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ATTENTION-DEFICIT HYPERACTIVITY DISORDER:
ONE POSSIBLE EXPRESSION OF A BIOBEHAVIORAL
DISREGULATORY MECHANISM IN SONS OF ALCOHOLICS?

presented by

HAZEN P. HAM

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Hiram E. Fitzgerald

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ATTENTION-DEFICIT HYPERACTIVITY DISORDER: ONE POSSIBLE EXPRESSION OF A BIOBEHAVIORAL DISREGULATORY MECHANISM IN SONS OF ALCOHOLICS

by

Hazen P. Ham

A THESIS

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ABSTRACT

ATTENTION-DEFICIT HYPERACTIVITY DISORDER:
ONE POSSIBLE EXPRESSION OF A BIOBEHAVIORAL
DISREGULATORY MECHANISM IN SONS OF ALCOHOLICS

by

Hazen P. Ham

The focus of the present study was to examine the occurrence of ADHD in three- to six-year-old sons of alcoholic/antisocial parents as compared to a similar group of sons of non-alcoholic/non-antisocial parents. Analysis of Variance revealed that for this group of at risk children, ADHD consistently occurred at higher rates, thus supporting the hypothesis that hyperactivity may be a developmental precursor to alcoholism. It is suggested that ADHD may be symptomatic of an underlying biobehavioral disregulatory mechanism associated with alcoholism that is exacerbated by the conflictual rearing environment that frequently characterizes the alcoholic family. Further, hierarchical regression analysis revealed that it is maternal rather than paternal psychopathology that is most predictive of these high risk sons' expression of problematic behaviors (i.e., ADHD), at least in the pre-school years.

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Chapter I

Introduction

Attention Deficit Hyperactivity Disorder (ADHD), more commonly referred to as hyperactivity, is one of the most recurrently exhibited behavioral problems of children referred to mental health professionals. Estimates of its prevalence in school aged children vary greatly, the range being anywhere from 1% to 20% (Barkley, 1981; Safer & Allen, 1976). One of the reasons for variation in the prevalence rate is the inconsistency in criteria for diagnosis as well as the wide variety of labels given to the disorder.

Historically, hyperactivity has been referred to as "Minimal Brain Dysfunction", "Hyperactive Child Syndrome", "Attention Deficit Disorder", "Hyperkinesis", and "Hyperkinetic Reaction of Childhood". The nomenclature for hyperactivity has undergone, and continues to undergo, many changes. Differentiations of the disorder continue to be classified and there is a continuous breakdown of more reliably measured subtypes (Windle & Searles, 1990). In the most recent revision of the DSM-III (DSM-III-R), hyperactivity is defined as Attention-deficit Hyperactivity Disorder (ADHD) and is given a more workable definition. The manual describes the general features of the disorder as: "developmentally inappropriate degrees of inattention, impulsiveness, and hyperactivity", with excessive gross

motor activity being most prominent in preschoolers (American Psychiatric Association, 1987 p. 50-52). The manual further defines excessive motor behavior as fidgeting, constant manipulating of objects, difficulty remaining seated, excessive jumping about, inability to await turn, difficulty playing quietly. Other identifying behavioral characteristics of ADHD are low frustration tolerance, poor emotional control and lability, hyperexcitability, aggressiveness, antisocial behavior, and poor academic progress (a majority of hyperactives repeat at least one grade but have average to above average intelligence) (Baxley & LeBlanc, 1976; Horn & Ialongo, 1988).

In this study it was partially our intention, to aid in an attempt at the differentiation and breakdown of subtypes of hyperactivity into what may very well be several syndromes appearing collectively. The primary endeavor of this study was to isolate those biobehavioral characteristics that are currently thought of as being indicative of ADHD, aside from its possible major affiliates Conduct Disorder and/or aggression. Even though the two may actually co-exist, they have been treated separately in the analysis and their individual affects on child outcome and parental psychopathology have been looked at.

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Chapter II

Review of the Literature

Temperament/Hyperactivity

The specific features of hyperactive behavior that are most prominent in children during late infancy and early childhood (i.e., 3 to 6 years) represent and exemplify several aspects of behavior that have been referred to by some as temperament. One aspect of temperament is that feature of a behavior which distinguishes individuals from one another based on its unique quality and intensity. Temperament has also been characterized as the physical speed with which one executes an act, the manner in which one approaches a task whether it be in a new social context or a new physical environment, and the ease with which one is distracted from the present task (Thomas and Chess, 1984). Thus, temperament applies to a broad spectrum of the child's everyday activities including responsibilities in the home and at school, to obeying directives from parents and teachers, and following acceptable social norms. According to past and present research dealing with hyperactive children, there are certain deviations within the aforementioned behavioral situations (i.e., everyday activities, responsibilities at home and school etc.) which, if expressed at certain ages and for certain periods of

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time, are indicative of ADHD. In the hyperactive child, these deviations of behavior may be a facet of what Thomas and Chess refer to as temperament.

It may be that certain children with specific temperamental traits (in the present investigation hyperactivity) are predisposed to the pathology of the parents when these temperaments are exposed to certain reoccurring environmental situations, for example, a chaotic home, parental substance abuse and/or antisocial behavior. Tarter et al. (1990) suggest that, "certain childhood temperament characteristics may be assqciated with the risk for alcoholism." They have observed that sons of alcoholics can be distinguished from sons of non-alcoholics according to general activity levels. Activity levels being one of the major components of temperament as it has here and elsewhere (e.g., Thomas & Chess, 1984) been defined. Evaluating the cognitive differences between sons of alcoholics and non-alcoholics, Tarter, Jacob, and Bremer (1989) found that sons of alcoholics performed more poorly in several areas of cognitive functioning as well as showing higher levels of behavioral tempo. These results, Tarter suggests, are indicative of an anterior cerebral dysfunction which is a favorable proponent for a genetic etiology of alcoholism. Although the observance of these behavioral manifestations of hyperactivity do support a genetic predisposition to certain temperament characteristics the manifestations neither "confirm nor disconfirm a genetic

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hypothesis" (Tarter et al., 1989). But these observations do lead one to believe that different temperaments may predispose a child to certain deficiencies or pathologies when the child is exposed to the parents' pathology as well as the chaotic environment created by the parents.

Some researchers suggest that temperament is not simply an isolated characteristic of the child, but also emerges from parent-child interaction; it is this interaction that researchers' feel little is known about (Fitzgerald et al., 1990). One should bear in mind that the diagnosis of ADHD in children coming from chaotic or inadequate environments may not be warranted if the behavioral disorder is "primarily a function of the chaotic environment" and not due to the child's own psychopathology (APA, 1987). Children reared in environments in which there are high levels of conflict and chaos perform poorly on tasks requiring delay of gratification, and delay of gratification has been shown to have a high relationship to hyperactivity (Funder, Block and Block, 1983). Funder et al. further claim that boys who are unable to delay gratification appear more restless, fidgety, aggressive and irritable as well as having rapid personal tempo. This will be a consideration in the present study as it has been noted that many of the children in this study have very disorganized and chaotic home lives with fathers who exhibit high levels of aggressive and violent behavior (Fitzgerald, Jones, Maguin, Zucker, & Noll, 1991).

Alcoholism and ADHD

As was previously stated, many studies have shown a correlation between alcoholism and ADHD postulating this to be one of the primary antecedents for alcoholism in children at risk for alcoholism (Cloninger et al., 1989; Goodwin et al., 1975; Knop et al., 1985; Morrison & Stewart, 1970; Wood, Wender & Reimherr, 1983 Workman-Daniels & Hesslebrock, 1987). However, the methodologies utilized in these and other studies have been for the most part retrospective. There have been few prospective studies focusing on the early manifestations and developmental course of hyperactivity and conduct problems as they relate to the later development of alcoholism (Campbell, Breaux, Ewing, & Szumowski,1986). Therefore, the purpose of this study includes looking at the behavioral disposition of the two groups, comparing them in regards to hyperactive and aggressive behavior as the child is developing and in particular from late infancy to early childhood (i.e., 3 to 6 years). If ADHD is a predisposing factor to alcoholism (especially in high risk populations) it should begin to surface in late infancy and be fully apparent by the age of seven (APA, 1987). It follows that this is the time period in which the child at high risk should begin to be monitored for such behavioral expressions.

Recent research on children with alcoholic fathers gives some indication that hyperactivity may be in some way associated with the later development of alcoholism.

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The behavioral characteristics associated with hyperactivity are more evident in children at high risk for alcoholism as compared with children at low risk. It is possible that hyperactive behavior may exhibit itself in children with a predisposition towards alcoholism and may be one of the markers or precursors present in children who will develop into alcoholics later in life.

There is some controversy as to whether hyperactivity as a possible precursor to alcoholism is due strictly to genetic components, environmental influences or a combination of the two. The genetic controversy was not specifically the target of the present study, (although it will be discussed later) however, an overview for the reader is here warranted. The alcoholism literature leads one to believe that there needs be a combination of both genetic and environmental factors in the etiology of alcoholism (Cloninger, Bohman, Sigvardsson & von Knorring, 1985; Goodwin, 1971), and many studies support the notion of genetic transmission of hyperactivity in conjunction with the expression of alcoholism (Cantwell, 1972; McMahon, 1981; Morrison, Stewart & Louis, 1973).

However, in order to claim that the etiology of alcoholism were a purely genetic one, and possibly hyperactivity as a precursor to alcoholism, biological markers would need be identified. One biological characteristic that is known to be genetically transmitted and distinctive to alcoholics is certain EEG patterns

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(Gabrielli, Mednick, Volavka, Pollock, Schulsinger & Itil, 1982; Volavka, Pollock, Gabrielli & Mednick, 1985) as well as certain Evoked Potential (EP) aberrations. Alcoholics and their offspring have a general tendency to show excessive resting Beta activity while non-alcoholics do not (Volavka et al., 1985). The link between hyperactivity and the subsequent development of alcoholism has been noted and consequently, studies utilizing these techniques have noted similarities in brain wave activity between hyperactive youths and adult alcoholics. Recent progress has been made to further support this genetic claim.. Specific areas of the brain that are affected genetically through alcohol abuse (e.g., frontal lobe) have been isolated and are consistent with those areas affected in hyperactives (for a review see Galanter, 1985). For example, several studies evaluating brain EPs in adolescent males with alcoholic fathers (Begleiter, Prjesz & Bihari, 1984) and hyperactive children (Zambelli, Stamm, Matinsky & Loisell, 1977) revealed marked differences in P3 and N1 components. Specifically, there is a diminution of the P3 amplitudes to task relevant targets as well as reduced N1 amplitude to all stimuli in the hyperactive youths. It was noted in the Begleiter et al. study that Evoked Response Potentials (ERPs) in high risk boys were similar to those found in their alcoholic fathers even though the boys in the high risk group had not started drinking. Gabrielli et al. (1982) found faster EEGs in children of alcoholics when

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compared to children of non-alcoholics and hypothesized that since faster EEG is heritable this might be one of the exhibited biological antecedents to alcoholism. They argue that since fast EEGs are associated with tension and anxiety while slower EEGs are associated with relaxation, that this might be one of the biobehavioral mechanisms high risk individuals inherit. They further assume that in order for alcoholics to reduce this increased activity they resort to drinking, which in turn slows down brain activity enabling alcoholics to escape the "uncomfortable state associated with fast brain activity" (Gabrielli et al.,1982).

However interesting and provocative these electrophysiological findings may be, the most convincing evidence for a genetic basis of alcoholism and its association with hyperactivity is the history of many alcoholics. Self-reports from alcoholic samples report having been hyperactive as children at the same time their offspring are also showing evidence of hyperactive behavior (Goodwin, Schulsinger, Hermanse, Guze & Winkokur, 1975; Morrison & Stewart, 1970). Many of these investigations reveal that a large majority of parents who report having been hyperactive as children are now psychiatrically ill with specifically high prevalence rates of alcoholism, sociopathy, and hysteria further suggesting a familial relationship to the syndrome (Cloninger et al., 1985). In this fairly recent and classic adoption study, Cloninger and his associates identified and studied two types of

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alcoholics. Type I alcoholics are those whose biological parents revealed mild alcohol abuse and low levels of antisocial behaviors. Type I children were considered to have a genetic background which increases risk for alcoholism in men and when this type of child is raised in an environment characterized by lower SES factors it serves further to increase risk for alcohol abuse. Type II alcoholism on the otherhand, is expressed in those whose biological fathers revealed more extensive levels of alcohol abuse (i.e., requiring more medical treatment) and criminality (i.e., requiring longer and more frequent incarcerations). They found that the heritability rate of Type II alcoholism was about 90% in the sons of these men. In this group of sons they revealed more severe levels of alcohol abuse regardless of the environment they were revealed in. These findings when examined on the whole suggest that alcoholism has a definite genetic component and that this trait is further exacerbated by lower social/emotional rearing environment.

Morrison and Stewart (1970) were among the first to make the association between alcoholism and hyperactivity. In an early study they interviewed the parents of 59 hyperactive children and 41 non-hyperactive children. They found twice the incidence of alcoholism in the parents of the hyperactive children when compared to the non-hyperactives, 20% and 10% respectively. Of those parents of the hyperactive children, 12 were hyperactive as

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youths and 6 of the 12 were alcoholic as parents. Goodwin et al. (1975) reported similar findings in a group of Danish men. Out of a group of 133 men, 14 met diagnostic criteria for alcoholism. The other 119 served as controls. Looking at the childhoods of the 14 alcoholics, these men reported that 50% were hyperactive as youths as well as being impulsive and hot tempered. In some of his earlier work done with hyperactives, Cantwell (1972) studied the fathers of 50 hyperactive boys between the ages of 5 and 9 years comparing them to fathers of 50 normal boys of the same age and obtained results similar to the extant literature. He found twice the incidence of alcoholism in the fathers of hyperactive children (30%) when compared to the control group of fathers (14%) revealing a trend of psychopathy in the fathers of hyperactives. Sociopathic behavior was statistically higher in the alcoholic group which lends some support to the notion that hyperactivity may carryover into adulthood, showing up as aggression and antisocial behavior (Blouin, Bornstein, & Trites, 1978; Weiss & Hechtman, 1986).

One study that looked at the frequency of psychiatric disorders in sons of alcoholics found high prevalence rates of ADHD, Conduct Disorder, and Oppositional Defiant Disorder to be higher in children who had either one or both parents who were alcoholic as compared to those who did not (Earls, Reich, Jung & Cloninger, 1988). In this study the authors looked at psychopathology in children as it exists in an alcoholic and psychopathic environment. They found no

significant differences in psychopathology when comparing children with alcoholic parents and children with antisocial parents. However, childhood psychopathology was 2 to 3 times greater in families where there was a parent or parents who had both alcoholism and antisocial personality as compared to families where there was neither alcoholism nor antisocial personality in either parents. Earls et al. insist that antisocial personality coexists with alcoholism and that it is the combination of alcoholism and antisocial personality that predispose the children to psychopathology and possibly to alcoholism - not simply one or the other.

Interestingly, there is evidence indicating a strong relationship between alcoholic fathers' perception of their sons' behavioral problems and ratings of their own antisocial behavior (Fitzgerald, Sullivan, Bruckel, Schneider, Zucker, & Noll, 1989). In alcoholic families it has been seen that the activity level of sons is significantly predicted by levels of fathers' antisocial behavior and researchers suggest that this may be due to certain socialization and/or biological elements that aid in determining certain temperament traits (Fitzgerald, Sullivan, Gover, Maguin, Zucker, & Noll, 1990). It is the perception of behaviors by alcoholic parents that has been linked conceptually to the etiology of alcoholism. For instance, activity levels in children at low risk appear to be related only to SES, in particular family income and family occupational status, whereas those of high risk

children are related to alcoholism and parents' perception of their own (husbands) and their spouses (wives) antisocial behavior (Noll, Zucker, Fitzgerald, & Curtis, 1989).

On the other hand, however, Tarter et al. (1985) found no link between alcoholism and hyperactivity in two groups of adolescents both of whom were anti-social. One group was at high risk for alcoholism (having a father who was alcoholic) and the other group was at low risk (the father being nonalcoholic). No significant differences were found in hyperactivity symptomatology between high and low risk groups, concluding that although hyperactivity has been associated with higher risk for alcoholism, hyperactivity does not influence one to become alcoholic more readily than other pathology. Schuckit, Sweeney and Huey (1987) obtained findings similar to those of Tarter et al. They compared a group of young adult sons of alcoholics to a group of sons of nonalcoholic of like sociodemographic status, examining their levels of childhood and adult symptoms of hyperactivity. Inasmuch as no significant differences in hyperactivity levels in childhood or adulthood were found, Schuckit et al. concluded that hyperactivity does not play a causal role in the etiology of alcoholism.

Still, other investigators have reported an association between alcoholism and hyperactivity for temperament attributes such as high activity levels, impulsiveness, and poor concentration in high risk offspring (Cloninger et al., 1985; Goodwin et al., 1975; Owings & West, 1987;

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Workman-Daniels & Hesselbrock, 1987). In a 10 to 15 year follow-up study of sons of alcoholics, Knop (1985), using neuropsychological assessments, teacher evaluations, and psychopathology interviews, found consistently significant differences between the high and low risk groups for impulsivity, restlessness, and verbal deficiency. The sons of alcoholic fathers from this cohort exhibited higher rates of hyperactive behaviors, specifically impulsive and restless behavior, than did the sons of non-alcoholic fathers. This finding, according to Knop, may be of predictive importance in the etiology of alcoholism.

Adoption studies have been extremely useful, although limitedly so by virtue of the difficulty in conducting these types of studies, in revealing associations of adult alcoholism and child psychopathology and other factors that may predispose one to alcoholism. It has been shown that adopted sons of alcoholics are as much as four times more likely to become alcoholic than adopted sons of non-alcoholics (Cadoret & Gath, 1978; Goodwin, Schulsinger, Moller, Hermansen, Winokur, & Guze, 1974). Morrison and Stewart (1973) evaluated the psychiatric status of a group of adopting parents and a group of biological parents both of whom had hyperactive children. Males made up 97% of the children in the biological group and 89% in the adopted group. Biological fathers had significantly higher rates of alcoholism than did adopting fathers and were more likely to be hyperactive as children than were the other male

relatives of the adopting fathers. Such findings favor the idea of the heritability of hyperactivity but, as the authors point out, with a co-dependency of alcoholism being a significant interactive factor in its expression.

Although these findings point to the heritability of alcoholism in conjunction with certain parental psychopathologies it is beyond the scope of the present study to address in any comprehensive manner a genetic component for the etiology of alcoholism. The current study focuses on the psychopathology in children of alcoholic/antisocial parents, in particular hyperactivity and aggression. These behavioral abnormalities (e.g., hyperactivity, aggression etc.) may be indicative of a biobehavioral disregulatory mechanism and may precede the onset of alcoholism as well as play a role in the latter expression of other psychopathological behavior (e.g., antisocial behavior). This disregulatory mechanism may in fact be a heritable one, however, further and extensive study need be done to ascertain the veracity of such a theory.

From the previous review the association between risk for alcohol abuse and several temperament/behavioral attributes that are characteristic of ADHD (i.e., impulsivity, restlessness or excessive motor behavior, poor attention-span and distractibility) can be readily seen. Moreover, it seems evident that a male child of an alcoholic father is likely to exhibit some or all of these temperament

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attributes and that these attributes might possibly be predisposing factors leading to the subsequent development of alcoholism. As mentioned previously, few studies have looked at the developmental occurrence of hyperactivity in this high risk alcoholic population, except in retrospective fashion. So it was interesting to note the prevalence rate of hyperactive behaviors in older male infants and toddlers (i.e., 3 to 6 years) of alcoholic/antisocial parents as compared to those of non-alcoholic/non-antisocial parents, and it will be interesting to follow their developmental progress into late childhood and adolescence.

ADHD and Conduct Disorder

It would appear that children expressing ADHD most often also exhibit Conduct Disorder behaviors - especially boys. The majority of researchers agree that ADHD and Conduct Disorder actually coexist, and the separation of one from the other is most difficult if not impossible (for a comprehensive review see Hinshaw, 1987). Conduct Disorder is a behavioral regime typified by behaviors that violate the basic rights of others and a general abusiveness to peers as well as strangers. While there are those attempting to make a differentiation of the two disorders into separate and discrete syndromes, namely, ADHD or "pure" hyperactivity, and Conduct Disorder, there is also the notion of another syndrome that has been bantered about for many years - that of Attention Deficit Disorder. According

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to DSM-III the disorder is exhibited by behaviors that connote the inability to sustain attention and the ease of distractibility in the absence of hyperkinetic or excessive physical behavior. Hyperactivity (ADHD) and Conduct Disorder appear to be linked together in both prevalence rates and by certain definitions of the hyperactive syndrome which insist that hyperactivity contains an aggressive/anti-social behavioral component. As stated earlier, some suggest that the two are mutually inclusive thus, separation is impossible. August et al. (1983) did a follow-up of two groups of hyperactive youth with and without associated conduct problems. The first group consisted of what the authors called "pure" hyperactive youth, meaning they exhibited no aggressive conduct problems, and the second group consisted of "hyperactive-unsocialized aggressive" youth. Those boys originally diagnosed as "purely" hyperactive remained so, exhibiting primarily inattentive and impulsive behavior. The second group of hyperactives co-morbid with conduct problems continued to exhibit inattention and impulsivity but were also significantly more aggressive, noncompliant, antisocial and prone to alcohol use by the age of ten as compared to the purely hyperactive group. In agreement with the hypothesis of Earls et al. (1988), the authors suggest that it is not hyperactivity per se that predisposes one to alcohol abuse or other psychopathologies, but rather the coupling of hyperactivity (e.g., inattention and impulsivity) and Conduct Disorder,

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particularly aggressive and antisocial behavior that influences the etiology of alcoholism.

The basis for determining whether a child is ADHD or Conduct Disorder has been based on DSM-III-R criteria. Items directly pertaining to DSM-III-R definition of ADHD and Conduct Disorder have been used to summarize the behavior of the boys under study. The relationship of child hyperactive and antisocial behaviors has been observed with respect to levels of risk for alcoholism and parental antisocial behavior and the ability of the parents psychopathology to predict their own child's psychopathology.

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Chapter III

Hypotheses

This study examined the behavioral attributes of male sons of alcoholics to see if ADHD, and its associated symptoms, Conduct Disorder, and aggressive behavior are dominant personality/temperament traits of male children in a high risk population for the latter development of alcoholism. Using the Connors Parent Questionnaire (Connors), Dimensions of Temperament Survey for Children (DOTS), and the Child Behavior Checklist (CBCL) an attempt was made to differentiate boys at risk from those not at risk on the basis of ADHD behavior, specifically, ADHD of an aggressive nature vs. ADHD of a more non-aggressive nature. The Conduct Disorder factor from the Connors was used to assess excessive conduct behaviors and the Aggression factor from the CBCL was used to assess excessive aggressive behavior. Hypotheses made were as follows:

Hypothesis I

Boys in the high risk group would score significantly higher on measures of ADHD, Conduct Disorder and aggressive behaviors than boys in the low risk group.

Hypothesis II

Parental psychopathology (e.g., antisocial behavior and lifetime problem drinking behavior) were assumed to be more

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significant predictors of the high risk sons' ADHD, Conduct Disorder and aggressive behavior than the various family demographic variables measured.

Hypothesis III

Family demographic variables (e.g., socio-economic status, family income, and parental education) would be more significant predictors of ADHD, Conduct Disorder and aggressive behavior in the low risk boys than parental psychopathology.

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Chapter IV

Method

Subjects

Subjects are two groups of boys between 3.0 and 6.0 years of age. One group of boys is considered to be at high risk for alcoholism as a result of having a father (and in some cases a mother) who is alcoholic and who also exhibits high levels of antisocial behavior; these will be referred to as the **High Risk Group** throughout this paper. The other group is considered to be at low risk for alcoholism having neither parent who exhibits signs of alcoholism and where levels of antisocial behavior are comparable with normals; these will be referred to as the **Control Group** or **Comparisons**. Boys from both groups came from an intact family at the time of recruitment. Boys in the high risk group (N=69) are from similar, if not the same, census tracts as those in the control group (N=32) but control parents, unlike risk parents, are asymptomatic for alcohol problems (See Table 1 for Demographic characteristics of sample).

Alcoholic fathers have been recruited via the district courts in the Mid-Michigan area. Using a population net in the Mid-Michigan area involving four adjacent counties with six district courts, all convicted drunk drivers with a blood alcohol concentration (BAC) of 0.15 percent or higher (or 0.12 percent or higher if this was a second or more

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Table 1

Demographic Characteristics of Risk and Control Families

Variable	High Risk (N=69)		Control (N=32)	
	M	SD	M	SD
Demographics:				
Family SES[a]	30.55	14.5	41.77	19.9
[1]Family Income[c]	6.65	2.0	7.53	1.5
Education Mother (yrs)	12.81	1.9	13.12	1.9
Education Father (yrs)[b]	12.90	2.1	14.27	2.0
Age of Mother	30.25	4.0	30.84	4.6
Age of Father	32.71	5.1	32.94	4.9
Age of Child	4.30	1.1	4.30	1.0

[1]6=$16,001 - 20,000; 7=$20,001 - 30,000
[a]p<.004 [b]p<.002 [c]p<.03

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documented drinking related driving problem) who have a biological son between the ages of 3.0 and 6.0 years currently living with them and who are from intact families at the time of first contact, were recruited into a study of "child development and family health." Probation officers from the district courts request permission to release names and phone numbers to our project. When contacted by project staff, respondents are told that the study has no connection to the courts and that all information collected is confidential. Of the total number of men contacted by probation officers, 79% agreed to have their name and phone number released to the project; of these, 92% agreed to participate. All families in the study are paid for their participation.

After a high risk family is recruited into the study, a matched community comparison family whose parents are neither alcoholic nor drug dependent is located using door-to-door canvassing interviews. Canvassers begin a door-to-door search one block away from the alcoholic family, staying within the same census tract, and screening for an age appropriate (+/-6 months match) male child in a nonalcoholic home. To date, 18,232 families have been contacted. Of the 494 families with an age-appropriate male child, 398 agreed to participate. Two hundred-fifteen families were ineligible due to ethnicity, SES, or parentage (i.e., non-biological); 102 were ineligible due to parent alcohol/drug involvement, and 81 were

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successfully recruited as control subjects.

Later data collected as part of the longitudinal protocol insures that each district court father meets Feighner diagnostic criteria (Feighner, Robins, Guze, Woodruff, Winokur, & Munoz, 1972) for probable or definite alcoholism, and that both parents in the comparison family do not make this diagnosis or one of drug dependence. Maternal alcoholism among the high risk families is neither a criterion for inclusion nor exclusion from the study. However, in accord with study screening criteria, no child manifested characteristics required for a diagnosis of fetal alcohol syndrome (i.e., prenatal and/or postnatal growth retardation; apparent central nervous system involvement; and/or characteristic facial dysmorphology) (Sokol & Clarren, 1989).

Community canvassing to obtain comparison families was used to control for effects of age and sex of target child, community influences, and as an approximate control for SES. This procedure allows findings from the families with an alcoholic father to be contrasted to an ecologically comparable but non-alcohol/drug abusing population.

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Chapter V

Procedure

All families that participated in the project completed numerous questionnaires, interviews, and direct observation sessions. Data collection takes place across 9 sessions, requiring approximately 15 hours for each parent and 7 hours for each target child. All data are gathered at the participants homes with the exception of a video taped session conducted at university facilities.

Instruments

Several aspects of the parents behavior and life circumstances were measured and compared to see which were the best predictors for child psychopathology (i.e., hyperactive behaviors and conduct problems): 1) antisocial behavior, 2) problems related to alcohol usage, and 3) socio-economic factors. These were measured by the Antisocial Behavior checklist (ASB; Zucker & Noll, 1980), the Lifetime Alcohol Problems Score (LAPS; Zucker, 1991), and a demographic questionnaire.

Antisocial Behavior checklist (ASB). The ASB is 46-item revision of an earlier antisocial behavior inventory utilized in the Rutgers Community Study (Zucker & Barron, 1973) that has been modified so that items are also salient for adult antisocial activity. A series of reliability and validity studies with populations ranging from college

students to prison inmates has shown adequate test retest reliability (.91 over four weeks) and internal reliability (coefficient A = .93) (Zucker & Noll, 1980). The ASB also differentiates between groups of people with varying degrees of antisocial behavior such as inmates versus minor offenders in district courts versus college students (Zucker & Noll, 1980), and between alcoholic and non-alcoholic adult males (Fitzgerald, Jones, Maguin, Zucker, & Noll, 1991).

Lifetime Alcohol Problems Score. LAPS was the primary drinking variable to be used in the current study. The score is designed to assess differences in the extent of drinking problems over the life course, and is derived from information gained from the administration of the Drinking and Drug History interview (Zucker, Fitzgerald, & Noll, 1990), the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1980), and the short form of the Michigan Alcoholism Screening Test (SMAST) (Selzer, 1971, 1975). The LAPS provides a composite score derived from three component subscores: (a) the primacy component, involving the squared inverse of the age at which the respondent reported first drinking enough to get drunk; (b) the variety component, involving the number of areas in ones lifetime in which drinking problems are reported, and (c) the life percent component, involving a measure of interval between most recent and earliest drinking problems, corrected for current age. Scores are standardized

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separately for males and females within our project sample. This measure is unrelated to current drinking consumption in problem drinking samples and has been shown to be a valid indicator of differences in long term severity of drinking difficulty in a wide variety of areas (Zucker, 1991).

Demographic Questionnaire. This questionnaire was administered during the first visit, which inquired about self-reported background information (occupation, education, income, years married, number of children in the house, age, etc.) and family of origin (SES, education, etc.). This instrument provided the data from which the demographic items and information about family income etc. were coded. The SES of each parent is established using the occupation based Revised Duncan Socioeconomic Index (TSEI2; Stevens & Featherman, 1981).

Three instruments were administered to the parents of the target child independently to assess temperament, overall behavioral repertoire, and social and emotional functioning: 1) the Child Behavior Checklist (CBCL); 2) the Dimensions of Temperament Survey (DOTS) for children; and 3) the Connors Parent Questionnaire (Connors). From these instruments an assessment of hyperactivity (ADHD), Conduct Disorder and aggressive behavior has been determined based on a constellation of behaviors that constitute these childhood psychopathologies, (e.g., attention span, distractibility, impulsivity, restlessness, excessive

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physical activity, abusiveness, irritability etc...) according to DSM-III-R criteria.

Dimensions of Temperament Survey (DOTS). The DOTS utilized in this study is the 34-item scale reconstructed by Lerner, Palermo, Spiro, & Nesselroade (1982), in order to provide a continuous measure of the components of temperament from late infancy to adulthood. It specifically gives a good measure of activity level for both awake and sleep states as well as providing a measure of attention span and distractibility. Reliability coefficients (Cronbach alphas) were obtained on all scales using samples of infants, preschoolers, school-aged children and young adults with only the subscale for reactivity being consistently below .60 (Lerner et al., 1982). The instrument has also demonstrated acceptable test-retest reliability.

A factor analysis of the DOTS was conducted with the entire subject pool of T1 families from the MSUFS. There was a total of 1519 cases used in this analysis. The analysis revealed 8 factors of temperament as compared to Lerners' original 5 factors. The Activity factor was the only factor to remain intact in our analysis and maintain all the items from Lerner's original analysis; this factor was not to be included in the analysis to begin with. The Attention Span/Distractibility factor broke down into two distinct factors, we appropriately named Attention Span and

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Distractibility. However, due to the fact that these two behaviors appear to be closely linked both conceptually and statistically, in the analysis they were merged together (see Table 1 in Appendix for item list). This factor looks at a child's ability to maintain an activity without being distracted from it and his/her ability to sustain attention during a task. The Adaptability/Approach-Withdrawal factor also broke down into two neatly formed factors that we felt measured Adaptability and Inhibition; neither of these to factors were of interest in the present study. The factor Lerner labeled Rhythmicity basically measured several behaviors and their regularity of appearance, however, in this analysis it was felt that the strongest rhythmic behavior that appeared from this factor was eating behavior and its regularity; so this factor was labeled Eating Regularity; this factor was also not included in the analyses. The final factor in Lerner's analysis was labeled Reactivity and this factor broke down into two factors in our analysis; one that tapped items pertaining to hyperactivity (i.e., physical overactivity) labeled Hyperactivity, and the other which measured reactive behaviors which we labeled Reactivity. The factor entitled Hyperactivity reveals a child's level of physical activity, more specifically if it is excessive or not, and was included in the analysis (see Table 2 in Appendix for item list) the Reactivity factor was not to be used.

The two factors selected from the DOTS that were

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included in this study (Hyperactivity and Attention Span/Distractibility) were then combined to obtain an overall rating of ADHD or "pure" hyperactivity following DSM-III-R guidelines (see Table 3 in Appendix for item list in Appendix I). These new factors were compared to several outside variables including scores for problems due to drinking behavior, anti-social behavior and depression in order to assure for parallelism. All of the DOTS factors revealed satisfactory parallelism as well as internal consistency and factor reliability. Cronbach's Alpha for the analysis of the DOTS were .65 and .75 for factors included in this study (Hyperactivity and Attention Span/Distractibility, respectively). A full report on these analyses will be reported on in a different paper.

The DOTS is filled out independently by both parents at one of the home visits. Parents are asked to rate their child on the 34 behavioral situations using a 2 point response format. A score of 1 indicates the behavior is "more true than false" with a score of 2 being "more false than true." Items are re-coded so that all responses are in the same direction for the behavior then item responses from each factor are summed. Although the original intent of this instrument is to get an assessment of temperament the present study was interested in finding abnormally high levels of undesirable behavior/temperament attributes. Cutoff scores were considered to be met for those boys scoring in the top 10% of the sample. A cutoff score

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obtained for a factor is indicative of that behavior and is considered to be abnormally high or in the clinical range. The Hyperactivity factor is the only exception in the analysis. This factor consisted of three (3) items. The possible range for a total score is 0-3; 0 means none of the items were endorsed by parents, 1 means only one item was endorsed, 2 means two items were endorsed and if a child received a score of 3 this indicated that his parents felt he expressed all three of the hyperactive items. If a child's parents endorsed all three items on this factor the child was said to be abnormally overactive. This was done because of the limited range of variability and thus the inability to look at the top 10% of boys in this study.

Connors Parent Questionnaire. The Connors used in this study is a modified version of the revised 48-item version of Connors original instrument. This modified version is similar to the 48-item version as far as the scales are concerned, however, several items are worded different but only slightly, so it was felt that the items had remained essentially intact. The scale of interest from the Connors for this study, namely, the Hyperactive Index, is the same on all versions of the instrument. The Hyperactive Index is comprised of 10 items from the overall instrument (see Table 4 in Appendix for item list) that are commonly used in both clinical and research settings to make among other things, a diagnosis of hyperactivity (Connors,

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1990). The Index provides an empirical assessment of childhood behaviors that are considered indicative of hyperactivity. When used in the research setting it is realized that the index is more generally an overall rating of child psychopathology and not simply a measure of ADHD or hyperactivity. Thus it seems to reveal children who exhibit hyperactivity but also related psychopathology such as high affective states and aggression or, in other words, behaviors that may exemplify aggressive or psychopathic type hyperactivity. The Hyperactive Index will be utilized in this study in an attempt to differentiate children who exhibit this "aggressive hyperactivity" as compared to those children who display ADHD or what is referred to in this study as "pure" hyperactive behaviors.

There is adequate reliability and validity of the 48 item version of the instrument; additional factor analysis done by Connors (1985) provided support for the five primary scales as well as the Hyperactivity Index. This instrument was recently re-analyzed by members of the MSUFS using the entire T1 collection (number of cases=986), revealing high levels of reliability on 10 distinctive factors with Cronbach's Alpha above .61 with one exception. Items taken from the Connors that assess hyperactive behavior (ADHD) were those items that specifically measure levels of hyperactivity, attention span/distractibility, and impulsive behavior, all of which are three behavioral components of the syndrome of interest. Three factors were

selected from the Connors to measure hyperactivity. The first was a 4-item factor which looks at a child's motor activity labeled Hyperactive (see Table 5 in Appendix for item list). The second, a 2-item factor measures a child's ability to maintain attention over a period of time as well as assessing his/her distractibility; this factor was labeled Attention Span/Distractibility (see Table 6 in Appendix for item list). The third and final factor for ADHD behaviors taken from the Connors was a 3-item factor looking at a child's impulsive behaviors labeled Impulsivity (see Table 7 in Appendix for item list). All 3 factors showed internal consistency, reliability and parallelism with Cronbach's Alpha being .80, .74 & .69 respectively for the factors. As well as providing individual measures for these component behaviors of ADHD, these three factors have been merged, as was the case with the DOTS, to form a final factor that has been called ADHD in that all items pertain to the definition of the disorder as described by most researchers (APA, 1987) (See Table 8 in Appendix for item list). A final factor was used from the Connors that measures Conduct Disorder behaviors (see Table 9 in Appendix for item list). This is one of the factors found in the re-analysis of the 93-item version of the instrument and was used because it was a broad measure of conduct disorder type behaviors corresponding to DSM-III-R criteria (Connors, 1990). This 24-item factor labelled Conduct Disorder had several items that overlapped the Hyperactive Index. These

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items of overlap that pertain to what are thought to measure "pure" hyperactivity, or ADHD, have been removed so as to gain a more "pure" measure of antisocial/aggressive behaviors typical of Conduct Disorder. One item (#56 - throws him/herself around) from the original factor was not in the present version of the instrument, but it was not felt that this would have any significant effect on the factor which retained the other original items.

The child's behavior is rated on a 4-point scale (0-3) with 0 indicating the behavior is "not at all" apparent to 3 indicating a behavior to be "very much" apparent in the child's behavior. The conventional cutoff score for the Hyperactive Index according to the author is 15 which is 2 standard deviations above the mean, 10% of the boys from the present sample met this criteria. So what we did with the remaining factors used to measure other child problem behaviors was to take those boys scoring in the top 10% on those factors as also being in the clinical range for a particular problem behavior.

Child Behavior Checklist (CBCL). The CBCL, developed by Achenbach (1978; Achenbach & Edelbrock, 1983) is completed by both parents independently during the home visit. The first portion of the instrument requires parents to provide information on 20 competence items related to four areas of their child's functioning: 1) activities, 2) involvement in social organizations, 3) social relations,

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and 4) school performance. The remainder of the instrument asks the parents to rate their child on 118 problem behaviors. Two open-ended items are provided to describe additional problems not specifically listed. The CBCL provides an overall assessment of the child's social and emotional functioning as well as yielding standardized scores on eight narrow band subscales, (one of which measures aggression), and two broad band subscales that evaluate external and internal psychopathology and social competence.

The CBCL is a widely utilized and well standardized parent report that gives a good assessment of child psychopathology (Campbell, Breaux, Ewing & Szumowski, 1986). Because the instrument was normed on 4 to 16 year old children, data of children under the age of 4 will be interpreted with some degree of caution.

A program designed to utilize FORTRAN is supplied with the check list for scoring procedures. This program produces total raw scores, total T scores (with a mean near 57 and standard deviation near 5), and intraclass correlations for individual assessments (Achenbach & Edelbrock, 1983; McConaughy & Achenbach, 1988). A member of the MSU Family Study has designed a modified scoring technique that utilizes Achenbach's original scoring procedures and yields overall scores on all factors for groups as well as for individuals.

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for how true the item is for the child currently or within the last 6 months. A score of 2 indicates that the item is very true or often true; a 1 indicates the item is somewhat or sometimes true; and 0 indicates the item is not true at all (McConaughy & Achenbach, 1988). Items selected for inclusion in this study make up the Aggressive Factor (see Table 10 in Appendix for item list). Items from this factor are summed with a raw score of 20 or higher being indicative of a clinical diagnosis of aggression problems (i.e., the child is in the 90th percentile).

Items selected from the Connors, CBCL and the DOTS for inclusion in this study (aggressive behavior) have undergone the aforementioned analysis and reliability testing and they adhere to criteria set forth by the American Psychiatric Association in selecting children who may exhibit ADHD and Conduct Disorder. Below is a breakdown of the nomenclature used throughout this paper in order to more readily avail the reader to the various instruments used and the specific behavior measured by each.

Problem Behavior to be Measured	Instrument(s) Used
ADHD	DOTS, Connors
- Attention Span/Distractibility	DOTS, Connors
- Hyperactive (Physical Activity)	DOTS, Connors
- Impulsivity	Connors
Conduct Disorder	Connors
Aggression	CBCL

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Chapter VI

Design

The present study is a subsidiary study of the Michigan State University Family Study (MSUFS). The specific aim of the MSUFS is to "...trace the development of children who come from homes with alcoholic, drunk-driver fathers, and who therefore are statistically at high risk for problems involving aggression, negative mood, failures in persistence, difficulties in academic performance and problems interacting with other family members" (Zucker, Noll, & Fitzgerald, 1986). These children are also at increased risk for later development of alcoholism since approximately 25% of male children of alcoholics will themselves become alcoholics and a portion of the rest will have difficulties with drinking behavior. The male child between 3 and 6 years old from these alcoholic/antisocial fathers make up the high risk group in the study, who will be contrasted with a same age group of males considered to be at low risk for alcoholism and antisocial behavior. When possible, comparison subjects are drawn from the same census tracts as the high risk group.

The predictive framework of the MSUFS is designed to be consistent from childhood to adulthood. The dysfunctional characteristics of the children under study are presumed to be the "etiologic variables for later alcoholic outcome" (Zucker, 1991). Specific characteristics as set forth by

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the principal investigators are: 1) aggressive and hyperactive behaviors, 2) negative mood, 3) genetic loading for alcoholism, 4) problematic social relationships (between parent and child and child and sibling for the children; between parents, and between parent-child for the parents) which, as development progresses, enhance the characteristics of (1) and (2) above; and 5) a more elaborated, and earlier developed cognitive structure about alcohol and attitudes towards alcohol (Zucker & Fitzgerald, 1991).

The specific criterion sought for in the present study was ADHD, Conduct Disorder, and aggressive behavior as perceived by fathers and mothers at differing levels of risk for alcoholism with the predictors being antisocial behavior, problems related to drinking, and specific demographic characteristics, namely, education, ses, and income. The specific purpose of this investigation was manifold in nature: 1) to isolate a constellation of abnormal behaviors that, in keeping with current findings, constitute ADHD according to many researchers in the fields of psychology and medicine as they relate to risk for alcoholism and other parental psychopathology as well as attempting to further delineate the syndrome, 2) to observe Conduct Disorder and/or aggressive behavior as it interacts with the expression of ADHD in a group of boys at high risk for alcoholism, and 3) to observe several parental variables that are suspected to be strong predictors of ADHD.

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Utilizing several instruments that effectively target these specific behaviors, it was felt that a more valid and timely statement could be made as to the behavioral status of the children under study.

It is impossible to validly establish the predisposing factors of behavioral and/or biological problems in a retrospective fashion. The most efficient means of attaining this type of information on any given population is to look at both high and low risk groups prospectively, monitoring their biobehavioral states. Therefore, behaviors indicative of ADHD namely; impulsivity, attention span difficulties, distractibility, and locomotor activity as an index of hyperactivity and behaviors typical of Conduct Disorder were looked at in a group of children at high risk for various psychopathology (i.e., alcoholism and antisociality) and compared them to a group of children who are not at present at high risk for such. Data utilized in the present study were archival data that have been collected prospectively over the past eight years.

As previously stated, the study was an attempt to differentiate children at high risk for alcoholism from those at low risk for alcoholism. The experiment was a two (Risk: hi, lo) by two (Parent: father, mother) between subjects design. Children at high risk for the latter development of alcoholism are so defined by fathers excessive abuse of alcohol, as measured by LAPS, with the majority having a normal consuming mother (i.e., mother does

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not abuse alcohol)*. Children in the low risk group are so defined by fathers and mothers who do not abuse alcohol. It was hypothesized that levels of ADHD and conduct problems would differentiate these two groups of children as measured by the Connors, CBCL, and DOTS.

Analysis

Analysis of variance was conducted on the factors used to measure and predict ADHD, Conduct Disorder, and aggression, namely the Connors Hyperactive Index, the Connors Conduct Disorder factor, the CBCL Aggressive factor and several factors from the DOTS and Connors that specifically measure the component behaviors of ADHD. The specific variables were father's and mother's scores on antisocial behavior (ASB), problems due to drinking behavior (LAPS), and demographic characteristics as measured by the Demographic Questionnaire, and also ratings of their sons, hyperactive and conduct/antisocial/aggressive behaviors.

The scores for hyperactivity and antisocial/aggressive behavior were subjected to hierarchical multiple regression analysis with ASB, LAPS, and SES variable scores. This procedure served to reveal which parental factors (antisocial behavior, problems due to drinking, or demographic characteristics) most greatly influence the

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* A large portion of mothers in the risk group met diagnostic criterion for alcoholism thus further increasing risk status.

problem behaviors in there sons. Several of the factors in this study are designed to measure ADHD or the "purely" hyperactive behaviors (i.e., excessive physical activity, attention span, distractibility, and impulsivity) while the Connors Hyperactivity Index attempts to measure hyperactivity and the element of aggressiveness associated with hyperactive behaviors in some hyperactive children, the Conduct Disorder factor is self explanatory and the CBCL aggression factor likewise. Regression analysis revealed which parental factors may be influencing the "pure" hyperactive behaviors as compared to the more aggressive/hyperactive aspects of the phenomenon, thus allowing differentiation between those who may outgrow their behavioral problems (i.e., those with purely hyperactive behaviors - ADHD) from those whose hyperactivity associated with conduct problems that may progress into adulthood thus more greatly increasing their risk for adult psychopathology (e.g., alcohol abuse and antisocial behavioral problems).

Chapter VII

Results

Child Problem Behaviors

According to most researchers in the fields of psychology and psychiatry, childhood hyperactivity in its various forms (i.e., "pure" hyperactivity, aggressive hyperactivity vs. non-aggressive hyperactivity, attention deficits, etc.), has prevalence rates ranging anywhere from 1% to 20% (Barkley, 1981; Safer & Allen, 1976). However, according to the DSM-III-R, the national rate is nearer to 3% in prepubertal children, with rates ten times more common in boys than in girls (APA, 1987). In the sample under study, rates of hyperactivity and its various associated behaviors were found to be elevated in sons at risk for alcoholism but lower and somewhat similar in magnitude for controls as occurs in the general population. Boys from both groups were compared on three related child-temperament variables: 1) ADHD and its component behaviors; a) attention span/distractibility, b) impulsivity, and c) hyperactivity or excessive physical behaviors; 2) conduct disorder problem behavior, and 3) general aggressive behavior. Reference will be made to "aggressive hyperactivity" at certain places in the following sections of this study; this term refers to the combination of both ADHD and Conduct Disorder type behaviors as they co-occur in the child's behavioral regime

and as they are specifically measured by the Connors Hyperactive Index. The Hyperactive Index encompasses children who are not necessarily categorized as "pure" ADHD or "pure" Conduct Disorder. Rather, as noted above, this instrument seems to reveal a combination of ADHD and Conduct Disorder behaviors that may not be separable in some children but may in fact co-exist as early precursors to later more aggressive/violent behavioral expressions. It was assumed in the present study that if ADHD and Conduct Disorder behaviors could be more narrowly defined according to current diagnostic criteria then they might very well appear as separate behavioral disorders and not as highly related to one another as reported by many researchers (see Hinshaw, 1987; Pihl & Peterson, 1991). As will be discussed below this was not the case, in fact rates of co-occurance of the two disorders in this sample of ADHD children were identical to rates found in most other studies.

Group x Parent ANOVAs computed for all child behavior variables revealed several main effects for Risk, no main effects for Parent, nor were there any meaningful Interaction effects. Based on results from the Connors Parent Questionnaire (Connors) there were significant effects for ADHD [$F(2,198)=4.59, p<.03$] and Hyperactivity (i.e., excessive physical activity) [$F(2,198)=5.89, p<.02$] thus lending support to Hypothesis I. Similar results were found for the factors derived from the Dimensions of Temperament Survey (DOTS) to assess ADHD. A risk effect was

found for ADHD [$F(2,198)=7.50, p<.01$], Hyperactivity [$F(2,198)=5.14, p<.03$], and Attention Span/Distractibility [$F(2,198)=6.26, p<.02$] with the sons of alcoholics being rated significantly higher on ADHD behaviors than sons of nonalcoholics, again in support of Hypothesis I. Sons of alcoholics were rated higher on aggressive behaviors than were sons of non-alcoholics, however, the analysis of variance results only approached significance [$F(2,198)=3.79, p=.053$].

Individual t-tests were conducted for parental ratings of child behavior in the two groups in order to determine whether or not the risk effects were due to father or mother perceptions. The analysis of the Connors and DOTS factors revealed that the differences between groups on ADHD and its component behaviors as well as aggressive behaviors were due to perceptions of alcoholic fathers not mothers; mother ratings did not significantly differ on any of the child variables between the two groups (Tables 2 and 3). Alcoholic fathers rated their sons on most ADHD behaviors as significantly more problematic compared with ratings of non-alcoholic fathers and their sons. More specifically, alcoholic fathers perceived their sons to be more physically active, as having more attention span/distractibility problems and as displaying more behaviors indicative of ADHD than the non-alcoholic comparison fathers (Tables 4 and 5). The two groups did not differ significantly on Conduct

Table 2

Means (M), Standard Deviations (SD), and t-Test Comparisons for Maternal Ratings of Child Problem Behaviors (Connors & CBCL)

Variable	High Risk (n=69) M	SD	Control (n=32) M	SD	t	p
Attention	1.45	1.51	1.34	1.26	.34	.73
Impulsivity	2.79	2.19	2.59	1.60	.47	.64
Hyperactivity	3.46	3.16	2.91	2.57	.87	.39
ADHD	7.71	6.07	6.84	4.52	.72	.47
Hyperactive Index	7.00	5.46	6.56	4.29	.40	.69
Conduct Disorder	9.76	6.57	10.03	6.29	.19	.85

Table 3

Means (M), Standard Deviations (SD), and t-Test Comparisons for Maternal Ratings of ADHD Behaviors (DOTS)

Variable	High Risk (n=69) M	SD	Control (n=32) M	SD	t	p
Hyperactive	1.74	1.23	1.28	1.08	1.80	.08
Attention/Distract	5.69	3.11	4.97	3.07	1.10	.28
ADHD	7.43	3.88	6.25	3.59	1.46	.15

Table 4

Means (M), Standard Deviations (SD), and t-Test Comparisons for Paternal Ratings of Child Problem Behaviors (Connors & CBCL)

Variable	High Risk (n=69) M	SD	Control (n=33) M	SD	t	p
Attention	1.71	1.38	1.21	1.05	1.83	.07
Impulsivity	2.95	2.08	2.36	1.80	1.39	.17
Hyperactivity	4.03	3.06	2.48	1.97	2.63	.01
ADHD	8.69	5.79	6.06	3.72	2.38	.02
Hyperactive Index	7.78	4.96	6.21	3.76	1.61	.11
Conduct Disorder	10.75	5.96	8.63	4.54	1.77	.08

Table 5

Means (M), Standard Deviations (SD), and t-Test Comparisons for **Paternal** Ratings of ADHD Behaviors (DOTS)

Variable	High Risk (n=69) M	SD	Control (n=33) M	SD	t	p
Hyperactive	1.94	1.09	1.60	1.17	1.40	.16
Attention/Distract	6.48	2.76	4.97	2.96	2.51	.01
ADHD	8.42	3.46	6.58	3.70	2.45	.02

Disorder behaviors or aggressive behaviors as measured by the Connors Conduct Disorder factor (Tables 2 and 4) or the CBCL Aggression factor (Tables 8 and 9) although, alcoholic fathers ratings of their sons' Conduct Disorder and aggression were much higher than those of non-alcoholic fathers and did approach significance levels (Tables 4 and 9).

In order to get a family picture of the behavioral perception of the boys under study, we combined both parents scores. When both mother and father ratings were combined (**parental** perception of problematic behaviors), parents from the alcoholic high risk group rated their sons as significantly higher than non-alcoholic parents rated their sons on hyperactivity, attention span/distractibility, and ADHD as measured by the DOTS (Table 6). Parental perceptions jointly accounted for a significant difference between the two groups on ADHD and Hyperactivity as measured by the Connors (Table 7) and also a significant difference for aggressive behaviors based on the results from the CBCL Aggression factor (Table 10). It should be noted that although the differences between the two groups did not differ statistically for all measures of child psychopathology when rated separately by both parents, boys being reared in the high risk family environments scored higher on **all** child problem behavior variables (with the exception of maternal ratings of Conduct Disorder) than boys

Table 6

Means (M), Standard Deviations (SD), and t-Test Comparisons for Parental Ratings of ADHD Behaviors (DOTS)

Variable	High Risk (n=135) M	SD	Control (n=65) M	SD	t	p
Hyperactive	1.83	1.17	1.44	1.13	2.24	.03
Attention/Distract	6.08	2.96	4.97	2.99	2.48	.01
ADHD	7.92	3.70	6.42	3.62	2.71	.01

Table 7

Means (M), Standard Deviations (SD), and t-Test Comparisons for **Parental** Ratings of Child Problem Behaviors (Connors & CBCL)

Variable	High Risk (n=135) M	SD	Control (n=65) M	SD	t	p
Attention	1.58	1.45	1.28	1.15	1.47	.14
Impulsivity	2.87	2.13	2.48	1.69	1.31	.19
Hyperactivity	3.74	3.12	2.69	2.27	2.42	.02
ADHD	8.19	5.93	6.45	4.12	2.14	.03
Hyperactive Index	7.39	5.22	6.38	4.00	1.36	.17
Conduct Disorder	10.26	6.62	9.32	4.48	1.01	.31

Table 8

Means (M), Standard Deviations (SD), and t-Test Comparisons for **Maternal** Ratings of Child Aggression (CBCL)

Variable	High Risk (n=69) M	SD	Control (n=32) M	SD	t	p
Aggression	12.16	6.75	11.03	5.55	.82	.41

Table 9

Means (M), Standard Deviations (SD), and t-Test Comparisons for **Paternal** Ratings of Child Aggression (CBCL)

Variable	High Risk (n=66) M	SD	Control (n=33) M	SD	t	p
Aggression	12.41	6.57	9.79	5.96	1.93	.06

Table 10

Parental Ratings of Child Aggression (CBCL)

Variable	High Risk (n=135) M	SD	Control (n=65) M	SD	t	p
Aggression	12.28	6.63	10.40	5.75	1.96	.05

who are currently being reared in the low risk family environments (i.e., low levels of alcohol use and no abuse and low levels of antisocial behavior). The following figures are presented for both father and mother ratings separately and in combination (i.e., parental ratings) in order to depict the consistent **trend** towards psychopathology that we are seeing in children growing up in this high risk environment (see figures 1 thru 12). Further, these consistently higher scores for the various psychopathic variables lend themselves to the interpretation that a greater propensity towards psychopathology is due to one or more of the heritable/environmental risk factors available in the lives of sons of alcoholic/antisocial parents.

Prevalence of Problem Child Behaviors

Even though the significant findings reported above were found for paternal ratings, most studies using self administered questionnaires find that maternal ratings are more reliable indices of their children's behavior. This may be due to the fact that in earlier life the mother, being the primary caregiver for the most part, spends more time with the child both qualitatively as well as quantitatively. Therefore, it was deemed appropriate to use mothers ratings exclusively when looking at **prevalence rates** of the various psychopathologies under study. Percentages of prevalence of the various behaviors under study can be seen in Table 11.

DIMENSIONS OF TEMPERAMENT (Maternal Ratings)
ADHD and Component Behaviors

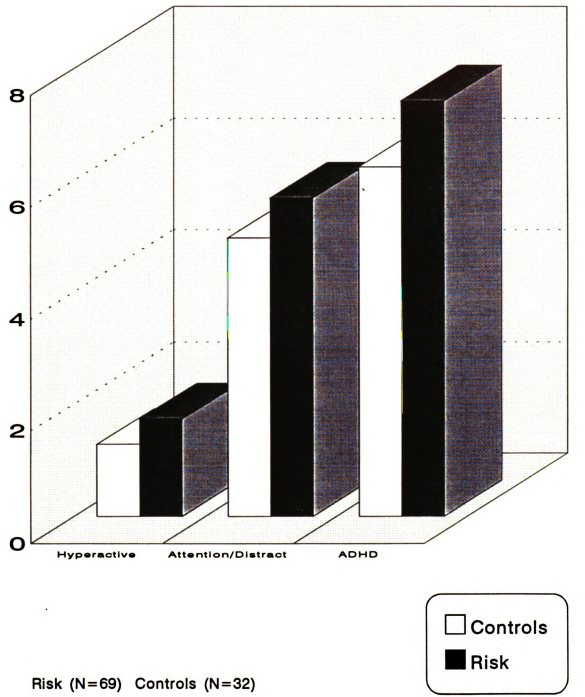
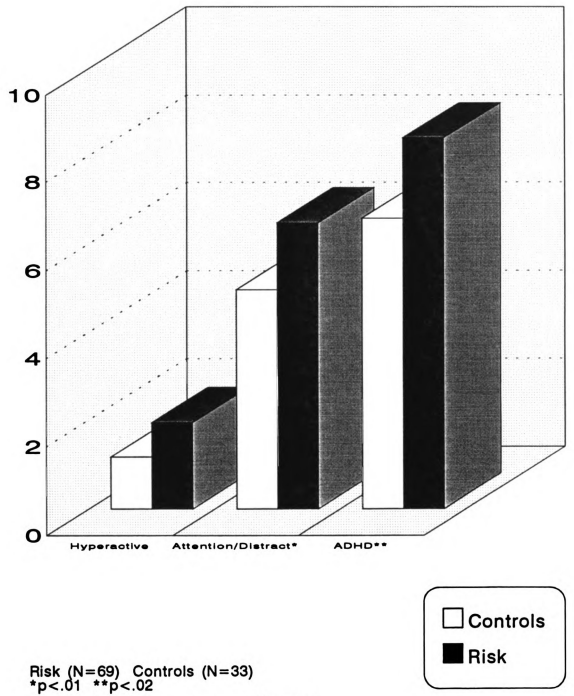


Figure 1

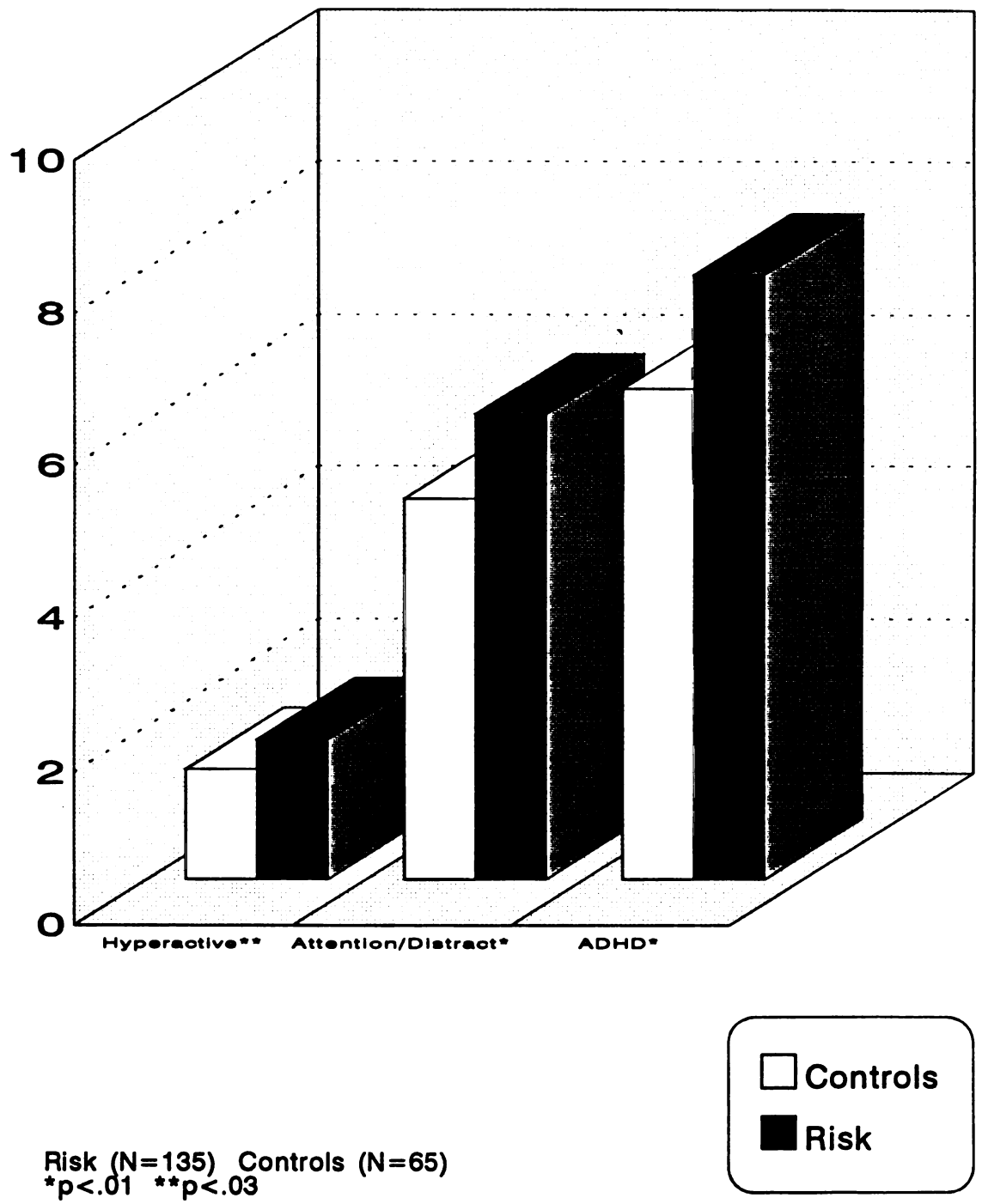
DIMENSIONS OF TEMPERAMENT (Paternal Ratings)
ADHD and Component Behaviors



Risk (N=69) Controls (N=33)
*p<.01 **p<.02

Figure 2

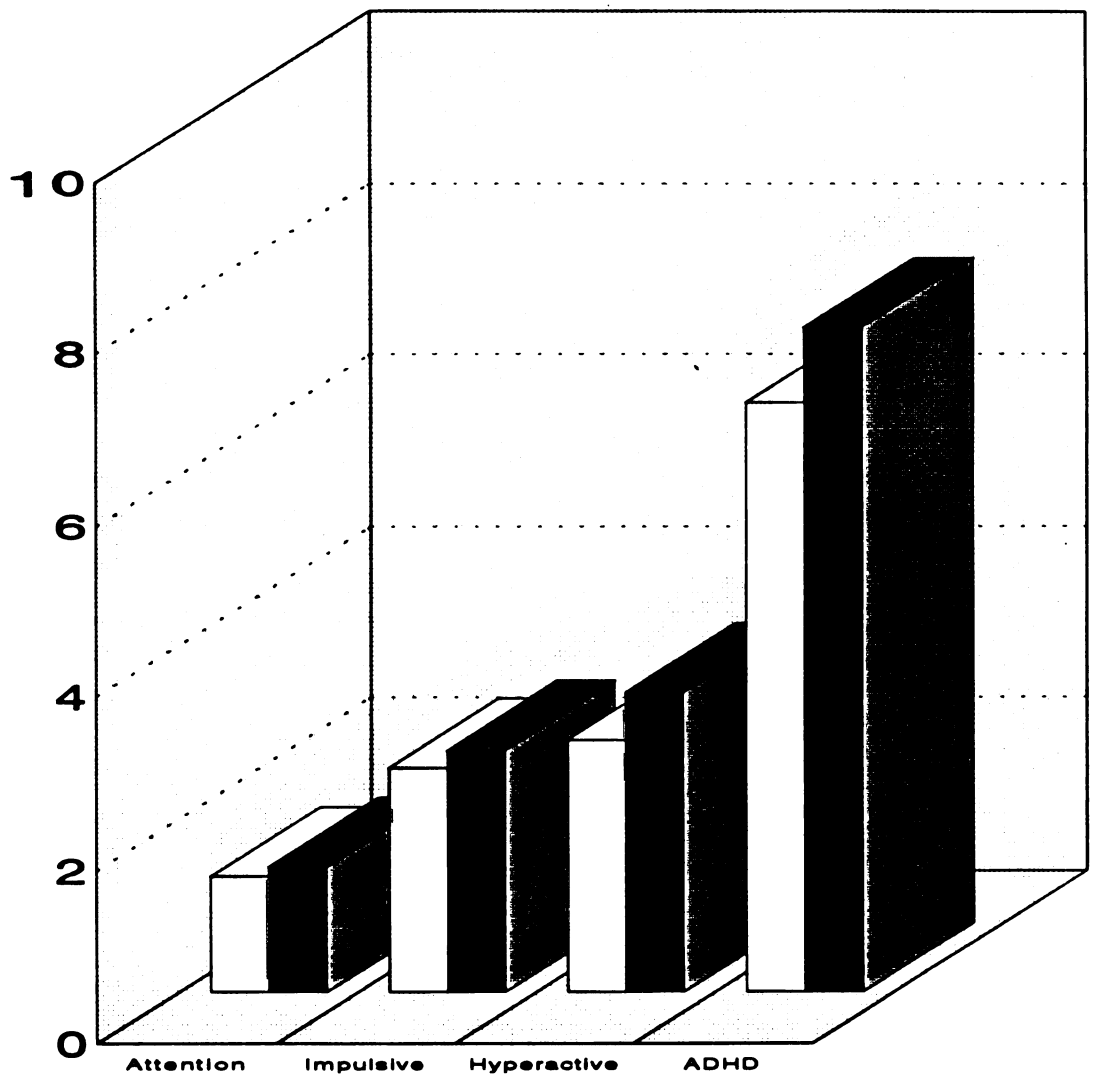
DIMENSIONS OF TEMPERAMENT (Parental Ratings)
ADHD and Component Behaviors



Risk (N=135) Controls (N=65)
*p<.01 **p<.03

Figure 3

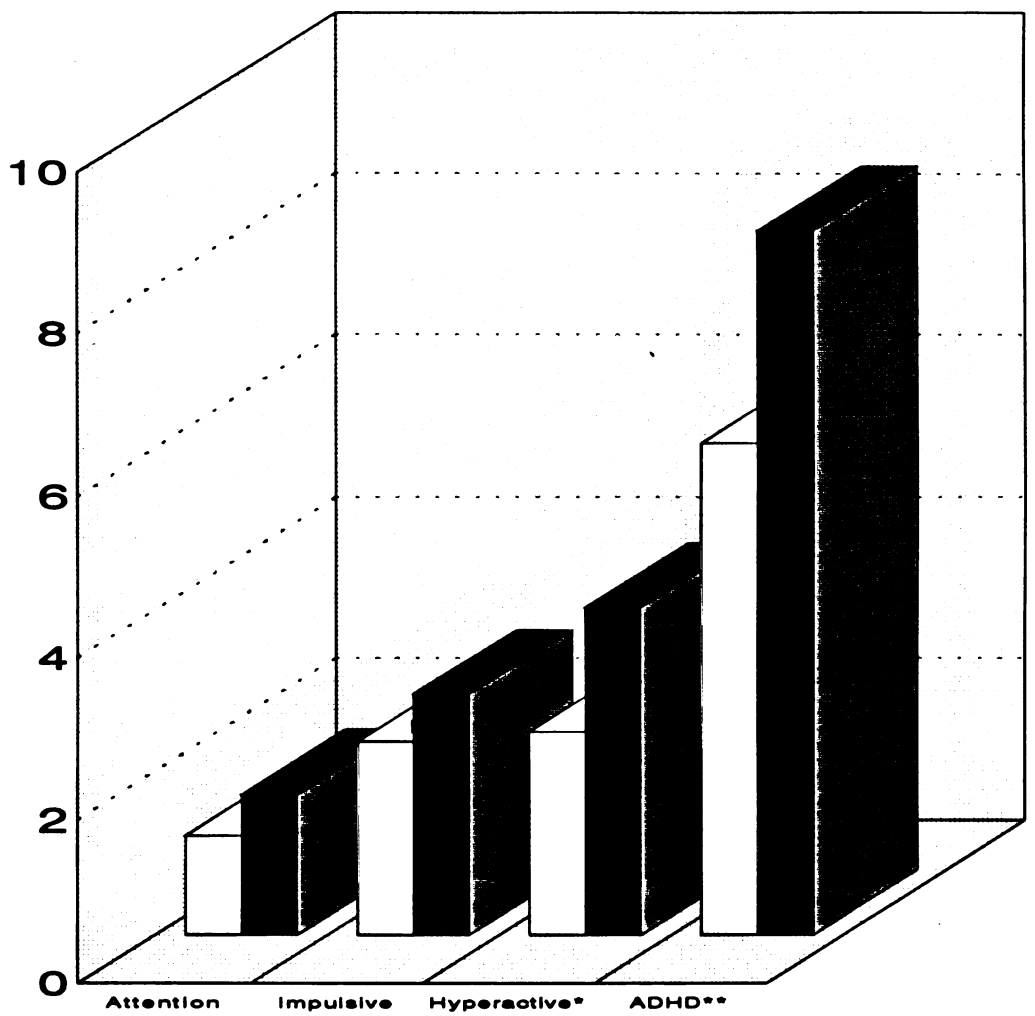
CONNORS PARENT QUESTIONNAIRE (Maternal Ratings)
ADHD and Component Behaviors



Risk (N=69) Controls (N=32)

Figure 4

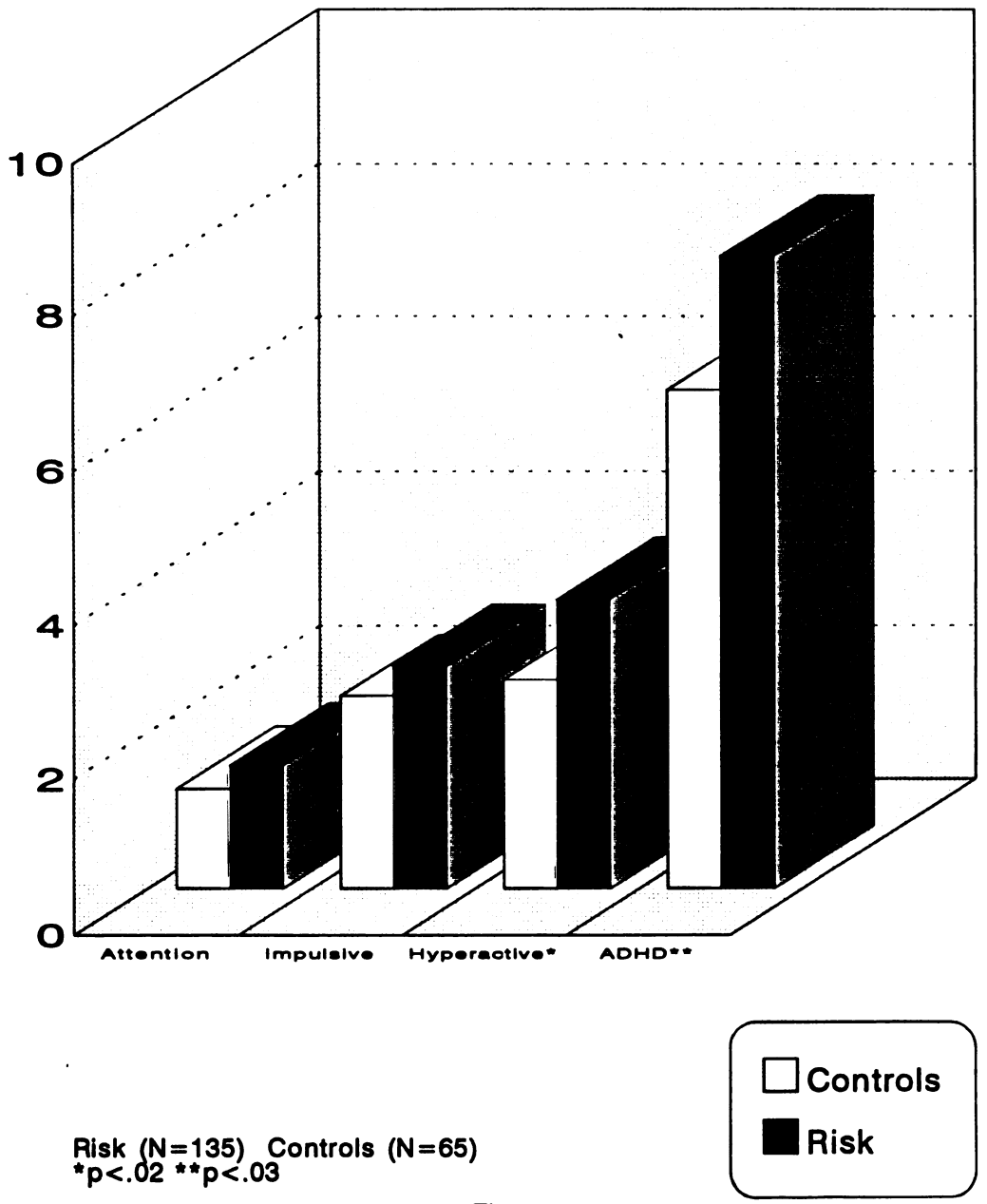
CONNORS PARENT QUESTIONNARE (Paternal Ratings)
ADHD and Component Behaviors



Risk (N=69) Controls (N=33)
*p<.01 **p<.02

Figure 5

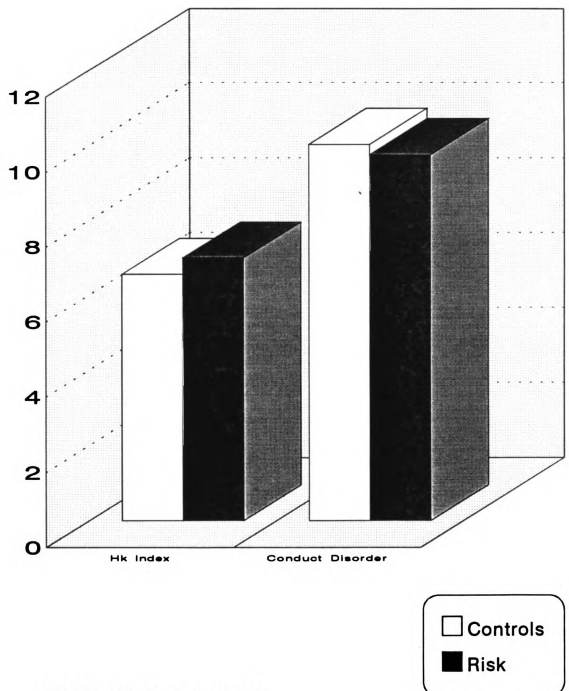
CONNORS PARENT QUESTIONNAIRE (Parental Ratings)
ADHD and Component Behaviors



Risk (N=135) Controls (N=65)
*p<.02 **p<.03

Figure 6

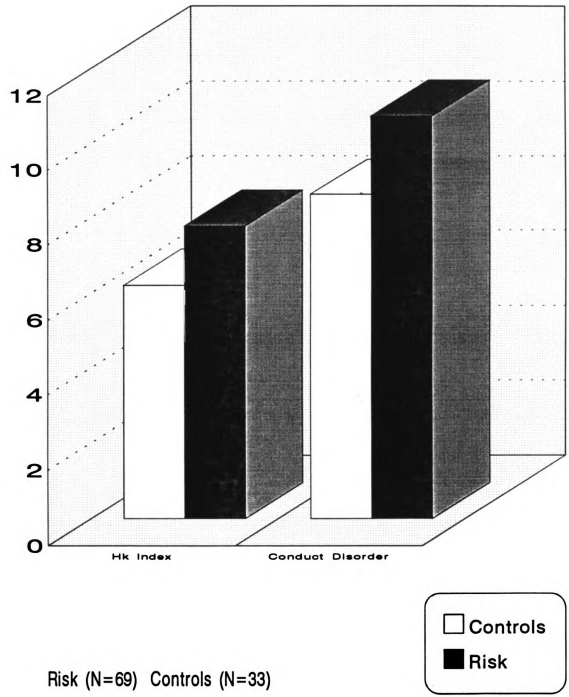
CONNORS PARENT QUESTIONNAIRE (Maternal Ratings)
Aggressive Hyperactivity and Conduct Disorder



Risk (N=69) Controls (N=32)

Figure 7

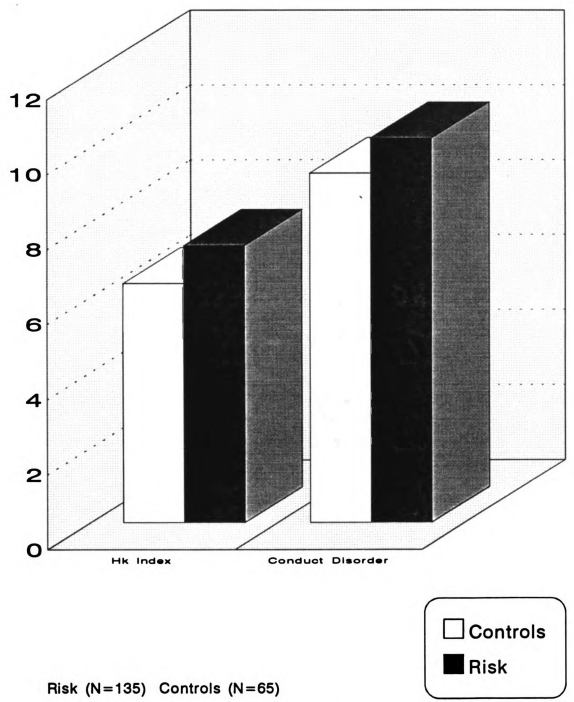
CONNORS PARENT QUESTIONNARE (Paternal Ratings)
Aggressive Hyperactivity and Conduct Disorder



Risk (N=69) Controls (N=33)

Figure 8

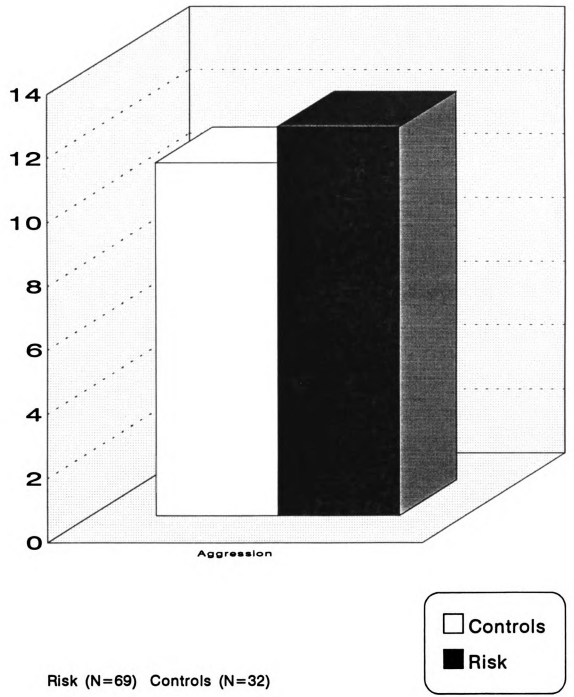
CONNORS PARENT QUESTIONNAIRE (Parental Ratings)
Aggressive Hyperactivity and Conduct Disorder



Risk (N=135) Controls (N=65)

Figure 9

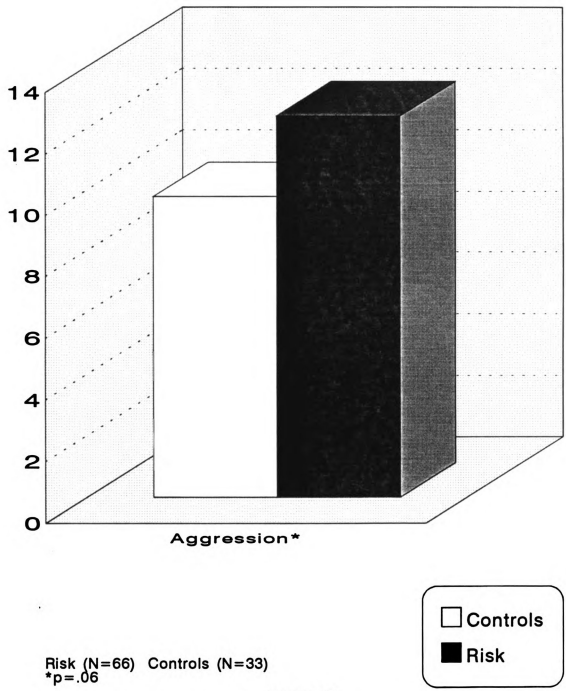
CHILD BEHAVIOR CHECKLIST (Maternal Ratings)
Aggressive Behavior



Risk (N=69) Controls (N=32)

Figure 10

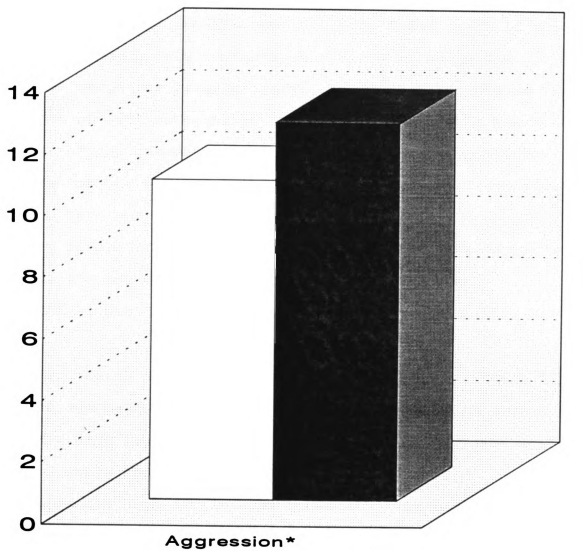
CHILD BEHAVIOR CHECKLIST (Paternal Ratings)
Aggressive Behavior



Risk (N=66) Controls (N=33)
*p=.06

Figure 11

CHILD BEHAVIOR CHECKLIST (Parental Ratings)
Aggressive Behavior



Risk (N=135) Controls (N=65)
*p<.05

Figure 12

Cutoff scores for the various measures were established based on the standardized cutoff score for the Connors Hyperactive Index as derived by Connors (1990). Based on his standardization studies, Connors came up with a standard cutoff score of 15 for the Hyperactivity Index; a child who meets or exceeds this score is considered to be in the clinical range for hyperactivity. In the current sample the children who met or exceeded this score were in the top ten percent of the group. Insofar as there are no formalized cutoffs for the other factors, and being that the individual factors have been altered so as to better define ADHD and Conduct Disorder behaviors, those children scoring in the top 10% for the other factors on this and the other instruments were also considered to be in the clinical range.

Looking at the boys who met or exceeded the cutoffs for the various psychopathologies (Table 11), it can be seen that the majority of them are being reared in families where alcohol abuse and antisociality are exhibited at significantly high levels (see Table 12). Examining Table 11 reveals twice the incidence of ADHD, Hyperactivity, Impulsivity and Aggression in boys being reared in a high risk, alcoholic/antisocial environment as compared to those being reared in a low risk, non-alcoholic/non-antisocial environment. There is a discrepant finding between the results for rates of Attention Span/Distractibility problems

Table 11

Percentages of Sons Meeting Cutoff Scores for ADHD, Conduct Disorder and Aggression Utilizing **Maternal** Ratings

	Risk Group (N=69)	Control Group (N=32)
CONNORS		
Attention	10%	9%
Hyperactive	13%	6%
Impulsive	13%	6%
ADHD	12%	3%
Hk Index	10%	6%
Conduct Disorder	9%	12%
DOTS		
Att/Dist	13%	3%
Hyperactivity	41%	19%
ADHD	12%	6%
CBCL		
Aggressive	12%	6%

Table 12

Means (M), Standard Deviations (SD), and t-Test Comparisons for Parental Alcoholic Problems (LAPS) and Antisocial Behavior Scores

Parent Variable	High Risk (n=69) M	SD	Control (n=32) M	SD	t	p
Mothers						
LAPS	10.49	2.18	9.15	1.40	3.18	.00
ASB	12.85	8.62	8.34	5.32	2.73	.00
Fathers						
LAPS	10.49	1.86	7.05	1.38	9.41	.00
ASB	22.61	12.45	11.18	6.20	4.96	.00

between the two measures used; the Connors revealed nearly the same rate of occurance for the two groups, whereas the DOTS showed nearly four times the incidence in the high risk group when compared to the control group. This result can probably be attributed to the wider range of responses available for the Connors factor thus increasing the variability of item endorsement.

Analysis of the factors from the DOTS selected to assess temperamental characteristics indicative of ADHD yielded some interesting results. As mentioned, four times as many boys in the high risk group exhibited behavior in the problem range for attention span/distractibility and two times as many for ADHD. However, the most interesting finding was the rather large group (one third of the entire sample) of perceived overly active youths in the present sample. Forty-one percent of the risk boys were in this group; over twice the rate (19%) of the boys in the control group. Again it must be pointed out that the range of response is more narrow on the DOTS questionnaire (1=true and 2=false) thus, those boys who had all three items endorsed for this factor were considered to be overly active as perceived by their mothers, whereas, for the Connors Hyperactivity factor, only the top ten percent, as explained above, were considered to be overly active. This rather sizable group of children that met cutoffs for being hyperactive as defined by the DOTS, might not be clinically

hyperactive, insofar as pre-school aged children for the most part exhibit what adults might perceive as "inappropriate" levels of activity. However, it does serve to confirm the notion that sons of alcoholics tend to be more physically active than sons of non-alcoholics (e.g., Cantwell, 1975; Jones, 1968; Tarter et al., 1985).

Looking at the rates of psychopathology in the two groups from a slightly different perspective yields a more striking comparison between the groups. When we examine only the group of boys who exhibited problem behaviors, the majority of them are being reared in high risk environments where alcoholism and antisocial behavior (as well as other psychopathologies not currently assessed; see Fitzgerald et al., 1991, and Zucker and Barron, 1973) are at significantly higher levels than in the comparison families. For example, of the boys who exhibit ADHD type behaviors in this sample, nearly 90% of them are living in the high risk environment. Similarly, 90% of the boys with attention span difficulties, 82% exhibiting hyperactive and impulsive behaviors, 78% aggressive hyperactive, and 80% exhibiting general aggressive behaviors are also being reared in a high risk environment. Only Conduct Disorder boys revealed no between group differences; a result probably due to the age of boys in this study and the rather small sample size of boys meeting problematic behavioral cutoffs. However, these findings point to the association of alcoholism and

hyperactivity, reaffirming that greater levels of risk yield greater levels of problematic behavior. Therefore, in the current sample, considering only abnormal behavior, it appears that risk for alcoholism and antisocial behavior significantly heightens one's risk for poor behavioral outcome (Earls et al., 1988; Pihl, Peterson & Finn, 1990; Schachar, Rutter, & Smith, 1981).

Co-Morbidity of ADHD and Conduct Disorder

Most researchers argue that ADHD and Conduct Disorder occur together in children and some insist that the two behaviors are in fact indicative of one syndrome (Hinshaw, 1987). Based on the Connors ratings, we observed that between 44 and 55 percent of those boys who exhibited ADHD, or "pure" hyperactivity, as it is so defined here, also exhibited Conduct Disorder behavior; nearly identical rates found on average for many studies (cited in Pihl & Petersons review, 1991) and consistent with and well within the 32-92% mean rates of overlap found elsewhere (Sandberg, Wieselberg, and Shaffer, 1980; Stewart, Cummings, Singer, and deBlois, 1981). In addition, of those boys who displayed behavior indicative of Conduct Disorder, 50% simultaneously met cutoff scores for ADHD. A more discrete breakdown of the component behaviors of ADHD revealed that forty percent of those boys who exhibited severe attention span difficulties also reached or exceeded the cutoff for Conduct Disorder, and 55% of boys meeting or exceeding cutoff scores for

impulsivity likewise were in this same group of boys with conduct behavior problems. The overly active boys (i.e., hyperactive) had similar, although somewhat lower, incidence of conduct disorder type behaviors (36%) as rated by the Connors Parent Questionnaire.

The DOTS factors yielded very similar results. Forty-four percent of those boys exhibiting ADHD also met cutoffs for Conduct Disorder, as did 40% of the boys having attention span/distractibility problems. Among the large group of hyperactive children (n=34), 20% were in the Conduct Disorder range again revealing an association between Conduct Disorder and ADHD type behaviors although, as will be discussed below, this was a lower rate of overlap than compared with overall ADHD and other ADHD component behaviors (i.e., impulsivity and attention span problems).

In summary, of all the boys in the present sample who exhibited one or more of the problem behaviors measured here (n=43), the majority of them are being raised in risk environments (n=34) (i.e., this amounts to 50% of the high risk individuals in the study) and the remaining problem behavior children (n=9) are being raised in the low risk environments (i.e., this amounts to 28% of the controls). This provides confirmation that parental alcoholism (and antisociality) increases a child's chances for a poor behavioral developmental outcome in the pre-school years. And from other research, we expect that such problematic

behavior will be exacerbated in later childhood (Campbell, 1987) and adolescence (Blouin et al., 1978; August et al., 1983) so long as children continue to be exposed to parental alcoholism and antisocial behavior (Hinshaw, 1987).

Predictors of Child Problem Behaviors

Hypothesis II predicted that parental scores on antisocial behavior (ASB) and problems related to drinking (LAPS) would be significant predictors of psychopathology for children in the risk group more so than demographic variables, and that demographic variables would be predictors of psychopathology for children in the low risk group more so than problems related to parental drinking and antisocial behavior. To determine whether these hypotheses were correct, multiple hierarchical regressions were conducted. When testing for predictors of child psychopathology in children at high risk, parents' LAPS and ASB scores were forced into the equation simultaneously and then the variables measuring SES, income and education were forced into the equation. This was based on the presumption that parental psychopathology in the alcoholic/antisocial parents is the primary factor contributing to child psychopathology and that demographic characteristics play a secondary role. On the other hand, for control families, the assumption was that the demographic variables would be more predictive of child psychopathology (i.e., ADHD, Conduct Disorder, and aggressive behavior), since parents

are presumed not to be pathological with respect to alcohol abuse or antisocial behavior. Regressions done for control families also contained two hierarchical steps of entry; the first being the demographic variables forced in together, and the second being LAPS and ASB scores forced in together. These assumptions were based on prior findings by Fitzgerald et al. (1990) that: 1) demographic factors were more influential on child activity levels in control families than was parental psychopathology, and 2) that parents in the control group revealed significantly lower levels of antisocial behavior and problems related to drinking than the risk group.

Preliminary correlation analysis revealed that LAPS scores in control families were unrelated to child psychopathology for both mothers and father and that only mothers' antisocial behavior was related to several child variables. As can be seen in Table 13, mothers correlations of LAPS and child variables in the control families are very small and non-significant while interestingly their antisocial behavior scores are highly correlated with several of the child psychopathology ratings. Note also that several relationships between mother ratings of child psychopathology and demographic variables (i.e., mothers education and family income level) were statistically significant as hypothesized. Fathers in the control group, on the other hand, showed no significant correlations

Index for Variables in Correlation Tables

Parental Psychopathology Variables

LAPS - Lifetime Alcohol Problems Score

ASB - Antisocial Behavior Score

Parental Demographic Variables

SES - Socioeconomic Status

- Revised Duncan Code

ED - Education

INCOME - Family Income/Year

Parental Ratings of Child Problem Behaviors

Dimensions of Temperament

DHK - Hyperactivity

DATT - Attention Difficulties

DADHD - Attention-deficit Hyperactivity Disorder

Connors Parent Questionnaire

CHK - Hyperactivity

CATT - Attention Difficulties

CIMP - Impulsivity

CADHD - Attention-deficit Hyperactivity Disorder

CINDX - Hyperactivity Index

CINDX - Hyperactivity Index

CCD - Conduct Disorder

Child Behavior Checklist

AGGR - Aggression (CBCL)

Table 13

Correlations of Control Maternal Variables With Child Variables (N=32)

	LAPS	ASB	SES	ED	INCOME	DHK	DATT	DADHD	CHK	CATT	CIMP	CADHD	CINDX	CCD	AGGR
LAPS	1.00														
ASB	.15	1.00													
SES	.35[c]	-.21	1.00												
ED	.31	-.32	.41[c]	1.00											
INCOME	.04	-.24	.22	.43[c]	1.00										
DHK	.00	.23	-.22	-.20	-.25	1.00									
DATT	-.23	.22	-.51[b]	.01	.03	.34	1.00								
DADHD	-.20	.25	-.50[b]	-.05	-.05	.59[a]	.96[a]	1.00							
CHK	-.10	.46[b]	-.29	-.33	-.39[c]	.62[a]	.42[b]	.55[a]	1.00						
CATT	-.28	.25	-.27	-.23	-.15	.38[c]	.56[a]	.59[a]	.51[b]	1.00					
CIMP	-.16	.14	-.18	-.38[c]	-.17	.18	.13	.16	.62[a]	.29	1.00				
CADHD	-.19	.38[c]	-.30	-.39[c]	-.33	.52[b]	.44[b]	.54[c]	.93[a]	.67[a]	.79[a]	1.00			
CINDX	-.08	.47[b]	-.19	-.26	-.26	.55[a]	.41[c]	.52[c]	.87[a]	.70[a]	.65[a]	.92[a]	1.00		
CCD	.00	.63[a]	-.08	-.40[c]	-.34[c]	.43[c]	.11	.23	.70[a]	.45[b]	.35[c]	.65[a]	.77[a]	1.00	
AGGR	-.11	.58[a]	-.01	-.31	-.36[c]	.41[c]	.15	.25	.74[a]	.25	.45[b]	.65[a]	.70[a]	.84[a]	1.00

[a]p<.001 [b]p<.01 [c]p<.05

between LAPS and ASB scores with child psychopathology variables nor for any of the demographic variables (see Table 14). This preliminary look at the data served to substantiate, in part, the rationale for the ordering of the hierarchical regressions for the control families.

The correlation analysis of risk family variables also substantiated, to a point, the rationale for the ordering of variables entered into the regression analyses. Tables 15 and 16 show the correlation coefficients for mother and father ratings of parental psychopathology and demographic variables with child problem behavior variables. Overall, the results were consistent with the hypotheses. Correlations for the mothers' LAPS and ASB scores were significantly related to child problem behavior ratings while correlations for the fathers were much less so. In this particular sample it has been found that father ratings are significantly higher than mother ratings for both LAPS and ASB, so it was expected that the fathers' psychopathology would be more related to and thus more predictive of their sons problematic behavior. It can also be seen that for risk mothers, level of income was strongly related to hyperactivity and conduct problem behavior whereas for fathers level of SES was more strongly correlated with hyperactive and conduct problem behavior. For neither of the risk parents was education significantly correlated with any of the child problem behavior variables.

Table 14

Correlations of Control Paternal Variables With Child Variables (N=33)

	LAPS	ASB	SES	ED	INCOME	DHK	DATT	DADHD	CHK	CATT	CIMP	CADHD	CINDX	CCD	AGGR
LAPS	1.00														
ASB	.27	1.00													
SES	-.26	-.03	1.00												
ED	-.18	.02	.73[c]	1.00											
INCOME	.02	-.24	.19	.33	1.00										
DHK	.34	-.02	-.31	-.26	.05	1.00									
DATT	.17	.11	-.07	-.31	-.06	.51[b]	1.00								
DADHD	.24	.08	-.16	-.33	-.03	.72[a]	.96[a]	1.00							
CHK	.15	.10	.05	-.02	-.03	.59[a]	.48[b]	.56[a]	1.00						
CATT	.19	.03	-.06	-.04	-.05	.24	.44[b]	.43[b]	.48[b]	1.00					
CIMP	-.01	.07	-.15	-.19	.02	.20	.13	.17	.40[b]	.20	1.00				
CADHD	.13	.09	-.06	-.11	-.02	.48[b]	.44[b]	.50[b]	.86[a]	.63[a]	.75[a]	1.00			
CINDX	.17	.12	-.03	-.02	-.07	.37[c]	.38[c]	.42[b]	.67[a]	.61[a]	.71[a]	.87[a]	1.00		
CCD	.09	.33	-.00	-.09	-.06	.38[c]	.31	.37[b]	.56[a]	.46[b]	.73[a]	.79[a]	.80[a]	1.00	
AGGR	-.02	.26	.08	-.15	-.02	.32	.34	.37[b]	.55[a]	.33	.57[a]	.66[a]	.67[a]	.77[a]	1.00

[a]p<.001 [b]p<.01 [c]p<.05

Table 15

Correlations of Risk Maternal Variables With Child Variables (N=69)

	LAPS	ASB	SES	ED	INCOME	DHK	DATT	DADHD	CHK	CATT	CIMP	CADHD	CINDX	CCD	AGGR
LAPS	1.00														
ASB	.57[a]	1.00													
SES	-.12	-.33[b]	1.00												
ED	-.16	-.41[a]	.45	1.00											
INCOME	-.11	-.43[a]	.35	.41[c]	1.00										
DHK	.04	.23[c]	-.09	-.31	-.39[a]	1.00									
DATT	.14	.29[c]	-.07	-.11	-.19	.49[a]	1.00								
DADHD	.13	.30[b]	-.02	-.19	-.28[c]	.72[a]	.96[a]	1.00							
CHK	.39[a]	.42[c]	-.12	-.19	-.35[b]	.53[a]	.45[a]	.53[a]	1.00						
CATT	.33[b]	.39[c]	-.14	-.18	-.26[c]	.59[c]	.59[c]	.71[a]	.71[a]	1.00					
CIMP	.37[b]	.38[a]	-.23	-.06	-.27[c]	.35[b]	.31[b]	.36[b]	.67[a]	.57[a]	1.00				
CADHD	.42[a]	.45[a]	-.18	-.17	-.35[b]	.55[a]	.51[a]	.58[a]	.94[a]	.83[a]	.85[a]	1.00			
CINDX	.42[a]	.49[a]	-.21	-.15	-.28[c]	.49[a]	.54[a]	.59[a]	.84[a]	.83[a]	.81[a]	.94[a]	1.00		
CCD	.49[a]	.61[a]	-.28[a]	-.17	-.29[c]	.28[b]	.33[b]	.35[b]	.61[a]	.47[a]	.66[a]	.66[a]	.74[a]	1.00	
AGGR	.43[a]	.53[a]	-.24	-.01	-.27[c]	.23	.34[b]	.34[b]	.64[a]	.49[a]	.68[a]	.70[a]	.73[a]	.84[a]	1.00

[a]p<.001 [b]p<.01 [c]p<.05

Table 16

Correlations of Risk Paternal Variables With Child Variables (N=69)

	LAPS	ASB	SES	ED	INCOME	DHK	DATT	DADHD	CHK	CATT	CIMP	CADHD	CINDX	CCD	AGGR
LAPS	1.00														
ASB	.56[a]	1.00													
SES	-.18	-.34[b]	1.00												
ED	.00	-.17	.42[a]	1.00											
INCOME	-.13	-.28[c]	.31[b]	.28[c]	1.00										
DHK	.08	.02	-.18	-.19	-.13	1.00									
DATT	.19	.11	-.05	-.13	-.15	.53[a]	1.00								
DADHD	.19	.09	-.10	-.17	-.16	.73[a]	.96[a]	1.00							
CHK	.21	.27	-.29[c]	-.13	-.26[c]	.58[a]	.36[b]	.47[a]	1.00						
CATT	.06	.09	-.05	-.05	-.04	.37[b]	.58[a]	.58[a]	.64[a]	1.00					
CIMP	.34[b]	.20	-.16	-.16	-.18	.27[c]	.23	.27[c]	.72[a]	.56[a]	1.00				
CADHD	.24[b]	.23	-.22	-.14	-.21	.49[a]	.42[a]	.49[a]	.94[a]	.78[a]	.87[a]	1.00			
CINDX	.23	.15	-.22	-.05	-.15	.42[a]	.44[a]	.48[a]	.84[a]	.82[a]	.81[a]	.93[a]	1.00		
CCD	.32[b]	.23	-.33[b]	-.10	-.26[c]	.31[c]	.30[c]	.33[b]	.73[a]	.55[a]	.76[a]	.79[a]	.81[a]	1.00	
AGGR	.34[b]	.40[a]	-.37[b]	-.13	-.14	.33[b]	.25[c]	.30[c]	.60[a]	.45[a]	.51[a]	.61[a]	.62[a]	.69[a]	1.00

[a]p<.001 [b]p<.01 [c]p<.05

Hierarchical Multiple Regression Analyses

The next step was to perform hierarchical multiple regressions on parent and child variables. Results of these regressions can be seen in Tables 17 thru 28. In order to explore the predictive power of parental psychopathology and demographic variables on childhood problem behaviors, each child variable was subjected to hierarchical multiple regressions with order of equation entry as outlined above. Analyses were run separately for mother variables predicting mother ratings of child behavior, and with fathers variables predicting father ratings of child behavior.

Although regression analysis substantiated Hypothesis II the results were unexpected in that mother variables were more significant predictors of child psychopathology than were father variables. Hypothesis III was supported in part, although as will be discussed later, some of the effects found seem to be masked by variables not included in the current study.

Predictors of Child Problem Behaviors (Risk Group)

The following results are for ratings of child problem behaviors as measured by the various Connors ratings and the CBCL aggression factor, results for the measures from the DOTS will be presented below. Antisocial behavior scores for mothers in the high risk group emerged as the strongest and most significant predictor of ADHD and its component behaviors, conduct disorder, aggressive hyperactivity, and

aggression (Tables 17 and 18). As indicated in Table 17, it is maternal antisociality that is most highly and consistently related to her sons aggressive problematic behaviors. However, as can be seen in Table 18, maternal antisocial behavior is most predictive of her son's ADHD scores before the entry of the demographic variables. After the demographic variables are entered into the equation, antisocial behavior no longer is a significant predictor but rather problems related to drinking and level of income emerge as the primary predictors of ADHD. Notice, however, that the beta weights for the three variables under discussion (antisocial behavior, problems due to drinking and income) are nearly the same in the two regression equations. Thus, even though antisociality may not be statistically significant in the presence of alcoholism and income it does contribute to the effect. A similar result was found for the Connors Hyperactivity factor. Antisocial behavior was the strongest predictor in the first equation but it appears to lose its predictive significance in the second equation, where income and alcoholism emerge as the strongest of the predictors. For the Attention factor maternal antisocial behavior maintains its predictive strength in both equations although not quite significantly so in the second equation.

Table 17

Hierarchical Multiple Regressions for High Risk Boys' Aggressive Problem Behaviors (Connors) Utilizing Maternal LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Connors Conduct Disorder	.42	.40	[F(2,54)=20.0,p<.00]	
LAPS			.22	1.77
ASB			.49	3.98[a]
	.44	.39	[F(5,51)=8.11,p<.00	
LAPS			.23	1.75
ASB			.46	3.10[a]
SES			-.09	-.78
Income			-.09	-.72
Education			.12	.92
Connors Hk Index	.30	.27	[F(2,61)=13.1,p<.00]	
LAPS			.20	1.55
ASB			.40	3.15[a]
	.33	.27	[F(5,58)=5.69,p<.00]	
LAPS			.22	1.65
ASB			.37	2.45[b]
SES			-.08	-.65
Income			-.15	-1.18
Education			.15	1.21
CBCL Aggession	.33	.31	[F(2,61)=15.2,p<.00]	
LAPS			.22	1.76
ASB			.42	3.31[a]
	.42	.31	[F(5,58)=8.50,p<.00]	
LAPS			.23	1.85
ASB			.42	2.95[a]
SES			-.16	-1.43
Income			-.18	-1.50
Education			.34	2.80[a]

[a]p<.01 [b]p<.02

Table 18

Hierarchical Multiple Regressions for High Risk Boys' ADHD Problem Behaviors (Connors) Utilizing Maternal LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
ADHD	.26	.23	[F(2,61)=10.75,p<.00]	
LAPS			.23	1.72
ASB			.34	2.58[a]
	.31	.25	[F(5,58)=5.22,p<.00]	
LAPS			.27	2.00[b]
ASB			.24	1.53
SES			-.02	.17
Income			-.26	-2.00[b]
Education			.10	.74
Hyperactivity	.22	.19	[F(2,61)=8.48,p<.00]	
LAPS			.21	1.53
ASB			.31	2.29[a]
	.28	.21	[F(5,58)=4.44,p<.00]	
LAPS			.26	1.86
ASB			.19	1.22
SES			.06	.49
Income			-.29	-2.15[b]
Education			.03	.23
Attention	.19	.17	[F(2,61)=7.23,p<.00]	
LAPS			.12	.84
ASB			.36	2.59[a]
	.21	.15	[F(5,58)=3.16,p<.02	
LAPS			.14	.97
ASB			.31	1.85
SES			.00	.03
Income			-.18	-1.25
Education			.09	.60
Impulsivity	.21	.18	[F(2,61)=7.90,p<.00]	
LAPS			.25	1.83
ASB			.26	1.89
	.26	.19	[F(5,58)=4.03,p<.00]	
LAPS			.28	2.03[b]
ASB			.17	1.09
SES			-.15	-1.18
Income			-.19	-1.41
Education			.17	1.23

[a]p<.02 [b]p<.05

For the fathers in the high risk group the results for the Connors and CBCL factors are similar as those for the mothers although the picture they paint is not as vivid (Tables 19 and 20). Fathers drinking behavior appears to be predicting his sons Conduct Disorder (Table 19) in that the overall equation was significant although the individual T value only approached significance at the $p<.05$ level ($p=.056$). As expected, paternal antisociality predicted aggression. Socioeconomic status appears to be of some predictive power of childhood aggression revealing that the lower ones SES is the higher the level of aggression in ones offspring (see Table 19, the F is significant, but the T value failed to meet the .05 level of significance). For the measures of ADHD (Table 20) the only significant predictor of child behavior is associated with fathers' drinking behavior. Fathers' problems related to excessive drinking were consistently related to their sons' impulsivity in both regression equations. Note that this was also the case for the mothers' ratings of their sons' impulsivity (refer back to Table 18).

Results for regressions using mothers' DOTS ratings for child behavior problems were similar to those obtained with the Connors factors; antisocial behavior was the most consistent and significantly strong predictor of their sons' ADHD behavior with the exception of level of education and hyperactivity (Table 21).

Table 19
Hierarchical Multiple Regressions for **High Risk** Boys' Aggressive Problem Behaviors (Connors) Utilizing **Paternal** LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Connors Conduct Disorder	.09	.06	[F(2,58)=3.0,p=.06]	
LAPS			.26	1.77
ASB			.07	.49
	.19	.12	[F(5,55)=2.58,p<.04]	
LAPS			.27	1.84
ASB			-.06	-.38
SES			-.26	-1.86
Income			-.13	-.95
Education			-.00	-.05
Connors Hk Index	.05	.01	[F(2,60)=1.5,p=.24]	
LAPS			.19	1.24
ASB			.05	.30
	.08	.00	[F(5,57)=1.02,p=.41]	
LAPS			.19	1.25
ASB			-.04	-.22
SES			-.17	-1.14
Income			-.07	-.50
Education			-.00	-.05
CBCL Aggession	.17	.15	[F(2,60)=6.5,p<.00]	
LAPS			.15	1.11
ASB			.31	2.25[a]
	.25	.18	[F(5,57)=3.79,p<.00]	
LAPS			.16	1.20
ASB			.23	1.56
SES			-.24	-1.80
Income			.07	.55
Education			-.11	-.80

[a]p<.03

Table 20
Hierarchical Multiple Regressions for High Risk Boys' ADHD Problem Behaviors (Connors) Utilizing Paternal LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
ADHD	.06	.03	[F(2,60)=1.99,p=.14]	
LAPS			.15	.98
ASB			.14	.93
	.16	.03	[F(5,57)=1.35,p=.26]	
LAPS			.16	1.03
ASB			.05	.29
SES			-.12	-.82
Income			-.12	-.87
Education			-.05	-.34
Hyperactivity	.06	.03	[F(2,60)=2.07,p=.13]	
LAPS			.07	.45
ASB			.21	1.42
	.14	.06	[F(5,57)=1.83,p=.12]	
LAPS			.07	.48
ASB			.09	.60
SES			-.20	-1.40
Income			-.17	-1.26
Education			.02	.12
Attention	.01	-.03	[F(2,60)=.20,p=.82]	
LAPS			-.00	-.01
ASB			.08	.54
	.01	-.07	[F(5,57)=.14,p=.98	
LAPS			.01	.04
ASB			.07	.42
SES			.01	.05
Income			.02	.12
Education			-.08	-.53
Impulsivity	.10	.78	[F(2,60)=3.42,p<.04]	
LAPS			.31	2.13[a]
ASB			.02	.12
	.14	.06	[F(5,57)=1.81,p=.13]	
LAPS			.33	2.20[a]
ASB			-.06	-.35
SES			-.04	-.29
Income			-.10	-.72
Education			-.11	-.78

[a]p<.05

Table 21
Hierarchical Multiple Regressions for **High Risk** Boys' Aggressive Problem Behaviors (DOTS) Utilizing **Maternal** LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Att/Dist	.09	.06	[F(2,61)=3.17,p<.05]	
LAPS			-.00	-.03
ASB			.31	2.09[a]
	.14	.06	[F(5,58)=1.94,p=.10]	
LAPS			-.00	-.00
ASB			.32	1.87
SES			.22	1.58
Income			-.14	-.99
Education			-.02	.11
Hyperactivity	.09	.06	[F(2,61)=2.93,p<.07]	
LAPS			-.15	-1.01
ASB			.35	2.39[a]
	.22	.16	[F(5,58)=3.33,p<.01]	
LAPS			-.08	-.53
ASB			.13	.80
SES			.15	1.09
Income			-.33	-2.37[a]
Education			-.20	-1.42
ADHD	.11	.08	[F(2,61)=3.82,p<.03]	
LAPS			-.05	-.34
ASB			.36	2.46[a]
	.18	.10	[F(5,58)=2.47,p<.05]	
LAPS			-.02	-.16
ASB			.30	1.78
SES			.22	1.63
Income			-.22	-1.53
Education			-.05	-.34

[a]p<.05

Consistent with the Connors findings, risk fathers' variables were not predictive of their sons' problem behavior as measured by the DOTS (Table 22).

Predictors of Child Problem Behaviors (Controls)

According to Hypothesis III it was assumed that parental psychopathology would not be predictive of child problem behavior in the control families. This hypothesis was strongly substantiated in the analysis of the DOTS variables (Table 23). Control mothers perceptions of their sons' ADHD and Attention Span/Distractibility problems were highly predicted by SES on both regression equations. However, as can be seen in Tables 24 and 25, control mothers' antisocial behavior was the only significant predictor of Hyperactivity, Conduct Disorder, and Aggression and nearly so for ADHD. No control father variables, however, significantly predicted any child variable in the regressions (Tables 26, 27 and 28).

Table 22

Hierarchical Multiple Regressions for High Risk Boys' ADHD Problem Behaviors (Connors) Utilizing Paternal LAPS, Antisocial Behavior Scores and Demographic Variables as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Att/Dist	.04	.00	[F(2,60)=1.14,p=.33]	
LAPS			.19	1.30
ASB			-.01	-.06
	.08	-.00	[F(5,57)=.95,p=.46]	
LAPS			.22	1.43
ASB			-.06	-.35
SES			.08	.51
Income			-.10	-.68
Education			-.17	-1.16
Hyperactivity	.00	-.03	[F(2,60)=.22,p=.80]	
LAPS			.10	.65
ASB			-.07	-.44
	.07	-.00	[F(5,57)=.90,p=.48]	
LAPS			.12	.77
ASB			-.17	-1.08
SES			-.14	-.94
Income			-.08	-.59
Education			-.13	-.90
ADHD	.03	-.00	[F(2,60)=.94,p=.40]	
LAPS			.18	1.24
ASB			-.03	-.19
	.08	-.00	[F(5,57)=1.00,p=.43]	
LAPS			.21	1.38
ASB			-.10	-.61
SES			.02	.11
Income			-.10	-.73
Education			-.18	-1.21

Table 23
Hierarchical Multiple Regressions for **Control** Boys' ADHD Problem Behaviors (DOTS) Utilizing **Maternal** Demographic Variables, LAPS,and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Att/Dist	.33	.25	[F(3,28)=4.52,p<.02]	
SES			-.63	-3.67[a]
Income			.06	.37
Education			.24	1.33
	.39	.27	[F(5,26)=3.29,p<.02]	
SES			-.55	-3.10[a]
Income			.07	.41
Education			.35	1.80
LAPS			-.19	-1.07
ASB			.26	1.47
Hyperactivity	.09	-.00	[F(3,28)=.94,p=.44]	
SES			-.15	-.78
Income			-.19	-.93
Education			-.06	-.28
	.11	-.06	[F(5,26)=.66,p=.65]	
SES			-.16	-.73
Income			-.16	-.79
Education			-.04	-.18
LAPS			.05	.26
ASB			.13	.65
ADHD	.28	.21	[F(3,28)=3.71,p<.03]	
SES			-.58	-3.32[a]
Income			-.00	-.01
Education			.19	1.00
	.34	.21	[F(5,26)=2.69,p<.05]	
SES			-.57	-2.81[a]
Income			.01	.06
Education			.29	1.42
LAPS			-.15	-.79
ASB			.26	1.44

[a]p<.01

Table 24
Hierarchical Multiple Regressions for Control Boys' Aggressive Problem Behaviors (Connors) Utilizing Maternal Demographic Variables, LAPS and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Connors Conduct Disorder	.21	.00	[F(3,28)=2.5,p<.08]	
SES			.10	.58
Income			-.21	-1.15
Education			-.36	-1.78
	.49	.39	[F(5,26)=5.0,p<.00]	
SES			.19	1.15
Income			-.15	-.97
Education			-.20	-1.34
LAPS			-.09	-.53
ASB			.58	3.76[a]
Connors Hk Index	.10	.00	[F(3,28)=1.07,p=.38]	
SES			-.09	-.48
Income			-.18	-.88
Education			-.15	-.70
	.36	.22	[F(5,26)=1.9,p=.13]	
SES			-.02	-.08
Income			-.14	-.73
Education			-.01	-.05
LAPS			-.13	-.69
ASB			.45	2.40[b]
CBCL Aggression	.18	.09	[F(3,28)=2.0,p=.13]	
SES			.14	.78
Income			-.29	-1.53
Education			-.24	-1.19
	.42	.31	[F(5,26)=3.75,p=.01]	
SES			.19	1.13
Income			-.23	-1.34
Education			-.13	-.66
LAPS			.00	.04
ASB			.52	3.12[a]

[a]p<.01 [b]p<.05

Table 25
Hierarchical Multiple Regressions for Control Boys' ADHD Problem Behaviors (Connors) Utilizing Maternal Demographic Variables, LAPS and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
ADHD	.20	.11	[F(3,28)=2.36,p=.09]	
SES			-.16	-.88
Income			-.19	-.99
Education			-.24	-1.20
	.28	.14	[F(5,26)=2.01,p=.11]	
SES			-.09	-.47
Income			-.17	-.90
Education			-.13	-.62
LAPS			-.13	-.64
ASB			.41	2.13[a]
Hyperactivity	.21	.12	[F(3,28)=2.47,p=.08]	
SES			-.17	-.90
Income			-.30	-1.61
Education			-.13	-.66
	.33	.20	[F(5,26)=2.54,p=.05]	
SES			-.10	-.55
Income			-.27	-1.47
Education			-.02	-.09
LAPS			-.10	-.56
ASB			.39	2.15[a]
Attention	.09	-.00	[F(3,28)=.92,p=.44]	
SES			-.20	-1.03
Income			-.05	-.23
Education			-.13	-.60
	.18	.02	[F(5,26)=1.11,p=.38]	
SES			-.10	-.49
Income			-.05	-.26
Education			.00	.00
LAPS			-.28	-1.37
ASB			.26	1.28
Impulsivity	.14	.05	[F(3,28)=1.57,p=.22]	
SES			-.03	-.17
Income			-.01	-.04
Education			-.36	-1.75
	.15	-.02	[F(5,26)=.89,p=.50]	
SES			-.01	-.06
Income			-.01	-.05
Education			-.34	-1.49
LAPS			-.05	-.26
ASB			.04	.18

[a]p<.05

Table 26

Hierarchical Multiple Regressions for Control Boys' Aggressive Problem Behaviors (Connors) Utilizing Paternal Demographic Variables, LAPS and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Connors Conduct Disorder	.02	-.08	[F(3,28)=.16,p=.92]	
SES			.13	.45
Income			-.03	-.13
Education			-.18	-.60
	.14	-.02	[F(5,26)=.87,p=.51]	
SES			.21	.74
Income			.16	.51
Education			-.30	-1.00
LAPS			-.02	-.09
ASB			.38	1.89
Connors Hk Index	.01	-.09	[F(3,29)=.06,p=.98]	
SES			-.04	-.15
Income			-.07	-.38
Education			.03	.12
	.04	-.14	[F(5,27)=.22,p=.95]	
SES			.01	.04
Income			-.07	-.32
Education			.02	.07
LAPS			.16	.79
ASB			.06	.29
CBCL Aggression	.11	.02	[F(3,29)=1.2,p=.33]	
SES			.43	1.66
Income			.06	.34
Education			-.49	-1.82
	.22	.07	[F(5,27)=1.50,p=.22]	
SES			.46	1.77
Income			.18	.92
Education			-.58	-2.16[a]
LAPS			-.11	-.58
ASB			.36	1.94

[a]$p<.05$

Table 27
Hierarchical Multiple Regressions for Control Boys' ADHD Problem Behavior (Connors) Utilizing Paternal Demographic Variables, LAPS and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
ADHD	.02	-.08	[F(3,29)=.15,p=.93]	
SES			.05	.19
Income			.02	.11
Education			-.16	-.57
	.03	-.14	[F(5,27)=.20,p=.96]	
SES			.09	.32
Income			.02	.20
Education			-.18	-.62
LAPS			.09	.44
ASB			.09	.44
Hyperactivity	.01	-.09	[F(3,29)=.11,p=.95]	
SES			.15	.55
Income			-.02	-.10
Education			-.12	-.43
	.04	-.13	[F(5,27)=.25,p=.93]	
SES			.20	.71
Income			-.01	-.04
Education			-.14	-.47
LAPS			.15	.75
ASB			.07	.36
Attention	.01	-.10	[F(3,29)=.05,p=.98]	
SES			-.07	-.25
Income			-.04	-.21
Education			.02	.07
	.04	-.14	[F(5,27)=.23,p=.95]	
SES			-.02	-.07
Income			-.07	-.33
Education			.03	.11
LAPS			.20	.99
ASB			-.05	-.22
Impulsivity	.05	-.05	[F(3,29)=.47,p=.71]	
SES			-.01	-.06
Income			.09	.47
Education			-.22	-.77
	.06	-.11	[F(5,27)=.37,p=.86]	
SES			-.02	-.08
Income			.14	.66
Education			-.25	-.86
LAPS			-.10	-.51
ASB			.13	.65

Table 28
Hierarchical Multiple Regressions for Control Boys' ADHD Problem Behaviors (DOTS) Utilizing Paternal Demographic Variables, LAPS, and Antisocial Behavior Scores as Predictors

Dependant Variable / Predictors	R^2	Adj R^2	Beta	T
Att/Dist	.15	.06	[F(3,29)=1.73,p=.18]	
SES			.35	1.36
Income			.07	.39
Education			-.59	-2.22[a]
	.19	.04	[F(5,27)=1.29,p=.29]	
SES			.40	1.54
Income			.10	.53
Education			-.62	-2.28[a]
LAPS			.13	.67
ASB			.14	.73
Hyperactivity	.12	.03	[F(3,29)=1.29,p=.30]	
SES			-.25	-.95
Income			.14	.75
Education			-.13	-.48
	.19	.04	[F(5,27)=1.27,p=.31]	
SES			-.18	-.68
Income			.10	.49
Education			-.11	-.40
LAPS			.29	1.56
ASB			-.08	-.42
ADHD	.13	.05	[F(3,29)=1.50,p=.24]	
SES			.20	.78
Income			.10	.55
Education			-.51	-1.92
	.18	.03	[F(5,27)=1.22,p=.32]	
SES			.27	1.01
Income			.11	.58
Education			-.53	-1.95
LAPS			.19	1.02
ASB			.08	.46

[a]$p<.05$

Chapter VIII

Discussion

Researchers have postulated that child problem behaviors are grounded in biopsychosocial events, and that the expression of such behaviors is dependant upon varying levels of risk in the child's rearing environment (August et al., 1983; Campbell et al., 1986; Cloninger et al., 1988; Earls et al., 1988; Fitzgerald et al., 1992). Attention-deficit Hyperactivity Disorder co-morbid with Conduct Disorder appears to be one of the foremost behavioral regimes exhibited in children at risk for various problematic behavioral outcomes such as alcoholism and antisocial behavior (Earls et al., 1988; Goodwin et al., 1975; Hinshaw, 1987; Holden, 1991; Knop et al., 1985; Lilienfeld and Waldmen, 1990; Morrison and Stewart, 1970; Schuckit et al., 1987). However, one of the most confusing aspects of ADHD studies is that of nomenclature, with considerable variation from study to study in how the disorder is precisely defined. Some argue that there is a "pure" form of ADHD exclusive of the aggression associated with Conduct Disorder (August & Stewart, 1982; Laprade & Trites, 1985), while others argue that the two disorders are mutually inclusive of one another or perhaps are separate but co-existing (see Hinshaw, 1987; Lilienfeld & Waldmen, 1990).

Incidence of ADHD

In the present study we have attempted several things: 1) to observe the occurance of ADHD and Conduct Disorder behaviors in children at high risk for the latter development of alcoholic/antisocial outcomes as compared too children not currently at such risk, while at the same time attempting to more precisely delineate the two disorders, 2) to observe if these two disorders co-occur as previously suggested by others and, 3) to uncover several suspected parental predictors of such child problem behaviors.

Results from the present study coincide with the majority of other studies that have found ADHD and its component behaviors and Conduct Disorder to occur in higher rates in children who are being reared in alcoholic/antisocial families as compared to children being reared in lower risk family environments (Campbell et al 1986; Cantwell, 1972; Earls et al., 1988;). The assumption that sons of alcoholics experience more attention deficits, hyperactivity, impulsivity, conduct problem behavior, and aggression than sons of nonalcoholics received support from the present analyses. As previously stated, these specific findings are consistent with the extant literature on the relationship between alcoholism and child psychopathology (Cantwell, 1972; Cloninger et al., 1975; Jones, 1968; Knop et al., 1985; Morrison & Stewart, 1970, 1972; Tarter et al., 1985; Tarter et al., 1990).

Although not all differences were statistically significant, the overall mean ratings of both fathers and mothers for all child problem behaviors were higher in the risk boys than in the comparison boys. Fathers who have high levels of alcohol related problems and antisocial behavior perceived their sons to be significantly more overactive, distractible, and inattentive as assessed by the DOTS and Connors rating scales. This was not the case, however, for mothers. There was no difference between high risk mothers and comparison mothers ratings of their sons' problem behavior. When the data for both parents were analyzed together as an overall parental rating of their sons' problematic behavior, however, they jointly rated their sons as significantly higher on those behaviors that collectively describe ADHD (i.e., attention deficits, distractibility, impulsivity and overactivity) and aggressive behavior but not Conduct Disorder.

The relationship between childhood hyperactivity and alcoholism has been interpreted as evidence supporting the heritability of alcoholism. Cantwell (1972, 1975) suggested that hyperactivity may be genetically linked to alcoholism and described the disorder as one of the possible precursors to alcoholism. He found that many hyperactive children had parents who were hyperactive themselves as children and who as adults had higher rates of psychopathology, the most apparent being alcoholism and antisocial behavior.

Cantwell's failure to find increased rates of hyperactivity in adopting parents and second degree relatives was offered as evidence in support of the heritability of hyperactivity as opposed to a strictly environmental etiology. Retrospective studies have reported that alcoholics tend to recall more hyperactive behavior in childhood than do nonalcoholics (Alterman, Petrarula, Tarter & McGowan, 1982; Alterman, Tarter, Baughmen, Bober & Fabian, 1985; Goodwin et al., 1975; Tarter, McBride & Schneider, 1977) and this has been offered as evidence supporting Cantwell's position for a genetic link. In addition, other studies of hyperactive children tend to report higher incidence of childhood hyperactivity, alcoholism, and antisocial behavior in the parents of hyperactives (Cantwell, 1972, 1975; Earls, et al., 1988; Goodwin et al., 1975; Hetchman et al., 1984; Morrison & Stewart, 1970).

Delineating the Hyperactive Syndrome

ADHD children can be categorized in various ways according to type, duration, and outcome. Consistent with other research (e.g., August et al., 1983), the current study attempted to give precision to the definition of hyperactivity, by asserting that ADHD is a "pure" form of hyperactivity, specifically composed of attentional deficits, distractibility, impulsivity, and excessive physical activity exclusive of violent, aggressive behavior. Children exhibiting this "pure" form of hyperactivity are

said to have more favorable outcomes as compared to children who also display conduct disturbances; as the latter are associated with delinquent and antisocial behavior (Campbell 1987; Earls et al., 1988). Studies that have found symptoms of "pure" hyperactivity such as inattention and impulsivity to remain relatively constant in ADHD children have found that these children have a more progressive and positive developmental outcome when compared to those who simultaneously exhibit aggressive/antisocial behavior with ADHD (August et al., 1983). The latter children appear to be at increased risk for delinquent behaviors such as alcohol and drug abuse and violence in adolescence.

In the current study the results indicate that ADHD and Conduct Disorder may in fact be symptoms of one overall disregulatory disorder. It was not possible in the present data set to uniquely identify ADHD as a separate entity from Conduct Disorder type problems as set forth by DSM-III-R diagnostic criteria. In keeping with many researchers (Hinshaw, 1987; Lilienfeld & Waldman, 1990) ADHD may in fact be precursorily related to Conduct Disorder which in turn may precede Antisocial Personality Disorder in adulthood. If this assumption is a correct one it would simply constitute a continuum of antisocial behavior that begins in infancy and continues to gain severity of expression during adolescent and adulthood development.

Biobehavioral Disregulation: A Possible Explanation

Despite the implied role of hyperactivity, conduct disorder, and aggression in the etiology of alcoholism, some argue that their role may only be partially defined. Henri Begleiter, one of the principal investigators of the National Collaborative Studies on the Genetics of Alcoholism, suggests that these relationships are not solely grounded in the genetics of alcoholism, but are emergent from an inherited non-specific behavioral disregulation (personal communication, May, 1992). He postulates that this underlying behavioral disregulation is not specific to alcoholism per se, but rather, is a "...set of biologic factors which are heavily influenced by environmental events and can lead to very different adverse outcomes" (Holden, 1991). Thus, according to Begleiter's hypothesis, the later appearance of alcoholism may or may not have hyperactivity, conduct disorder, or aggressive behavior as etiologic precursors. Whether it does or not may depend on the individual's particular developmental history. Begleiter further states that, although similar brain wave anomalies have been found in young sons of alcoholics even before the onset of alcohol consumption (Begleiter et al., 1984 and Gabrielli et al., 1982), this phenomenon may not be specific to or indicative of the later development of alcoholism, as these findings have also been reported to be consistent with those found for cocaine abusers. Thus, according to the

present hypothesis, the association of hyperactivity, conduct problem behavior and aggression may not be specific to alcoholism, but rather they may be correlated with a more general biobehavioral disregulatory phenomenon.

High levels of hyperactivity (i.e., excessive physical activity), attention span difficulties, and impulsive behavior may be manifestations of such biobehavioral disregulation. Hyperactivity is the most apparent externalizing behavioral component of ADHD. In the current study hyperactivity was found to occur at a substantially higher rate in boys reared in a high risk environment as compared with boys raised in low risk environments. Tarter et al. (1989) suggest that high levels of physical activity reflect CNS involvement, particularly implicating deficits related to functions of the anterior cerebral cortex which mediate self-regulatory behavior. Results of a recent study by Tarter et al., (1990) suggest that physical overactivity, being a specific deviation of temperament, may reflect a genetic predisposition that is relevant to the etiology of alcoholism. Tarter et al. point out that these findings don't necessarily confirm or disconfirm a genetic predisposition for alcoholism, however, they are suggestive of anterior cerebral involvement of self-regulatory function in children at risk for alcoholism.

In the present study, we measured hyperactive expression using an earlier version of the same instrument

used by Tarter et al. (DOTS). The results indicated that 41% of the sons of alcoholics exhibit excessive physical activity as rated by their mothers. This was twice the rate reported for boys in the control families (19%). These findings are consistent with other studies (Fitzgerald et al., 1991; Tarter et al., 1985) and also are consistent with the general notion that excessively high levels of physical activity may reflect some underlying biobehavioral disregulation that may be heritable (Cloninger, 1987). This would help to account for the correlation found between hyperactivity, attention span difficulties, antisocial behavior, and/or conduct disorder and alcoholism. This relationship as led some investigators such as Cloninger et al. (1985) and Goodwin (1971) to propose that ADHD is a heritable trait in sons of alcoholics. It has been hypothesized that when such children are reared in a particular alcoholic environment (i.e., high levels of alcohol problems, abusive behavior, and low SES) the rearing environment may serve to substantially exacerbate their already present disregulatory behavior system and set them on a pathway for alcohol abuse and related negative outcomes such as antisocial behavior and depression (Cloninger et al., 1985).

Neurodevelopmental Delay: A Possible Explanation

Bakwin and Bakwin (1966) discussed several types of hyperactive children that, from an etiological standpoint, may aid in the present discussion towards delineating group(s) of "pure" hyperactives from those co-morbid for aggressive behavior. One type of hyperactivity involves individuals who are born with neurologic lesions (minimal cerebral damage) or who express hyperactive behavior due to infantile autism or reactive behavior disorders. Another type of hyperactive child the authors describe is a developmentally disturbed child with tendencies toward hyperactivity. This developmental hyperactivity is associated with no known anatomical brain abnormality, but rather is thought to be due to a neurodevelopmental "delay or disturbance in the maturation of those areas of the brain which have to do with ... motor coordination" (Bakwin & Bakwin, 1966). This type of developmental hyperactivity is of primary interest in the current study.

Developmental hyperactivity is further divided into two subtypes with regard to developmental course and outcome; one in which there is amelioration of the primary features of the disorder due to a "catch-up" phenomenon in neurodevelopment, and the other is due to a failure in later neurodevelopment which ultimately results in the maintenance of the disorder. Bakwin and Bakwin state that it is imperative to ascertain whether the child has sustained

peri- or post-natal trauma so as to rule out neurologic implications due to lesions of primary or associative areas of the brain, which consequently would indicate a disorder of the first type. When spontaneous disappearance of the primary symptoms of hyperactivity occurs in late childhood and/or adolescence this implies the "catch-up" phenomenon in neurodevelopment indicative of one subtype of developmental delay hyperactivity. This reasoning is consistent with the findings of several follow-up studies reporting improvement and disappearance of primary symptoms in late childhood and adolescence (August et al., 1983; Campbell, 1987). However, when there is no evidence of brain injury, and when "catch-up" does not occur, this would suggest the presence of a persistent developmental abnormality rather than simply a delay in neuromaturation (although a dysfunctional neuromechanism should not be ruled out). It is possible then, that this subtype of developmental hyperactivity (i.e., the persistence of the disorder) is a form of hyperactivity that appears to be more chronic in nature and undergoes an evolutionary process leading to associative adult disorders such as Alcoholism and Antisocial Personality Disorder. Further, it may be that the children who express primary symptoms of hyperactivity co-morbid with aggressive behavior and noncompliance (i.e., Conduct Disorder) are those with this type of persistent developmental hyperactivity.

Co-Morbidity of ADHD and Conduct Disorder

Findings from the current study are consistent with those of other studies concerning the incidence of ADHD and its co-morbidity with Conduct Disorder. Other investigators report rates of co-morbidity of ADHD and Conduct Disorder ranging anywhere from 32% to 92% (reported in Hinshaw, 1987); in the current study the rate of overlap for the two disorders was most consistently between 44% and 55%, confirming rates described by Pihl and Peterson (1991) in their review of the literature. Some researchers argue that children exhibiting ADHD and/or Conduct Disorder are separable (Laprade & Trites, 1985) and that such separation is useful in predicting future outcomes (August & Stewart, 1982; August et al., 1983; Stewart et al., 1983). For example, August et al. (1983) found that 37% of the boys diagnosed as hyperactive were also co-morbid for aggressive/conduct disorder and on follow up had poorer outcomes in adolescence than did the 63% who only showed attention deficits and impulsivity. Poor developmental outcomes for the boys with co-morbid symptoms included higher incidence of truancy, alcohol use, problems with the law, etc.

The Conduct Disorder factor from Connors' Parent Questionnaire (Connors), which has been widely and reliably used in the research setting (Connors, 1990; Goyette et al., 1978), revealed similar rates of Conduct Disorder behavior

for the two groups. When dealing with the issue of the co-morbidity of ADHD and Conduct Disorder several considerations were taken into account regarding formal definition of the disorders. In this study we have attempted to maintain close ties with the diagnostic criteria set forth in the DSM-III-R so as to conform to the present standards in regards to this area of research. In keeping with this point it was felt that several methodological issues had to be addressed in order to meet these standards. As pointed out in Lilienfeld and Waldmans' review of the hyperactive/conduct problem literature (1990), there is considerable overlap of items from the Connors' Conduct Disorder factor and the hyperactive factors (i.e., Hyperactivity Index, Hyperactivity factor) which may in some cases account for the high incidence of overlap found between the two disorders. As stated above, one of our endeavors in this study was an attempt to isolate "pure" forms of ADHD and Conduct Disorder so as to make a more definitive statement about their occurance in high risk individuals as well as to further delineate the nomenclature for the two disorders. Items in the Conduct Disorder factor that specifically targeted ADHD type behaviors were dropped from the factor. This was done so as to measure only Conduct Disorder type behaviors as defined by DSM-III-R which by item definition does not specifically include hyperactive behaviors (although according to the manual,

children diagnosed as Conduct Disorder may in fact also meet criteria for a diagnosis of ADHD). Also, when compiling the Connors ADHD factor (which assesses the primary symptomatology of hyperactive children e.g., attention span/distractibility, impulsivity and hyperactivity or excessive physical activity), items that measured aggressive/violent behaviors that were previously included in Connors' original Conduct Disorder factor were removed from the ADHD factor. Again, this was done to assess only "pure" ADHD type behaviors apart from the aggressive/violent behaviors seen in children with Conduct Disorder. Only several items were found to overlap these factors (range 3-5 items) so it was felt that the original factors were not altered significantly, especially in the case of the Connors Conduct Disorder factor which is quite large. It was believed that this would allow us to gain a more narrowly defined measure of conduct ADHD and conduct problem behaviors, thus possibly isolating two groups of problem behavior children, if in fact the two disorders are orthogonal. According to the results presented here, apparently this assumption was an incorrect one as both ADHD and conduct behavioral problems occurred in this sample at similar rates.

Hinshaw (1987) cites study after study which found much the same rates of Conduct Disorder associated with ADHD as those found here. So it would appear that the two disorders

are highly related and may be co-morbid as well as related to risk for poor behavioral outcomes such as those under investigation (i.e., alcoholism and antisociality). It is assumed that the two disorders were, in the present study, more narrowly defined than in past studies but isolating them in any "pure" form may not in fact be possible in that the two disorders may be part and parcel of the same, as yet, undefined disorder. To further confirm these results the CBCL Aggression factor was used as a second measure of conduct problems to assess any significant overlap of aggression and ADHD behaviors. Similar to the Connors Conduct Disorder factor, several items (3) that specifically targeted ADHD type behaviors were eliminated from this cluster and again the integrity of the original factor was thought to remain intact as it also is a rather large factor. Similar results of overlap (33% to 55%) with the two measures of ADHD were obtained as those using the Connors Conduct Disorder factor.

However, when further breakdown of the component behaviors of ADHD were compared with co-occurance rates of conduct/aggressive behavior a modest result was found that may, albeit only theoretically, indicate a group of children who are currently at risk that may have better developmental outcomes. A somewhat lower rate (20% to 36%) of Conduct Disorder was found in the hyperactive (i.e., excessive physical activity) boys. It is this group of hyperactive

boys who are currently exhibiting the lowest levels of conduct disturbances who will possibly have more favorable outcomes (i.e., Bakwin & Bakwin's developmentally delayed hyperactive) compared with the boys who have high incidence of conduct disturbances coupled with the other ADHD behaviors (August et al., 1983; Stewart et al., 1983; Gittleman, Mannuzza, Shenker & Bonagura, 1985). Physical overactivity may be the primary symptom of ADHD that we are able to isolate and define as qualitatively different from Conduct Disorder and/or aggressive behaviors in pre-school aged children. Further, this rather large group of overly active boys (per the DOTS measure) may be those with the more favorable outcome (as they have the fewest aggressive/antisocial behavioral problems) compared to the group of ADHD boys who simultaneously express conduct/ aggression problems, who appear to progress into more severe psychopathology (i.e., Antisocial Personality Disorder) (Blouin et al., 1978; Weiss & Hechtman, 1986) and is consequently more highly associated with risk for alcoholism (August et al., 1983; Earls et al., 1988).

Summary of ADHD Outcomes

In sum, there are several possibilities for these various outcome scenarios of boys expressing ADHD alone and when coupled with antisocial/aggressive/conduct disorder behavior. Are the boys who are co-morbid for ADHD and Conduct Disorder the ones whose behavior will progress from

extreme externalizing or acting out in childhood to conduct disorder type behavior in adolescence and then ultimately evolve into antisocial behavior in adulthood? Some investigators suggest that ADHD behavior is but a sub-syndrome of Conduct Disorder to begin with (see Lilienfeld & Waldman, 1990) and is simply a product of the symptomatology of the disorder. It is believed that aggressive childhood behavior is antecedent to adulthood violent/antisocial behavior. During the preschool years "hyperactive" behavior (which may or may not include aggressive behavior) is exhibited in rather unfettered fashion but is not usually perceived as an "immediately" dangerous violation toward others. Conduct Disorder in adolescence and antisocial behavior in adulthood, on the other hand, are so defined as an infringement upon others' basic rights and as a serious violation of social boundaries. As the child continues to express antisocial/aggressive behavior (possibly co-morbid with ADHD), his behavior progressively is viewed as representing violations of societal norms and as an encroachment on the basic rights of others. So it could be postulated that the display of this more aggressive type of hyperactivity precedes adult antisocial behavior and consequently, in this sample, is indicative of increased risk for alcoholism. On the other hand, the overactive and/or inattentive child who is compliant and non-aggressive may therefore be at reduced risk for more detrimental adult

pathologies such as alcoholism and antisocial behavior.

If in fact hyperactivity has its origin in the genotype and if some children exhibit an amelioration of the disorder, then those who express the primary symptoms of ADHD in childhood may not simply "outgrow" the condition or experience a "catch-up" phenomenon as suggested by Bakwin & Bakwin but rather, these children may learn to cope with or modify their socially unacceptable behavior into more socially effective ways as they progress on a more normal developmental tract. On the other hand, those who exhibit hyperactive behaviors (ADHD) coupled with Conduct Disorder in childhood may be locked into a developmental pathway that leads to increasingly intolerable behaviors such as alcoholism and antisociality. Are aggressive/hyperactive behaviors then, reliable markers for children who are at greatest risk for the later development of alcoholism/antisocial behavior or as Begleiter has hypothesized, as a general "behavioral disregulation" (Holden, 1991)? Further, are we then able to select those children who are thus headed for more negative outcomes based on their biobehavioral/temperamental repertoire as early as the preschool years? It remains to be seen in future follow-up studies whether or not the boys in this sample who are now displaying hyperactive behavior in its various forms will either learn to "cope" with or "outgrow" their hyperactive behavior, or whether it will evolve into

more extreme adulthood psychopathologies.

Parental Predictors of Child Behavioral Outcomes

Parents in the high risk group (where all fathers met formal diagnostic criteria for alcoholism and a portion of the mothers likewise) revealed significantly higher rates of psychopathology, particularly antisocial behavior and recurring problems due to alcohol usage, than did parents in the low risk group. Again this lends support to the notion that aggressive hyperactive behavior may continue through adolescence and reveal itself as antisocial/aggressive behavior in adulthood (Blouin et al., 1978; Weiss & Hechtman, 1986) coupled with other pathologic expressions such as alcoholism. Researchers on the Michigan State University Longitudinal Study are fast coming to the conclusion that alcoholism and antisocial behavior appear together with great frequency and in fact may be mutually inclusive of one another. Earls et al., (1988) conjunctivaly contend that it is not alcoholism per se that predisposes a child to poor behavioral outcome nor is it the alcoholics antisocial behavior, but rather it is a combination of the two that impinges upon the child's behavioral outcome. It has been reported elsewhere that children born into an unstable and chaotic environment due to parental psychopathology (i.e., alcoholism and antisocial behavior) are predisposed to similar pathology later in life (Campbell et al, 1986; Goodwin 1970; McMahon, 1981; Morrison

et al., 1973). Thus, it is parental psychopathology that is thought to have a great impact on the child's behavioral outcome. The specific hypotheses in the present study regarding predictors of child psychopathology were presented with this idea in mind. The current assumption in alcoholism research, however, is that it is the father's level of alcoholism that is the most significant predictor of his sons psychopathology (Cantwell, 1972; Earls et al., 1988; Morrison & Stewart, 1972; Noll et al., 1989) and that his drinking and antisocial behavior are linked to his sons problematic behaviors (e.g., aggression, inattention, conduct disorder). Fitzgerald et al., (1991), using a smaller group of boys (three year olds) from the same sample as used in the present study, found that fathers' alcoholism and antisocial behavior were **not** causally linked to their sons problem behaviors, but rather, it was the mothers' drinking behavior and related psychopathology (e.g., depression) that were most predictive of the boys problems behaviors. These results are consistent with the results from the larger sample used in the current study. Specifically, fathers levels of antisocial behavior and drinking problems do not appear to be influencing their sons behavioral expression in any dramatic way but rather, regression analysis revealed specifically that it is the mother's antisocial behavior that is most predictive of her sons abnormal behavior, particularly ADHD, Conduct Disorder,

and aggression.

This study is unique in that the group of children under examination were much younger (preschool age) than most samples in similar studies. Most prospective studies have only looked at young children and adolescents while ignoring the pre-elementary aged child when, according to most mental health professionals, this is the time period when hyperactivity and conduct problems begin to surface and are for the first time reasonably diagnosed (APA, 1987). In that only antisocial behavior was most predictive of her sons behavior, how can we explain the high association of childhood problem behaviors and alcoholism in the mothers of high risk boys? Is the mother's drinking problem a result of her antisocial behavior or is it the opposite - her drinking behaviors encourage her antisocial behavior? Is it the mother's antisocial behavior in association with her alcoholic problems as hypothesized by Earls et al. (1988) that is impinging upon her son's abnormal behavioral expression? Could it be that alcoholism is in fact influencing ADHD and Conduct Disorder type behaviors but in a mediating way rather than, as assumed by many, a direct way (e.g., Tarter et al., 1985; Cantwell, 1972; Morrison & Stewart, 1972)? Conjointly then, it seems intuitively apparent that even though the father's alcoholism and extreme antisocial behavior isn't driving his sons behavioral expression in any immediately apparent manner,

his conflictual relationship with his wife may serve to "fuel" her psychopathology, and thus his presence is making an indirect impact upon his sons behavioral expression via his wife. Due to the fact that she is the primary caregiver (Cowan & Cowan 1988) perhaps we are only seeing direct behavioral effects through her. Further, as previously stated, the mothers in the high risk group exhibit significantly more antisocial behavior than the mothers in the control group, and being that antisocial behavior has been found to be directly associated with alcoholism (Earls et al. 1988), her alcoholic situation (whether it is directly hers or mediated indirectly from her spouse) may actually be an indirect link to her sons poor behavioral expression. In follow up studies we can observe more closely the association of alcoholism and antisocial behavior as they impact on child behavioral outcomes in conjunction with other abnormal parental and family factors.

So with respect to these findings relating mother's psychopathology to their sons psychopathology, there are several possible explanations. Mothers, and not fathers, seem to have a greater impact upon their sons life during the early years possibly because mothers are the primary caregiver and spend most of their time with the child thus giving rise to and/or shaping his behavioral repertoire. However, as previously mentioned, other studies have found that it is the father's problematic behavior that impinges

upon his child's behavior (e.g., alcoholic fathers' high activity levels were predictive of his sons' high activity levels) (Fitzgerald et al., 1991). This may in fact be the case later in childhood as the child becomes a more integral and active member in the family as perceived by the father. The father then may be making a greater social and emotional impact upon his son and consequently his psychopathology becomes more important in the fashioning of his sons negative behavioral outcome.

Possible Direct and Indirect Effects of Alcoholism

Another and conjunctive theory is also presented by the author and other members of the MSUFS staff (Fitzgerald et al., 1991) in a recent study of behavioral predictors of infants (3 year olds). In this study we postulated that the co-morbidity of alcoholism and violence in families at high risk for alcoholism and antisocial behavior may play a significant role in the functioning of the family and in child rearing practices thus impinging upon the child's behavioral outcome in a negative manner. Thus, in the present study the significant levels of antisocial behavior and problems due to alcoholism in the mothers may play a direct role in the child's adaptive capabilities. The causal pathway that was once thought to be directly from father to child may in fact, during the preschool years, be an indirect pathway from the father through the mother to the child with independent contributions from both father

and mother as well as combinatorial contributions from the marriage not otherwise expressed directly towards the son (e.g., marital dissatisfaction, maternal depression). This could result from the fathers disruptive impact upon his wife due to his chaotic behavior, as well as the unsupportive characteristics of this type of marriage in general which may also serve to increase her level of psychopathology. The combined effects of his alcoholism and antisocial behavior and its impact upon the entire family, specifically in this case the son, may also serve to further exacerbate the wife's psychopathic condition (Moos & Billings, 1982; Jacob & Leonard, 1986). What we may be seeing here are several positive behavioral feedback systems that are all inter-related to one another and fueling the pathology of individual members in the family.

Contextual Factors Involved in the Expression of ADHD

It should not be forgotten in light of the findings regarding the alcoholic family, that several contextual factors seem to be playing a role in the structuring of abnormal behavioral expression in children who are not at risk for such psychopathic outcomes as alcoholism and antisocial behavior. As was hypothesized, certain demographic variables (e.g., SES, parental income and education) would be more significant predictors of child behavioral problems in the families who do not experience high levels of alcohol and antisocial behavior involvement.

From the maternal perspective in the low risk families it would appear that the level of socioeconomic status of her family is most predictive of her son's level of ADHD problems, while on the other hand father's SES factors are not playing any apparent role in predicting his sons expression of ADHD. These findings are consistent with other findings (Campbell et al., 1986) that lower social class (of which SES and education are components) is associated with higher ratings of problem behaviors in children. As was the case with the risk parents, antisocial behavior of the mothers in the control group is significantly predictive of her son's conduct/aggressive behaviors.

Not unexpectedly, however, the only finding, relating drinking behavior and child psychopathology was found for the measures of impulsivity for both fathers and mothers in the high risk group. These results are consistent with other findings (August et al., 1983; Fitzgerald et al., 1991) with regards to alcohol being a direct cause of child problem behaviors, especially paternal alcoholism. However, as August et al, (1983) point out in their follow-up study of a group of hyperactives with and without Conduct Disorder, children who exhibit impulsivity in adolescence as a carry over of childhood hyperactivity, tend to have more favorable behavioral outcomes. In that the only finding relating the effect of alcoholism and problem behavior was found for

impulsivity, we will have to track these boys into adolescence and see if in fact these impulsive boys are developmentally advantaged, even though parental alcoholism has been seen to greatly impinge upon offspring development.

Chapter IX

Summary

As was expected, the prevalence of childhood ADHD and its various component behaviors is noticeably more evident in families where fathers and mothers share in alcoholism and antisocial behavior as compared to the families were alcoholism and aggression are at more socially acceptable levels. What we are finding in the current sample are levels of child psychopathology in preschool-aged boys being more a result of parental antisocial behavior rather than a direct result of alcoholic involvement. And it would seem that it is the mothers psychopathic condition, particularly antisocial behavior, that is the greatest influence on the preschool child's behavior. Not to be misunderstood, there is a causal link between alcoholism and antisocial behavior but from the current findings it would appear that the effects due to alcoholism are hidden somewhere in the structure of the antisocial behavioral expression, and/or it is a combination of problems due to alcohol abuse and antisocial behavior taken together that drives the majority of child psychopathologic expression.

APPENDIX

Table 1

Dimensions of Temperament Survey (DOTS) Attention Span/Distractibility Factor Item List

Scoring range: 1-2 (1=more true than false, 2=more false than true)

3. Once my child is involved in a task, he/she can't be distracted away from it

4. My child persists at a task until it's finished

7. No matter what my child is doing, he/she can be distracted by something else

9. My child stays with an activity for a long time

10. If my child is doing one thing, something else occurring won't get him/her to stop

11. My child does not do any one thing for a long period

13. Things going on around my child can take him/her away from what he/she is doing

15. Once my child takes something up, he/she stays with it

18. My child doesn't keep at an activity when other things are going on around him/her

21. If stopped from doing something, my child will always go back to it

24. If watching something, my child will keep at it for a long period

Table 2

Dimensions of Temperament Survey (DOTS) Hyperactivity Factor Item List

Scoring range: 1-2 (1=more true than false, 2=more false than true)

1. My child can't sit still for long

16. When my child has to be still, he/she gets very restless after a few minutes

22. My child never seems to slow down

Table 3

Dimensions of Temperament Survey (DOTS) ADHD Factor Item List

Scoring range: 1-2 (1=more true than false, 2=more false than true)

1. My child can't sit still for long
3. Once my child is involved in a task, he/she can't be distracted away from it
4. My child persists at a task until it's finished
7. No matter what my child is doing, he/she can be distracted by something else
9. My child stays with an activity for a long time
10. If my child is doing one thing, something else occurring won't get him/her to stop
11. My child does not do any one thing for a long period
13. Things going on around my child can take him/her away from what he/she is doing
15. Once my child takes something up, he/she stays with it
16. When my child has to be still, he/she gets very restless after a few minutes
18. My child doesn't keep at an activity when other things are going on around him/her
21. If stopped from doing something, my child will always go back to it
22. My child never seems to slow down
24. If watching something, my child will keep at it for a long period

Table 4

Connors Parent Questionnaire Hyperactive Index Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

7. Disturbs other children
8. Restless or overactive
9. Temper outbursts, explosive and unpredictable behavior
14. Inattentive, easily distracted
19. Cries often and easily
15. Constantly fidgeting; restless in the "squirmy sense"
25. Excitable, impulsive
30. Demands must be met immediately - easily frustrated
43. Fails to finish things he/she started; short attention span
46. Mood changes quickly and drastically

Table 5

Connors Parent Questionnaire Hyperactivity Factor Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

8. Restless or overactive

15. Constantly fidgeting; restless in the "squirmy sense"

16. Always climbing

35. Acts as if driven by a motor

Table 6

Connors Parent Questionnaire Attention Span/Distractibility Factor Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

14. Inattentive, easily distracted

43. Fails to finish things he/she started; short attention span

Table 7

Connors Parent Questionnaire Impulsivity Factor Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

25. Excitable, impulsive

30. Demands must be met immediately - easily frustrated

31. Gets over excited easily

Table 8

Connors Parent Questionnaire ADHD Factor Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

8. Restless or overactive

14. Inattentive, easily distracted

15. Constantly fidgeting; restless in the "squirmy sense"

16. Always climbing

25. Excitable, impulsive

30. Demands must be met immediately - easily frustrated

31. Gets over excited easily

35. Acts as if driven by a motor

43. Fails to finish things he/she started; short attention span

Table 9

Connors Parent Questionnaire Conduct Disorder Factor Item List

Scoring range: 0-3 (0=not at all, 1=just a little, 2=pretty much, 3=very much)

2. Does not act his/her age
4. Bullying
6. Feels cheated
12. Denies having done wrong
13. Stealing from parents
21. Bragging and boasting
22. Afraid they do not like him/her
23. Mean
24. Wants to run things
26. Pouts and sulks
28. Blames others for mistakes
29. Throws and breaks things
37. Wants help doing things he/she should be doing alone
39. Sassy to grown-ups
41. Fights constantly
42. Picks on other children
45. Tells stories which did not happen
51. Will not obey school rules

Table 10

Child Behavior Checklist Aggression Factor Item List

Scoring range: 0-2 (0-not true as far as you know, 1=somewhat or sometimes true, 2=very true or often true)

3. Argues a lot
10. Can't sit still, restless, or hyperactive
15. Cruel to animals
16. Cruelty, bullying, or meanness to others
19. Demands a lot of attention
20. Destroys his/her own things
21. Destroys things belonging to his/her family or other children
22. Disobedient at home
25. Doesn't get along with other children
26. Doesn't seem to feel guilty after misbehaving
27. Easily jealous
37. Gets in many fight
41. Impulsive or acts without thinking
43. Lying or cheating
45. Nervous, high-strung, or tense
57. Physically attacks people
68. Screams a lot
74. Showing off or clowning
86. Stubborn, sullen, or irritable
87. Sudden changes in mood or feelings
94. Teases a lot
95. Temper tantrums or hot temper

Table 10 (cont'd).

97. Threatens people

104. Unusually loud

109. Whining

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