

# Attention-Deficit Hyperactivity Disorder, Childhood Conduct Disorder, and Alcoholism

## *Is There an Association?*

ROBERT O. PIHL, PH.D., AND JORDAN B. PETERSON, PH.D.

*What are the connections between attention-deficit hyperactivity disorder, childhood conduct disorder, and the development later in life of alcoholism or other drug abuse? Can we differentiate children who may develop problems with alcohol or other drugs later in life from those who may not?*

Inclusion of the diagnostic category attention-deficit hyperactivity disorder (ADHD) in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* (DSM-III-R) (1987) constitutes the most recent of many attempts to delineate a pattern of disruptive childhood behaviors known variously within the last two or three decades as "minimal brain damage," "minimal brain dysfunction," "behavior and learning disorder," "hyperkinetic-impulsive disorder," "hyperkinetic syndrome," "hyperactive child syndrome," "developmental hyperactivity," and "attention-deficit disorder with hyperactivity" (Lilienfeld and Waldman 1990). (See sidebar for the formal DSM-III-R diagnostic criteria for ADHD.)

The defining feature of children with ADHD, according to Henker and Whalen (1989), is "trouble—trouble getting things done, both at home and at school, and trouble getting along, both with adults and with other children" (p. 216). Approxi-

mately 10 percent of boys and 3 percent of girls aged 4 to 11 might be characterized by this particular sort of trouble (Offord et al. 1989). Precise estimation of the prevalence of ADHD is difficult not only because the criteria for what is now known as ADHD frequently change, but also because between 40 and 50 percent of children with ADHD also have DSM-III-R childhood conduct disorder (Henker and Whalen 1989; Offord et al. 1989) (see sidebar for diagnostic criteria). The degree of overlap between these two disorders is so high that the utility of efforts to distinguish between them has often been debated (Henker and Whalen 1989).

### ATTENTION-DEFICIT HYPERACTIVITY DISORDER AND CHILDHOOD CONDUCT DISORDER DEFINED

The characteristic behavior of both ADHD and childhood conduct disorder is

noncompliance with the social contract; that is, established rules governing social behavior are broken. In the case of "pure" ADHD, the rules that are broken appear not to infringe on the rights of others. Children with ADHD are unwilling or unable to sit down, be quiet, and pay attention in structured social situations. They seem to be deficient in the ability to regulate their own behavior.

In contrast to children with "pure" ADHD, children with conduct disorder actively interfere with the rights of others. These children are aggressive and unreliable, and they steal or destroy private property belonging to others. Childhood conduct disorder tends to predict the development of antisocial personality during adolescence and adulthood. In addition, childhood conduct disorder tends to predict the development of alcohol and other drug abuse, which often represents another form of rule-breaking behavior (Pihl et al. 1990).

Childhood conduct disorder appears to be heritable (Bohman et al. 1987), at least

in part, and it may be exacerbated (if not engendered) by family environments that are characterized by parental antisocial

behavior and alcohol and other drug abuse, particularly if manifested by the father.

Stimulant medication (usually methylphenidate) has been used to treat children with ADHD with some success. This drug appears to heighten the attentional capabilities and reduce the overactivity characteristic of children with ADHD. However, the fact that children with ADHD respond positively to psychoactive medication has led to a number of secondary concerns. These include worries that these children might be primed for alcohol and other drug abuse later in life, either because they have learned to associate use of psychoactive drugs with improvement of their symptoms or because they actually might find use of certain drugs physiologically rewarding.

The association between ADHD, childhood conduct disorder, and alcohol abuse has been a topic of particular concern. There are a number of reasons to suspect that ADHD during childhood and alcoholism during adulthood might be related: the two disorders are equally prevalent, and both are much more common among males (Adrian 1989; Offord et al. 1989). More significantly, however, many male alcoholics have a childhood history of what appears to be ADHD, characterized in part by impulsiveness and by disruptive behavior in school (Pihl et al. 1990).

However, because of the indistinct nature of the ADHD diagnosis, it has proved difficult to specify more precisely the nature of the relationship between ADHD, childhood conduct disorder, and alcoholism. Despite these difficulties, the nature of the connection is becoming clearer and currently can be summarized in one word: aggression. Although aggression has been defined variously in the many articles referenced in this text, generally it refers to physically intervening against another individual or animal. Aggression is one symptom in the broader definition of conduct disorder, and the children most at risk for later alcohol and other drug abuse seem to have a history of aggression.

## LONGITUDINAL STUDIES OF THE ASSOCIATION OF ADHD AND ALCOHOLISM

What happens to children with ADHD later in life? Do they develop alcohol and other drug problems? Do they develop conduct disorder? Do they develop anti-

# DIAGNOSTIC CRITERIA FOR ATTENTION-DEFICIT HYPERACTIVITY DISORDER AND CHILDHOOD CONDUCT DISORDER<sup>1</sup>

## Attention-Deficit Hyperactivity Disorder

A. A disturbance of at least 6 months during which at least eight of the following are present:

1. Often fidgets with hands or feet or squirms in seat (in adolescents, may be limited to subjective feelings of restlessness)
2. Has difficulty remaining seated when required to do so
3. Is easily distracted by extraneous stimuli
4. Has difficulty awaiting turn in games or group situations
5. Often blurts out answers to questions before they have been completed
6. Has difficulty following through on instructions from others (not due to oppositional behavior or failure of comprehension), e.g., fails to finish chores
7. Has difficulty sustaining attention in tasks or play activities
8. Often shifts from one uncompleted activity to another
9. Has difficulty playing quietly
10. Often talks excessively
11. Often interrupts or intrudes on others, e.g., butts into other children's games
12. Often does not seem to listen to what is being said to him or her
13. Often loses things necessary for tasks or activities at school or at home (e.g., toys, pencils, books, assignments)
14. Often engages in physically dangerous activities without considering possible consequences (not for the purposes of thrillseeking), e.g., runs into street without looking

B. Onset before the age of seven

C. Does not meet the criteria for a Pervasive Development Disorder

## Childhood Conduct Disorder

A. A disturbance of conduct lasting at least 6 months, during which at least three of the following have been present:

1. Has stolen without confrontation of a victim on more than one occasion (including forgery)
2. Has run away from home overnight at least twice while living in parental or parental surrogate home (or once without returning)
3. Often lies (other than to avoid physical or sexual abuse)
4. Has deliberately engaged in fire-setting
5. Is often truant from school (for older person, from work)
6. Has broken into someone else's house, building, or car
7. Has deliberately destroyed others' property (other than by firesetting)
8. Has been physically cruel to animals
9. Has forced someone into sexual activity with him or her
10. Has used a weapon in more than one fight
11. Often initiates physical fights
12. Has stolen with confrontation of a victim (e.g., mugging, purse-snatching, extortion, armed robbery)
13. Has been physically cruel to people

B. If 18 or older, does not meet criteria for Antisocial Personality Disorder

<sup>1</sup>Diagnostic criteria for Attention-Deficit Hyperactivity Disorder and Childhood Conduct Disorder as set forth in the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* (American Psychiatric Association 1987). Reprinted by permission of the American Psychiatric Association.

social personality disorder? Do they develop all three? Or is the future of children with ADHD more hopeful? After thoroughly reviewing the relevant literature, Kramer and Loney (1982) determined that the evidence linking hyperactivity with later alcohol and other drug abuse was, at best, inconclusive, and that the diagnostic overlap between aggression and hyperactivity likely accounted for any relationship that did exist.

Thorley (1984) reviewed 17 followup studies of older adolescents and young adults who had received a diagnosis of ADHD in childhood. Thorley also reviewed seven studies of individuals who had received a diagnosis of psychiatric disorders (most commonly personality, affective, and anxiety disorders) in adulthood and compared the current diagnoses with psychiatric diagnoses in childhood and adolescence. He concluded that many hyperactive children remained hyperactive in adolescence, and many also developed conduct disorder in adolescence.

Only a few of the studies reviewed by Thorley specifically examined alcohol and other drug use, and those studies had concluded that children with ADHD also were more likely than normal children to abuse alcohol and other drugs as adolescents and adults. Thorley's review revealed, however, that it was the concurrence of ADHD, childhood conduct disorder, and aggression that was most powerfully associated with alcohol and other drug abuse in adulthood, and not merely the presence of ADHD alone.

Recent longitudinal prospective<sup>1</sup> studies support Thorley's general conclusion. Barkley and colleagues (1990) studied a large sample of children in 1979 and 1980 who were assessed as hyperactive, aggressive, or both. When reexamined 8 years later, 80 percent of these children qualified for a diagnosis of ADHD. Of the 80 percent, 60 percent could be considered to have conduct disorder or were otherwise in conflict with authority, demonstrating the considerable overlap between diagnostic criteria for ADHD and childhood conduct disorder when children with ADHD are followed over time. In this sample, the children with hyperactivity and conduct disorder were more likely to abuse alcohol and other drugs than either children with the diag-

nosis of ADHD only or children in the control group.

### *Studies of Male Alcoholics*

At least 20 studies have demonstrated an association between a family history of male alcoholism and childhood conduct disorder, regardless of the presence of hyperactivity (Pihl et al. 1990). For example, sons of male alcoholics are also at a substantially heightened risk of developing alcoholism (Goodwin 1985; Cloninger et al. 1981). In addition, Alterman and Tarter (1986) reviewed a number of adoption, high-risk, and familial studies of alcoholism and compared them with studies of psychiatric disorders in alcoholic individuals and their families. In these studies, as in the studies reviewed above, aggression among children, many with ADHD, predicted

*A relationship between ADHD and alcohol abuse was evident only because the diagnostic criteria for ADHD and childhood conduct disorder overlap.*

the development of alcoholism in adulthood.

It is interesting to note that children who display a combination of hyperactivity and aggression fare worse when assessed in terms of peer ratings and observable behaviors in childhood and adulthood (Hinshaw 1987). It appears likely that children who are characterized by such a combination of hyperactivity and aggression are at particular risk for later alcohol and other drug abuse (Pihl et al. 1990).

### *Risk of Developing Alcohol or Other Drug Abuse*

Bukstein and co-workers (1989) reviewed the literature describing the co-

occurrence of alcohol and other drug abuse and psychiatric disorders among adolescents. They concluded that a relationship between ADHD and alcohol abuse was evident only because the diagnostic criteria for ADHD and childhood conduct disorder overlap. When ADHD is associated with alcohol abuse, it is because both ADHD and childhood conduct disorder are present or because childhood conduct disorder has been misdiagnosed as ADHD.

Because childhood ADHD often appears to predict development of antisocial personality disorder in adulthood, Lilienfeld and Waldman (1990) reviewed relevant longitudinal, family, adoption, neuropsychological, and psychophysiological studies to determine if this relationship does, in fact, exist. They concluded that the association seen between childhood ADHD and the development of antisocial personality disorder in adulthood resulted from the overlap in diagnostic criteria between ADHD and childhood conduct disorder. It is childhood conduct disorder that predicts the development in adulthood of antisocial personality disorder.

Both Bukstein and co-workers (1989) and Lilienfeld and Waldman (1990) suggest that the relationship seen between ADHD and possible later development of conduct disorder, antisocial personality disorder, or alcohol abuse is actually a consequence of the co-occurrence of childhood conduct disorder and childhood ADHD or of the co-occurrence of aggression and childhood ADHD. A number of recent studies designed to examine this relationship demonstrate this point and are described below.

Wallander (1988) noted the existence of a weak but nevertheless statistically significant relationship between teachers' ratings of attention problems in males between the ages of 10 and 13 and their cu-

---

*ROBERT O. PIHL, PH.D., is professor of psychology and psychiatry in the psychology department, McGill University, Montreal, Quebec, Canada.*

*JORDAN B. PETERSON, PH.D., is a postdoctoral student of psychology, Douglas Hospital-McGill University, Montreal, Quebec, Canada.*

*This work was supported in part by the Medical Research Council of Canada and the Douglas Hospital-McGill University Alcohol Research Study Group.*

<sup>1</sup>Longitudinal prospective studies follow the development of an individual over time, through future years.

mulative arrest records 8 years later. That is, children whose teachers rated them as having attention problems were somewhat more likely to have been arrested 8 years later. However, this perceived relationship was later attributed to these children having lower IQs and a history of fathers who abused alcohol.

Halikas and colleagues (1990) assessed 114 juvenile offenders for ADHD, aggression, and alcohol and other drug abuse. Although ADHD and aggression were significantly associated with alcohol and other drug abuse, statistical analyses showed that, when aggression was excluded from the analysis, ADHD alone did not predict development of alcohol and other drug abuse. The authors concluded that the stronger relationship is between aggression and alcohol and other drug abuse. Stewart and colleagues (1980) noted that boys with conduct disorder, but not boys with hyperactivity alone, tend to have fathers with antisocial personality disorder. On the basis of studies such as those cited above, it seems reasonable to conclude that children who do have ADHD, but who do not have conduct disorder and who are not aggressive, are not at substantially increased risk for the development of adolescent conduct disorder, adult antisocial personality disorder, or adult alcoholism.

In contrast, children with conduct disorder and children who are aggressive are more likely to become antisocial, aggressive (Olweus 1979), alcoholic, or a combination of these, as adults (Pihl et al. 1990). The risk appears to be exacerbated substantially by the presence of biological or familial alcoholism<sup>2</sup> or other drug abuse: alcoholism, conduct disorder, and antisocial personality tend to co-occur in individuals and to aggregate in families. All three conditions are much more common in men than in women (Adrian 1989). Approximately 50 percent of male alcoholics are antisocial (Gerstley et al. 1990), and sociopathy in males has long been associated with a family history of alcoholism (Guze et al. 1963).

Schubert and colleagues (1988) conducted a meta-analysis<sup>3</sup> of 40 studies to investigate the relationships between antisocial personality disorder and alcohol or other drug abuse. They concluded that the occurrence of any one condition substantially increased the probability that either of the others would be present.

Stabenau (1990) recently demonstrated that three additive, independent factors—antisocial personality disorder,

impulsive behavior, and conduct disorder—predicted the development of alcohol abuse or alcohol dependence. He conducted a 5-year followup of 98 male and 121 female volunteers selected from an outpatient dental clinic. The presence of antisocial personality disorder was associated with a 3-fold increase in incidence of alcohol abuse or alcohol dependence; a family history of alcoholism was associated with a 1.5-fold increase in incidence of alcohol abuse and dependence; and male gender was associ-

*Three additive, independent factors—antisocial personality disorder, impulsive behavior, and conduct disorder—predicted the development of alcohol abuse or alcohol dependence.*

ated with a 1.5-fold increase in incidence of alcohol abuse and dependence.

Children who abuse alcohol and adults who begin to abuse alcohol in their adulthood are often antisocial or impulsive or both (Hagnell et al. 1986). When childhood conduct disorder is severe enough to warrant inpatient psychiatric treatment, it may be associated with a ten-fold increase in risk for later hospitalization for alcohol or other drug abuse (Thomsen 1990). Childhood conduct disorder often precedes the development of male-limited, Type 2 alcoholism (Hasin et al. 1988; Schaeffer et al. 1988), which is characterized by early onset, heightened severity (Von Knorring et al. 1985), and increased heritability (Gilligan et al. 1987).

### **RULE-BREAKING BEHAVIOR AND SUSCEPTIBILITY TO ALCOHOLISM**

As stated above, the defining characteristic of ADHD, childhood conduct disorder,

and adult antisocial personality disorder is noncompliance with the social contract. Two interacting factors—cognitive deficits and poor socialization—may underlie manifestation of the rule-breaking behaviors that define ADHD and childhood conduct disorder (Figure 1).

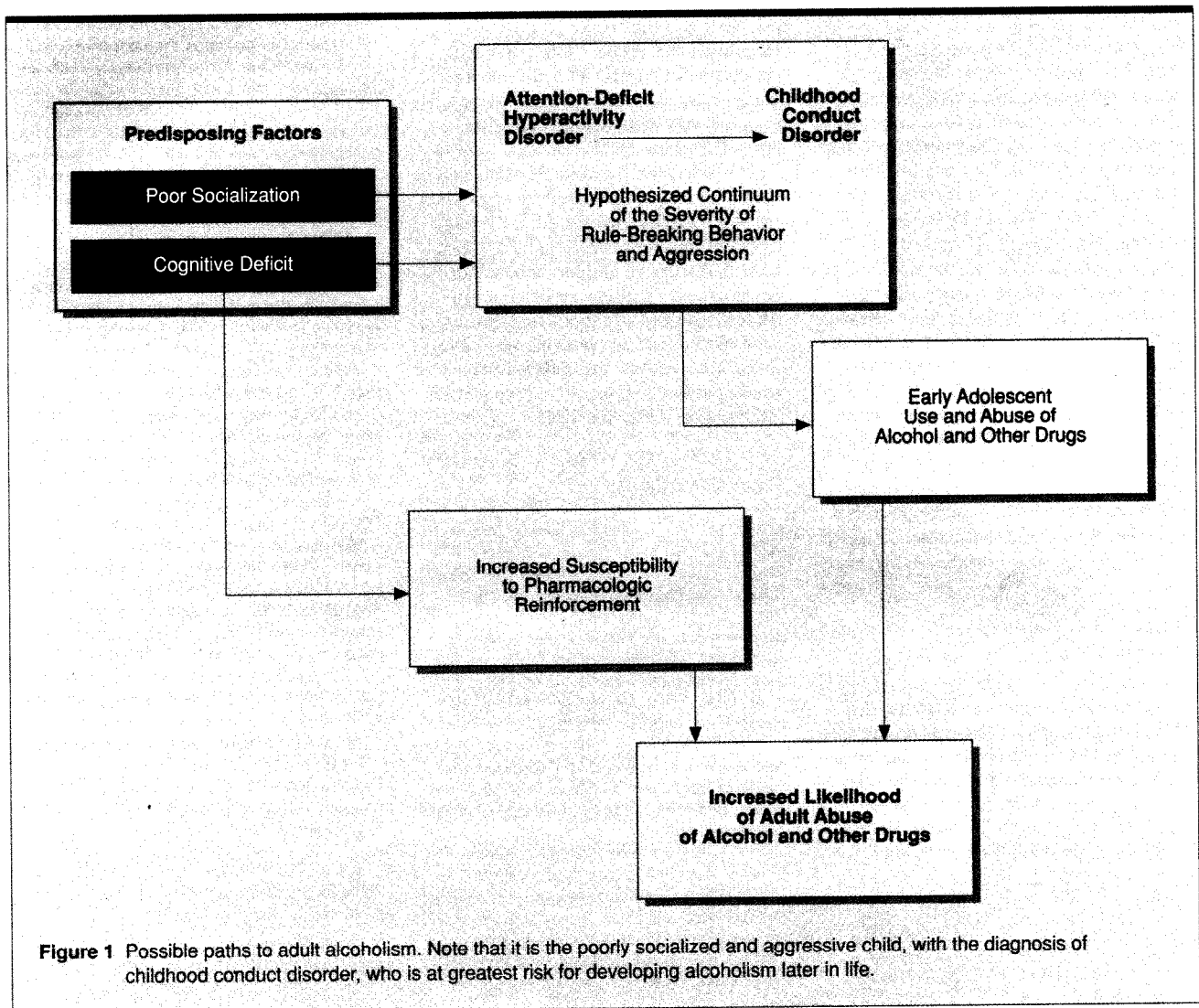
There is reasonably consistent evidence that some children—usually male, with conduct disorder or ADHD, and often with histories of antisocial personality disorder and alcohol and other drug abuse among male family members—are characterized by deficits in linguistic ability (Drejer et al. 1985; Schonfeld et al. 1988) and by reduced performance during tests that involve abstract thought processes or problem solving (Peterson et al. in press).

Tarter and colleagues (1985) posited that such linguistic and problem-solving deficits may reflect abnormalities in the functions of prefrontal areas of the brain. (These areas are involved in complex behaviors, including focusing attention, organizing, planning, and short-term memory.) Several studies have shown that, when evaluated by electroencephalogram (EEG),<sup>4</sup> sober, occasional-drinking sons of male alcoholics show different brain-wave responses to certain types of stimuli requiring voluntary attention (such as a flashing light) than do individuals who do not have a family history of alcoholism. Specifically, the sons of male alcoholics show increased brain (Hill et al. 1990) and cardiovascular responses (as measured by electrocardiogram) (Finn and Pihl 1987, 1988) to unpredictable, novel, or threatening stimuli. The sons of alcoholics also show decreased EEG responses to boring or predictable stimuli (Begleiter et al. 1984). For some individuals who show these abnormal brain and cardiovascular responses, alcohol consumption appears to normalize at least some aspects of the

<sup>2</sup>Biological alcoholism typically affects people who are at risk genetically for developing alcoholism but who do not always have a family history of alcoholism. *Familial alcoholism* refers to a pattern of alcoholism that runs in families and that may or may not have a genetic component.

<sup>3</sup>Meta-analysis refers to the application of statistical techniques to the results of separate studies, allowing the results of the studies to be compared.

<sup>4</sup>Electroencephalogram (EEG) testing involves recording the activity of different areas of the brain in response to various stimuli.



response pattern (Finn and Pihl 1987, 1988; Finn et al. 1990).

Peterson and Pihl (in press) have suggested that the cognitive deficit underlying at least some forms of the childhood conduct disorder–alcohol abuse prone connection may render sons of male alcoholics less able to use abstract thinking to categorize unpredictable events, more apt to revert to action in the face of threat and novelty, and less able to maintain voluntary attention to stimuli that are predictable, merely for the sake of social demand. This theory also posits that an inherited factor in familial alcoholism might be a tendency to react negatively to the new and to the anxiety provoking, and that it is this tendency that might be suppressed temporarily by alcohol intoxication.

Poor socialization is the second factor that may underlie rule-breaking behavior in children with ADHD and childhood conduct disorder. Children who are poorly socialized (but otherwise mentally able) might not be aware of the intricate, explicit and implicit rules and assumptions that govern social interaction; at a more complex level, they may not have incorporated the verbally mediated “social program” that allows for disciplined self-governance and voluntary direction of attention. The families of conduct-disordered children often have a reduced socioeconomic status and frequently are permeated by hostility, parental alcoholism and abuse of other drugs, antisocial personalities, and unstable behavior (Hinshaw 1987).

Familial alcoholism is associated as well with dramatically increased rates of divorce and frequent family separations (Chafetz et al. 1971). It is not difficult to imagine that children raised under such volatile circumstances might be deficient in their socialization, especially given that children of alcoholics are often neglected (Rydelius 1981).

The presence of both of these factors—cognitive deficits and poor socialization—might increase the severity of either; this type of interaction has been shown to occur in adults with antisocial personality disorder and may also occur in children with ADHD and conduct disorder. Cadoret and co-workers (1990) demonstrated an environment–gene interaction in the genesis of antisocial personality disorder. These researchers

examined the biological and adoptive family histories of 44 male adoptees (31 abused alcohol) who were characterized by antisocial personality disorder and 242 adoptees not characterized by antisocial personality disorder. They concluded that the biological parents of adoptees with antisocial personality disorder were significantly more likely to be alcoholic or criminal and delinquent than were the biological parents of the adoptees who did not have antisocial personality disorder. In addition, children placed in an adoptive home in which a family member had an alcohol problem or exhibited antisocial behavior were more likely to develop antisocial personality disorder. Children whose biological parents were delinquent or criminal and who were placed in a home with lower socioeconomic status also were more likely to develop alcohol and other drug abuse problems.

## CONCLUSIONS

A number of additional, and potentially important, issues remain. It is important to remember (as Figure 1 suggests) that children with conduct disorder do not follow rules, and use of alcohol and other drugs by adolescents is against the rules. The early onset of the severe Type 2, highly heritable, male-limited form of alcoholism might be in part a consequence of this rule-breaking propensity. It seems at least possible that the effects of early drug use might be more profound on a nervous system that is still maturing.

Currently, only imprecise definitions of disorders such as ADHD, childhood conduct disorder, and antisocial personality disorder exist. Each DSM-III-R diagnostic item is as complex in structure as the condition itself. Researchers studying ADHD might do well to consider the complex net of assumptions guiding responses to such items. It is likely to be impossible to determine the precise relationship between ADHD, childhood conduct disorder, and alcohol and other drug abuse, because these childhood disorders have multiple causes (Lilienfeld and Waldman 1990). However, the importance of aggression as a factor delineating those children with ADHD who are at increased risk of developing alcohol or other drug abuse should be underscored.

Children with "pure" ADHD are not at substantially increased risk of developing alcohol and other drug abuse, and at least 50 percent of these children func-

tion well as adults (Gittelman et al. 1985; Hechtman and Weiss 1986). However, children with ADHD who also are aggressive are at increased risk of developing problems with alcohol and other drugs (Hinshaw 1987).

It is reasonably certain that those children who are characterized by aggression are at the highest risk for all of the negative consequences traditionally associated with disruptive childhood behaviors—development of antisocial behavior in adolescence and adulthood and development of abuse of alcohol and other drugs. These are, perhaps, the children for whom particular concern and innovative intervention is warranted. ■

## REFERENCES

ADRIAN, M.; JULL, P.; AND WILLIAMS, R. *Statistics on Alcohol and Drug Use in Canada and Other Countries. Vol. 1: Statistics on Alcohol Use*. Toronto, Canada: Addiction Research Foundation, 1989.

ALTERMAN, A.I., AND TARTER, R. An examination of selected typologies: Hyperactivity, familial and antisocial alcoholism. In: Galanter, M., ed. *Recent Developments in Alcoholism*. Vol. 4. New York: Plenum Press, 1986. pp. 169–189.

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R)*. Washington, DC: the Association, 1987.

BARKLEY, R.A.; FISCHER, M.; EDLEBROCK, C.S.; AND SMALLISH, L. The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective followup study. *Journal of the American Academy of Child and Adolescent Psychiatry* 29(4):546–557, 1990.

BEGLEITER, H.; PORJESZ, B.; BIHARI, B.; AND KISSIN, B. Event-related brain potentials in boys at risk for alcoholism. *Science* 225(4669):1493–1496, 1984.

BOHMAN, M.; CLONINGER, C.R.; SIGVARDSSON, S.; AND VON KNORRING, A.L. Genetics of alcoholism and related disorders. *Journal of Psychiatric Research* 21(4):447–452, 1987.

BUKSTEIN, O.G.; BRENT, D.A.; AND KAMINER, Y. Comorbidity of substance abuse and other psychiatric disorders in adolescents. *American Journal of Psychiatry* 146(9):1131–1141, 1989.

CADORET, R.J.; TROUGHTON, E.; BAGFORD, J.; AND WOODWORTH, G. Genetic and environmental factors in adoptee antisocial personality. *European Archives of Psychiatry and Neurological Sciences* 239(4):231–240, 1990.

CHAFETZ, M.E.; BLANE, H.T.; AND HILL, M.J. Children of alcoholics: Observations in a child guidance clinic. *Quarterly Journal of Studies on Alcohol* 32(3):687–698, 1971.

CLONINGER, C.R.; BOHMAN, M.; AND SIGVARDSSON, S. Inheritance of alcohol abuse: A cross-fostering analysis of adopted men. *Archives of General Psychiatry* 38(8):861–868, 1981.

DREJER, K.; THEILGAARD, A.; TEASDALE, T.W.; SCHULSINGER, F.; AND GOODWIN, D.W. Prospective study of young men at high risk for alcoholism: Neuropsychological assessment. *Alcoholism: Clinical and Experimental Research* 9(6):498–502, 1985.

FINN, P.R., AND PIHL, R.O. Men at high risk for alcoholism: The effects of alcohol on cardiovascular response for unavoidable shock. *Journal of Abnormal Psychology* 96:230–236, 1987.

FINN, P.R., AND PIHL, R.O. Risk for alcoholism: A comparison between two different groups of sons of alcoholics on cardiovascular reactivity and sensitivity to alcohol. *Alcoholism: Clinical and Experimental Research* 12(6):742–747, 1988.

FINN, P.R.; ZEITOUNI, N.C.; AND PIHL, R.O. Effects of alcohol on psychophysiological hyperreactivity to nonaversive and aversive stimuli in men at high risk for alcoholism. *Journal of Abnormal Psychology* 99(1):79–85, 1990.

GERSTLEY, L.J.; ALTERMAN, A.I.; MCELLEMAN, A.T.; AND WOODY, G.E. Antisocial personality disorders in patients with substance abuse disorders: A problematic diagnosis? *American Journal of Psychiatry* 147(2):173–178, 1990.

GILLIGAN, S.B.; REICH, T.; AND CLONINGER, C.R. Etiologic heterogeneity in alcoholism. *Genetic Epidemiology* 4(6):395–414, 1987.

GITTELMAN, R.; MANNUZZA, S.; SHENKER, R.; AND BONAGURA, N. Hyperactive boys almost grown up. *Archives of General Psychiatry* 42(10):937–947, 1985.

GOODWIN, D.W. Alcoholism and genetics: The sins of the fathers. *Archives of General Psychiatry* 42(2):171–174, 1985.

GUZE, S.B.; TUASON, V.B.; GARFIELD, P.D.; STEWART, M.A.; AND PICKEN, B. Psychiatric illness and crime with particular reference to alcoholism: A study of 223 criminals. *Journal of Nervous and Mental Diseases* 134:512–521, 1963.

HAGNELL, O.; LANKE, J.; RORSMAN, B.; AND OHMAN, R. Predictors of alcoholism in the Lundby study. II. Personality traits as risk factors for alcoholism. *European Archives of Psychiatry and Neurological Sciences* 235(4):192–196, 1986.

HALIKAS, J.; MELLES, J.; MORSE, C.; AND LYTTLE, M. Predicting substance abuse in juvenile offenders: Attention deficit disorder versus aggressivity. *Child Psychiatry and Human Development* 21(1):49–55, 1990.

HASIN, D.S.; GRANT, B.F.; AND ENDICOTT, J. Lifetime psychiatric comorbidity in hospitalized alcoholics: Subject and familial correlates. *International Journal of the Addictions* 23(8):827–850, 1988.

HECHTMAN, L., AND WEISS, G. Controlled prospective 15-year followup of hyperactives as adults: Nonmedical drug and alcohol use and antisocial behavior. *Canadian Journal of Psychiatry* 31(6):557-567, 1986.

HENKER, B., AND WHALEN, C.K. Hyperactivity and attention deficits. *American Psychologist* 44(2):216-223, 1989.

HILL, S.; STEINHAUER, S.; PARK, J.; AND ZUBIN, J. Event-related potential characteristics in children of alcoholics from high density families. *Alcoholism: Clinical and Experimental Research* 14(1):6-16, 1990.

HINSHAW, S.P. On the distinction between attention deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological Bulletin* 101(3):443-463, 1987.

KRAMER, J., AND LONEY, J. Childhood hyperactivity and substance abuse: A review of the literature. In: Gadaw, K., and Bialer, I., eds. *Advances in Learning and Behavioral Disabilities*. Vol. 1. Greenwich, CT: JAI Press, 1982. pp. 225-259.

LILIENFELD, S.O., AND WALDMAN, I.D. The relation between childhood attention-deficit hyperactivity disorder and adult antisocial behavior reexamined: The problem of heterogeneity. *Clinical Psychology Review* 10(6):699-725, 1990.

OFFORD, D.R.; BOYLE, M.H.; FLEMING, J.E.; BLUM, H.M.; AND GRANT, N.I. Ontario Child Health Study: Summary of selected results. *Canadian Journal of Psychiatry* 34(6):483-491, 1989

OLWEUS, D. Stability of aggressive reaction patterns in males: A review. *Psychological Bulletin* 86(4):852-875, 1979.

PETERSON, J.B., AND PIHL, R.O. Information processing, neuropsychological function and the inherited predisposition to alcoholism. *Neuropsychology Review*, in press.

PETERSON, J.B.; FINN, P.; AND PIHL, R.O. Cognitive dysfunction and the inherited predisposition to alcoholism. *Journal of Studies on Alcohol*, in press.

PIHL, R.O.; PETERSON, J.; AND FINN, P. Inherited predisposition to alcoholism: Characteristics of sons of male alcoholics. *Journal of Abnormal Psychology* 99(3):291-301, 1990.

RYDELIUS, P.A. Children of alcoholic fathers: Their social adjustment and their health status over 20 years. *Acta Paediatrica Scandinavica* (Suppl. 286):1-89, 1981.

SCHAEFFER, K.W.; PARSONS, O.A.; AND ERRICO, A.L. Abstracting deficits and childhood conduct disorder as a function of familial alcoholism. *Alcoholism: Clinical and Experimental Research* 12(5):617-618, 1988.

SCHONFELD, I.S.; SHAFFER, D.; O'CONNOR, P.; AND PORTNOY, S. Conduct disorder and cognitive functioning: Testing three causal hypotheses. *Child Development* 59(4):993-1007, 1988.

SCHUBERT, D.S.P.; WOLF, A.W.; PATTERSON, M.B.; GRANDE, T.P.; AND PENDLETON, L. A statistical evaluation of the literature regarding the association

among alcoholics, drug abuse, and antisocial personality disorder. *International Journal of the Addictions* 23(8):797-808, 1988.

STABENAU, J. Addictive independent factors that predict risk for alcoholism. *Journal of Studies on Alcohol* 51(2):164-174, 1990.

STEWART, M.A.; DE BLOIS, C.S.; AND CUMMINGS, C. Psychiatric disorder in the parents of hyperactive boys and those with conduct disorder. *Journal of Child Psychology and Psychiatry* 21(4):283-292, 1980.

TARTER, R.E.; ALTERMAN, A.L.; AND EDWARDS, K.L. Vulnerability to alcoholism in men: A behavior-genetic perspective. *Journal of Studies on Alcohol* 46(4):329-356, 1985.

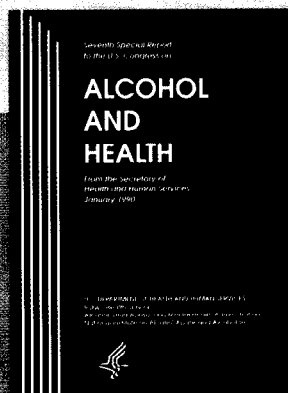
THOMSEN, P. The prognosis in early adulthood of child psychiatric patients: A case register study in Denmark. *Acta Psychiatrica Scandinavica* 81(1):89-93, 1990.

THORLEY, G. Review of followup and follow-back studies of childhood hyperactivity. *Psychological Bulletin* 96(1):116-132, 1984.

VON KNORRING, A.-L.; BOHMAN, M.; VON KNORRING, L.; AND ORELAND, L. Platelet MAO activity as a biological marker in subgroups of alcoholism. *Acta Psychiatrica Scandinavica* 72(1):51-58, 1985.

WALLANDER, J. The relationship between attention problems in childhood and antisocial behavior eight years later. *Journal of Child Psychology and Psychiatry* 29(1):53-61, 1988.

**NIAAA  
PROUDLY  
PRESENTS**



For almost two decades, physicians, treatment professionals, researchers, educators, and policy makers have relied on NIAAA's Special Reports to Congress on Alcohol and Health.

Single copies available free of charge from the National Clearinghouse for Alcohol and Drug Information, P.O. Box 2345, Rockville, Maryland 20852, telephone 301-468-2600 or 1-800-729-6686.