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DEVELOPMENTAL RISK AND PROTECTIVE FACTORS FOR GENERAL HEALTH PROBLEMS AMONG MALE CHILDREN OF ALCOHOLIC FATHERS

By

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ABSTRACT

DEVELOPMENTAL RISK AND PROTECTIVE FACTORS FOR GENERAL HEALTH PROBLEMS
AMONG MALE CHILDREN OF ALCOHOLIC FATHERS

By

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This study utilized concepts and methods from developmental systems theory, risk and resiliency theory, and cumulative risk theory to identify developmental risk and protective factors for health problems in children of alcoholics. Specifically, cumulative risk and cumulative protection was recorded among children of antisocial-alcoholics (n=66), non-antisocial alcoholics (n=147), and a control group (n=107). Results from multivariate analysis and covariance matrix modeling indicate that vulnerability for negative health outcomes is determined by high levels of risk and low levels of protection (GFI=.98). Antisocial alcoholic fathers have significantly higher levels of risk (f, 2,317=26.6; p<.001)and significantly lower levels of overall protection than the non-antisocial (f, 2,317=9.72; p<.001), group when children are as young as three years old. Results indicate that early risk and protective factors can be useful in identifying individuals who are on a developmental trajectory leading to negative health outcomes, and classification as a child of an antisocial alcoholic significantly predicts the scenario of high risk, low protection. The findings are discussed in terms of their implications for developmental research with children of alcoholics and early intervention strategies for high-risk samples.

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CHAPTER ONE: INTRODUCTION

As a group, alcoholics have poor health outcomes which account for substantive health costs to society (NIAAA, 2000). There are many factors that must be considered in estimating the overall consequences of alcoholism in the United States (NIAAA, 1997, 2000). First, there are significant consequences that result from drinking during pregnancy. Prenatal exposure to alcohol can result in Fetal Alcohol Syndrome, the leading cause of mental health deficiency in the United States that is completely preventable. Prenatal exposure to alcohol can result in prenatal neurobiological deficits including low birth weight and low cognitive functioning (Day, 1992; Striessguth, et al., 1994). Excluding the effects of prenatal exposure to alcohol, researchers have reported at least two postnatal reasons to explain the consequences and costs involved with alcohol abuse and alcohol-related health problems. Research has shown that accidents requiring medical attention are greater for intoxicated individuals. Specifically, there is a dose-response relationship between alcohol consumption and risk for injury due to behavior following a drinking episode (Cherpitel et al., 1995; Hingson & Howland, 1993). Intoxicated individuals have delayed motoric functioning and reaction times and are at greater risk of having accidents and/or become injured. Furthermore, intoxicated individuals may underestimate the consequences of participating in high-risk behaviors that lead to accidents.

Long-term alcohol abuse has also been shown to cause direct damage to the liver, cardiovascular, skeletal and immune system (NIAAA, 2000). Both behavioral and physiological evidence indicates that alcohol consumption is causally related to poor health outcomes. Furthermore, the annual cost of alcohol-related health costs has been

estimated to be over 180 billion dollars (NIAAA, 1999). Alcoholism is more problematic than other substance-related disorders and has been identified as causing more overall problems than all other substances combined (Royce & Scratchley, 1997). Clearly, alcohol abuse is a burden on health care systems and taxpayers in the United States.

Less is known about a third, less studied, pathway of risk for negative health outcomes in alcoholics. This pathway includes early exposure to aggregate risk factors that may appear prior to ever having a drink. Specifically, exposure to an alcoholic parent may expose children of alcoholics (COAs) to a variety of risk factors that increase their overall level of risk and lead to poor health outcomes. However, exposure to risk factors only explains part of the developmental processes associated with cumulative risk. Another important part of the equation involves the individual's vulnerability to risk. Alcoholic subtype classification (Zucker et al., 1996) may moderate the effect of exposure to cumulative risk by creating heightened vulnerability for some groups (i.e. antisocial alcoholics) but not others.

Children who grow up in homes with at least one alcoholic parent are at heightened risk for a number of developmental outcomes. For example, COAs are more likely to have internalizing and externalizing disorders (Sher, 1997). Researchers have reported differences between COAs and matched control samples in behavioral problems (Rubio-Stipec et al., 1991). COAs are also exposed to a considerable amount of stressful situations such as domestic violence, neglect, and familial instability. All of the negative characteristics that describe the alcoholic family are amplified in families with antisocial alcoholics. Not all COAs become alcoholic, and one must therefore work to understand

how resilience functions in COAs. In the current study a number of protective factors are analyzed for their contribution to health outcomes.

There are a number of examples of cumulative risk theories to explain negative developmental outcomes (Barocas, Seifer & Sameroff, 1985; Jessor, 1993; Jessor et al, 1995; Newcomb, Maddahian, & Bentler, 1986; Newcomb, Huba, & Bentler, 1981; Sameroff & Seifer, 1983). Risk structures have been found to canalize the multiple pathways to alcohol use and abuse (Zucker & Fitzgerald, 1991). Other research details the effects of alcohol consumption on a number of health outcomes (NIAAA, 1997, 2000). However, few have explained how these same variables and processes affect the general health of alcoholics prior to, and following, their first drink. One reason for this is that the diagnosis of alcoholism generally precedes investigations of health consequences related to the diagnosis. That is, to be included in a study of health history in alcoholics, usually one must be diagnosed with alcoholism. Therefore, information about risk structures that were present prior to diagnosis of alcoholism is gathered retrospectively. Longitudinal, prospective models of cumulative risk (e.g. Zucker et al, 2000) may be helpful in understanding the etiology of health problems of alcoholics because they allow researchers to consider the contribution of the early risk and protective factors, from overlapping ecological systems, that dictate a variety of outcomes. Longitudinal studies of children of alcoholics allow one to assess early contextual, interpersonal, and familial characteristics of a group who are at heightened risk for developing alcoholism. Furthermore, these person-centered research designs allow one to test the explanatory contribution of multiple variables that affect health outcomes prior to the diagnosis of alcoholism within and between children of different

subclasses of alcoholic fathers. This may help to delineate causal pathways of resilient and problematic health outcomes in COAs.

The etiology of early risk structures for health problems in COAs needs to be better understood if social interventions and prevention programs are to be successful. Research with COAs has been aimed at understanding alcohol-specific behaviors that are prevalent in COAs, such as early onset of drinking (Mayzer, Wong, Puttler, Fitzgerald, & Zucker, 2001a, 2001b). Others are aimed at understanding psychological problems and behaviors that are prevalent in COAs including internalizing and externalizing behaviors. The current study examined the causal relationship of such risk and protective factors to the general health of COAs at four time periods and between two types of alcoholic families including antisocial alcoholics (AAL), non-antisocial alcoholics (NAAL) and an ecologically matched control sample (CON).

Vulnerability for negative health outcomes in the current study is a composite variable which is made up of the overall level of risk and the overall level of protective factors that are observed in the lives of children. Because of the dynamic interplay between individual, familial, and contextual risk and protective factors, information from all of these developmental domains was gathered. The focus on vulnerability has important implications for developing early intervention programs for children of alcoholics because it allows researchers and clinicians to identify individuals who are at risk for negative health outcomes prior to the realization of such health problems.

The purpose of the current study is to investigate the causal effects of cumulative risk and protective factors on the general health status of COAs across four time points. Children with relatively low levels of cross-temporal risk loadings are expected to have

lower reportings of health problems. Furthermore it is assumed that group membership in an alcohol subclass based on paternal alcoholism and comorbid psychopathology will be an important explanatory variable in understanding vulnerability.

CHAPTER TWO: LITERATURE REVIEW

The primary purpose of this study is to utilize concepts from developmental systems theory (e.g. Fitzgerald et al., 1994; Ford & Lerner, 1992; Gottleib, 1991a) risk and resiliency theory (e.g. Luthar, Cicchetti & Becker, 2000; Werner, Bierman, & French,1971;Werner, 1986) and cumulative risk theory (Barocas, Seifer & Sameroff, 1985) to identify developmental trajectories of health digression in COAs (including children with antisocial fathers and non-antisocial fathers) and non-COAs (e.g. matched controls). The following review of the literature discusses several important aspects of risk and resilience, the role of stress, and the population of concern including characteristics of COAs, family characteristics of homes with paternal alcoholics and paternal alcoholism subtypes (e.g. antisocial alcoholic). These biopsychosocial constructs are important aspects to explain how COAs 1) may have a genetic loading for negative developmental outcomes 2) grow up in risky (stressful) environments 3) respond inefficiently to stress, and 4) suffer from health problems due to the repeated exposure to multiple stressors. Furthermore, they help to explain the effects of cumulative risk and protective factors prior to first consumption of alcohol.

Cumulative Risk and Resiliency

The literature review begins with a discussion of important longitudinal research with at-risk samples, research regarding cumulative risk, and protection in the alcohol literature, and work which links this approach to the health of COAs.

The issue of better than expected development in the face of adversity has been studied for years. The origin of the modern conceptualization of resiliency is rooted in research dealing with schizophrenia (see Garmezy, 1970). These initial studies were

primarily concerned with the maladaptive nature of patients with schizophrenia. However, focus began to shift to the positive adaptation that was previously considered atypical. Researchers began to question why in some cases patients seemed to have more adaptive patterns than other patients with the same diagnosis. What they found was that schizophrenics with the least severe courses of illness were characterized by a premorbid history of relative competence at work, social relations, marriage, and capacity to fulfill responsibility (Garmezy, 1970; Zigler & Glick, 1986). This finding was important because it led people to question whether the positive events early in life helped to canalize a developmental trajectory of resiliency (Luther, Cicchetti & Becker, 2000).

Studies of children of schizophrenic mothers (see Garmezy, 1974; Garmezy & Streitman, 1974) make up the foundation upon which the literature dealing with childhood resiliency was built (Luther, Cicchetti & Becker, 2000). These studies presented us with evidence that, in some cases, children who are at risk not only develop normally they actually thrive. Emmy Werner wrote a number of papers using children in Hawaii as subjects (Werner, Bierman, & French, 1971; Werner & Smith, 1977). What these studies led to was an investigation as to why people in similar situations take varied developmental pathways to different ends. That is, why do some children who face significant adversities thrive while others suffer? Researchers tested a number of explanatory models that included variables from overlapping levels (e.g. personal, familial, & contextual) of the environment. These early studies guided researchers to group explanatory variables into three broader categories: 1) attributes of the individual, 2) aspects of their families, and 3) characteristics above their social context (Masten & Garmezy, 1985; Werner & Smith, 1977). These pioneering studies are important to the

current study because they lay out a longitudinal prospective model for studying cumulative risk and protective factors over a significant period of time in a high-risk sample.

One trend in resiliency research is to understanding how multiple predictors influence each other and the organization of the system as a whole which acts to canalize the individual's developmental trajectory to resiliency (Ford & Lerner, 1992; Gottlieb, 1991a; Gottlieb, 1998; Lerner, 1998; Rolf et al., 1990). Such predictors have been referred to as risk and protective factors and the following discusses their importance in the resiliency and alcohol literature.

Sameroff and Seifer (1990) developed a multiple risk index which incorporates several risk factors representing the following three broad categories of risk: 1. individual psychological functioning of the mother; 2. aspects of the status of the family; and 3. the broad cultural context in which the family operates. This cumulative risk index has been successful in predicting a range of outcomes including IQ at four years of age (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). Specifically, the extreme categories of risk identified groups of children with IQ difference scores of over 30 points. Significant differences in social emotional competence have also been found using the composite risk index (Sameroff & Seifer, 1983). No individual risk factor, or combination of risk factors was found to account for the results, rather the degree of overall risk was the best predictor of outcomes. The Sameroff and Seifer approach is replicated in the current study with the creation of multiple risk, multiple protection, and multiple health indices.

Risk factors are those that have a negative impact on development. Such factors initiate, maintain, or exacerbate the level of negative developmental outcomes. For example, risk factors within the context of alcoholism are variables that are linked to the etiology of alcohol abuse or dependence, regardless of whether their origins are individual (e.g., depression; Deyken, Levy, & Wells., 1987; Kushner & Sher, 1993), familial (e.g., parental antisocial personality disorder and/or alcoholism; Moeller & Dougherty, 2001), or peer related (Hughes, Power, & Francis, 1992; Margulies, Kessler, & Kandle, 1977). Researchers dealing with child maltreatment (Cicchetti & Lynch, 1993) have referred to risk factors as potentiating factors, or factors that increase the probability of maltreatment. Cicchetti and Lynch (1993) termed protective factors as compensatory factors that decrease the risk for maltreatment.

Protective factors buffer or shield individuals from negative developmental outcomes. In the alcohol abuse literature, Felix-Ortiz and Newcomb (1992) describe protective factors as, Influences that prevent, limit, or reduce alcohol use. Protective factors may counter, buffer, neutralize, and interact with risk factors within or across time. Furthermore, protective factors refer to effects involving interactions wherein individuals with a particular attribute, but not those without it, are relatively unaffected by high versus low levels of risk (von Eye & Schuster, 2000).

Exposure to multiple risk factors places a person at greater risk for negative outcomes. Such exposure is frequently referred to as risk cumulation, risk load, and/or stress pile-up, and investigators have demonstrated repeatedly that cumulative risk predicts negative outcomes (Bry, 1982; Felix-Ortiz & Newcomb, 1992; Sameroff, 1975; Sameroff & Seifer, 1995). Consistent with these findings, alcohol research supports the

hypothesis that a combination of risk factors predicts alcoholism better than any single risk variable. However, no one combination of risk factors predicts better than any other (Bry, 1983; Bry, Mckeon & Pandina, 1982; Felix-Ortiz & Newcomb, 1992). This would suggest that researchers focus on the number of risk factors rather than the factors themselves. Bry et al. (1982) were among the first to use the variable-centered approach specifically for substance use and demonstrated that a set of six factors was linearly related to both use and heavy use. However, they did not include protective factors in their models. Newcomb et al. have expanded on earlier ideas by providing two types of risk that predict either drinking initiation or progression to problem drinking (1994). Furthermore, they delineated the roles of both risk and protection on a variety of substances including alcohol, marijuana, and tobacco.

According to a risk-focused, ecological approach, the more risk factors and the fewer protective factors one has, the greater the danger of one's involvement in potentially problematic behaviors. Research on youth problems indicates that one risk factor alone is not likely to lead to negative outcomes, but that two or more risk factors increase the probability of being involved in problem behavior (Hawkins, et al., 1985; Newcomb, & Bentler, 1989; Rutter et al., 1979), perhaps up to four times (Rutter et al., 1979). The odds are nearly 20 times higher when an individual is exposed to four risk factors.

Protective factors act to promote positive outcomes and buffer against the negative aspects of risk factors. For example, Felix-Ortiz & Newcomb (1992) found that there was a significant interaction between protection and risk. The interaction indicated that high risk is exacerbated by low protection and buffered by high protection in relation

to substance use. The assumption is that the greater the number of protective factors one has the higher the probability of not engaging in frequent alcohol use and binge drinking. Specifically, Felix-Ortiz & Newcomb (1992) demonstrated that cumulative protection functions in the same manner as cumulative risk and can be treated in a similar way as cumulative risk to predict outcomes. Furthermore, when entered in a stepwise regression, cumulative protection accounted for a significant proportion of variance in drinking behavior on its own, as well as having some shared variance with cumulative risk.

Zucker et al. (2000) have demonstrated that defining different adaptation groups based on vulnerability during the preschool years can be important in understanding early signs of risk and resiliency. In their work, two categorical indicators of risk were used to form a two-by-two risk matrix. Specifically family adversity and child psychopathology were used to create four groups. The "nonchallenged" group was made up of children with low family adversity and in the normal range in child psychopathology. The "troubled" group consisted of children with low family adversity and high child psychopathology. Children were categorized as "resilient" if they had high family adversity and low child psychopathology. Finally, the "vulnerable" group had both high family adversity and high child psychopathology. The troubled and vulnerable groups scored significantly higher than the other groups on internalizing and externalizing problems on the CBCL during the three-five year old time period. These significant differences remained consistent during the six-eight and the nine-11 year period. During the 12-14 year period, the troubled group remained higher than other groups; however, the vulnerable group did not score significantly higher on internalizing symptoms than the other groups.

Methodological and Conceptual Approaches

Most research on risk and resiliency can be grouped into two methodological categories: variable-oriented and person-oriented. Each of these approaches can be used to test hypotheses regarding the relationship between risk, protection, and outcomes. In this section, I will introduce the variable-centered and person-oriented approaches and discuss the advantages and disadvantages of both methods, concluding with an argument supporting the person-oriented approach for the current study.

The variable-centered approach to the study of the effects of cumulative risk and protective factors has a long history and is the method of choice when asking questions about the relationship between and among psycho-social constructs and outcomes. For example, one might examine the relationship between level of depression and amount of drinking. This would be a variable-centered approach because the focus is on the relationship between the risk and drinking variables.

A person-centered approach using the same information from above would be different. For example, one might look at group differences in level of depression for alcohol users, abusers, and alcohol-dependent groups. This would be considered a person-oriented approach because the focus is on the differences among groups of people. Level of drinking in this example is used as a grouping variable.

There are advantages and disadvantages to both methods. For example, the variable-centered approach is able to determine the relative strength of relationships between variables. In the example above, one could explain the relationship between depression and level of drinking and make inferential conclusions about the relationship

of the two variables. However, this method would not be optimal to determine similarities and differences among groups of people with similar levels of depression.

One advantage of the person-oriented approach is that it allows researchers to combine information into a single grouping variable and lower the necessary sample size needed to perform statistical analysis. For example, person-oriented methods such as the aggregate risk and protective approach allow the information from a variety of sources to describe groups of children. By merging aggregate risk and protective factors and creating an overall scale of risk and protection, one significantly reduces the necessary sample size for performing data analysis while simultaneously creating a situation where only the risk and protective factors that are important to an individual are considered. Therefore, although two people can have a score of 5 on a risk scale, the 5 risk factors that make up the score may be unique. The fact that the overall level of risk predicts better than individual risk factors (Bry, 1982; Sameroff & Seifer, 1983) is consistent with the theory of equifinality (Gottlieb, 1991a).

Children of Alcoholics

The next section is a review of the research dealing with psychological and behavior disorders in COAs. The relevance of this section to the current study is to demonstrate that a large number of COAs have high levels of psychopathology that may elevate the probability of health problems in adulthood. This is an important piece of the literature dealing with COAs because it provides a foundation to build hypotheses based on the heightened level of risk for children who have an alcoholic father.

Internalizing Symptoms and Personality Disorders

Internalizing psychopathology of COAs includes symptoms such as anxiety and depression and is important for understanding the effects of risk and protective factors between individuals. A large proportion of the heritability for alcoholism is mediated by individual psychopathology (Sher, 1997). The most salient personality classifications in the literature are neuroticism/negative emotionality, impulsivity/disinhibition, and extraversion/sociability.

Sher (1997) described neuroticism and/or negative emotionality as including a variety of personality traits and a tendency to experience negative affective states, a propensity for guilt and self-blame, and sensitivity to criticism. However, mixed findings "cast doubt on the robustness of neuroticism as a reliable discriminator of heterogeneous samples of COAs versus non-COAs" (Sher, 1997, p. 251).

COAs are also often characterized by lower self-esteem than non-COAs in childhood, adolescence, and young adulthood (Sher, 1991, 1997). Sher posits that self-esteem deficits might be reflective of high levels of neuroticism or transient depressive states.

Externalizing Symptoms

Research spanning several years has proven to be consistent in that it reports that children who have at least one parent with a mental illness have a higher probability for the development of externalizing behavior problems. COAs have been characterized as having several behavioral problems. Specifically, COAs had higher rates of lying, stealing, fighting, truancy, and school behavior problems (West, 1987). Such problems may include conduct disorder, attention-deficit hyperactivity disorder, or oppositional disorder (Hammen, Burge, & Stansbury, 1990; Jansen et al., 1995; Stanger, Achenbach,

& McConaughy, 1993; Walker, Downey, & Bergman, 1989). One salient parental disorder that affects the development of approximately 6 ½ million children under the age of 18 in the United States (Russell et al., 1985) is parental alcoholism. Research has demonstrated that several childhood disorders are associated with paternal alcoholism. Some of the childhood disorders associated with paternal alcoholism include hyperactivity, substance abuse, aggressive behavior, and hyperactivity (Phares & Compas, 1992).

Researchers have reported differences between COAs and matched control samples in behavioral problems (Rubio-Stipec et al., 1991). Specifically, they demonstrated that COAs are more likely to exhibit behavior problems than non-COAs. Jansen et al. (1995) found that preschool children who exhibited clinically significant levels of behavior problems are more likely to have parents who had a history of alcohol problems and antisocial behavior than those children in the nonclinical range.

The link between childhood problem behavior and paternal alcoholism has been noted in samples of children as early as three years old (Fitzgerald et al., 1994; Zucker & Fitzgerald, 1991). Furthermore, Zucker and Fitzgerald (1991) reported that preschool age children who have an alcoholic parent were statistically more impaired in every area of symptomology measured by the Child Behavior Checklist (CBCL) than a matched control group of children (with the exception of depression). In this study, it was also reported that three times as many COAs were rated in the clinical range for the CBCL "overall problem behavior" category and the global measures of externalizing symptoms and aggressive behavior (Zucker & Fitzgerald, 1991).

Zucker et al. found that COAs have higher externalizing scores on the CBCL (1997) than ecologically matched controls. Furthermore, COAs are more likely to score higher on measures of aggression when compared with non-COAs (Zucker et al., 1997). This particular study also contrasted COAs reared in two types of families: those with antisocial alcoholic fathers (AALs) and those with nonantisocial alcoholic fathers (NAALs) and found that children of AALs had more externalizing and internalizing behaviors indicating that comorbid psychopathologies that accompany alcoholism may also be important in explaining group differences in children's behavior. There is also strong evidence that demonstrates that hyperactive children are most likely to have fathers who display alcoholic and antisocial personality traits (Hawkins, Catalano, & Miller, 1992).

Cognitive Performance

Children of alcoholics may be at risk for lower intellectual, cognitive, and academic performance. Poon et al. (2000) found that COAs with parents who have co-existing anti-social personality disorder may be at even greater risk. Parents' alcohol classification is useful in framing the picture of COAs because it also influences parental cognitive abilities and educational attainment. These characteristics may also determine offspring performance. Cognitive function in children of alcoholics is an important explanatory element of adaptation at all developmental stages. Low cognitive performance is associated with classification as a COA. Researchers have demonstrated that abstract reasoning, conceptual reasoning, and verbal scores are significantly lower among COAs than non-COAs (Gabrielli & Mednick, 1983). COAs often have academic problems as well and are susceptible to having to repeat grades and are greater risk for

failing to graduate from high school. Cognitive deficits in COAs may explain poor academic performance. However, one must also consider the stress of the home environment as a contributor to problems in school.

Health

The literature on COAs would suggest that they are at heightened risk for health problems. For example, the National Association for Children of Alcoholics (NACOA) reports that COAs experience greater physical and mental health problems and higher health care costs than children from nonalcoholic families. Inpatient admission rates for substance abuse are triple that of other children. Inpatient admission rates for mental disorders are almost double that of other children. Injuries are more than one and one-half times greater than those of other children. The rate of total health care costs for children of alcoholics is 32% greater than children from nonalcoholic families (NACOA, 1988).

Although the number of studies linking paternal alcoholism and child health outcomes is few, some researchers have addressed this question directly. Dobkin et al. (1994) reported lower birth weights in COAs than the children of nonalcoholics. Boys in nonintact alcoholic families were of shorter stature than the other children. A three-way interaction showed that daughters of alcoholic and sons of nonalcoholics living in nonintact families were more likely to have used psychological services as were some of alcoholic in intact families. The results of this study indicated that COAs were not more ill than the children of nonalcoholics. However, there were early indicators of future health problems including low birth weight. In addition, the pre-pubertal heights of the COAs were significantly shorter than the control group. In a study of adult offspring of alcoholics, Hart et al. (2003) assessed physician-diagnosed health problems and minor

self-report medical problems between adult offspring of alcoholics and two control groups. Adult offspring of alcoholics reported a greater number of physician-diagnosed serious health problems than both treatment and nontreatment controls. Neuroticism was used as a statistical control in all analyses. The three groups did not differ in terms of minor symptom reports when neuroticism-stability was controlled. However, when neuroticism was not covaried, significant differences were found indicating that the adult offspring of alcoholics had significantly higher reports of minor medical symptomatology.

These findings along with others indicate that the observable characteristics related to health may not be evident at an early age, but may resurface at other critical points in development. Health problems in adult alcoholics are prevalent and have been documented and replicated across studies. The indicators of pre-problematic health represent the developmental trajectory that forms the basis for the current study. Specifically, the current study will test for observable differences as well as early indicators of vulnerability for developing later health problems.

Family Characteristics of Homes with Paternal Alcoholics

Families with one or more alcoholic members fall under the category of "alcoholic family" (Steinglass, Bennett, Wolin, & Reiss, 1987). The use of the label "alcoholic family" is used because the degree to which family members become organized around the presence of the alcoholic member is quite large. Furthermore most researchers describe that the state of alcoholic-centered families is most often disorganized. In a published literature review of child development in alcoholic families, Zucker and Gomberg (1986) concluded that overall, parent-child interactions in the

alcoholic families were characterized by inadequate parenting and lack of parent-child contact. Some qualities of parent-child interactions were described as being disinterested, lacking affection for the child, having inadequate supervision, or lacking interest in the activities of the child.

The environment of the family with parental alcoholism and/or other psychopathology is characterized as having several adverse environmental factors such as marital discord and low socioeconomic status. Furthermore, such conditions are often associated with poor child outcomes, such as aggression and conduct problems (Chassin, Rogosch, & Barrera, 1992; Jacob & Leonard, 1986; Jansen et al., 1995). It has been demonstrated that alcoholic families who report more psychological problems and alcohol-related problems have children with the most severe psychological and behavioral impairments (Jacob & Leonard, 1986).

Family Dysfunction

Alcoholic families have been characterized by disruption, deviant parental role models, inadequate parenting, and disturbed parent-child relationship (Sher, 1997). Family dysfunction is related to abnormal psychological development and is the source of distress for COAs (Sher, 1997). The characteristics of families of COAs are important for the current study because it sets the stage for exposure to multiple stressors (risk factors). Not only is there a higher probability for conflict and stress, alcoholic families are more likely to lack the ability to adapt to such stress (Jacob & Leonard, 1986). These risk factors cause distress and may cause a heightened activation of the hypothalamic-pituitary-axis. The current study tests the hypothesis that exposure to aggregated risk-factors over time will be related to more health problems in adulthood. Families with

alcoholic parents typically demonstrate lower levels of cohesion and high levels of conflict (Moos & Moos, 1984).

Family Child Interactions

There is little consensus regarding how parent-child interactions and aspects of the alcoholic family lead to particular outcomes prospectively (Fitzgerald et. al, 1993). However, a study by Whipple et al. (1995) examined parent-child interactions in alcoholic and nonalcoholic families during the son's preschool years and used a microanalytic technique for coding videotaped interactions to assess the interactive process. During the child-directed play segment, there was a group main effect for demands self-reliant behavior with alcoholic parents scoring significantly higher on number of demands per minute than control parents. This may indicate that in alcoholic families, children are expected to quickly become independent or assume a caregiving role. Furthermore alcoholic fathers scored significantly higher in negative affect scores followed by control mothers, risk mothers, and control fathers. During parent-directed play, control children stayed closer to their parents than did COAs. During a clean-up segment, control parents displayed more positive effect than controls and were more facilitative of self-regulation than risk families. This indicates that alcoholic parents were less able to provide supportive directions and thereby decreased their child's chance of success.

Paternal Alcoholism Subtypes

Research has revealed that children of alcoholics are at higher risk for less-than-optimal developmental outcomes than non-COAs. However, studies have not adequately addressed whether this has resulted from the presence of parental alcoholism or from

other factors, such as co-occurring parental psychopathology or disruptions in the family environment (Chassin, Rogosch, & Barrera, 1991). A positive family history of alcoholism carries environmental as well as genetic risks that may provide a causal pathway toward maladaptive behavior, including drinking (Fitzgerald et al., 1993; Zucker et al., 1996). For example, preschool boys who scored in the clinical range on the Total Behavior Problems scale of the CBCL were more likely to be a COA and have low socioeconomic status (SES) than those boys who scored in the normal range (Jansen et al., 1995).

Although all alcoholics share a familiar pattern of excessive drinking, the group as a whole is heterogeneous and the within-group differences are important. For example, COAs may also be children of depressed, antisocial, or anxious parents. These comorbid psychopathologies must be taken into consideration when assigning causality to group membership as a COA. That is, researchers should attempt to parcel out shared and unique variance among the comorbid pathologies and alcoholism. This is important for the current study because it is posited that paternal antisociality moderates the effect of being a COA on health outcomes so that children of antisocial alcoholics have a greater chance of suffering from stressors associated with COA status.

When alcoholism is paired with antisocial personality disorder the odds of experiencing psychological and ecological stressors are increased fourfold (Moeller & Dougherty, 2001). Furthermore, researchers have reported that paternal antisocial alcoholism is associated with a number of risk factors. For example, Fitzgerald and Zucker (1995) reported that antisocial alcoholism is associated with low family socioeconomic status. Furthermore antisocial alcoholism is often characterized by

relationship disturbances between spouses (Ichiyama, Zucker, Fitzgerald, & Bingham, 1996). Other correlates of antisocial alcoholism include neuroticism (Piejak, Twitchell, Loukas, Fitzgerald, & Zucker, 1996), and depression and family violence (Ellis, Zucker, & Fitzgerald, 1997). These characteristics of alcoholics are important for developing models of the bio-psycho-social contributors of health digression in COAs because it offers information about variance in health status above and beyond the transmission of genetic risk. With that in mind, the literature as a whole still supports the idea that paternal antisociality is a categorical marker for negative child development.

Maternal Psychopathology

Although theory would suggest that the aggregation of risk factors from both parents is important, research on alcoholic households often downplays the maternal contributions to child development. However, in alcoholic households, the effects of maternal psychological and emotional problems are important for several reasons. First there is some degree of assertive mating among women with psychopathology and alcoholic men (Jacob & Bremer, 1986). For example within AAL families, there is significant dual diagnosis for alcoholism (Maes et al, 1998). Second, in many instances mother-father relationship disturbances may result in disrupted mother-child relationships (Wang & Crane, 2001). One goal of the current study was to capture the interplay of paternal and maternal risk and protective factors; therefore the data were structured to reflect this.

The Role of Stress

Children of alcoholics display significantly higher levels of symptoms related to stress than children from nonalcoholic families (Moos & Billlings, 1982). One of the

hypotheses of the current study is that exposure to cumulative risk factors over time will increase health problems. One of the assumptions that must be made in order to link psychological risk factors to health outcomes is that exposure to such risk factors causes a biological response. This assumption is supported with a number of scientific studies which indicate that there is synchrony in the biological and psychological response to stressful stimuli. Furthermore, there is a growing body of literature that reports relationships between alcohol consumption and the physiological response to stress. This same body of literature has also demonstrated a main effect being a COA on the hypothalamic and brainstem response to stress. The following section is a discussion of the human biological response to stressful situations.

Allostasis and the Hypothalamic-Pituitary-Adrenal Axis (HPA)

The Allostatic Model

Research linking such psycho-social risk and protective factors to health outcomes tends to focus more heavily on psychopathology and less on general health. However a branch of medical literature has addressed the relationship between multiple stressors and health outcomes and may be an important in linking multiple risk and protective factors to the health of COAs.

In medical research, one probabilistic model of cumulative risk has been referred to as the allostatic health model (McEwen & Stellar, 1993). The allostatic model of the developmental digression of health status suggests that individuals who continually react to many environmental/ecological stressors may be at heightened risk for a number of negative health problems (McEwen & Stellar, 1993). Such models may help causally link the exposure to several risk factors with negative health outcomes in COAs.

Through allostasis, the autonomic nervous system, the hypothalamic-pituitary-adrenal axis, and the cardiovascular metabolic, and immune systems protect the body by responding to internal and external stress. The price of this accommodation to stress causes wear and tear that results from chronic overactivity to underactivity to allostatic systems (McEwen & Stellar, 1993). Stressors may promote physiological and behavioral disturbances, ranging from psychiatric disorders to immune system dysfunction. Chronic activation of the stress response also constitutes a major risk factor in the development of disease due to its physiologic effects in the body.

Cortisol

Cortisol is a hormone that is produced and secreted by the adrenal glands to help the body cope with stress. There are three structures that collectively regulate secretion of cortisol. They are the hypothalamus, pituitary gland, and the adrenal cortex (referred to as the HPA system). Adinoff et al. (1998) detail the physiological chain of events involved in cortisol secretion in the following passage:

> In response to the stimulation from the brain, the hypothalamus produces corticotropin releasing hormone (CHR) and/or arginine vasopressin (AVP). CRH and AVP are then channeled directly to the pituitary gland situated just beneath the hypothalamus. Within the pituitary, these two hormones act together to stimulate the release of adrenocorticotropic hormone (ACTH). ACTH arrives at the adrenal cortex via the bloodstream, where it stimulates the secretion of cortisol. Cortisol then travels through the bloodstream, exerting effects on multiple organs and tissues. (p. 68)

The HPA has a control system that keeps activation to a minimum. Therefore, when a stressor is experienced and CRH and ACTH are released, cortisol levels increase. The increased levels of cortisol suppress any additional CRH and ACTH production.

Blunted cortisol response has been linked to a variety of characteristics. For example, children with atopic dermatitis showed a blunted cortical response to stress when compared to a control group (Buske-Kirschbaum, et al., 1997). Other research has made the link between blunted and disrupted secretion of cortisol in response to chronic alcohol consumption and withdrawal (Adinoff, Iranmanesh, Veldhuis & Fisher, 1998).

Beta-Endorphin

Plasma beta-endorphin is released into the system in response to stressful stimuli. This allows the body to effectively maintain a homeostatic state while concurrently dealing with the stressor. Alcohol consumption prior to stress interferes with the natural physiological system. In a stress exposure situation (Xing, Thavundayil, & Gianoulakis, 2002), researchers found statistically significant differences in stress-induced plasma beta-endorphin concentration in groups based on statistical risk for alcoholism. Subjects were grouped into high and low risk groups based on their family history of alcoholism. The low-risk group presented a higher stress-induced increase in plasma beta-endorphin and a faster recovery that the high-risk group following stressful stimuli. Furthermore, alcohol consumption before stress attenuated the stress-induced increases in plasma beta-endorphin in both groups; however, this interaction was stronger in the low-risk group. This example illustrates two important points. The first is that there is a physiological response to stress. The second is that there are main effects of both variable-based (i.e. consumption) and person-based (i.e. risk-group) risk factors on physiological response to stress.

The person-based approach for studying the human response to stress is important for COAs. Although most research shows little or no difference between COAs and non-

COAs at baseline, differences arise when a stimulus is introduced (Finn & Justus, 1997). For example, COAs react more to nonstressful stimuli than do non-COAs (Finn, 1990). In Finn's study (1990) subjects responded to nonstressful stimuli presented over headphones at a loudness level similar to that of a passing car. The data revealed that COAs had greater skin conductance and were slower to habituate than a non-COA control sample.

COAs also differ in their physiological response to stressful situations. For example, Finn et al. (1990) found that young adult COAs showed higher heart rates and higher levels of vasoconstriction while waiting for aversive stimuli. In this study, subjects were told that they would receive a mild electric shock. The differences in group mean scores demonstrated that COAs are hyperreactive to stressful stimuli.

The Current Model

The previous review of the literature summarized important scientific findings regarding the biopsychosocial risk and protective factors associated with alcoholic families and the physiological response to such stimuli. The literature review is the foundation for the hypotheses in the current study. Therefore, the following section is a discussion of the hypotheses that will be tested in the current study.

The current study uses age-appropriate risk and protective variables that are prevalent in alcoholic households and links them to the current and prospective health status of COAs and a control group. This makes it possible to track the continuities and changes in level of risk and protection, and health status within and between groups of children who have either an antisocial or non-antisocial alcoholic father.

Apropos of the study's purpose, the following hypotheses will be tested:

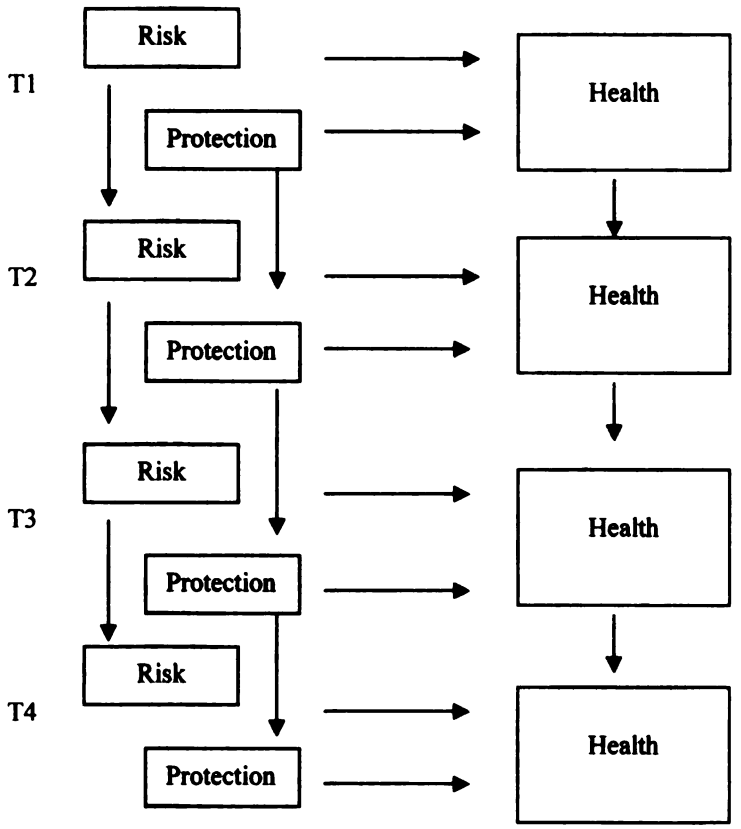
There will be a significant main-effect of group membership (e.g. COA, COAA, CON) on level of risk across four time periods. This hypothesis and the one that follows are grounded in research which demonstrates that being a child of an alcoholic carries a significant amount of risk factors that may or not affect individual development in a negative manner. Some researchers have also demonstrated a model of risk continuity that states that for particular groups (i.e. COAs) level of risk is high and remains high across time. Because we are using level of risk across time, we drop the constraint of specificity of individual risk factors and test whether level of risk, regardless of individual and combinations of risk factors, remains relatively stable or changes over time across and between groups based on paternal alcoholism classification.

The second hypothesis is that there will be a significant main-effect of group membership on level of protection across four time periods. The reasoning behind this hypothesis is similar to the cumulative risk hypothesis stated above but also includes ideas about the relative levels of protective factors (i.e. absence of or limited number of protective factors) in some groups of people. For example Montanez et al. (under review) tested for the effects of having very few protective variables on adolescent drinking behaviors and found that resilience is not merely a function of having very few risk factors, but rather, it is equally important to have a significant number of protective factors. Although this phenomenon has been examined less in the cumulative risk literature, we have preliminary data (Zucker et al., 1996) that lead us to expect alcoholic and antisocial-alcoholic groups will have fewer protective factors than the control group across all time periods.

Hypothesis three states that there will be a significant main-effect of group membership on health status. Specifically, I hypothesize that COA membership in the NAAL and AAL groups will increase health problems when compared to the non-COA control group. This hypothesis is supported by previous research dealing with COAs that suggests that general health of children of alcoholics is compromised because of the robust constellation of negative consequences of having an alcoholic father.

The final hypothesis was that level of risk and level of protection will predict health outcomes. The test for this hypothesis used structural equation models and required multiple models to be estimated. Figure 1 shows the conceptual model with risk, protection, and health across four time periods.

Figure 1. Hypothesized effects of risk and protection on health across four time periods.



CHAPTER THREE: METHODOLOGY

Subjects

The present work is from an ongoing longitudinal study of children at risk (Wong, Zucker, Puttler, & Fitzgerald, 1999; Zucker, Ellis, Bingham, & Fitzgerald, 1996; Zucker, et al., 2000). This is a prospective study that tracks the developmental pathways of initially intact families with high levels of substance use/abuse, along with a community control sample of families. The long-term focus of the project is the emergence and development of substance abuse and problems in the children, and the patterns of stability and change in drug involvement among the parents. Families are assessed at three-year intervals (time periods are designated by the abbreviations T1-T4).

The sample consists of two population-based sub-samples of alcoholic families and an ecologically matched control sample of nonalcoholic families. In order for the families to be included in the study, the father had to be living with the male child and his mother. Furthermore, they had to have a male child between the ages of three and six years old. The first sample of alcoholic families was recruited from the population of all convicted male drunk drivers in four Michigan counties who had a blood alcohol concentration of at least 0.15%. Alternatively, those with a blood alcohol concentration of 0.12% and a history of prior alcohol-related arrests were included. Another inclusion criterion was that men had to have a definite diagnosis of alcoholism during recruitment and during data collection (see Zucker et al., 2000 for recruitment details). All subjects are White Americans.

A second group, the community alcoholics, was recruited via door-to-door canvassing of the neighborhoods in which the court-recruited alcoholics lived. This

contrast group had the same criteria for inclusion as the original sample with the exception of having a history of drunk driving or previous arrests. The control families were recruited from the same census tracts as the other sub-samples but were only included if they had a definite negative diagnosis of alcoholism as diagnosed by the Feighner criteria (Feighner et. al., 1972).

Sample Size

Participants for the present study involved all project families who have completed assessments at T1, T2, T3, and T4. In the current study, male children comprised the target sample for creating overall risk and protection scores. For example, in the creation of a T1 risk score, information is merged about the child, his family, and his context from multiple sources including the child, mothers, fathers, and teachers. There are 184 MTCs who have information from at least one source across all four T-periods. However with data imputation, the number will ultimately approximate 320.

Missing Data and Imputation

As described in the appendix, the dichotomous variables that were used in this study came from scale scores of several different measures. Each measure had an individual database where it was stored which created a need to estimate data and merge files to make a common database with a set of variables that represented dichotomous risk and protection scores. For example, a maternal score on the original database of the Beck Depression Inventory has several variables and a total score. The total score was dichotomized to indicate presence or absence of moderate to severe symptoms and merged into the common database where individuals could have a score of 1 to indicate that they had the risk factor or 0 to indicate that they did not have the risk factor. In some

cases information came from both mother and fater and scores were summed so that if both parents had the risk factor, the child received a score of 2. In cases where one parent had the information and one did not, imputation was performed prior to summing. This was the first round of imputation. Imputation was performed for missing data on these variables in there original data sets and merged into a common database with all measures. This would create a database with four rows of information from the four possible sources for every male target child. The next step involved combining information from four sources by summing scores and combining into a single row of data for each male target child. The rest of the missing scores were then estimated using linear interpolation in SPSS v. 11.5. Scores were rounded and decimal points were dropped. This method allowed for the use of all available data across time periods and resulted in a total of 320 subjects.

Power

In the current study, there are several proposed analyses, and power for for all analyses was relatively good. Evaluations of a priori power generally carry a minimum criterion of .80 be considered good. If significant findings are not found and relatively high power is achieved, one can assume that there probably is not a significant relationship in the population. To estimate power, a balanced design with 100 subjects per group and three treatment levels was used (sample $\underline{N} = 320$). The criterion for estimating power was the ability to detect differences of 0.5 of a standard deviation between groups. An effect size of 0.50 is considered moderate. The alpha coefficient was set at .05. Using these parameters, there was an 88% probability of finding a significant between groups, if one existed in the population.

The sample also included a sufficient number of subjects needed in order to place 95% confidence in the estimation of parameters of model fit. Kline (1992) suggests that researchers use no less that 5 subjects per parameter estimated in the covariance structural model. In the current study 10 subjects per parameter were available for the largest analyses.

Measures

Three scales were created for the current study. The first scale captures cumulative risk and includes a count of important risk factors while the second identifies protective factors in the same manner. All risk and protective factors were extracted from the battery of instruments utilized on the UM-MSU Longitudinal study over several years. The following list of measures taken from appendix 10.3 of the NIAAA grant application from 2002 (Zucker et al., 2002). All measures were dichotomized to represent whether a person had an at-risk score on risk variables, or whether they had a positive score on the protective scales. After the constructs were dichotomized, the total scores were calculated by summing the scores across the risk and protective scales. The rationale for dichotomization of scores is described for each construct below.

Table 1

Number of Risk and Protection Variables by Time Period

	Number of Risk Scales	*Number of Protection Scales*
T1	0-15	0- 5
T2	0-19	0-11
T3	0-17	0-10
T4	0-20	0-11
Total	0-71	0- 37

Individual data files were merged with the dichotomous information described below. With merged data, there were a total of 71 risk factors and 42 protective factors. Table 1 is a distribution of risk and protective factors at particular time periods. In previous work using cumulative risk scales (Bry et al., 1983; Montañez et al., 2003) as few as seven indicators were sufficient to categorize individuals as low and high risk and to demonstrate linear and nonlinear relationships between predictors and outcomes. Therefore, by including nearly two times the indicators for both risk and protection at every time point, we have the ability to identify a significantly higher number of at-risk individuals. Furthermore, by using clinical cutoffs and extreme scale scores, we are at an advantage over previous work that used item-level information (i.e. Felix-Ortiz and Newcomb, 1992; Montañez, et al, 2003).

Table 2.

Risk and Protective Factors

Measure	Risk or Protection Factor	Time Period	Definition	Possible Points per T-period
Family Events Questionnaire	Both	1,2,3,4	Number of positive events and negative events in previous year	1,1
Dimensions of Temperament Survey and revised edition	Both	1,2,3(r)	a. attention span/distractibility, b. adaptability/approach-withdrawal scale	1,1
Hassles and Uplifts Scale	Both	1,2,3,4	Daily life events that are categorized as hassles and uplifts.	1,1
School Performance Questionnaire	Both	2,3,4	a. Attendance, b. disciplinary problems, c. level of competence, d. attractiveness	4
CBCL-Teacher Form	Protection	2,3,4	Child's performance in school and child competence	2
Conflicts Tactics Scale	Protection	1,2,3,4	Methods of resolving conflicts	1
Demographics Questionnaire	Protection	1,2,3,4	Parent's religiosity	2
Demographics Questionnaire	Protection	3,4	Adolescent religiosity	1
Harter Perceived Competence Scale for Children	Protection	2,3,4	Child's sense of his or her a. own abilities of school related matters, b. peer relationships, c. athletic activities, and d. general feelings of self-worth	4
Norbeck Social Support Quest.	Protection	1,2,3,4	High quantity or good quality of social support	1

Table 2. Continued

Measure	Risk or Protection Factor	Time Period	Definition	Possible Points per T-period
Sibling Relationship Questionnaire	Protection	1,2,3,4	Close relationship with a sibling.	1
Smells Task	Risk	1,2	Positive identification of a. adult-use alcoholic substance, b. cigarettes	1
Antisocial Behavior Checklist	Risk	4	Adolescent antisocial behaviors.	1
Axis V, DSM-III-R, Parental Social Competence	Risk	1,2,3,4	Highest level of adaptive functioning in the last year. (both Mother and Father)	2
Beck Depression	Risk	1,2,3,4	Maternal indicator of moderate to severe depression	1
Child Behavior Checklist-Depression Scale	Risk	1,2,3,4	Maternal reports of child's clinical aspects of depression. At T4, self-report CBCL is used.	1
CBCL – Externalizing and Internalizing	Risk	1,2,3,4	Child externalizing and internalizing behaviors	1
Demographics Questionnaire	Risk	1,2,3,4	Low Income	1
Drinking and Drug History	Risk	1,2,3,4 depends on timing of first drink	First drink and problem drinking	2
Moos FES	Risk	1,2,3,4	High levels of family conflict	1

Table 2. Continued

Measure	Risk or Protection Factor	Time Period	Definition	Possible Points per T-period
OSCL-Family Crisis	Risk	1,2,3,4	High levels of family related stressors	1
Parenting Monitoring	Risk	4	Low levels of parental monitoring	1
Parent Perception Inventory	Risk	3,4	Negative Parenting behaviors	1
Peer Behavior Profile	Risk	3,4	Exposure to risky peer group	1
Ways of Coping Interview	Risk	1,2,3,4	Negative coping behaviors	1
Work Satisfaction Questionnaire	Risk	1,2,3,4	Paternal dissatisfaction with their current employment or related issues	1

Study Measures

Several measures were used in the current study. Below each measure is described, and the method for dichotomizing and including as either a risk or protective variable is described. Dichotomization of individual variables was decided in one of two ways; in some cases, clinical cutoffs, and cutoffs suggested by the manufacturer or author of the measure was used. Alternatively, an 80%/20% split was used to capture only the most extreme scores as a risk or protective factor.

Alcohol Assessment Smells Task

The Smells Task was designed to determine whether children can identify alcoholic beverages by smell alone. This is a proxy measure of current level of knowledge of alcoholic beverages. Opaque sniff jars containing nine different substances are used: three of the substances are considered to be universal-use substances (apple juice, Playdoh, popcorn); two are considered to be noncontrolled adult-use substances (coffee, perfume); and four are considered to be controlled adult-use substances (beer, whiskey, wine, cigarettes). A successful identification is one that represents a reasonable approximation for the olfactory stimulus (Engen, 1982). In the current study, a positive identification of any of the controlled adult-use alcoholic substances (e.g. beer, whiskey or wine) is considered a risk factor for children, and scores were dichotomized as either exactly recognizing (+1) or not recognizing (0). The same procedure was used for correct identification of cigarettes so that subjects were dichotomized as either recognizing (+1) or not recognizing (0) the smell of cigarettes. Both of these constructs are included in the risk scales for T1 and T2.

Antisocial Behavior Checklist

The ASB-R-Adolescent (Zucker & Noll, 1980) is a revision of an earlier antisocial behavior inventory utilized in the Rutgers Community Study (Zucker & Barron, 1973; Zucker & Fillmore, 1968). A cutoff of 24 is used to indicate the presence of antisocial behavior. Paternal lifetime antisociality is measured by the DSM-III (see below) and is used to create groups for the study. However adolescent antisociality scores are measures with ASBCL used to indicate heightened risk. Therefore, when an adolescent has an ASBCL score above the cutoff, they are given a (+1) positive score for the T4 risk scale.

Axis V DSM-III-R, Parental Social Competence

Information necessary to code the Parental Social Competence scale *(American Psychiatric Association, 1987),* pertaining to social, occupational, and leisure time functioning, is obtained at the end of the DIS. This measure is especially important because it is an index of social/personal competence that may be semi-independent of symptomatic status. This measure was used as an indicator of risk for T1-T4 risk scales (Highest level of adaptive functioning in last year). A person was coded positive (+1) on this risk factor if he or she scored in the range from poor to grossly impaired.

Beck Depression Inventory (short from)

The BDI (and short form) is a self-report instrument that assesses cognitive, emotional, motivational, and physical manifestations of depression. In the current study individuals will be given a positive (+1) score on the T1-T4 risk scale if they have a score that is indicative of moderate or severe depression.

Child Behavior Check List -Depression Scale

The depression scale of the CBCL consists of 15 items that are important indicators of the clinical aspects of depression. During the T1-T3 waves this subscale is derived from parent report data and scores which indicate signs of depression were scored as a positive (+1) on the T1-T3 risk scale. At T4, the CBCL is administered in a self-report format. However, the same method of translating reports of depression to the T4 risk scale is used as in the previous t-periods.

Child Behavior Checklist-(Parent Form)

The CBCL developed by Achenbach (Achenbach & Edelbrock, 1983), is completed by each parent independently. The two broad band subscales concerning externalizing and internalizing behavior were used for this study. When externalizing and internalizing scores from either parent fall within the clinical range, a positive (+1) score is figured into the risk scale for the corresponding T-period. This will yield the possibility of two possible risk points from parents' reports of child behavior at four time periods.

Child Behavior Checklist-Teacher

The target child's teacher completes the Teacher Version of the CBCL. School performance data and measures of child competence reported are used as factors of the protective scale so that scores that indicate positive performance in school and/or high levels of competence in the school setting are given a positive (+1) score on the protection scale at T2-T4. This yields a total of two protective factors from T1-T4.

Child Health and Development History

This measure is used in the current study to gather information about the child's past and current health status. Although the questionnaire focuses on a variety of areas,

only information regarding health is used. This information forms the foundation for a number of dependent (outcome) variables regarding health at four time periods.

Coddington Life Stressors (T1, Social Readjustment Rating Scale for Children)

The extent of stress experienced by each of the children in the proposed study was assessed through the use of Coddington's Social Readjustment Rating Scale for Children (Coddington, 1972a). This questionnaire inquires about life events that occurred during the past six and 12 months of the child's life and whether that event was positive or negative. In the current study, scores are summed for negative events and positive events to create independent scale scores. Once scale scores are created, the dichotomization of the scores is created using 20% cutoff scores at the positive extreme of the distribution. Therefore, subjects who score in the positive extreme of the positive events scale will score a positive (+1) on the protection scale and those with extreme positive scores on the negative events scale will receive a positive (+1) on the risk scale.

Demographic Questionnaire (and Background Follow-ups)

The demographic questionnaire is used in the current study to include the contribution of religion and church attendance, parent's level of education, occupation of parents, and a calculation of socio-economic status (Mueller & Parcel, 1981). In the current study, parent's current level of religiosity was determined using a multiplicative interaction term which was the product of two ordinal-level items of religious attendance and self-appraisal of "how religious" (i.e. level of personal faith) one considers themselves. Using an interaction term, a 20% cutoff was made at the upper extreme of the distribution so that mothers and fathers with the highest combination of participation and beliefs were given a positive (+1) score on the T1-T4 protection scale. At T3-T4,

adolescent's level of religiosity is measured and was calculated in the same manner as stated above and added to the protection scale.

Diagnostic Interview Schedule (DIS)

The NIMH Diagnostic Interview Schedule - Version III (Robins et al., 1981, 1981) is a structured interview that allows trained lay interviewers to gather extensive physical, alcohol and drug related, and mental health (symptomatic) information that can then be computer processed to yield diagnoses by way of the three major nosological systems in use today (DSM-III; Feighner, RDC). In addition, when given by a trained clinician it offers the opportunity of getting an extensive psychiatric clinical history in the course of telling one's life symptomatic story. The complete DIS, including the embedded Conflict Tactics Scale, takes 1 1/2 to 2 hours. As is also true for the Conflict Tactics measure, on retest at T2, recollective questions will only cover the past three year intervals rather than lifetime prevalence. DIS training is carried out in a like manner as already described for the Conflict Tactics Interview. To facilitate later coding and to allow for other processing of this information, all diagnostic interviews are audio recorded.

DISC-Parent is administered as a supplement to the DISC. The DISC and DISC-P are nearly identical and in the current study, the DISC-P is used to supplement information gathered with the DISC.

Dimensions of Temperament Survey (DOTS)-Child

The DOTS (Lerner, Palerno, Spiro, & Nesselroade, 1982) provides a continuous measure of temperament from early childhood through adulthood. In the current study we extracted information regarding attention span/distractibility and

adaptability/approach-withdrawal. Subjects were given a positive (+1) score on the T1-T3 risk scales if they scored in the lower 20% of the distribution of scores on the attention span/distractibility scale. Furthermore subjects were given a positive (+1) on the T1-T3 protection scales if they scored in the upper 20% of the distribution on the adaptability/approach-withdrawal scale.

DOTS-R (Child Ratings of Self)

Beginning with Time 3, we will use the DOTS-R (Windle & Lerner, 1986), a revision of the DOTS, to assess temperament. The DOTS-R is a 54-item revision of the DOTS. The factors revealed were: Activity Level-general, Activity Level-sleep, Approach-Withdrawal, Flexibility-Rigidity, Mood, Rhythmicity-Sleep, Rhythmicity-Eating, Rhythmicity-Daily Habits, Task Orientation, (and Distractability, Persistence for the young adult sample only). Children were asked to rate themselves with the DOTS-R. A positive score (+1) is added to the T3 and T4 risk scales if subjects have scores that indicate overall negative mood. In addition, a positive score (+1) is added to the T3-T4 protection scales if subjects score in the upper 20% of the distribution on the adaptability/approach-withdrawal scale.

Drinking and Drug History and Current Use Patterns

This questionnaire provides data on quantity, frequency, and variability of alcohol consumption, frequency of drug use, and multiple questions on consequences and troubles related to the use of these substances. In the current study, age of first drink will be extracted from the T4 questionnaire. A positive (+1) risk score was added to the appropriate T-period risk scale according to the age of first drink. For example, if a person reports that the age of first drink was age eight, then a positive score was added to

T2 risk scale. Problem drinking was also identified at specific time periods and added to the respective risk scale when problem- drinking scores are found.

Harter Perceived Competence Scale for Children

This instrument (Harter, 1978) was designed to measure the child's sense of his or her own abilities and stature vis-à-vis other children in terms of school-related matters, peer relationships, athletic activities, and general feelings of self-worth. It is comprised of 28 items, seven of each of four sub-scales; cognitive, social, physical, and general self-esteem. In the current study, a positive (+1) score was given to those subjects who have a high level of self-esteem. The dichotomization was based on 20% cutoffs at the upper extreme of the distribution.

Hassles Scale and Uplifts Scale

The Hassles and Uplifts scales (Kanner et al., 1981) are two lists of daily life events [losing things, not enough time for family, (hassles); relaxing, praying, using skills well at work (uplifts)], are endorsed for occurrence and intensity by respondents. It is used as an individual measure of both stress and its obverse (uplift). The two scales are independent of each other. Therefore, a positive (+1) score was added to the risk scale for high levels of hassles and a positive (+1) score was added to the protection scales for high levels of uplifts. For T1-T4, mother's report was used to generate a dichotomous scale score.

Moos Family Environment Scale (FES), Form R

The FES (Moos, 1974) is an empirically based taxonomy of family social environments as perceived by the family members themselves. A positive (+1) score was added to the T2-T4 risk scales to indicate high levels (as indicated by a 20% cutoff) of

family conflict. This information came from the target child. However at T1, mother's scores on the FES were used and scored in the same manner.

Norbeck Social Support Questionnaire

The present instrument (Norbeck et al., 1981) evaluates the affect, affirmation, and aid components of supportive transactions, using an interview format. Respondents generate a list of significant others in their life, and then answer a series of questions about those relationships (e.g. how much does this person make you feel loved or liked? If you were confined to bed how likely is it that this person would help you?). The instrument generates measures of the support network quantity (number), duration, and quality (affect, affirmation, aid). A positive (+1) score was added to the T1-T4 protection scales when mother's report has a high quantity and/or above average quality of social support.

OSCL--Family Crisis List

This 40-item list of family troubles (Patterson, 1982) was developed to record specifically family-related stressors and to document the interaction between stress and patterns of family coerciveness. In the current study, a positive (+1) was added to T1-T4 risk scales if families report very high levels of family related stressors. This was dichotomized using a 20% cutoff at the extreme of the distribution.

Parent Monitoring-Parent and Forms

In this instrument (Chilcoat & Anthony, 1996) parents are asked questions about their monitoring practices with the target child (e.g., How often does (child) check in with you or a sitter before going out?) A positive (+1) score was added to the T3-T4 risk scales to indicate very low levels of monitoring.

Peer Behavior Profile

This 54-item self-report questionnaire is designed to profile three aspects of the participant's peers: the peers' clique/group memberships, peer involvement in a wide range of behaviors, and the quality of the participants' relationships with his/her peers. Thirty-four items with responses ranging from "almost none" to "nearly all" are used to profile peer behaviors. These items were sampled from the four conventional social institutions outlined by Social Control Theory (i.e., family, school, church, legal system (Hirschi, 1969), and conventional and nonconventional behaviors as per Problem Behavior Theory (Jessor et al., 1983; Jessor & Jessor, 1977), and include church attendance, minor deviance behavior, delinquent/illegal behavior, sexual behavior, alcohol and drug abuse. In the current study a positive (+1) score was added to the T3-T4 risk scales to indicate exposure to risky peer group with respect to the behaviors listed above.

School Performance Questionnaire

The School Performance Questionnaire asks teachers to provide information about several indicators of risk and protection. The following is a list of important information from the School Performance Questionnaire and whether it is considered a risk or protective variable in the current study: 1. Attendance--students with scores in the upper 20% of the distribution were given a positive (+1) score on T2-T4 risk scales. 2. Disciplinary problems-- students with reports of discipline problems were given a positive (+1) score on the T2-T4 risk scales; 3. Level of competence--children with an overall low level of competence relative to other children in six areas (emotional, physical, social, language, and intellectual development, aggression, activity level) were

given a positive (+1) score on the risk scale; 4. Attractiveness-- students with positive reports of perceived attractiveness were given a positive (+1) score on the T2-T4 protective scales.

Sibling Relationship Questionnaire

This questionnaire (Furman & Buhrmester, 1985) was created from an analysis of interview materials, and it was subsequently refined to 51-items aimed at assessing four underlying dimensions: warmth/closeness, relative status/power, conflict, and rivalry. In the current study, children were given a positive (+1) score on the protection scale for scores on the questionnaire that represent warm and close relationships with a sibling.

Ways of Coping Interview (Revised)

The instrument is a 68-item checklist that people respond to about how they have dealt with a specific stressful encounter (Folkman & Lazarus, 1980; Lazarus & DeLongis, 1983). The instrument distinguishes between the problem solving and regulation of emotion processes of coping. The instrument is administered in a short interview in which the respondent describes a recent highly stressful event, says who was involved, where it took place, and what happened. The yes-no checklist is then applied to what went on during the event process. A positive (+1) score was added to the T1-T4 risk scales if mothers report negative coping behaviors. In addition, a positive score was also added for father's report of negative coping behaviors.

Work Satisfaction Questionnaire

This instrument is used to assess attitudes toward work and one's particular job. The present instrument was adopted from one developed by Renwick and Lawler (1978)

for a national survey of work satisfaction. The instrument evaluates job satisfaction and involvement, readiness to change work, attitudes toward boss and co-workers, amount of involvement with work peers as friends, extent to which there is conflict between work and home. In the current study, a positive (+1) score was added to the T1-T4 risk scales if fathers' reports indicate dissatisfaction with their current employment or related issues.

Health Measures

Items regarding health status were extracted from two forms. At time one, the information came from the Family Stress Inventory. After time one, all information regarding health came from the DIS Health History. In this survey of health, parents are asked to report whether or not their children have suffered from the following illnesses and health conditions:

Table 3

IRT Weights for Health Scale

Item Description	IRT Severity Weight
Chicken Pox	-5.50
Allergies	-2.73
Recurrent ear infections	-2.66
Pneumonia	-.69
Asthma	-.53
Heart Murmur	-.16
Measles	.32
Rubella	1.10
Scarlet Fever	1.10
Mumps	1.41
Seizures	1.41
Meningitis	1.83
Mononucleosis	2.55
Whooping Cough	2.55
Encephalitis	3.77
Rheumatic Fever	3.77
Polio	3.77
Diabetes	3.77
Cystic Fibrosis	3.77
Developmental disabilities	3.77
Muscular Dystrophy	3.77
Cerebral Palsy	3.77

Item-level information was used to create weighted scale scores. Scales scores were calculated using an Item Response Theory (IRT) model. Specifically, the IRT calculates the probability of an individual answering "yes" to an item given that individual's latent characteristics (for statistical details of IRT see Baker, 2001). The latent characteristic in the current study is general health. Traditionally, two parameters in IRT are individual trait level and item severity (level of the trait required to have a 50% probability of endorsing a given item). In the current study, the two parameters are an individual's tendency to have health problems and the severity of the health problem.

Traditional IRT theory is used to assign a difficulty level to items on tests of ability. The calculation of item difficulty is a multi-step process. One piece of the equation includes the percentage of individuals who answer an item correctly. If 90% of individuals answer the item correctly, it indicates that the item has a low difficulty level. If many people answer the item incorrectly, it may indicate that the item has a high difficulty level. The difficulty level assigned by the IRT model is on the ability scale (for example, the ability required to have a 50% of individuals correctly answer any given item). If individuals who correctly answered an item with a high difficulty (placed high on the ability scale) also answered several other items with high difficulty, one could consider the individual to be of "high ability" or high on the trait scale. Low-difficulty items are assigned lower trait levels and high-difficulty items are assigned higher trait levels. Therefore, when total scores are given, we can distinguish between high-ability and low-ability individuals because the number of correct answers is multiplied by the item weights, their location on the ability scale. The current study employed the traditional approach.

Once items were weighted, the individual was assigned the weighted score or a zero. For example, an individual who has seizures receives a score of 1.41, and a person who does not have seizures receives a zero. However, a person with Cerebral Palsy would receive a score of 3.77, and a person with chicken pox would receive -5.50. Chicken pox received the lowest eight because both healthy and less-healthy individuals experience chicken pox. On the other hand, because very few people have Cerebral Palsy, it is given a higher degree of severity. Scale weights from times 3 and 4 were anchored

using weights from T2 because T2 provided the optimal amount of item-by-person information.

Statistical Analyses

The current study attempted to track the changes and continuities in level of risk and protection variables in the lives of COAs and a control group across four time periods. Items were pulled and pooled from the measures above to create overall risk and protective factors. The following paragraphs are a description of the method which was used for creating the risk and protective scales.

Statistical Method for Hypotheses

Hypothesis one was that there will be a significant main-effect of group membership (e.g. AAL, NAAL, CON) on level of risk across four time periods. The analysis for this hypothesis involved multiple statistical procedures. In the first step, I utilized the repeated measures ANOVA procedure from SPSS v.11 to test for differences in mean scores between groups at four time points. The substantive interpretation of a significant ANOVA coefficient was that there are significant group differences in mean scores in at least one time point. If the analysis was significant I proceeded to step two and performed post-hoc analysis to detect at what time period and in what groups the differences were found statistically significant.

Hypothesis two was that there would be a significant main-effect of group membership on level of protection across four time periods. Hypothesis two utilized the same statistical procedures as above. However, the outcome variable was level of protection.

The third hypothesis centers on the assumption that there would be a significant main-effect of group membership on health status. The analysis for hypothesis three tested for main effects of group membership on number of health problems. For this analysis, a scale of health problems was created using a method similar to that which was used to create the risk and protection scales. Therefore the scales consisted of the number of health problems weighted by the severity of the health problem. The statistical analysis for this research question is identical to procedures used to test hypotheses one and two.

Three hypothesis were tested simultaneously; 1) level of risk will be a significant predictor of number of health problems; 2) level of protection will be a significant predictor of resilient outcomes; 3) early exposure (i.e. amount at T1) to risk predicts later (i.e. T4) levels These hypotheses above were tested using covariance structural modeling. Using this procedure one can test for the simultaneous effects of multiple predictors across a number of time periods. Other analyses centered on the strength of relationships between predictors and outcome variables across time and between groups.

CHAPTER FOUR: RESULTS

Item-Level Descriptive Statistics

The risk and protection scales that were used in all analyses consisted of several dichotomous scores from the battery of instruments listed in the methods section. Items were dichotomized based on the rubric for each scale. The proportion of individuals who had the items was calculated and proportions were tested for statistical significance among the three groups. Tables 4-11 contain lists of items for each risk and protective scale at all time periods. The percentages of individuals in each group with the factor are listed and statistically significant differences are noted by superscript figures. A significant difference indicates that significantly higher proportion of individuals from one group had the risk/protective factor than in another group. In general, antisocial alchoholics (AALs) tended to have significantly higher percentages on a number of risk factors and significantly lower percentages on a number of protective factors at all four time periods than non-antisocial alcoholics (NAALs) and the control group (CON). This information, as a whole yields information to describe the differences between the lives of children in antisocial, alcoholic households and those from nonantisocial, alcoholic and nonalcoholic households.

Table 4

Proportion of Individuals with Risk Factors at T1 by Alcohol Subclass.

a.CON	b.NAAL	c.AAL	Total	F	p	Variable Name
.16	.22	.20	.20	.84	.433	Short attention Span (DOTS)
.32[b,c]	.53[c]	.74	.50	16.56	.000	Can identify cigarettes by smell (smells task)
.22[c]	.34	.44	.32	4.62	.011	High amounts of family crisis (Family Crisis Inventory)
.24	.24	.26	.25	.026	.974	Child depression (CBCL)
.04	.05	.09	.05	1.24	.290	Maternal depression (Beck)
.14[b,c]	.40[c]	.65	.37	27.64	.000	Axis V Global assessment of functioning
.16[c]	.25	.35	.24	4.17	.016	High Externalizing Behaviors (CBCL)
.36[c]	.49	.64	.48	6.30	.002	High Family Conflict (Moos FES)
.30	.26[c]	.47	.32	4.91	.008	High Level of Hassles (Hassles and Uplifts Scale)
.25	.25	.26	.25	.004	.996	High Internalizing Behaviors (CBCL)
.10[c]	.14[c]	.50	.20	27.42	.000	Low income (Demographic Questionnaire)
.33	.29[c]	.50	.35	4.55	.011	Negative coping strategies
.24[c]	.24[c]	.45	.29	5.82	.003	High level of negative events (Family Events)
.85	.86	.89	.86	.356	.701	Exact Identification of Alcoholic beverage (beer, whiskey, or wine)
.30	.22	.20	.24	1.56	.213	Dissatisfaction with Work (father)

Table 5

Proportion of Individuals with Protective Factors at T1 by Alcohol Subclass.

a.CON	b.AAL	c.NAAL	F	p	Total	Variable Name
.16	.22	.23	.970	.380	.20	High approachability (DOTS)
.21	.29	.24	1.016	.363	.26	High positive events (Family Events Scale)
.45[c]	.33	.18	6.787	.001	.34	High religiosity
.37	.43[c]	.20	5.463	.005	.36	High social support (Social Support Scale)
.31	.39	.27	1.881	.154	.34	High level of "uplifts" (Hassles and Uplifts Scale)

All numbers are percentages. Group N's are CON, n = 107; AAL, n = 66 ; NAAL, n = 147.

Table 6

Proportion of Individuals with Risk Factors at T2 by Alcohol Subclass.

a.CON	b.NAAL	c.AAL	F	p	Total	Variable Name
.09	.06	.02	2.148	.118	.06	School Absences (school performance)
.21	.12	.12	2.383	.094	.15	Short Attention Span (DOTS)
.81	.90	.85	2.274	.105	.86	Exact Identification of Cigarettes by Smell (smells task)
.08[c]	.11[c]	.35	14.011	.000	.15	Low school competence (School performance)
.27[b,c]	.51	.64	13.521	.000	.46	High Family Crisis total
.30[c]	.20	.12	4.156	.017	.22	CBCL depression
.06	.05	.08	0.337	.714	.06	Maternal depression (Beck)
.11	.11	.09	.106	.900	.11	Disciplined for Problem Behavior (school performance)
.36[b,c]	.15	.15	9.169	.000	.22	High externalizing CBCL
.30[b,c]	.67	.82	33.068	.000	.58	High Family conflict (Moos FES)
.32[c]	.31[c]	.80	30.32	.000	.42	High level of hassles (Hassles and Uplifts)
.38[b,c]	.20	.17	7.21	.001	.26	High Internalizing CBCL
.07[c]	.09[c]	.80	151.26	.000	.23	Low income
.27	.29	.17	1.79	.169	.26	Negative coping strategies
.14	.18	.08	02.15	.118	.15	High number of negative family events (family events scale)
.17[c]	.10[c]	.64	51.62	.000	.23	total problem behavior (teacher CBCL)
.93[b,c]	.99	1	4.32	.014	.97	Exact identification of Alcohol by Smell (beer, whiskey, wine)
.18[c]	.25[c]	.67	78.23	.000	.31	Low work satisfaction
.07[c]	.11[c]	.67	29.42	.000	.21	Axis V Global assessment of functioning

All numbers are percentages. Group N's are CON, n = 107; AAL, n = 66 ; NAAL, n = 147.

Table 7

Proportion of Individuals with Protective Factors at T2 by Alcohol Subclass.

CON	NAAL	AAL	F	p	Total	Variable Name
.19	.24	.14	1.79	.168	.20	High Approachability
.16	.20	.15	.472	.624	.18	High Athletic competence
.16[c]	.14	.03	3.52	.031	.13	Very Attractive (teacher rating school performance)
.27	.29	.29	.072	.930	.28	Global self-worth
.21[c]	.22[c]	.52	12.49	.000	.28	High positive events (family events)
.57[b,c]	.29[c]	.06	29.25	.000	.34	High religiosity
.24	.20	.33	2.07	.128	.24	Scholastic competence (Harter)
.33[c]	.21[c]	.65	22.32	..000	.34	Positive relationship with a sibling (Sibling Relationship Questionnaire)
.20	.21	.12	1.24	.291	.19	Social acceptance (Harter)
.30[c]	.27	.12	3.85	.022	.25	High number of uplifts (Hassles and Uplifts Scale)
.45	.45	.47	.046	.955	.45	High social support

All numbers are percentages. Group N's are CON, n= 107; AAL, n = 66 ; NAAL, n = 147.

Table 8

Proportion of Individuals with Risk Factors at T3 by Alcohol Subclass.

CON	NAAL	AAL	F	p	Total	Variable Name
.12	.11	.12	.061	.941	.12	School absence
.17[c]	.16[c]	.44	12.70	.000	.22	Short attention span
.08	.10	.11	.118	.889	.09	School competence (school performance)
.32[c]	.25[c]	.79	35.35	.000	.38	Family crisis
.31	.24	.15	2.77	.064	.24	CBCL depression
.06	.05	.08	.20	.819	.06	Maternal Depression (Beck)
.04[c]	.11[c]	.35	19.77	.000	.13	Axis V Global assessment of functioning
.15	.17	.20	.327	.722	.17	Disciplined for problem behavior (School performance)
.24	.14	.17	2.47	.086	.18	High Externalizing Behavior (CBCL)
.17	.14	.08	1.50	.224	.13	High family conflict (Moos FES)
.25[c]	.48	.36	7.29	.001	.38	High Hassles
.27	.18	.17	2.08	.126	.21	High internalizing (CBCL)
.06	.10	.15	2.20	.112	.09	Low income
.31	.34	.21	1.78	.170	.30	Negative coping strategies
.11	.20	.23	2.35	.097	.18	Family events (high negative events)
.15	.10	.21	2.35	.097	.14	CBCL total behavior score (Teacher report)
.37[b,c]	.22	.15	6.29	.002	.26	Low work satisfaction

All numbers are percentages. Group N's are CON, $n = 107$; AAL, $n = 66$; NAAL, $n = 147$.

Table 9

Proportion of Individuals with Protective Factors at T3 by Alcohol Subclass.

CON	NAAL	AAL	F	p	Total	Variable Name
.28	.23	.20	.838	.433	.24	High approachability
.22	.16	.12	1.63	.197	.18	High athletic competence
.30[c]	.22	.09	5.30	.005	.22	Global self-worth (Harter)
.21	.21	.12	1.40	.247	.19	High positive events (family events)
.49[c]	.42[c]	.14	12.10	.000	.38	High religiosity
.29	.21	.17	1.99	.138	.23	Scholastic competence
.37[c]	.37[c]	.73	14.28	.000	.45	Positive relationship with sibling
.33	.31	.17	3.02	.05	.29	Social acceptance (Harter)
.47[c]	.29	.27	3.29	.04	.29	High family social support
.25[b]	.50[c]	.11	20.14	.000	.33	High level of uplifts (Hassles and uplifts scale)

All numbers are percentages. Group N's are CON, n = 107; AAL, n = 66 ; NAAL, n = 147.

Table 10

Proportion of Individuals with Risk Factors at T4 by Alcohol Subclass.

CON	NAAL	AAL	F	p	Total	Variable Name
.07[c]	.12	.21	3.7	.026	.12	School absence
.14[c]	.16[c]	.52	22.8	.000	.23	Antisocial behavior (adolescent ASBCL)
.02[c]	.09[c]	.30	19.53	.000	.11	Family crisis
.23	.27	.24	.177	.838	.25	CBCL depression –mother rating
.19	.17	.18	.063	.939	.18	CBCL depression- self reports
.04	.04	.12	3.35	.036	.06	Maternal depression (Beck)
.03	.04	.08	1.14	.322	.04	Axis V
.21	.22	.29	.809	.446	.23	Disciplined for problem behavior
.19[c]	.18[c]	.35	4.44	.013	.22	High externalizing CBCL
.22	.30	.27	.887	.413	.27	High family conflict (Moos FES)
.24[c]	.32[c]	.62	14.63	.000	.36	High Hassles (Hassles and uplifts scale)
.21	.22	.18	.178	.837	.21	High internalizing behaviors (CBCL)
.07	.06	.08	.120	.887	.07	Low parental monitoring
.02[c]	.08	.14	4.51	.012	.07	Low income
.31[c]	.24[c]	.64	17.53	.000	.35	Negative coping strategies
.03	.05	.06	.654	.52	.05	Drinking (adolescent)
.16	.11	.23	2.58	.078	.15	Negative family events
.06[c]	.16[c]	.56	41.39	.000	.21	CBCL total behavior score (Teacher report)
.13[c]	.12[c]	.65	55.23	.000	.23	Negative peer group
.24[c]	.33	.48	5.54	.004	.33	Work dissatisfaction

All numbers are percentages. Group N's are CON, n = 107; AAL, n = 66 ; NAAL, n = 147.

Table 11

Proportion of Individuals with Protective Factors at T4 by Alcohol Subclass.

CON	NAAL	AAL	F	p	Total	Variable Name
.27	.39[c]	.23	3.83	.023	.32	High athletic competence
.07	.05	.03	.765	.466	.06	Attractiveness (school performance)
.01	.02	.06	2.33	.099	.03	School competence
.34	.27	.20	2.01	.136	.28	Global self-worth
.20[c]	.16	.06	3.03	.05	.15	High positive events (family events)
.49[c]	.37[c]	.14	11.56	.000	.36	high religiosity (mother on self)
.30[c]	.21[c]	.06	7.27	.001	.21	High religiosity (adolescent on self)
.43[c]	.31	.17	6.83	.001	.32	Scholastic competence
.32[b,c]	.24	.27	.990	.373	.27	Social acceptance
.55[b,c]	.28	.32	11.03	.000	.38	High family social support
.22[b,c]	.39	.44	5.68	.004	.35	High level of uplifts

All numbers are percentages. Group N's are CON, n = 107; AAL, n = 66 ; NAAL, n = 147.

Hypothesis One

Hypothesis one stated that there would be a significant main-effect of group membership as an child of an antisocial alcoholic (AAL), non-antisocial alcoholic (NAAL) or a control (CON) on level of risk across four time periods. The following results support this hypothesis. Group mean scores on level of risk are listed in Table 12 below and Figure 2 is a graphical representation of the mean risk scores at four time periods for each group. One can see the differences between groups and those differences are maintained over the four time periods. Specifically, ALAs scored significantly higher than the NAALs and CONs at time one (f, 2,317=26.61; $p<.001$), time two (f, 2,317=25.08; $p<.001$), three (f, 2,317=21.43; $p<.001$) and four (f, 2,317=41.09; $p<.001$). These results support the hypothesis of a main effect of group.

To test for a main effect of alcohol classification on level of risk, a multiple analysis of variance (MANOVA) was performed. MANOVA tests for multiple outcomes in multiple groups simultaneously. In general, alcohol subclass predicts level of risk well. The range in R^2 is from approximately 0.13 to 0.21 which indicates that regardless of other important predictors, alcohol subclass explains up to 21 % of the variance in risk scores. The strength of prediction is strongest at T4. The greatest difference between AALs and other groups is at time four. Although, we do not yet have the data to model group differences in the future, previous research would suggest that the magnitude of the size of differences among AALs and other groups will continue to grow larger as they become older.

Figure 2. Mean risk scores by group across four time periods.

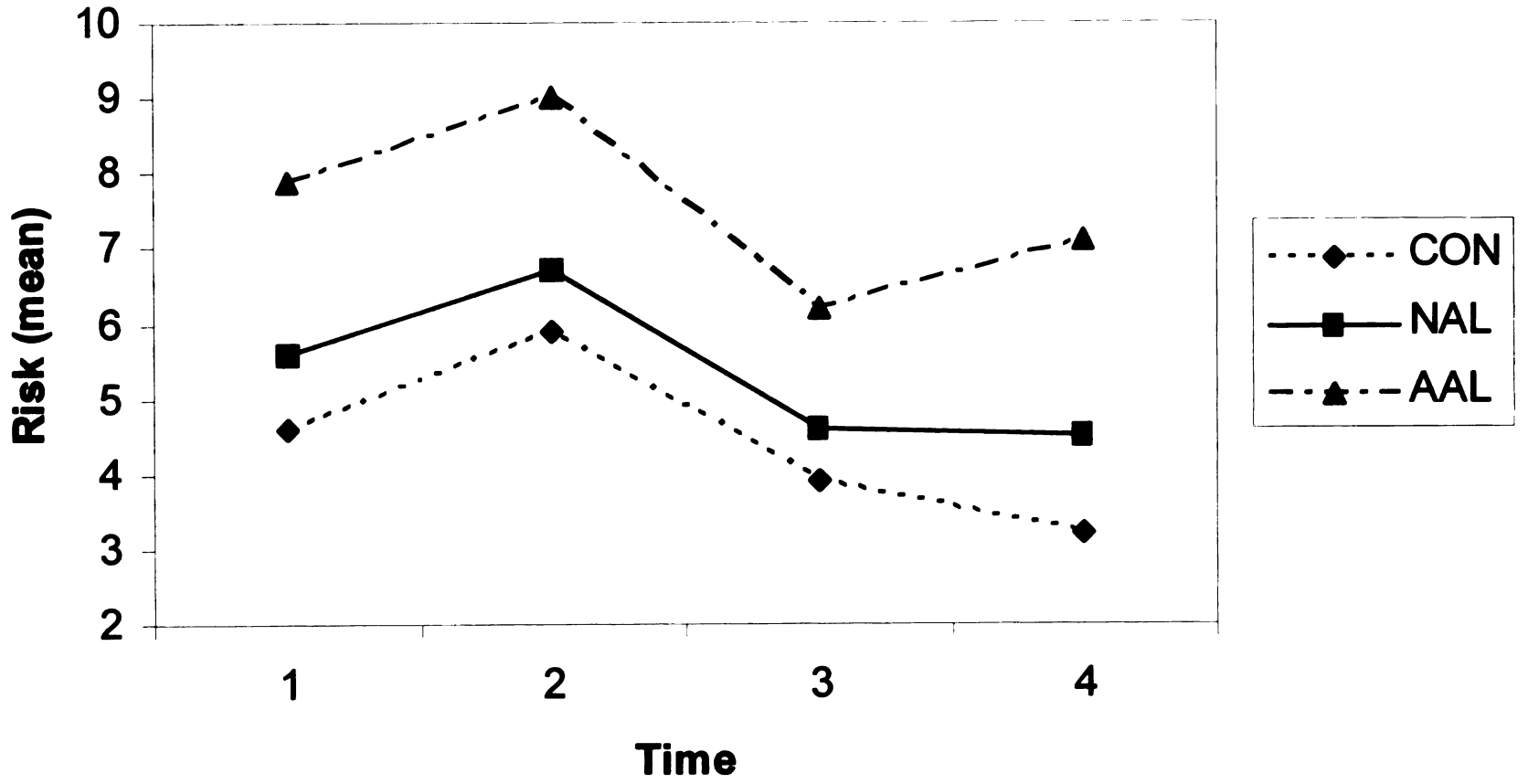


Table 12.

Mean Scores with Standard Deviations for Level of Risk by Alcohol Classification.

	1. Control	2. Alcoholic	3. Antisocial Alcoholic	Model (F)	R^2
Time 1	4.6 (2.8)[2,3]	5.6 (2.8)[3]	7.9 (3.1)	26.61***	.144
Time 2	5.8 (3.0)[2,3]	6.7 (2.8)[3]	9.0 (2.5)	25.08***	.137
Time 3	3.9 (2.2)[3]	4.5 (2.5)[3]	6.3 (2.1)	21.43***	.119
Time 4	3.2 (2.6)[2,3]	4.5 (2.8)[3]	7.1 (3.0)	41.09***	.206

N=317
Numbered superscript indicates the group number with a statistically significant mean difference at the 0.5 level.
Note. Degrees of freedom for all tests are [2(groups), 317(individuals)]
*** $p<0.001$

Hypothesis Two

Hypothesis two stated that there would be a significant main-effect of group membership (e.g. NAAL, AAL, CON) on level of protection across four time periods. The following results support this hypothesis. Group mean scores on level of protection are listed in Table 13 below and Figure 3 is a graphical representation of the mean protection scores at four time periods for each group. Group differences were found at all time periods except for time two. Specifically, AALs scored significantly lower than the NAALs and CONs at time one (f, 2,317=9.72; $p<.001$), three (f, 2,317=9.82; $p<.001$) and four (f, 2,317=8.60; $p<.001$). These results support the hypothesis of a main effect of group on level of protection.

To test for a main effect of alcohol classification on level of protection, a multiple analysis of variance (MANOVA) was performed. MANOVA tests for multiple outcomes in multiple groups simultaneously. In general, alcohol subclass predicts level of protection moderately. The range in R^2 is from approximately 0.051 to 0.058 which indicates that regardless of other important predictors, alcohol subclass explains up to approximately

6 % of the variance in protection scores. The strength of prediction is strongest at T1. The greatest difference between AALs and other groups is at time four. Based on these findings, one can make working hypotheses about future data. Specifically the patterns of the data suggest that the magnitude of the size of differences among AALs and other groups will continue to grow larger as they become older.

Figure 3. Mean protection scores by group across four time periods.

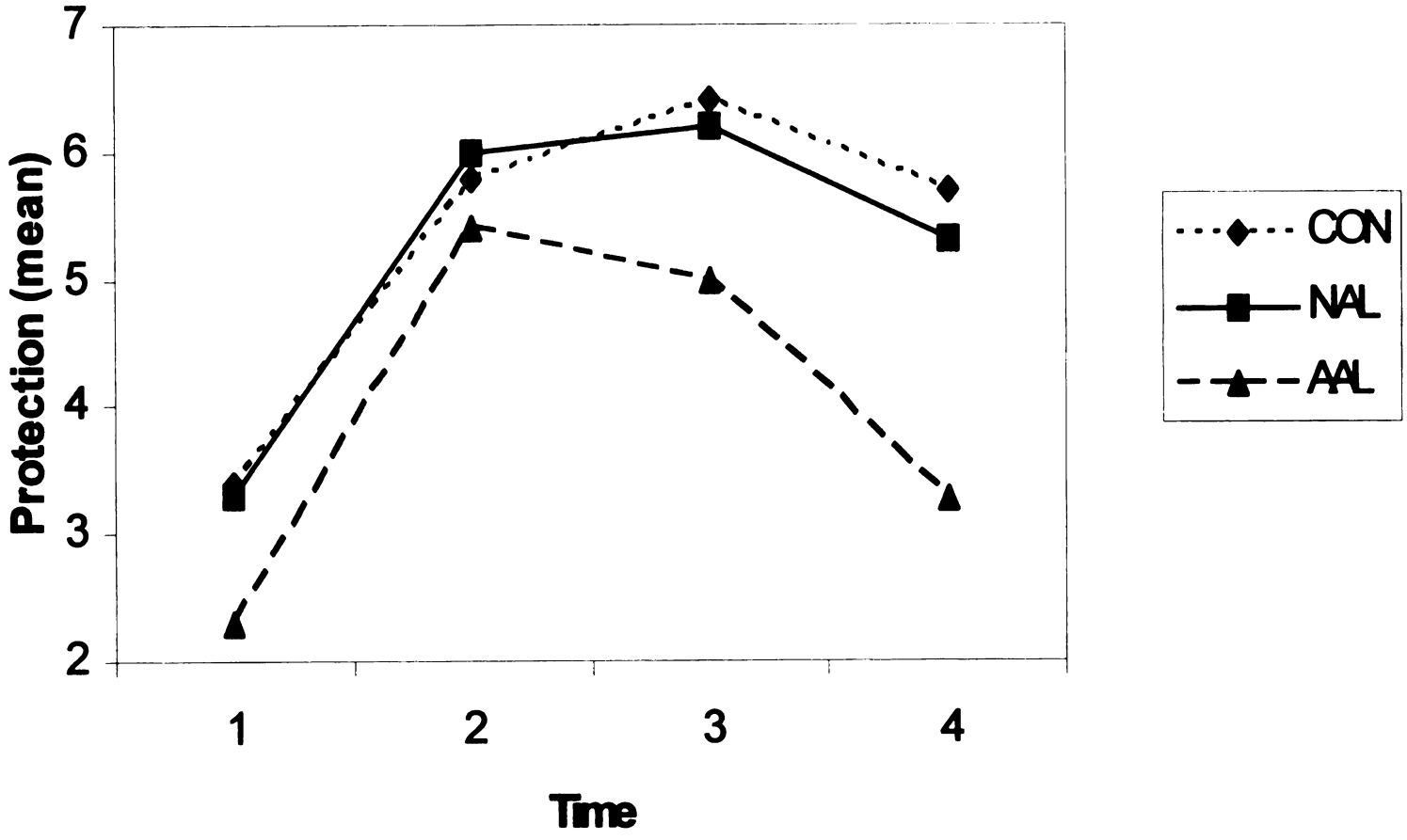


Table 13

Mean Protection Scores with Standard Deviations by Alcohol Classification.

	1. Control	2. Alcoholic	3. Antisocial Alcoholic	Model (F)	R^2
Time 1	3.4 (1.8)[3]	3.3 (1.9)[3]	2.3 (1.4)	9.72***	.058
Time 2	5.8 (1.9)	6.0 (2.0)	5.4 (1.3)	2.05	-
Time 3	6.4 (2.1)[3]	6.2 (2.1)[3]	5.0 (1.9)	9.82***	.052
Time 4	5.8 (2.1)[3]	5.3 (2.6)[3]	4.3 (2.1)	8.6***	.051

N=317
Numbered superscript indicates the group number with a statistically significant mean difference at the 0.5 level.
Note: Degrees of freedom for all tests are [2(groups), 317(individuals)]

Hypothesis Three

General health scores were created via a multi-method process which resulted in a standardized general health scores at four time periods. Information for T1 health differs slightly from other time periods; however, it loads equally heavily on the latent health variable (see Figure 6). Table 14 below lists the mean scores of the standardized health variable with a mean of 100 and a standard deviation of 15. Scores are represented in logits and represent the deviation from the average from the entire sample. This transformation of logits into a standardized scores is identical to the method used in IQ tests and was scaled in this manner for the purpose of achieving clarity. Because the raw logit scores were all initially negative, larger health scores indicate better overall health and lower scores indicate worse health in the converted scores.The raw scores were weighted by severity of health problem using a two-parameter Item Response Theory model where item difficulty and individual ability were set to capture construct severity and vulnerability.

Hypothesis three stated that there would be a significant main-effect of group membership on health status. The following results provide partial support for this hypothesis. Group health scores are listed in Table 14 below and Figure 4 is a graphical representation of the mean health scores at three time periods (T2-T4) for each group. Figure 5 show the mean health scores at time one. Group differences were found at two of the time periods. Specifically, AALs scored significantly lower than the NAALs and CONs at time two ($\underline{f}$, 2,317=15.85; $p<.001$) and three ($\underline{f}$, 2,317=5.63.; $p<.01$). These results provide only partial support for the hypothesis of a main effect of group on level of health.

Figure 4. Mean health scores by group T2-T4

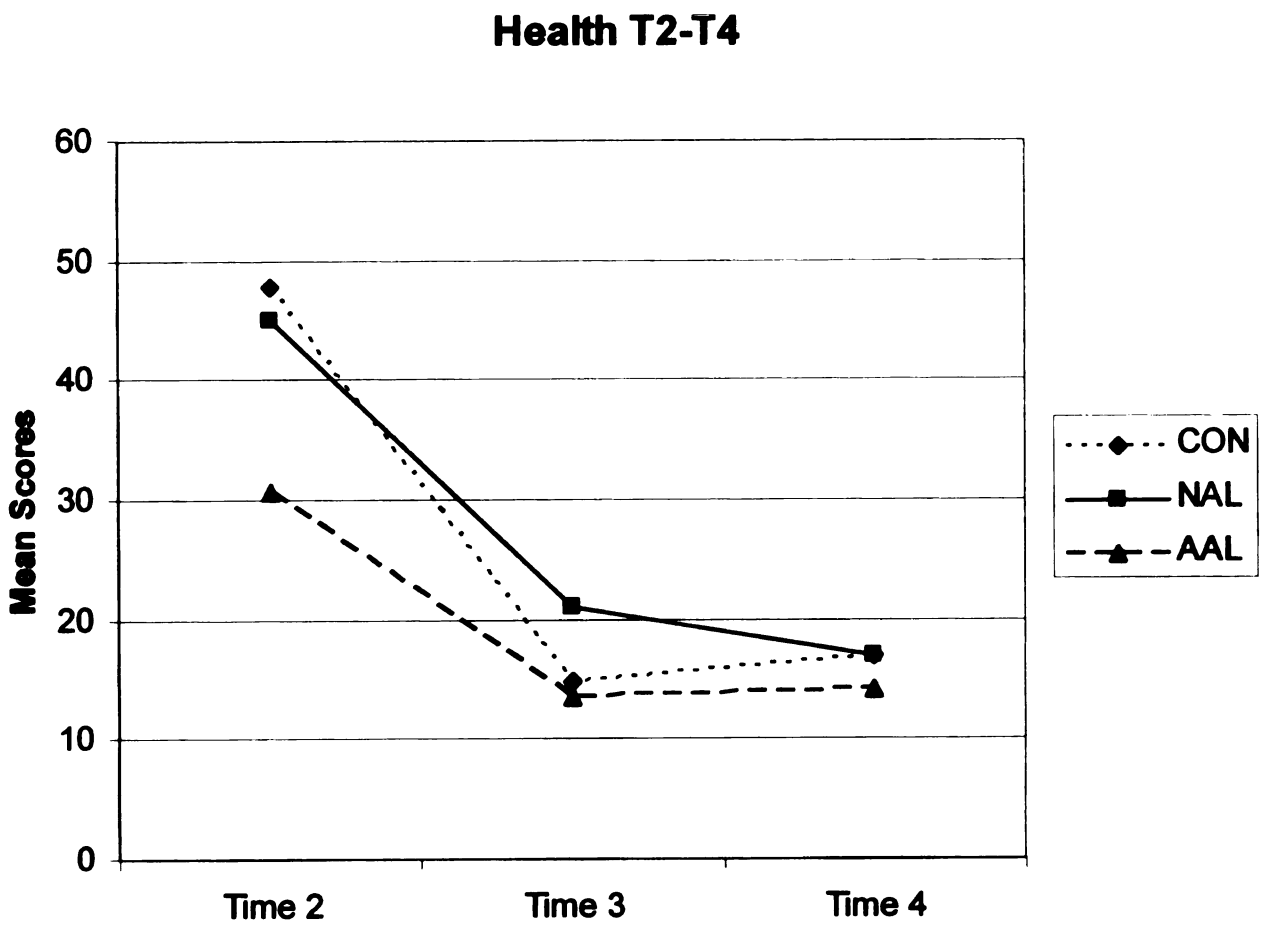


Figure 5. Mean health scores by group T1

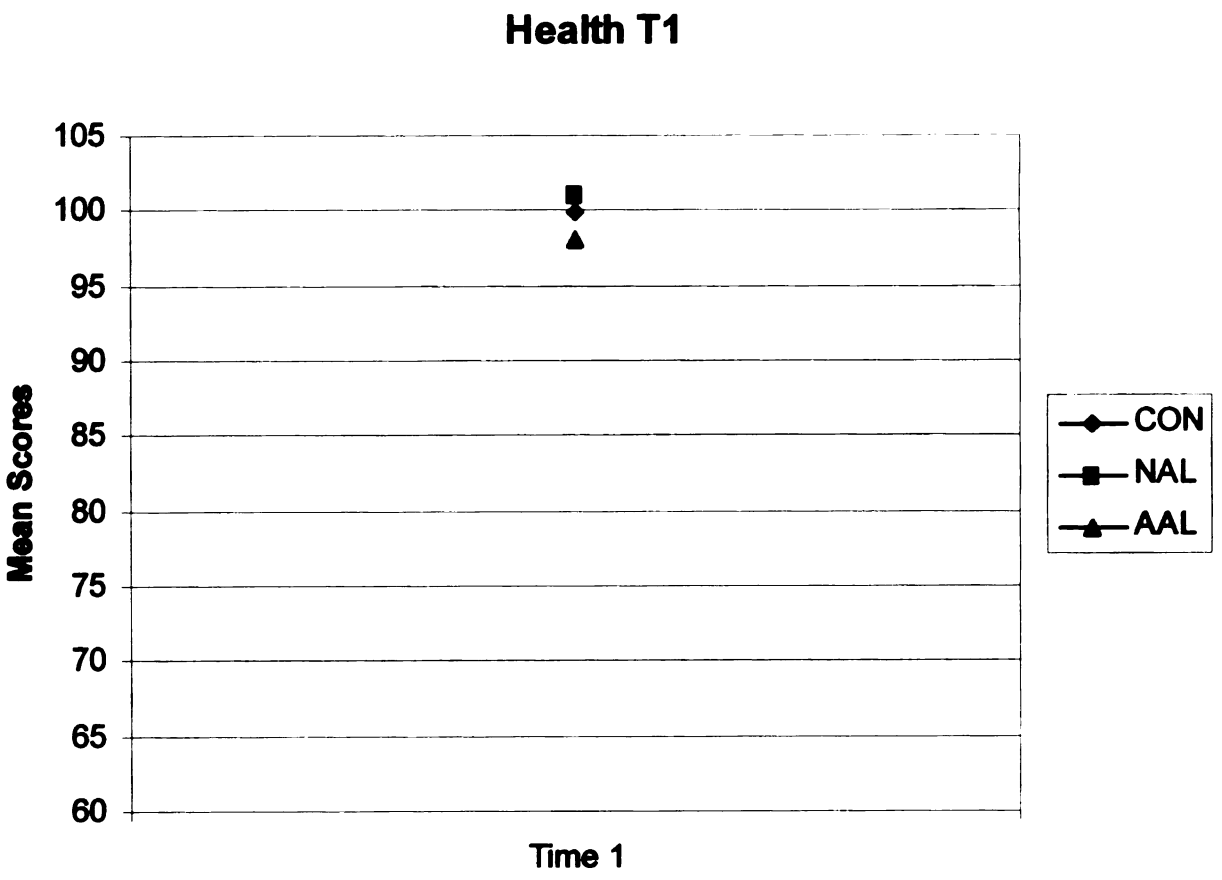


Table 14

Mean Health Scores with Standard Deviations by Alcohol Classification.

	1. Control	2. Alcoholic	3. Antisocial Alcoholic	Model (F)	R^2
Time 1	99.9 (14.3)	101.1(14.39)	98.1 (14.2)	1.05	-
Time 2	47.7 (20.9)[3]	44.9 (19.8)[3]	30.7 (19.8)	15.85***	.091
Time 3	14.7 (18.1)[2]	21.1 (20.2)[3]	13.4 (14.1)	5.63**	.034
Time 4	17.0 (16.0)	17.0 (14.9)	14.1 (12.8)	.978	-

N=317

Numbered superscript indicates the group number with a statistically significant mean difference at the 0.5 level.
Note. Degrees of freedom for all tests are [2(groups), 317(individuals)]
**P<0.01; ***P<.001

Main Effects Model

To test for a main effect of alcohol classification on level of protection, a multiple analysis of variance (MANOVA) was performed. MANOVA tests for multiple outcomes in multiple groups simultaneously. The analysis was identical to the previous MANOVA with changes made only in the dependent variable.

The following are the statistical results for three related hypothesis that were tested simultaneously. The three hypotheses are as follows:

1. Level of risk will be a significant predictor of concurrent and prospective health status
2. Level of protection will be a significant predictor of resilient outcomes in both COA groups
3. Early exposure (i.e. amount at T1) to risk predicts later (i.e. T4) levels.

The order of presentation of the following results replicates the order of analysis which began with zero-order analysis of relationships among key variables. The next step involved a measurement model that shows how each factor loads on its latent construct while controlling for measurement error. The final step of this analysis involves a structural equation model that considers the relationships among variables in a multivariate context.

Zero-Order Correlations

There were twelve variables for the analysis-four risk, four protection, and four health variables. Table 15 is the zero-order correlation matrix with bivariate (Pearson) coefficients listed in the lower triangle and the standard deviations are reported in the first row. There are several statistically significant bivariate relationships among variables. Significant relationships were those among risk variables. Correlation coefficients among risk variables range from 0.44 to 0.54, indicating that current or past level of risk is significantly related to later risk. Correlation coefficients among protection variables range from 0.31 to 0.47, indicating that current level of protection is significantly related to later protection. Current level of health was also statistically correlated with future health. However T1 health was not related to T2 health.

Health is significantly correlated with both risk and protection. However, the pattern is inconsistent. These relationships will be more thoroughly investigated using multivariate analysis which will consider all relationships in the model and controls for the effect of group membership.

Measurement Model

A scale analysis was performed to test for the psychometric properties of each scale at every time point. Table 16 lists the reliability coefficients for all tests along with the unstandardized factor loading of each factor on its relative scale. Figure 6 is a graphical representation of the measurement model.

Table 15

Zero-order Correlation Matrix of Important Variables.

	H1	H2	H3	H4	R1	R2	R3	R4	P1	P2	P3	P4
SD	14.3	21.0	18.7	14.9	3.1	3	2.5	3.1	1.8	1.9	2.1	2.4
H1	1											
H2	0.07	1										
H3	0.18*	0.22*	1									
H4	-0.03	0.05	0.15*	1								
R1	0.04	-0.05	0.03	0.03	1							
R2	0.02	-0.14*	-0.04	0.02	0.54*	1						
R3	0.00	-0.12*	-0.04	0.00	0.44*	0.50*	1					
R4	-0.02	-0.07	-0.01	-0.01	0.49*	0.45*	0.49*	1				
P1	0.12*	0.07	0.04	-0.01	-0.19*	-0.22*	-0.21*	-0.23*	1			
P2	0.09	0.01	0.02	0.07	-0.10	-0.09	-0.20*	-0.13*	0.34*	1		
P3	0.14*	0.15*	0.02	0.01	-0.18*	-0.16*	-0.22*	-0.22*	0.45*	0.37*	1	
P4	0.09	0.08	0.02	0.04	-0.18*	-0.23*	-0.23*	-0.31*	0.41*	0.31*	0.47*	1

*$p<0.05$

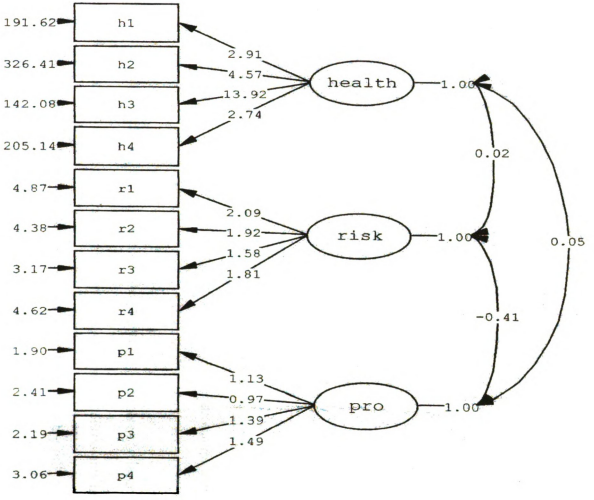
Table 16

Internal Consistency of all Scales.

Scale	Number of items	Coefficient Alpha	Factor Loading[1]	Mean	Standard Deviation
Risk1	15	0.6158	2.09*	5.74	3.11
Risk2	19	0.6330	1.92*	6.92	3.00
Risk3	17	0.5651	1.58*	4.70	2.48
Risk4	20	0.7182	1.81*	4.62	3.11
Protection1	6	0.2841	1.13*	3.15	1.80
Protection2	12	0.3576	0.97*	5.78	1.86
Protection3	12	0.4476	1.39*	6.00	2.11
Protection4	12	0.4026	1.49*	5.24	2.36
Health1	9	0.4574	2.91*	100.11	14.35
Health2	-	-	4.57*	42.95	21.07
Health3	-	-	13.92*	17.43	18.65
Health4	-	-	2.74*	16.42	14.88

[1] Unstandardized Path Coefficients * $p<0.05$

Figure 6. Structural equation of measurement model.



Taken together, the indices of absolute and comparative fit provide strong support for all measures. The overall fit (absolute fit) of the model was determined by the chi-square (χ^2) goodness of fit index. The chi-square statistic was not significant indicating a good fit. In addition, the Goodness of Fit (GFI) was .98, the Adjusted Goodness of Fit (AGFI) was .97, and the Root Mean Square Error Approximation (RMSEA) was .01. The GFI and AGFI indices range between zero and one and 0.90 is a considered an acceptable value. A RMSEA value of .05 or less is a close fit to the data; .05-.10 is a moderate fit; and above 0.10 is a bad fit. Relative fit was also assessed using the Comparative Fit Index (CFI) and the Non-Normed Fit Index (NNFI). The CFI was 1.00 and NNFI was 1.01. Values of .90 are considered as acceptable indicators of fit that are not dependent on sample size.

The structural model in Figure 7 tested the full manifest model with risk and protection predicting current and prospective health. This model used all observed variables and is similar to performing several regressions simultaneously. The model is presented with t-scores on the paths from predictors to outcomes. All relationships were non-significant at the .05 level

There may be several reasons for the nonsignificant paths. First, there is a large amount of shared variance among these manifest variables as seen in the coefficients in the matrix of Theta Epsilon. The indices of absolute and comparative fit for the full manifest model are conflicting. The overall fit of the model was determined by the chi-square (χ^2) goodness of fit index. The chi- square was not significant, indicating a good fit.

Figure 7. Inferential path model: Manifest model

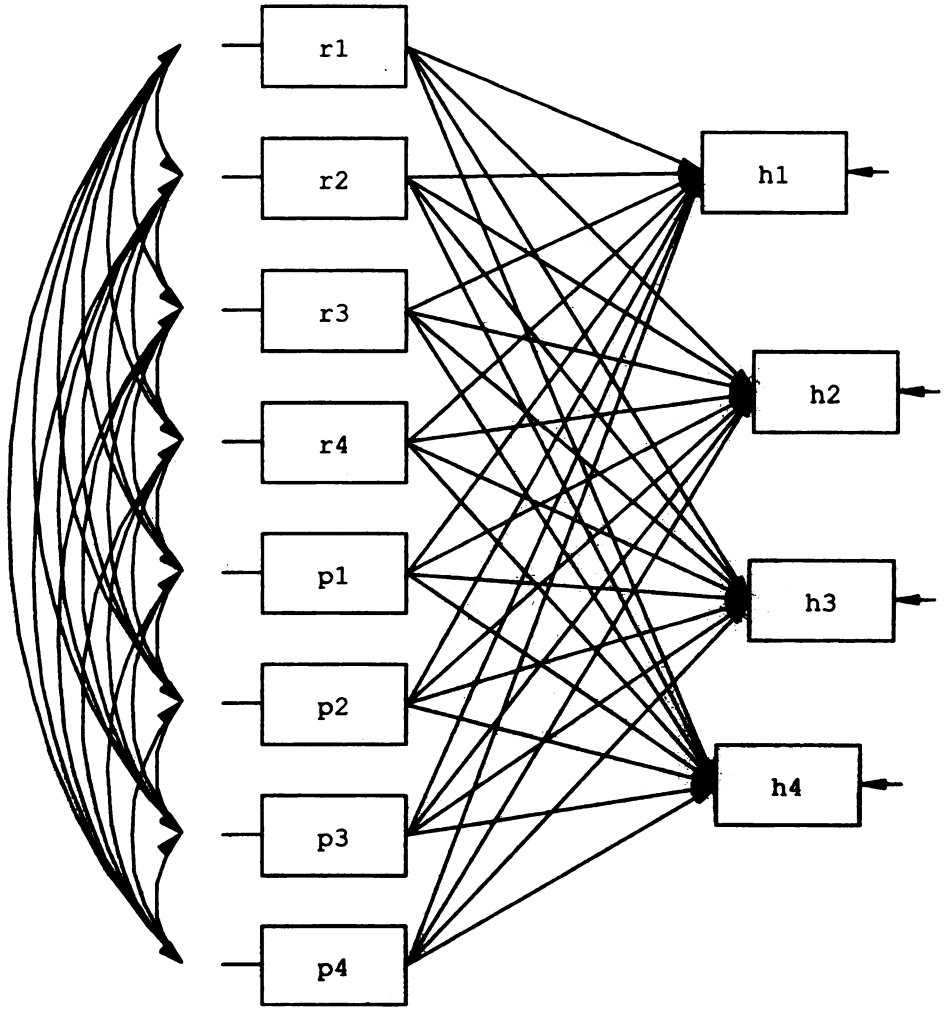


Table 17

Standardized Path Coefficients: Manifest Model

	H1	H2	H3	H4
R1	.09	.08	.11	.04
R2	-.05	.19*	.09	-.02
R3	-.02	.07	.07	.04
R4	0	-.07	-.05	-.01
P1	.04	.04	.06	-.07
P2	.03	.05	-.02	.09
P3	.11	.12	-.05	-.01
P4	.03	.02	-.01	-.06

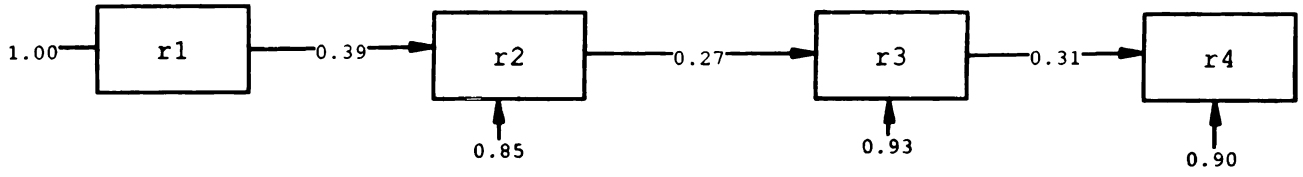
*P<.05

Additionally, the Goodness of Fit (GFI) was 1.0, the Adjusted Goodness of Fit (AGFI) was 0.97 and the Root Mean Square Error Approximation (RMSEA) was 0.0. Relative fit was also assessed using the Comparative Fit Index (CFI) which was 1.0. Although the fit indices appear to strongly support the model, the path coefficients are all non-significant with the exception of one (see table 17). This indicates that the model fit statistics may be misestimated due to the complexity of the model and the sample size. Therefore, the pieces of the model will next be described separately.

Risk-Continuity Model

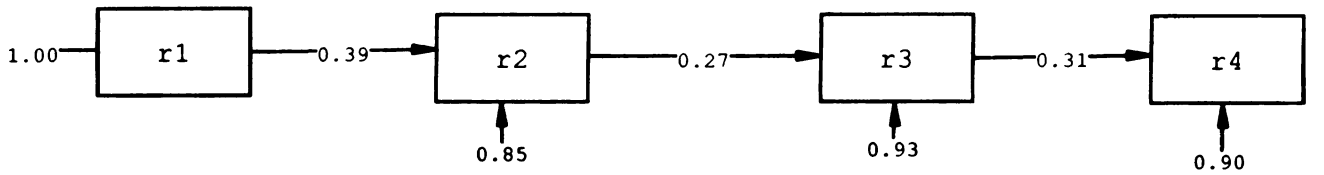
One of the developmental paths that was estimated using the saturated model was the risk-continuity chain from early childhood to adolescence. Specifically, current risk scales were used to predict later scales. Although scales were created using different age-appropriate risk factors, they all load on a common factor as seen in the measurement model. The common (latent) factor is the immeasurable characteristic of an individual that dictates the overall risk scores at each time period. In the structural equation in Figure 8, one can see the relationship between current and future risk is positive and significant. This indicates that risk at T1 is an important predictor of risk at later time periods of life. It is important because it indicates that aside from knowing information about specific risk-factors, we can also identify latent individual characteristics that explain why level of risk remains high or low cross-temporally.

Figure 8. Risk continuity model



Chi-Square=82.21, df=3, P-value=0.00000, RMSEA=0.288

Figure 8. Risk continuity model



Chi-Square=82.21, df=3, P-value=0.00000, RMSEA=0.288

The overall fit of the model was determined by the chi-square (χ^2) goodness of fit index. The chi-square was not significant, indicating good fit. Overall fit can be determined using a number of statistics such as the Goodness of Fit (GFI) which was .89. Relative fit was also assessed using the Comparative Fit Index (CFI) which was .61. The path coefficients between risk variables at all time periods are all significant at the .05 level.

Protection Continuity Model

An important component of the saturated model was the protection-continuity chain from early childhood to adolescence. In the same way that risk scales loaded on the latent risk variable, all protection scales load on a common factor as seen in the measurement model. In the structural equation in Figure 9, the relationship between current and future protection is positive and significant. This indicates that protection at T1 is an important predictor of protection at later time periods of life. It is important because it indicates that aside from knowing information about specific protection-factors, we can also identify latent individual characteristics that explain why level of protection remains high or low cross-temporally.

The chi-square (χ^2) goodness of fit index was significant, indicating less than optimal fit. However, the Goodness of Fit (GFI) was .96, the Adjusted Goodness of Fit (AGFI) was 0.88, and the Root Mean Square Error Approximation (RMSEA) was .15. Relative fit was also assessed using the Comparative Fit Index (CFI) which was .89. The path coefficients between protection variables at all time periods are all significant at the .05 level.

Health Continuity Model

The continuity of health from early childhood until adolescence is important because it provides evidence to support that health problems that exist at adolescence and perhaps into adulthood may have seeds that are evident in childhood. All of the health scales load significantly on the latent health variable. This indicates that there is an immeasurable quality in individuals that dictates their overall level of health problems. This quality is evident as early as three years of age.

The chi-square (χ^2) goodness of fit index was significant, indicating less than optimal fit. However, the Goodness of Fit (GFI) was .98, the Adjusted Goodness of Fit (AGFI) was 0.95, and the Root Mean Square Error Approximation (RMSEA) was .09. Relative fit was also assessed using the Comparative Fit Index (CFI) which was .75. The path coefficients between protection variables at all time periods are all significant at the .05 level (see Figure 10).

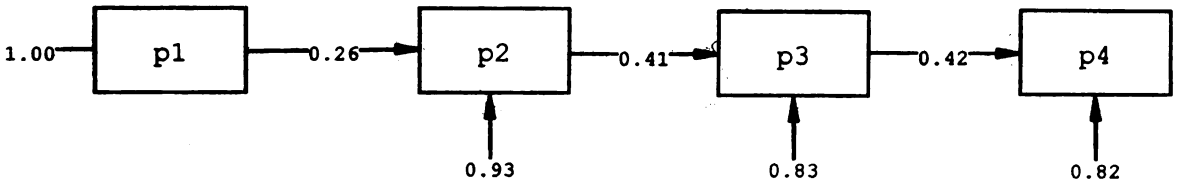
Latent Model

The next model uses two latent X-variables or predictors to explain the y-variable. The latent variables are risk and protection and are made up of R1-R4 scores and P1-P4 scores (see Figure 11). The latent health variable consists of the h1-h4 scale scores. In this model, risk and protection do not significantly predict health outcomes. The two factors both share some variance with the health variable; however the relationships are not independently strong enough to achieve statistical significance at the .05 level.

The indices of absolute and comparative fit were used to test the latent model. The overall fit of the model was determined by the chi-square (χ^2) goodness of fit index. The chi-square was significant. However, the Goodness of Fit (GFI) was .94; the

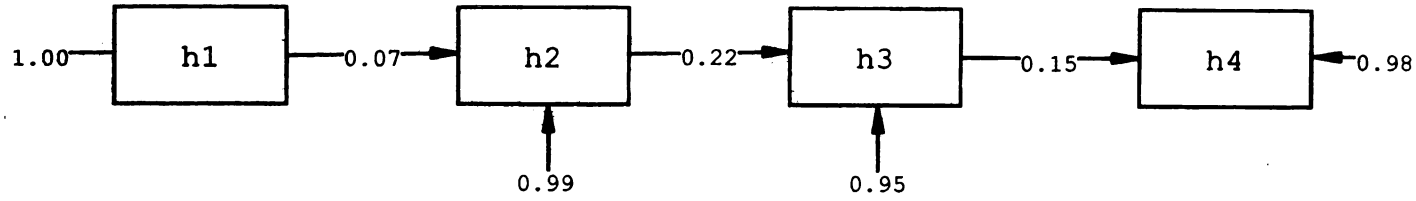
Adjusted Goodness of Fit (AGFI) was .90, and the Root Mean Square Error Approximation (RMSEA) was .07. Relative fit was also assessed using the Comparative Fit Index (CFI) which was .88. The path coefficients from risk and protection to health are not significant at the .05. However, significance is determined using a t-test for path coefficients, and 0.05 is the cutoff for significance. The t-value for the path from risk to health was 1.80 and the path from protection to health was 1.45. The t-values were close to reaching the 0.05 level of significance.

Figure 9. Protection continuity model



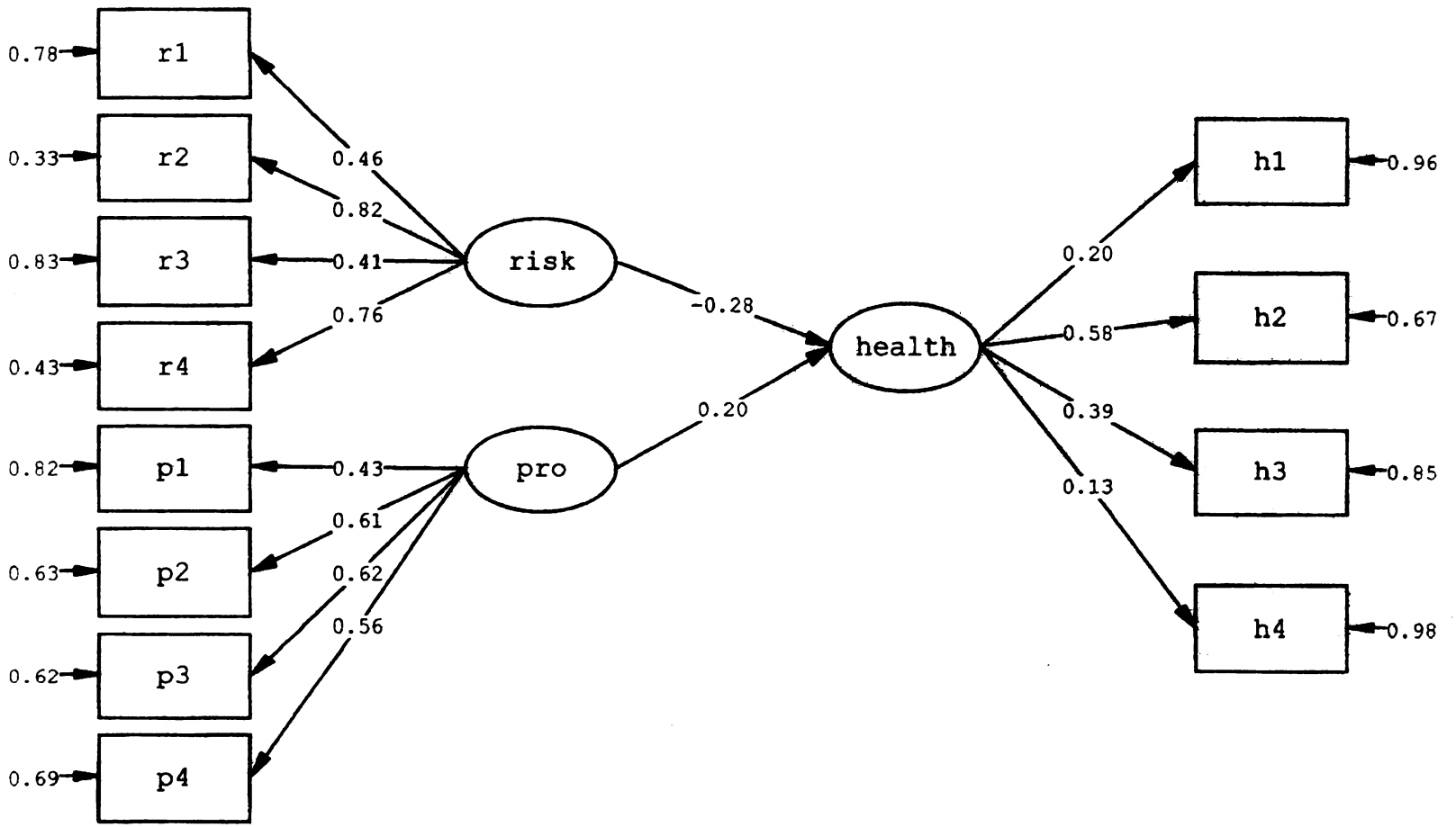
Chi-Square=23.40, df=3, P-value=0.00003, RMSEA=0.146

Figure 10. Health continuity model



Chi-Square=10.35, df=3, P-value=0.01578, RMSEA=0.088

Figure 11. Latent structural model



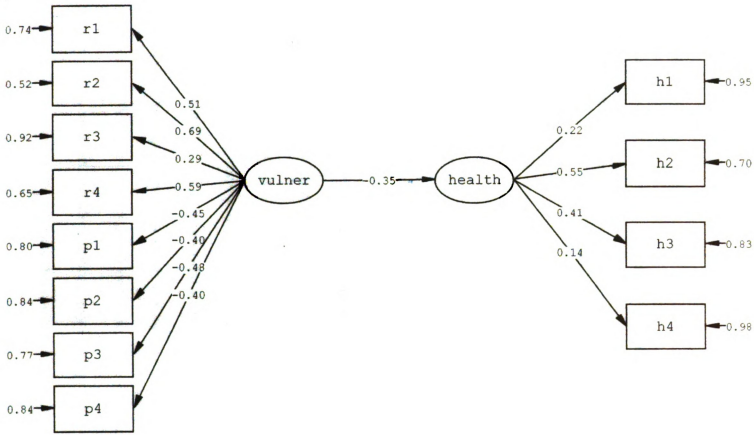
One Factor Latent Model

The final model that was estimated included one latent X-variable and one latent Y-variable (see Figure 12). This model had the best fit of any models that used risk and protection to explain health outcomes. In the model, observed risk and protection load on one latent variable that is called vulnerability (vulner). All risk scales load positively and significantly on the variable. All protection scales load negatively and significantly on the latent scale. The latent vulnerability scale significantly predicts general health. The fit statistics for the model are listed below.

The indices of absolute and comparative fit were used to test the latent model. The overall fit of the model was determined by the chi-square (χ^2) goodness of fit index. The chi-square was significant and the Goodness of Fit (GFI) was .98. Relative fit was also assessed using the Comparative Fit Index (CFI) which was .95.

The substantive interpretation of the final model is that both risk and protection are governed by the individual and familial characteristics of the individual. The latent variable is referred to as vulnerability in this model. Risk coefficients load positively on vulnerability, indicating the higher the level of vulnerability the higher the level of risk. Protection coefficients load negatively on vulnerability, indicating the higher the level of vulnerability the lower the level of protection. Vulnerability is a significant predictor of the latent health variable. This indicates that higher levels of vulnerability are predictive of poor health.

Figure 12. One-factor latent model



CHAPTER FIVE: DISCUSSION

The current study tested for the relationships between cumulative risk, cumulative protection, and their combined effect on general health outcomes in children with alcoholic fathers and children with nonalcoholic fathers. Several statistical analyses were employed to determine how growing up in a family with a number of negative or risk factors affects the general health of children and how paternal alcoholism affects both risk and protection. By testing a series of hypotheses, the current study yielded information indicating that the amount of risk and protection that is prevalent in the lives of children can predict the general health of the child.

The study demonstrated that the amount of risk in the lives of children of antisocial alcoholics is significantly higher than their nonantisocial alcoholic families and a control group. Such risk factors have been studied using variable-based approaches which examine the relationships among risk variables and outcomes and group differences in level of specific risk factors. The findings from this study add to the body of literature on COAs and compliment previous findings. Not only do children of alcoholics have more severe scores on a number of risk factors, they also have more overall risk. Families that are organized around an antisocial alcoholic father have a higher probability of encountering high levels of risk (many risk factors) than families without an anti-social alcoholic father. High levels of risk over time have a negative effect on development including emotional, social, behavioral, psychological, and biological development. Previous research demonstrated that children of alcoholics may also be at a disadvantage in their ability to respond to risk as noted by lower plasma-beta endorphin (Xing, Thavundayil, & Gianoulakis, 2002) in alcohol dependent individuals'

response to stress. Furthermore, behavioral and emotional/psychological response to the stress of familial disorganization and familial psychopathology manifests itself in the child internalizing symptoms and personality disorders (Sher, 1997). Children in such families also demonstrate higher prevalence of externalizing symptoms such as conduct disorder, ADHD, and oppositional disorder (Hammen, Burge, & Stansbury, 1990; Jansen et al., 1995; Stanger, Achenbach, & McConaughy, 1993; Walker, Downey, & Bergman, 1989). Higher levels of risk (e.g. stress) paired with lower coping mechanisms leads to a developmental trajectory that is expected to manifest in adult substance abuse and may indicate heightened risk for adult psychopathology. In this study, it was predicted that such developmental trajectories would also predict health disparities among a high-risk sample of children, and the data provide support for this hypothesis. The data give strong support for the main effect of group membership as a predictor of overall levels of stress and indicate that having an alcoholic and/or antisocial father increases the overall level of risk that a child encounters from childhood to adolescence.

In addition to risk, the amount of protection that individuals are exposed to is important in predicting outcomes. Resilience is the presence of better than expected outcomes in adverse conditions. The presence of protective factors predicts resilient outcomes. Researchers have demonstrated that both risk and protection are important predictors of resilient outcomes such that high levels of protection can moderate the relationship between risk and negative outcomes. In this sample, the children of anti-social alcoholics were lowest in overall protective factors. The relationship between group membership in the AAL group and overall level of protection was significant and positive. Furthermore, the overall level of protection can be predicted from membership

in the AAL, NAAL, and control group. Specifically, NAAL and AAL groups were significantly lower in overall levels of protection than the control group. This finding supports previous research that noted the disorganized nature of alcoholic households. Because both risk and protection are important contributors to developmental outcomes, this is a double-threat to children in alcoholic households even when risk is relatively low. The absence of protective factors creates an environment where low risk has greater probability of producing negative outcomes. In contrast, the presence of protective factors creates a buffered environment where risk can be dealt with in an efficient manner.

The current study used overall protective scales that were the sum of dichotomized protective factors. This method uses the level of protection rather than the specific factors. Two individuals with similar protection scores can have very different factors accounting for the score. This has important implications for intervention because intervention is considered a protective factor. Intervention can come in many different forms. The current study indicates that the overall number of protective factors is an important predictor of resilience. Results confirm the idea that group membership in AAL and NAAL is an identifier of at-risk children who will have both high levels of risk and low levels of protection. The implications of this extend beyond predicting health outcomes. This information is extremely useful for identifying at-risk status for emotional problems and behavioral problems that can be addressed early in life. These data confirm the continuity hypothesis of risk which is present from T1 to T4. This indicates that information about risk from a child as young at three years old is helpful in knowing future levels of risk for the child in adolescence and perhaps even older. Therefore, these

early at-risk children make ideal candidates for intervention programs in a variety of areas including social development, pre-school, behavioral training, and psychological services. In addition, their families are likely candidates for intervention as well. The data that make up the risk and protection scales in the current study include information about the family and therefore indicate that other members of the family are important contributors to the development of the target children. In terms of intervention, this indicates that programs for mothers and fathers that make significant contributions in the parents' lives will manifest themselves as lower overall risk for children and/or greater overall protection. Both may lead to positive outcomes for children. In general, father's alcohol status is sufficient to identify at-risk children. However it should not be used as a diagnostic criterion. A significant proportion of children of alcoholic and antisocial alcoholic fathers experience optimal development and lead healthy lives and may not be highly susceptible to the many risks for developmental outcomes associated with being a child of an alcoholic. However on average, this is not the case, and paternal alcohol dependence and poor psychological well being will predict child and family problems. Early intervention with children and their families has a high potential for altering the developmental paths of at-risk children from the highly canalized pathway to adult disorders to a pathway leading to better than expected outcomes.

The current study used developmental systems theory to model the relationships between cumulative risk and cumulative protection in predicting general health outcomes in children. The overall conclusion is that general health can be modeled using the cumulative approach with the inclusion of the latent constructs that determine level of protection, level of risk, and level of health from childhood to adolescence. Relationships

between manifest risk and protection and health outcomes were not statistically significant, but the relationships were present. To interpret these findings one must recall that most of the major health problems associated with alcoholism and alcohol abuse come after drinking patterns have been established. In this sample, the age of the subjects at T1 was three-six years old and at T4 12-14 years old. The majority of the children have not had an alcoholic drink. Given that, this study was an attempt to identify and map early origins of risk for health outcomes in males with a heightened risk for developing alcoholism. As stated in the introduction of this paper, much is known about the direct effect of alcohol intake on biological systems. There is also a large amount of evidence to support the link between intoxication and heightened occurrence of accidents that result in injury. Little is known about the many assaults on individuals' well being that wear and tear the body's natural tendency to return to a natural state of homeostasis. Specifically the current study tested for traces or patterns among risk and protection and health outcomes that are known to be prevalent in adult alcohol abusing populations.

Limitations and Future Directions

There are limitations that prevent the generalization of these findings to the general population. All subjects in the sample have significant contextual risk factors and were matched on these characteristics in order to track the effects of parental alcoholism from early childhood into adulthood. The design allows researchers to isolate the effect of alcoholism and comorbid psychopathology. However, it holds the contextual risk constant across both the alcoholic groups and the control group. The differences in health scores for all groups may be higher than for the general population and this element of the study design may truncate the variability in health outcomes in general.

The sample for the current study included only White American, mostly Christian families from the Midwest. The population of the state and county at the start of the project contained less than 4% of families who met inclusion criteria and who were non-White. Differences in alcohol use and abuse across ethnic and cultural groups have been demonstrated in previous research. The manner in which alcohol is integrated into cultures varies drastically across cultural and religious groups. Given the importance of ethnic and cultural variations in alcohol consumption, including such variation in the study without being able to statistically model its effects would only contribute to error (Zucker, et al 2001).

This study included only male children in the analysis. Other efforts to recruit females into the study have been made; however, the female data are not yet ready to report. Most alcohol research involves studies using males as subjects. However, in terms of health outcomes, it is especially important to include females as study populations. Females have an increased vulnerability to the damaging effects of alcohol. Specifically, alcohol-abusing women are more vulnerable to the development of liver cirrhosis and cognitive impairments than their male counterparts. Most alarming is the fact that vulnerability is relatively high among women even though alcohol intake is lower then men (Norton et al., 1987). These effects have also been noted in samples of women who were not heavy drinkers or alcoholics, but who were considered moderate drinkers (Harper et al., 1990). The findings demonstrate the need for more studies focusing on alcohol and its role in the development of girls and women.

An issue that arises in the longitudinal studies of alcoholism is that alcoholics may recover from alcoholism for a short time or forever. When drinking decreases, it

may influence positive increases in self-esteem and may aid in the suppression of depression (Blomquist, 1999; Hall et al., 1991; Humphreys et al., 1995). It is important to consider the recovery and relapse of alcoholics over a developmental period. In the current study, the membership in alcohol subclass predicted mean differences in risk and protection scales at every time period. This indicates that, in general, the group maintains relatively stable characteristics even though there is a fair amount of heterogeneity in terms of degree of drinking problem and recovery/relapse status.

Although these are limitations of this particular study, they are not criticisms of the broader study. The Longitudinal Study has addressed several of these issues throughout their study and has continually incorporated a multidisciplinary approach to gather evidence from biological, psychological, and social systems to explain the natural development of COAs. This model should serve as the standard for future studies.

The contributions of this study add to a growing literature regarding the concepts of risk, protection and vulnerability and have direct implications for child outcomes in families where the level of adversity approximates that found in treatment settings (Zucker et. al., 2003) A number of researchers have investigated the relationship between risk and protection. In the current study, it was assumed that risk and protection were two orthogonal constructs that each contributed to the development of general health. The models that were tested showed that increased risk is related to worse health and increased protection is predictive of better overall health. However neither of the relationships are significant at the .05 level.

The idea of both risk and protection loading on a latent construct of vulnerability is not a novel idea. In the current study it was demonstrated that risk loads positively on

vulnerability and protection loads negatively on vulnerability regardless of the observable risk factors. Vulnerability, as a single latent predictor explained a significant amount of variance in health outcomes and was negatively related. This indicates that increased vulnerability predicts poorer overall health.

Vulnerability in general is compromised by a number of factors including individual genetic, biological, and psychological factors, and environmental risk factors such as poverty, violence, and war. The models in the current study indicate that low protection is an indicator of vulnerability. This is not a trivial finding because of its relevance for identifying at-risk individuals. Specifically, a person who is low in protection may be considered vulnerable regardless of level of risk because protection loads significantly and negatively on the vulnerability construct at all four time periods. Level of protection is not dependent on specific protective factors which indicates that various types of intervention will be beneficial in decreasing vulnerability.

The findings related to continuity of risk and protection in this study is also important because it indicates that characteristics about individuals and their environment are organized in a manner that increase or decrease vulnerability. Furthermore, it is possible to group children by paternal alcoholism and comorbid psychopathology into groups that differ on overall vulnerability as early as 3-5 years old. The finding in the current study related to continuity suggest that the level of vulnerability and relative rank order of groups based on alcoholism and antisociality are consistent at least into adolescence. Because prospective risk and protection are dependent of current level, it suggests that lowering the current level of risk and increasing current protection is an effective method of disrupting the canalization of vulnerability pathways.

Future studies of health of COAs would be most valuable if clinical records of health such as medical records from primary physicians and schools were used. Studies that include less severe medical conditions such as somatic complaints, visits to the school nurse, and minor colds would also be valuable to the literature. The incorporation of standardized measurement instruments to track health outcomes from birth to adulthood would make a substantial impact on the literature of the health of COAs and their parents. Furthermore, this would address the missing literature regarding health status of alcoholics prior to diagnosis as an alcoholic. Such studies would be best served with multi-disciplinary research teams and might include developmental psychologists, family and child ecologists, clinical psychologists, medical doctors, nurses, nutritionists, geneticists, epidemiologists and others.

In conclusion, this study used concepts from developmental systems theory, developmental psychopathology, risk and resiliency theory, and cumulative risk theory to identify developmental risk and protective factors for health problems in children of alcoholics. It was demonstrated that children with antisocial, alcoholic fathers have significantly higher number of risk factors and a significantly lower level of protective factors than the nonantisocial and the control groups at all time periods. Both high risk and low protection were found to load significantly on a latent factor of vulnerability, which in turn significantly predicted general health. These findings suggest that children of antisocial alcoholics are at heightened risk for negative health outcomes. However, the pathway from group membership in the AAL group to health outcomes is indirect and determined by level of risk and level of protection.

APPENDIX A

Table 18. All Scales and Dichotomization Rules

T1 Risk Factors	Data Set	Rater	Number of observations	Dichotomization
Short attention Span	Dots parent on child T1 scored	mother	315	80/20 split to mean that high scores indicate a very long attention span (less distractibility). A score of 2 or lower was considered a risk for distractibility.
Can identify cigarettes by smell	Smell Recognition task T1	staff	250	Exact identification of cigarettes is a risk factor
High amounts of family crisis	Family Crisis List T1	Mother and father	309 mothers 319 fathers	Created a total score for family, house, economic, school, social, and legal and created a 80/20 split. I excluded the health scale. Risk score was given if either mother or father had the risk factor. Could total to two points per period if both mom and dad reported the risk factor.
Child depression	Achenbach parent parent T1 scored	Mother	328	Used depression scale. Created an 80/20 split to capture only the most extreme scores.
Maternal depression	Beck Depression Index T1 Scored	Mother	669	T1 cuttoffs were used according to moderate to severe symptoms for the short form.
Axis V Global assessment of functioning	Axis-v-r-T1	staff	330 mothers 328 fathers	Cut at 51 "moderate symptoms" range is from 60-51. I made the cut at 51 to be very selective

				about only having at-risk scores.
High Externalizing Behaviors	Achenbach parent parent T1 scored	Mother	328	Externalizing. Created an 80/20 split to include only the most extreme scores.
High Family Conflict	Famlily Environment Scale Parent on Family t1 scored	Either mother or father but not both	265	80/20 split was created to indicate high levels of family conflict.
High Level of Hassles	Hassles and uplifts T1	Both mothers and fathers	307 mothers 307 fathers	Top 20% of distribution of number of hassles was considered a risk factor. Possible to have 2 risk if both parents report at-risk score.
High Internalizing Behaviors	Achenbach parent parent T1 scored	Mother	328	Using the Internalizing scale. Created an 80/20 split to include only the most extreme scores.
Low income	Demographics T1	Mother and father	348 mothers 348 fathers	Risk factor was created using a split at 13g-16g income. Possibility of 2 risk factors.
Negative coping strategies	Coping T1 Scored	Mother and father	244 mothers 247 fathers	Risk was created using a composite of distancing, blaming self, and isolation. Strategies were considered regardless of stressor or event.
High level of negative events (Family Events)	Family Event Questionnaire T1	Mother	246	Positive events: 3,6,18,24,26 dichotomized so upper 20% is three or more good things happened.
Exact Identification of Alcoholic	Smell recognition TaskT1	staff	•250	Exact identification of either

beverage (beer, whiskey, or wine)				beer, whiskey, or wine is a risk factor.
Dissatisfaction with Work (father)	Work Satisfaction T1	fathers	256	Lowest 20% considered at risk for low work satisfaction.
T1 Protection Factors	**Data Set**	**Rater**	**Number of observations**	**Dichotomization**
High approachability	**Dots parent on child T1 scored**	**mother**	**315**	**Top 20% on high adaptability (high approach-less withdrawal) considered a protective factor.**
High Positive Events	Family Event Questionnaire T1	Mother	246	Top 20% of distribution of scores was considered having protective score.
High Religiosity	Demographics T1	Mother and father	348 mothers 348 fathers	Religiosity is a composite variable of attendance and importance of religion. Possible 2 points if both parents are very religious.
High Social Support	Social support parent t1 scored	mothers	310	Mothers level of social support top 20% was considered a protective factor. Only quantity was considered for this study.
High Level of Uplifts	Hassles and uplifts T1	Both mothers and fathers	307 mothers 307 fathers	Top 20% of distribution of number of hassles was considered a risk factor. Possible to have 2 risk if both parents report at-risk score.

T2 Risk Factors	Data Set	Rater	Number of observations	Dichotomization
School Absences (school performance)	Child School Performance T2	teacher	204	8 or more absences as determined by top 20% of distribution were considered a risk factor.
Short Attention Span (DOTS)	Dots Parent on child T2 scored	mother	226	80/20 split to mean that high scores indicate a very long attention span (less distractibility). A score of 2 or lower was considered a risk for distractibility.
Exact Identification of Cigarettes by Smell (smells task)	Smell Recognition task T2	staff	186	Exact identification of cigarettes is a risk factor
Low school competence (School performance)	Child School Performance T2	teacher	204	Score of below average or very much below average is a risk factor.
High Family Crisis	Family Crisis List T2 Scored	Mother and father	225 mothers 224 fathers	Created a total score for family, house, economic, school, social, and legal and created a 80/20 split. I excluded the health scale. Risk score was given if either mother or father had the risk factor. Could total to two points per period if both mom and dad reported the risk factor.
CBCL depression	Achenbach parent report T2	Mother	229	Used depression scale. Created an 80/20 split to capture only the most extreme scores.

Maternal depression (Beck)	Beck Depression Index T1 Scored	Mother	227	Risk factor was considered 18 and above which indicated mild to severe depression for the long form.
Disciplined for Problem Behavior (school performance)	Child School Performance T2	teacher	204	Children who received discipline for problem behavior were given a risk factor.
High externalizing CBCL	Achenbach parent report T2	Mother	229	Top 20% of distribution is characterized as a risk factor for externalizing scores.
High Family conflict (Moos FES)	Family Environment Scale Parent on family T2 scored	Mother and father	221 mothers 219 fathers	Top 20% of distribution of scores. A score of 5 or above was considered a risk factor. Possibility of 2 points if both parents report high conflict.
High level of hassles (Hassles and Uplifts)	Hassles and uplifts T2	Both mothers and fathers	198 mothers 196 fathers	Top 20% of distribution of number of hassles was considered a risk factor. Possible to have 2 risk if both parents report at-risk score.
High Internalizing CBCL	Achenbach parent report T2	Mother	229	Top 20% of distribution is characterized as a risk factor for internalizing scores.
Low income	Demographics T2	Mother and father	220 mothers 221 fathers	Risk factor was created using a split at 13g-16g income. Possibility of 2 risk factors.

Negative coping strategies	Coping T2 Scored	Mother and Father	220 mothers 218 fathers	Risk was created using a composite of distancing, blaming self, and isolation. Strategies were considered regardless of stressor or event.
High number of negative family events (family events scale)	Family Event Questionnaire T2	Mother	185	Negative events dichotomized so upper 20% is a risk factor.
total problem behavior (teacher CBCL)	Achenbach Teacher Report T2 scored	Teacher	197	Highest 20% cutoff for teacher scores.
Exact identification of Alcohol by Smell (beer, whiskey, wine)	Smell Recognition task T2	Staff	186	Exact identification of whiskey, wine or beer.
Low work satisfaction	Work Satisfaction T2	Fathers	215	Lowest 20% considered at risk for low work satisfaction.
Axis V Global assessment of functioning	Axis-v-r-T2	Staff	226 mothers 225 fathers	Cut at 51 "moderate symptoms" range is from 60-51. I made the cut at 51 to be very selective about only having at-risk scores.
T2 Protection Factors	**Data Set**	**Rater**	**Number of observations**	**Dichotomization**
High Approachability	Dots parent on child T2 scored	mother	315	Top 20% on high adaptability (high approach-less withdrawal) considered a protective factor.
High Athletic competence	Harter Self Perception T2 scored	Child	215	A score of 21 and above represents the top 20% of the distribution and is considered a protective factor.
Very Attractive (teacher rating school performance)	Child School Performance T2	teacher	204	Children who were rated as very attractive by their teacher received a protective factor.
Global self-worth	Harter Self Perception T2	Child	215	A score of 23 and above

	scored			represents the top 20% of the distribution and is considered a protective factor.
High positive events (family events)	Family Event Questionnaire T2	Mother	185	Positive events: 3,6,18,24,26 dichotomized so upper 20% is three or more good things happened.
High religiosity	Demographics T2	Mother and father	220 mothers 221 fathers	Religiosity is a composite variable of attendance and importance of religion. Possible 2 points if both parents are very religious.
Scholastic competence (Harter)	Harter Self Perception T2 Scored	Child	215	A score of 22 and above represents the top 20% of the distribution and is considered a protective factor.
Positive relationship with a sibling (Sibling Relationship Questionnaire)	Sibling Relations T2	Child	171	Composite variable based on "cares very much or extremely much about sibling" "like the same things" and "are happy about relationship" weighted by the number of siblings and amount of time spent with sibling.
Social acceptance (Harter)	Harter Self Perception T2 scored	Child	215	A score of 21 and above represents the top 20% of the distribution and is considered a protective factor.
High number of uplifts (Hassles and Uplifts Scale)	Hassles and uplifts T2	Both mothers and	198 mothers 196 fathers	Top 20% of distribution of number of uplifts was considered a protective factor. Possible to

		fathers		have 2 on protection scale if both parents report at-risk score.
High social support	Social support parent t2 scored	mothers	218	Mothers level of social support top 20% was considered a protective factor.

T3 Risk Factors	Data Set	Rater	Number of observations	Dichotomization
School absence	Child School Performance T3	Teacher	201	Upper 20% of absences and unexcused absences combined.
Short attention span	DOTS-R Child on Self T3 Scored	Child	238	Dichotomized so upper 20% of approach was considered a protective factor and lower 20% of distractibility is considered a risk.
School competence (school performance)	Child School Performance T3	Teacher	201	Lower 20% on competence was considered a risk factor.
Family crisis	Family Crisis List T3 Scored	Mother and Father	252 mothers 235 fathers	Top 20 of distribution was considered a risk factor
CBCL depression	Achenbach Parent Report T3 Scored	Mother	248	Upper 20% of the distributions of scores received a risk factor.
Maternal Depression (Beck)	Beck Depression Index T3 Scored	Mother	251	Risk factor was considered 18 and above which indicated mild to severe depression for the long form.

Axis V Global assessment of functioning	Axis-v-r t3	Mother and Father	247 mothers 242 fathers	Cut at 51 "moderate symptoms" range is from 60-51. I made the cut at 51 to be very selective about only having at-risk scores.
Disciplined for problem behavior (School performance)	Child School Performance T3	Teacher	201	Dichotomous to indicate has been or has not been disciplined
High Externalizing Behavior (CBCL)	Achenbach Parent Report T3 Scored	Mother	248	Upper 20% of the distributions of scores received a risk factor.
High family conflict (Moos FES)	Family Environment Scale Parent on Family T3 Scored	Mother and Father	250 mothers 230 fathers	Top 20% of distribution of scores. A score of 5 or above was considered a risk factor. Possibility of 2 points if both parents report high conflict.
High Hassles	Hassles and uplifts T3	Both mothers and fathers	236 mothers 222 fathers	Top 20% of distribution of number of hassles was considered a risk factor. Possible to have 2 risk if both parents report at-risk score.
High internalizing (CBCL)	Achenbach Parent Report T3 Scored	Mother	248	Upper 20% of the distributions of scores received a risk factor.
Low income	Demographics T3	Mother and father	250 mothers 229 fathers	Risk factor was created using a split at 13g-16g income. Possibility of 2

				risk factors.
Negative coping strategies	Coping T3 Scored	Mother and Father	245 mothers 233 fathers	Risk was created using a composite of distancing, blaming self, and isolation. Strategies were considered regardless of stressor or event.
Family events (high negative events)	Family Event Questionnaire T3	Mother	265	Dichotomized so upper 20% is a risk factor.
CBCL total behavior score (Teacher report)	Achenbach Teacher Report T3 Scored	Teacher	198	Upper 20% of total prolem behavior scores were considered a risk factor.
Low work satisfaction	Work Satisfaction T3	Fathers	225	Lowest 20% considered at risk for low work satisfaction.
T3 Protective Factors	Data Set	Rater	Number of observations	Dichotomization
High approachability	DOTS-R Child on Self T3 Scored	Child	238	Dichotomized so upper 20% of approach was considered a protective factor.
High athletic competence	Harter Self Perception T3 scored	Child	246	A score of 21 and above represents the top 20% of the distribution and is considered a protective factor.
Global self-worth (Harter)	Harter Self Perception T3	Child	246	A score of 23 and above represents the top 20%

	scored			of the distribution and is considered a protective factor.
High positive events (family events)	Family Event Questionnaire T3	Mother	265	Dichotomized so upper 20% is a risk factor.
High religiosity	Demographics T3	Mother and father	250	Upper 20% of religiosity was considered a protective factor.
Scholastic competence	Achenbach Teacher Report T3 Scored	Teacher	198	Upper 20% of total prolem competence scores were considered a protective factor.
Positive relationship with sibling	Sibling Relations T3	Child	223	Composite variable based on "cares very much or extremely much about sibling" "like the same things" and "are happy about relationship" weighted by the number of siblings and amount of time spent with sibling.
Social acceptance (Harter)	Harter Self Perception T3 scored	Child	246	A score of 21 and above represents the top 20% of the distribution and is considered a protective factor.
High family social support	Social support parent t3 scored	mothers	218	Mothers level of social support top 20% was considered a protective

				factor.
High level of uplifts (Hassles and uplifts scale)	Hassles and uplifts T3	Both mothers and fathers	236 mothers 222 fathers	Top 20% of distribution uplifts considered a protective factor.
T4 Risk Factors	Data Set	Rater	Number of observations	Dichotomization
School absence	Child School Performance T4	Teacher	215	Upper 20% of absences and unexcused absences combined.
Antisocial behavior (adolescent ASBCL)	Antisocial Behavior youth T4 scored	adolescent	267	Upper 20% of distribution of scores considered a risk factor.
Family crisis	Family Crisis List T4 Scored	Mother and Father	262 mothers 247 fathers	Top 20 of distribution was considered a risk factor
CBCL depression –mother rating	Achenbach Parent Report T3 Scored	Mother	262	Upper 20% of the distributions of scores received a risk factor.
CBCL depression- self reports	Achenbach youth self report T4 scored	adolescent	266	Upper 20% of depression scores were considered a risk factor.
Maternal depression (Beck)	Beck Depression Index T4 Scored	Mother	267	Risk factor was considered 18 and above which indicated mild to severe depression for the long form.
Axis V	Axis-v-r t4	Mother and Father	266 mothers 251 fathers	Cut at 51 "moderate symptoms" range is from 60-51. I made the

				cut at 51 to be very selective about only having at-risk scores.
Disciplined for problem behavior	Child School Performance T4	Teacher	215	Risk factor indicates that child has been disciplined for problem behavior.
High externalizing CBCL	Achenbach Parent Report T4 Scored	Mother	262	Upper 20% of the distributions of scores received a risk factor.
High family conflict (Moos FES)	Family Environment Scale Parent on Family T4 Scored	Mother and Father	265 mothers 246 fathers	Top 20% of distribution of scores. A score of 5 or above was considered a risk factor
High Hassles (Hassles and uplifts scale)	Hassles and uplifts T4	Both mothers and fathers	247 mothers 231 fathers	Top 20% of distribution of number of hassles was considered a risk factor. Possible to have 2 risk if both parents report at-risk score.
High internalizing behaviors (CBCL)	Achenbach Parent Report T3 Scored	Mother	262	Upper 20% of the distributions of scores received a risk factor.
Low parental monitoring	Parenting Monitoring youth T4	youth	183	Top 13 percent were at risk for low parental monitoring.
Low income	Demographics T4	Mother and father	258 mothers 242 fathers	Risk factor was created using a split at 13g-16g income. Possibility of 2 risk factors.

Negative coping strategies	Coping T4 Scored	Mother and Father	264 mothers 246 fathers	Risk was created using a composite of distancing, blaming self, and isolation. Strategies were considered regardless of stressor or event.
Drinking (adolescent)	Drinking and other drug use youth T4	youth	268	This composite risk factor consideres wither a youth has had his first drink and whether he is drinking heavily (3 or more per session).
Negative family events	Family Event Questionnaire T4	Mother	258	Dichotomized so upper 20% is a risk factor.
CBCL total behavior score (Teacher report)	Achenbach teacher report T4 scored	teacher	215	Upper 20% of total behavior score is a risk factor.
Negative peer group	Peer behavior Profile T4	Youth	184	Top 20% of negative peer group items was a risk factor.
Work dissatisfaction	Work Satisfaction T4	Fathers	242	Lowest 20% of satisfaction with work is a risk factor.
T4 Protective Factors	Data Set	Rater	Number of observations	Dichotomization
High athletic competence	Harter self perception T4 scored	youth	265	Upper 20% of athletic ability considered a protective factor.
Attractiveness (school performance)	Child School	teacher	215	Upper 20% of ratings of

	Performance T4			attractiveness considered protective factor.
School competence	Achenbach Teacher report T4	teacher	216	Upper 20% considered a protective factor
Global self-worth	Harter self perception T4 scored	youth	265	Upper 20% of global self worth considered a protective factor.
High positive events (family events)	Family Event Questionnaire T4	Mother	258	Dichotomized so upper 20% is a protective factor.
high religiosity (mother on self)	Demographics T4	Mother and father	258 mothers 242 fathers	Upper 20% of religious considered a protective factor.
High religiosity (adolescent on self)	Demographics Background info youth T4	youth	183	Upper 20% of religious considered a protective factor.
Scholastic competence	Achenbach Teacher Report T4 Scored	Teacher	198	Upper 20% of total prolem competence scores were considered a protective factor.
Social acceptance	Harter self perception T4 scored	youth	265	Upper 20% of global self worth considered a protective factor.
High family social support	Social support parent t4 scored	mothers	267	Top 20% was considered a protective factor.
High level of uplifts	Hassles and uplifts T4	mothers and fathers	247 mothers 231 fathers	Top 20% of distribution of number of uplifts is a protective factor.

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