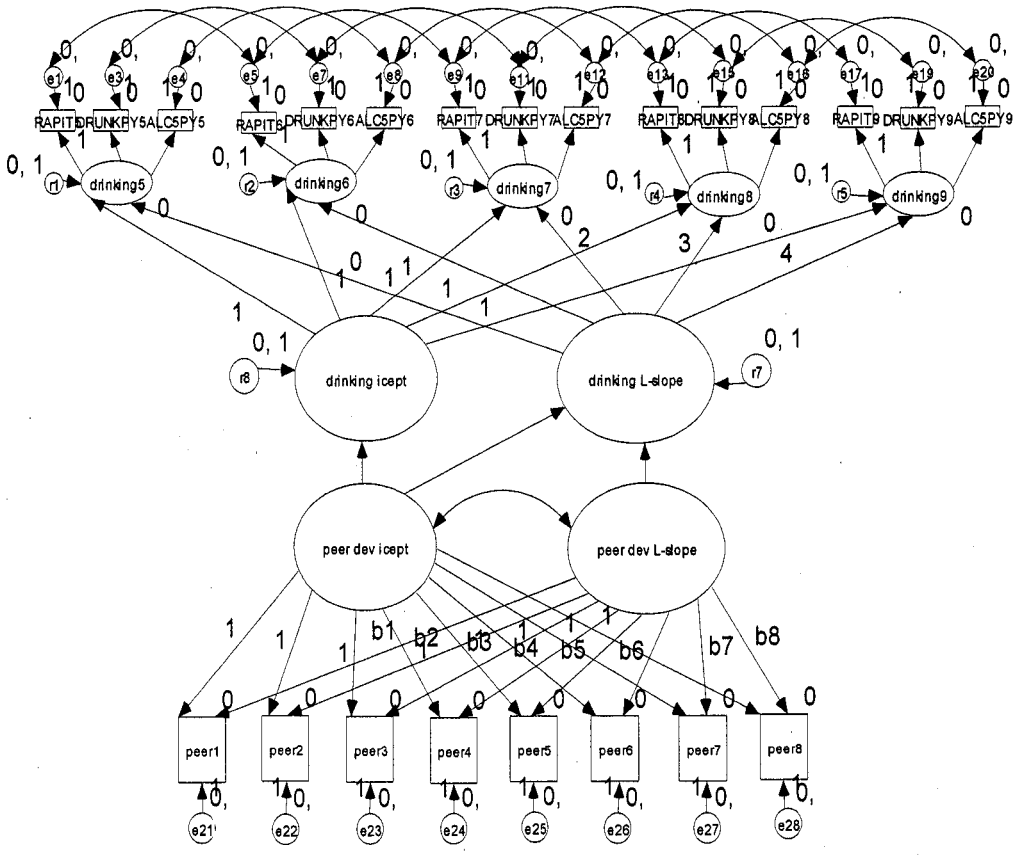

Figure 16: Three-factor LGM Model for Peer Deviance Effect on Drinking.

Countereffects of Problem Drinking on Self-Worth.

Finally, as described by SDT, hypothesis 4 states that initial status in and changes in drinking would be positively associated with initial self-worth and changes in self-worth. As illustrated in Figure 17, paths A, B, and C evaluated these relationships. The linear model fit the data well (χ^2/df=2.72, RMSEA=.077 (90%CI: .070; .084), TLI=.960, NFI=.946, CFI=.965, IFI=.965). Contrary to what was predicted by SDT, however, there were significant *negative* associations between the intercept factors (β=-.017, p=.002), and between the slope factors (β=-.012, p=.038). In addition, initial levels of the latent construct "drinking" were not causally related to changes in self-worth (β=-.002, p=.2). It appears that, in this sample, higher levels of drinking were associated lower self-worth, and vice versa.

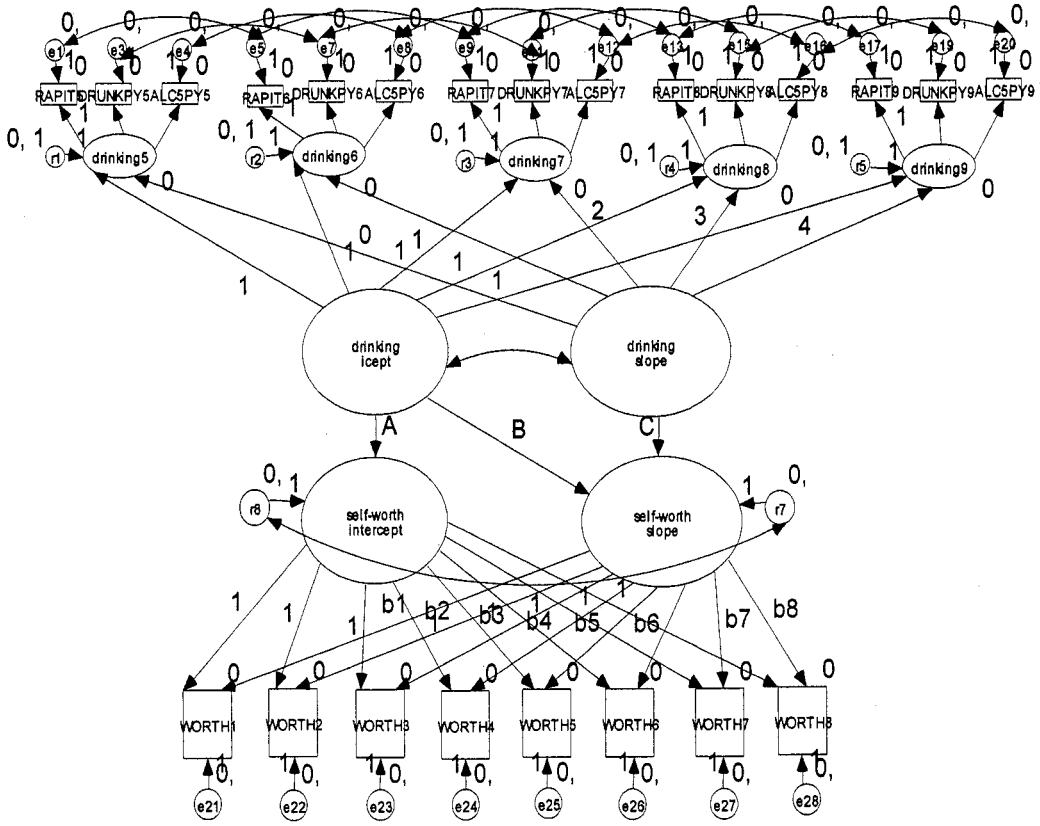

Figure 17: Three-factor LGM Model for Drinking Effect on Self-Worth.

Countereffects of Problem Drinking on Peer Deviance.

In addition, although this is not proposed by SDT, an additional relationship was assessed between drinking and peer deviance, as the literature has been mixed about the reciprocal relationships between these constructs. As might be expected, there is a reciprocal relationship between drinking and peer deviance. There was an adequate fit between the linear model and the data (χ^2/df=3.90, RMSEA=.10 (90%CI: .094; .107), TLI=.880, NFI=.864, CFI=.895, IFI=.965). Results revealed significant positive associations between the intercept factors (β=.124, p<.001), and between the

slope factors (β=.020, p=.001). There was also a positive relationship between drinking intercept and change in peer deviance which approached significance (β=.009, p=.098). These results suggest that higher levels of drinking and increases in drinking were related to higher peer deviance and increases in peer deviance.

Countereffects of Peer Deviance on Self-Worth.

Along similar lines, the countereffects of peer deviance on self-worth were evaluated. The linear model fit the data well (χ^2/df=2.79, RMSEA=.079 (90%CI: .068; .089), TLI=.979, NFI=.974, CFI=.983, IFI=.983). In an earlier model, self-worth was negatively associated with peer deviance. Here, a reciprocal relationship was found, with intercept factors (β=-.098, p=.001) as well as slope factors (β=-.074, p=.012) again negatively related. This suggests that neither increases in the latent constructs drinking nor peer deviance had positive effects on self-worth in this sample, but had negative influences instead.

Direct Effects of Self-Worth on Drinking.

Finally, although also not posited by the SDT model, the direct effects of self-worth on drinking were evaluated with a bivariate model. A good fit was provided by the linear model (χ^2/df=1.77, RMSEA=.051 (90%CI: .043; .059), TLI=.982, NFI=.965, CFI=.985, IFI=.985). Results indicated that higher initial levels of self-worth were associated with lower initial levels of drinking (β=-2.77, p=.001), increases in self-worth were related to decreases in drinking (β=-4.002, p=.02), and higher initial self-worth was associated with a larger increase in drinking over time than the average slope (β=.596, p=.042).

Final Model

The next analytic step incorporated all prior modeling, including individual growth models and constructed bivariate LGM models for hypotheses. A simplified analytic model is presented in Figure 18. As shown, latent intercept and slope factors for background variables are causally related to self-worth, which is causally related to peer deviance, which is causally related to drinking. Additional one-way arrows join drinking and self-worth in a feedback loop. As posited by SDT, drinking behavior was expected to positively influence self-worth.

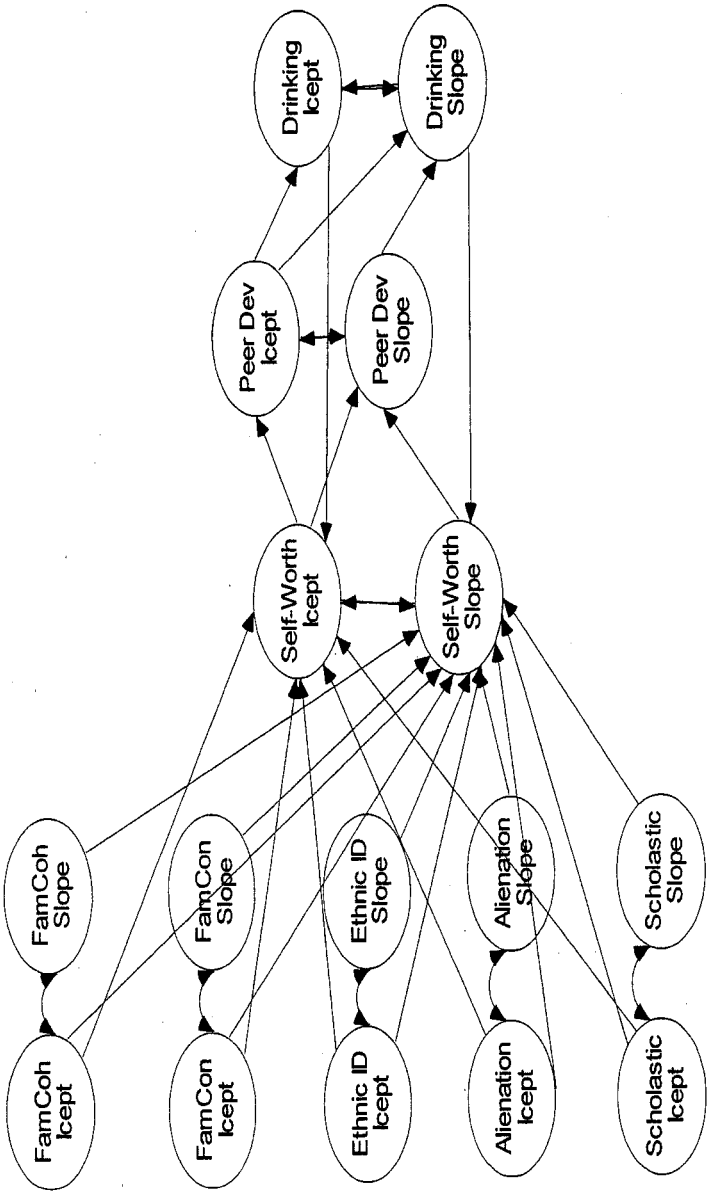

Figure 18: Final Simplified LGM Model for Self-Derogation Theory.

The final analytic model for SDT is provided in Figure 19. According to fit indices, the model fit the data well (χ^2/df=2.16, RMSEA=.063 (90%CI: .061; .066), TLI=.936, NFI=.894, CFI=.940, IFI=.940). In evaluating this final model, causal paths between each of the intercepts and slopes, as tested earlier with individual LGM models, were assessed simultaneously. Each variable is represented by its latent growth model, and LGMs are connected by one-way arrows representing the causal effects of the background variables (top row) on self-worth (middle), which is in turn causally related to peer deviance (bottom left), which then is directly associated with drinking (bottom right), and finally, the countereffect of drinking was evaluated with one-way arrows from drinking to self-worth.

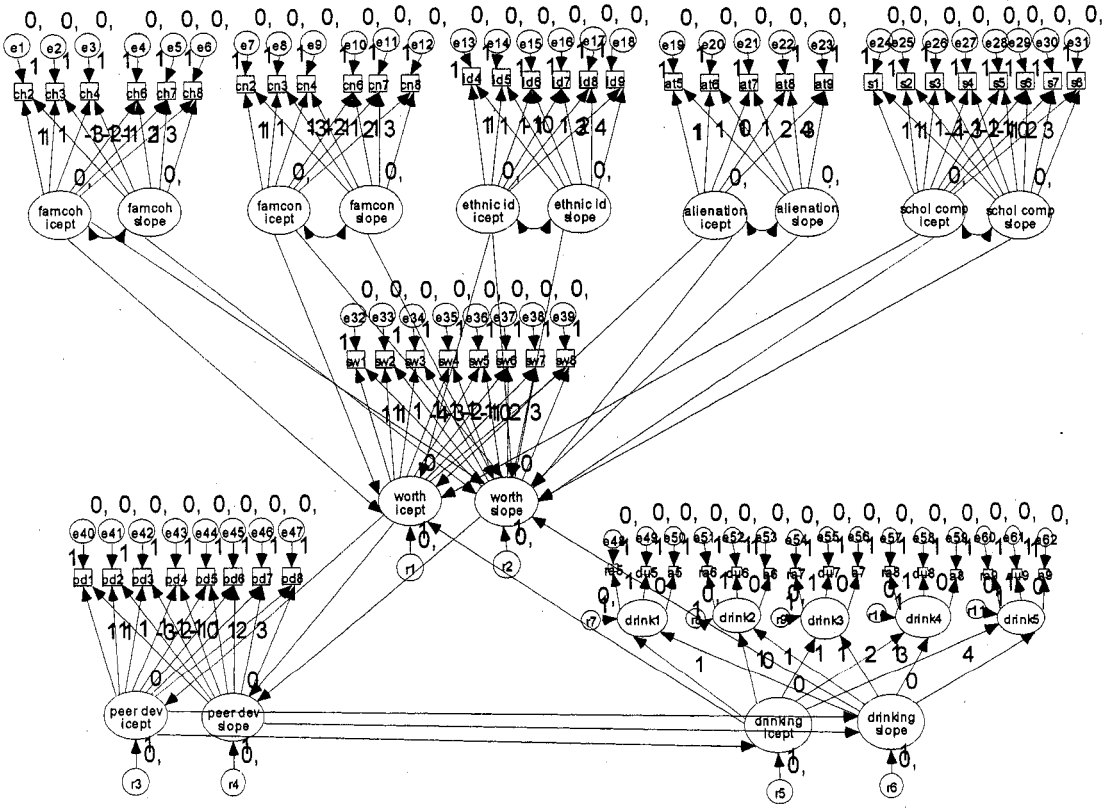

Figure 19: Final Analytic Model for Self-Derogation Theory.

Regression weights (unstandardized reported here) indicated that the strongest relationships between background variables and self-worth were scholastic competence, family cohesion, and family conflict. Table 4 summarizes all regression parameters from the final model analyses. Scholastic competence intercept was positively related to self-worth intercept (β=.474, p<.001) and competence slope was positively related to self-worth slope (β=.606, p<.001), suggesting that initial levels of competence in scholastic abilities predicted initial levels of self-worth and changes in competence were related to positive change in self-worth. Family cohesion was also positively related to self-worth, with significant relationships between intercept factors (β=.034, p=.01) and slope factors (β=.048, p=.01). As expected, family conflict was negatively associated with self-worth in the association between intercept factors (β=-.064, p<.001) but not between slope factors. In addition, initial levels of sociocultural alienation were negatively related to self-worth intercept (β=-.017, p<.001). Finally, there were no significant relationships between ethnic identification and self-worth, although intercepts approached significance (β=-.055, p=.057) in the hypothesized direction.

For this portion of the SDT model, most results were in the expected directions and reached statistically significant levels. It is important to keep in mind the nature of this type of modeling, as it is a form of regression analysis. Parsed into simpler, bivariate models testing the individual hypotheses, relationships between background variables and self-worth appeared stronger. For example, direct effects of self-worth on drinking were evaluated by adding paths in to the final model. With the inclusion

of peer deviance, however, the only significant relationship found was between self-worth intercept and drinking slope (β=.596, p=.042), suggesting that higher initial self-worth was related to higher increases in drinking. This result is consistent with an earlier study (Radin et al., in press) that demonstrated self-worth's influence on drinking problems was mediated through peer deviance. When modeling all variables together, their effects are evaluated simultaneously and some variables have stronger associations with self-worth than others which may detract from effects found in bivariate analyses due to shared influences, moderation, or mediation between variables.

Table 4: Regression parameters and significance levels for final SDT model paths.

Causal Path	β	SE	p-value
Family Cohesion Intercept→Self-Worth Intercept	.034	.013	.010**
Family Cohesion Slope→Self-Worth Slope	.048	.019	.010**
Family Cohesion Intercept→Self-Worth Slope	-.004	.003	.199
Family Conflict Intercept→Self-Worth Intercept	-.064	.014	<.001***
Family Conflict Slope→Self-Worth Slope	-.030	.021	.163
Family Conflict Intercept→Self-Worth Slope	-.003	.004	.816
Ethnic Identification Intercept→Self-Worth Intercept	-.055	.029	.057
Ethnic Identification Slope→Self-Worth Slope	-.067	.095	.480
Ethnic Identification Intercept→Self-Worth Slope	-.011	.007	.121
Sociocultural Alienation Intercept→Self-Worth Intercept	-.017	.004	<.001***
Sociocultural Alienation Slope→Self-Worth Slope	-.004	.004	.432
Sociocultural Alienation Intercept→Self-Worth Slope	-.001	.001	.352

Table 4 (continued)

Scholastic Competence Intercept→Self-Worth Intercept	.474	.045	<.001***
Scholastic Competence Slope→Self-Worth Slope	.606	.088	<.001***
Scholastic Competence Intercept→Self-Worth Slope	.019	.011	.077
Self-Worth Intercept→Peer Deviance Intercept	-1.874	.310	<.001***
Self-Worth Slope→Peer Deviance Slope	-.946	.409	.021*
Self-Worth Intercept→Peer Deviance Slope	.038	.062	.535
Peer Deviance Intercept→Drinking Intercept	2.734	.339	<.001***
Peer Deviance Slope→Drinking Slope	2.246	.580	<.001***
Peer Deviance Intercept→Drinking Slope	-.319	.120	.008**
Drinking Intercept→Self-Worth Intercept	.037	.009	<.001***
Drinking Slope→Self-Worth Slope	.002	.007	.820
Drinking Intercept→Self-Worth Slope	0	.002	.972

Note: * = statistically significant at the .05 level, ** = .01 level, *** = .001 level.

Evaluating the next portion of the proposed model, relationships between self-worth and peer deviance, as posited by SDT, were as expected. Initial levels of self-worth and changes in self-worth were significantly negatively related to initial peer deviance and changes in peer deviance (intercepts: β=-1.815, $p<.001$; slopes: β=-1.047, $p=.011$). Initial levels of self-worth were not predictive of peer deviance, although this path would not be necessary to support the proposed hypothesis. In turn, higher initial levels of reported peer deviance and changes in peer deviance were significantly positively related to initial levels of drinking (β=2.198, $p<.001$) and changes in drinking over time (β=2.359, $p<.001$). Additionally, there was an inverse relationship between peer deviance and drinking, such that high initial peer deviance

was associated with more moderate increases in drinking, and lower initial peer deviance was related to steeper increases in drinking. This was consistent with the bivariate model analyses results.

Finally, SDT suggests that delinquent behavior (e.g., drinking and related problems) for adolescents with low self-worth actually serves to increase an individual's self-worth. Paths causally relating the latent construct "drinking" to self-worth were evaluated. The only significant relationship was positive between drinking and self-worth intercepts (β=.037, $p<.001$), but initial drinking did not predict changes in self-worth and changes in drinking were not related to changes in self-worth.

Final Model Comparison

The final portion of analyses entailed the comparison of the SDT model with a more complex model. The more complex model was constructed by adding additional paths to the SDT model based on existing literature which supports these causal influences. Added paths tested relationships between family cohesion and conflict background variables, and peer deviance and drinking as outcomes. Such a comparison would either demonstrate that a more complex model is a better explanation for the observed data, or SDT would prove to be superior due to its more parsimonious explanation. A simplified illustrative model is provided below in Figure 20. LGM results indicated that there was no significant difference between overall model fit for the SDT model and the SDT-revised model ($\chi^2(6)=3.459$, $p=.749$), and all fit indices reported in these analyses were exactly the same. As SDT is the simpler

model, it may be viewed as a better explanation for the data and dynamic relationships between variables in this study.

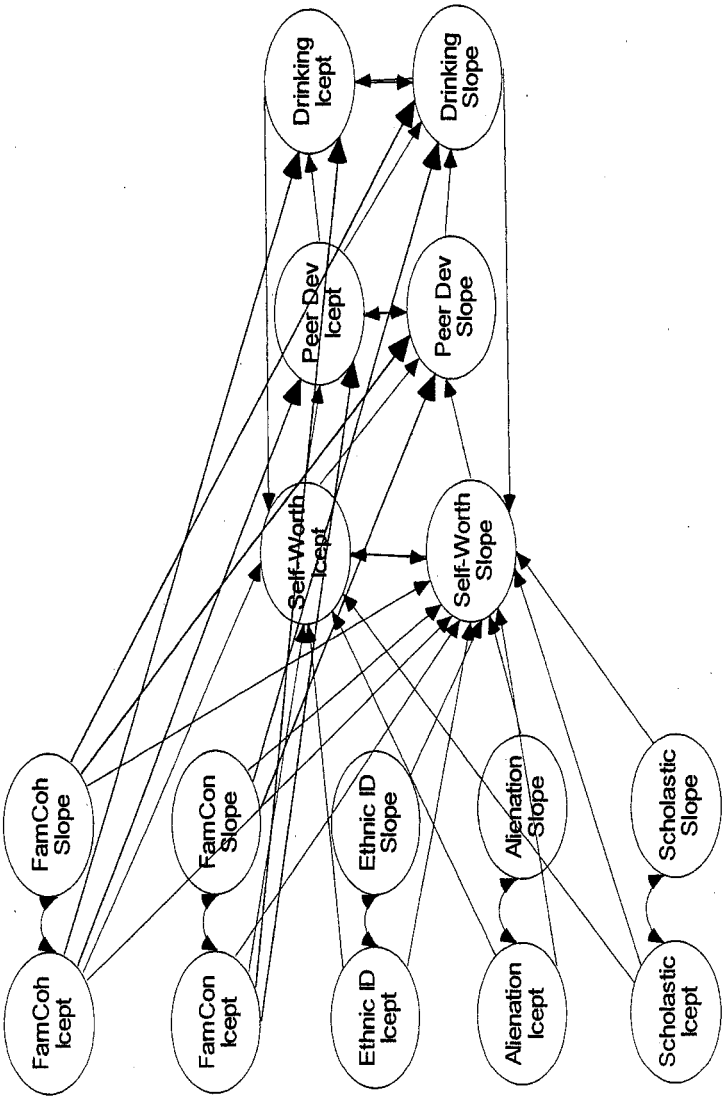

Figure 20: Final LGM Model for Self-Derogation Theory with Additional Relationships.

CHAPTER IV: DISCUSSION

Overview

There were several purposes for this study. First, traditional approaches to studying risk factors and drinking behavior have often been limited by statistical methods, cross-sectional data, and group approaches. This study was intended to take advantage of a cutting edge statistical technique, latent growth modeling, and longitudinal data in studying risk factors as they contributed to the development of individual adolescent drinking over time. Such developmental processes are inherently dynamic and, as demonstrated here, differ greatly at the individual level. Second, many previous studies have examined risk factors in a more isolated context, without the guidance of an organizing theory. Such approaches have identified many important risk factors in adolescent drinking, but have often left gaps in our understanding of the relationships between some of the most commonly studied factors, such as self-worth and peer deviance. This study extended the results of an earlier study (Radin et al., in press) that demonstrated a mediational relationship between self-worth, peers, and problem drinking, by exploring these variables and their relationships in a larger context along with familial, cultural, and academic background risk/protective factors in a comprehensive model, Self-Derogation Theory. With a concise theoretical model and a related comparison model, it was possible to directly test the hypothesized relationships and overall theory. Finally, few studies have been conducted with American Indian/Alaska Native adolescents, so little is known about the contributions of risk factors related to ethnicity to drinking behavior. This study utilized a remarkable data set collected over 9 years from AI/AN

adolescents who participated in the study at a very high rate over time. Overall, the goals of this study were met, results are enlightening, several interesting questions have been generated, and there are a number of theoretical and clinical implications to consider.

Results Summary

In summary, each variable or construct was characterized by quadratic/curvilinear growth, as opposed to linear growth. Growth curves were characterized by a few common patterns which would be expected based on each construct and existing knowledge of developmental changes during adolescence. For example, there were decreases in self-worth, family cohesion, and ethnic identification from earlier years of the study to about mid-way through when teens were about 16 years old, followed by a change in the opposite direction when these constructs began to return to initial levels or surpassed initial levels. Other curves mirrored these changes, such as family conflict, which increased steadily and then began to decrease mid-way and returned to initially lower levels. Still other constructs had steady increases over time and began to level off later on, around 18 years, such as sociocultural alienation, peer deviance, and problem drinking. Finally, it was encouraging to see that scholastic competence was less affected during early teen years and demonstrated an early (around 13 years) increase which continued through the end of the study.

It is also very important to note that these curves represent the average individual's change in the constructs, and significant variability was present in each, either in initial status or in slope, or both. For example, the intercept mean for peer

deviance was 1.21 with a 1.46 variance, and the mean for the linear slope factor was .86 with a .57 variance. Taken together with the covariance between intercept and slope factor (-.13), individuals varied greatly in initially reported peer deviance, and higher initial peer deviance tended to have a negative or slowing effect on peer deviance growth.

In subsequent analyses, linear LGM models were constructed to test SDT hypotheses and this was reasonable as all linear models fit the data well. Five of eight hypotheses were supported by bivariate model testing as summarized in Table 5. The intercept-slope relationships are included for information only and were not intended as hypothesis criteria.

Table 5: Summary of results from bivariate hypothesis testing and final model.

Hypothesized Relationship	Direction	Significant (bivariate)	Significant (final)
Family Cohesion Intercept→Self-Worth Intercept		X	X
Family Cohesion Slope→Self-Worth Slope	Positive	X	X
Family Cohesion Intercept→Self-Worth Slope		0	0
Family Conflict Intercept→Self-Worth Intercept		X	X
Family Conflict Slope→Self-Worth Slope	Negative	X	0
Family Conflict Intercept→Self-Worth Slope		0	0
Ethnic Identification Intercept→Self-Worth Intercept		0	0
Ethnic Identification Slope→Self-Worth Slope	Positive	0	0
Ethnic Identification Intercept→Self-Worth Slope		0	0

Table 5 (continued)

Sociocultural Alienation Intercept→Self-Worth Intercept		X	X
Sociocultural Alienation Slope→Self-Worth Slope	Negative	X	0
Sociocultural Alienation Intercept→Self-Worth Slope		X	0
Scholastic Competence Intercept→Self-Worth Intercept		X	X
Scholastic Competence Slope→Self-Worth Slope	Positive	X	X
Scholastic Competence Intercept→Self-Worth Slope		0	0
Self-Worth Intercept→Peer Deviance Intercept		X	X
Self-Worth Slope→Peer Deviance Slope	Negative	X	X
Self-Worth Intercept→Peer Deviance Slope		0	0
Peer Deviance Intercept→Drinking Intercept		X	X
Peer Deviance Slope→Drinking Slope	Positive	X	X
Peer Deviance Intercept→Drinking Slope		X (-)	X (-)
Drinking Intercept→Self-Worth Intercept		X (-)	X
Drinking Slope→Self-Worth Slope	Positive	X (-)	0
Drinking Intercept→Self-Worth Slope		0	0

Note: the intercept→slope relationships are included for information, but are not needed to support hypotheses.

Contrary to support found for SDT, some important exceptions were evident, including only partial support for the relationships between family conflict and self-worth and sociocultural alienation and self-worth, the lack of significant influence of ethnic identification on self-worth, and the lack of countereffects from problem drinking to self-worth. In particular, higher levels of initial drinking and increases in drinking were associated with lower self-worth and decreases in self-worth. Moreover, a few relationships that were significant in bivariate analyses were not

found in the final model, supporting the idea that some effects may have been due to the effects of other variables. There are several possible reasons for these unexpected results. First, the literature has been mixed as to the effects of American Indian ethnic identification as either a risk or a protective factor. Hawkins (2002) noted that white ethnic identification tended to protect against alcohol problems, while Indian identity tended to increase risk for problems. In this study, although results were not statistically significant, ethnic identification tended to have a dampening effect on self-worth, such that higher initial levels slowed the growth of self-worth or contributed to its early decline in adolescence. It is possible that the urban status of the participants and less of a connection to traditional Indian culture contributed to these results.

Second, both individual hypotheses testing and assessment of the entire SDT model suggested that neither problem drinking nor peer deviance positively influenced self-worth. In fact, both drinking and peer deviance were negatively related to self-worth in both directions, where lower initial self-worth and decreases in self-worth were related to more peer deviance and drinking, and increases in these measures. In addition, although it was not proposed with the original hypotheses, the effects of self-worth on drinking also followed the same pattern, with lower initial self-worth and decreases in self-worth contributing to higher initial drinking and increases in drinking. Considering why this might have occurred (as it was contrary to the theory), the theory might be incorrect, this particular sample data may simply not support that portion of the theory, problem drinking may be at a level too high (compared to lighter levels of drinking) to contribute positively to self-worth, or there might be some

difficulty in the interpretation of the theory and these results due to measures used in this study. For example, youth who drank more heavily and associated more with "deviant" peers might have endorsed self-worth items differently than "mainstream" youth. It may be useful to question what the self-worth instrument actually measured, and how that may have contributed to a younger adolescent's self-worth change over time, particularly if one began to value what deviant peers valued (e.g., "bad" might be "good").

Furthermore, although it was not proposed by SDT, the effects of drinking on alienation were evaluated. Higher drinking was causally related to increases in alienation. If the essence of SDT is that delinquent behavior promotes opportunities for alternative positive influences for self-worth, which includes positive evaluations by others, then perhaps there would be changes in sociocultural alienation. Since sociocultural alienation is actually measuring levels of perceived caring by adults, there might be lower levels of caring by adults as a result of increased associations with peer deviance and a rebellious attitude towards adults. This was the case, as higher peer deviance was significantly associated with lower perceived caring by adults. What is not known is if this corresponds with increased perceived caring by the deviant peer group. It is possible (likely?) that these youth would have reported increased feelings of caring or cohesion with their deviant peers.

Regardless of what underlies the lack of overwhelming support for SDT, it is clear that, at least in these analyses, the theory does not hold true for this sample of Native American adolescents. Despite these findings regarding SDT, analyses did provide information about the variables under study and helped to clarify the multiple

and changing relationships between these variables. For instance, although not highlighted in results, several protective influences were demonstrated. Primarily, higher levels of self-worth were associated with lower levels of peer deviance and lower levels of drinking. Background variables may also be viewed as protective, as higher levels of family cohesion and scholastic competence, and lower levels of family conflict and alienation were each associated with higher self-worth, lower peer deviance, and then lower reported drinking. In addition, results provided illustrations of the development of drinking within the context of age and among a chain of causal variables, from familial, sociocultural, and academic background factors, and through self-worth and peer deviance. The study also generated many new questions and potential areas for future study.

Implications

In addition to theoretical implications, there are several empirical and clinical implications to consider. Growth modeling was helpful in describing and understanding individual developmental changes in constructs that are often related to problem drinking. Development is dynamic and thus should be evaluated with an analytic method that capitalizes on information about growth and change. Latent growth modeling also revealed that, although there were average rates of change in this sample and trends followed developmental patterns through early, mid-, and late-adolescence, there was much individual variability. It was encouraging to see that negative individual changes (e.g., higher family conflict, alienation) reversed and stabilized later in adolescence, and that some factors were robustly positive at the final data collection. In addition, it was surprising and encouraging to find that models with

this level of complexity are possible using AMOS and LGM, and that by using them, one may evaluate a number of propositions and hypotheses that would not be possible using other statistical methods.

Practical implications involve the use of study results to inform primary and secondary interventions for adolescent drinking. Given that the SDT model was supported by some data, from background variables to self-worth and through peer deviance to drinking, results from each portion of the model are informative. Results suggest that family cohesion, family conflict, and scholastic competence were the most influential factors in self-worth. Informing interventions for younger children and adolescents, it may be particularly helpful to include family in interventions, for instance, by including them in whatever mode of treatment is used, or by strongly encouraging families to give their children strong positive messages, and to help parents understand and navigate adolescent development with their children. Scholastic competence could be bolstered by providing children with school curricula and teaching assistance that are commensurate with their level of need, as well as to positively encourage children and reinforce their scholastic strengths. Self-worth is also an important part of the developmental process. It may be helpful for adults to keep in mind that over and above a child's actual skills and abilities are his or her feelings and attitudes towards the self, and these feelings and attitudes may protect the child from associating with influential deviant peers or from engaging in harmful drinking behavior. Finally, peer deviance was again shown to be an important component in the development of problem drinking. Other studies have shown that

family/parental involvement in children's lives may influence friend choices, and this should be encouraged.

Limitations

There are a few possible limitations to this study. Primarily, although latent growth modeling was a very appropriate and informative analytic approach for these data, the complexity of models in this study presented practical constraints on what could be accomplished with variance/covariances matrices, software, and the computer. For instance, quadratic growth better characterized construct changes over time, however, linear models were used in bivariate hypothesis testing and the final model due to the software's inability to converge on solutions using the quadratic models. Although linear models also provided a good fit to the data, it is unknown how results might have differed if quadratic models could have been used throughout analyses. One would expect that differences would be minimal because linear and quadratic growth were similar in terms of intercepts and slopes. Another constraint was the inability to covary exogenous variables in the final model. It was first proposed that, for example, family cohesion and family conflict would covary, but again due to model complexity the final model would not run without error with the exogenous constructs covaried.

In addition, LGM requires a "large" sample size (Kline, 1998), however, the matter of sample size and power to detect effect sizes is not as straightforward with LGM as it is for other analytic techniques. Some researchers consider a sample size of 10 subjects per model parameter to be adequate. In this study, the combined sample size of 290 was adequate to test the individual hypotheses. There was also an

adequate number of degrees of freedom (df=1837) with which to evaluate the overall final model fit. Missing data presented another potential limitation. Although attrition in the sample was low, data were available for up to 8 of 9 years for some variables, and as few as 5 of 9 years for others. In these analyses, FIML made optimal use of all available data and is considered an appropriate and good method for the treatment of missing data (Schafer & Graham, 2002), but missing information made interpretation of results more complex.

In addition, measures used in the study may have influenced results and interpretation. Although the measures demonstrated good reliability, it may have been more informative to, for instance, assess negative self-worth as opposed to positive self-worth. In addition, global self-worth scores do not allow for the evaluation of other components of self-esteem, such as self-compassion or self-rejection. It is also important to note that the measure for deviance was not actual peer deviance but what was perceived and reported by the study participants. Furthermore, due to the necessity of limiting the study's scope, many other established risk and protective factors were not included in this study.

Finally, generalizability is always a potential concern. Although the sample was comprised of teens who identified to some degree as Native American or Alaska Native, this study did not use other measures of Indian-ness, such as reported blood quantum, thus the generalizability of results is limited. Similarly, this study did not utilize a measure of White ethnic identification. It may be informative to incorporate these into future studies.

Conclusion and Future Directions

In conclusion, this was a challenging and educational study that met its goals. Its results may be helpful for Native adolescents or, considering that ethnic identification was low and these teens may indeed be very similar to teens in the general population, results could be applied to all adolescents. The study also demonstrated the usefulness of LGM and some of its limitations, clarified relationships between much-studied risk factors that have not been well-understood, and it generated questions for future study. Future work may entail the use of additional instruments or the development of instruments that would measure different aspects of self-worth, peer relationships, feelings of alienation, caring, cohesiveness, and acceptance by peers, drinking behavior, and ethnic identification.

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