

and leads to considering problems in a different context. The result is reduced negative affect and frustration and improved interactions.

Second, and closely linked, awareness of differences in temperament can help parents and teachers anticipate potential problem situations. Waiting in line for long periods of time is an invitation for trouble in a group of active 9-year-old boys. Slow-to-warm-up children may have difficulty getting started when faced with new tasks and new demands and need to be alerted to upcoming changes in home or classroom routines. Finally,

sensitivity to temperamental differences points directions for intervention.

Forewarned is forearmed and many problems can be prevented or minimized by considering the behavioral styles of the children relative to the expectations and demands of the situation. Minor modifications in daily routines can often improve the goodness of fit between child and setting and thus reduce tensions and negative feelings.

In summary, temperament researchers have documented that there are real individual differences in

children's temperaments or behavioral styles which affect their everyday lives and experiences and their relationships with others. The role of temperament is best understood within an interactional framework in which the characteristics of both children and adults are important. Temperament is part of the goodness of fit between child and environment.

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## ADHD in children increases subsequent risk of drug use

Children diagnosed with ADHD are more at risk for using illicit drugs, alcohol, and cigarettes in their adolescence, according to a study published in the *Journal of Abnormal Psychology*. According to the researchers, childhood ADHD is linked to earlier first use of cigarettes, earlier progression to daily smoking and earlier use of illicit drugs.

Researchers identify ADHD as one of the most commonly diagnosed pediatric mental health disorders of childhood, occurring in three-to-five percent of school-age children. While previous research has indicated that ADHD, together with a variety of other childhood behavior disorders, may predispose children to drug, alcohol and tobacco use earlier than other children, this study explores more closely specific aspects of that association, researchers said.

"This is one of the first studies to focus on the severity of inattention problems in childhood ADHD as distinct from impulsivity and hyperactivity," said Ting-Kai Li, M.D., director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). "It demonstrates the usefulness of distinguishing ADHD's effects from the effects of childhood behavior disorders, such as aggression and defiance."

The study, "Childhood Predictors

of Adolescent Substance Use in a Longitudinal Study of Children with ADHD," was designed to clarify the magnitude of risk for early substance use and substance use disorder (SUD) in children with ADHD, compared to children without ADHD.

The researchers analyzed distinctions within the ADHD group, focusing on responses from youngsters with more severe symptoms of inattention in childhood, something not done previously. They also examined the differences among individuals with symptoms of comorbid behavior disorders, oppositional defiant disorder (ODD) and conduct disorder (CD).

Researchers tracked 142 adolescents ages 13 to 18 who had been diagnosed with ADHD from childhood. The children had received treatment for childhood ADHD an average of five years earlier at the Attention Deficit Disorder Clinic at the University of Pittsburgh School of Medicine. Adolescents with ADHD were recruited between 1987 and 1995. The 100 adolescents without ADHD were recruited in adolescence from the greater Pittsburgh area.

The ADHD and non-ADHD adolescents participated with their parents in a one-time office-based interview in which the adolescents, mothers, and fathers were interviewed

separately. Researchers also interviewed the teens' teachers.

"Teacher input is extremely important when conducting diagnostic assessments for ADHD, when planning treatments and when conducting research on these children," said Brooke S. G. Molina, Ph.D., associate professor of psychiatry and psychology at the Western Psychiatric Institute and Clinic, University of Pittsburgh School of Medicine. "We gather academic and behavioral information from them which is an aid in the diagnostic, treatment, and research process."

## Research findings

The researchers found that significantly more of the teens diagnosed with ADHD as children reported episodes of drunkenness than their counterparts in the non-ADHD group. Nearly twice as many of the ADHD group reported having been drunk more than once in the past six months.

According to the study, both groups gave similar responses when asked if they had ever tried alcohol, cigarettes, or marijuana at least once. However, 20 percent of adolescents with ADHD were more likely to have tried some other illegal drug besides marijuana compared to 7 percent of the non-ADHD group. These illicit drugs included inhalants, hallucinogens, co-

caine, and non-medicinal or non-prescribed use of stimulants.

The study found that 10.6 percent of adolescents with ADHD compared to 3 percent of the non-ADHD group reported lifetime use of illicit drugs in two or more drug classes.

The study found that teens with childhood ADHD also reported having used tobacco and having tried an illegal drug other than marijuana at younger ages than their non-ADHD peers.

The researchers found that the teens who reported more frequent episodes of drunkenness, higher alcohol problem scores, and a greater likelihood of substance abuse were those diagnosed with more severe inattention problems in childhood. The youngsters with severe inattention were about five times more likely than others to use an illegal drug other than alcohol and marijuana at an early age, according to the study.

The researchers pointed out that inattention appeared to be a uniquely important variable even when the analyses considered the presence of ODD and CD, factors which more typically have been considered predictive of substance use.

Molina said they found that children with persistent ADHD who had not developed CD were at increased risk for drunkenness, alcohol problems and daily smoking. "The children who also developed CD had even higher rates of substance use, so CD is very important, but our findings also suggest that persistence of ADHD is a contributing factor, which is a new

result," Molina said.

Molina said researchers were surprised that the ADHD symptoms were more predictive of substance use than childhood antisocial behaviors. "What we found surprising was the severity of ADHD in children that predicted substance use," Molina said. "The symptoms of the more severe and persistent ADHD child included difficulty paying attention in school, becoming easily distracted and the inability to stay focused on one thing for a long time."

Added Molina: "We expected other behavior problems to be predictors [such as] stealing, fighting, deviance. Instead, the ADHD [symptoms] predicted most of the variables."

The daily smoking reported by one-third of the ADHD participants was another area that stood out, said Molina. "Thirty percent is a lot and tobacco addiction is very hard to quit, with well-established long-term adverse health consequences," said Molina. "We expect that even more of these children will become addicted to nicotine as they grow older. The average age of the kids in this study was only 15."

According to researchers, the findings indicate that childhood ADHD may be as important for the risk of later substance use problems as having a history of family members with alcoholism and other substance use disorders.

### Other ADHD studies

Researchers at the American Psychological Association's (APA's)

recent conference said that ADHD treatment with stimulants such as Ritalin halves the chances that a child with ADHD will become a drug or alcohol abuser later. The study found that children treated with stimulants were no more likely than their peers in the general population to have drug or alcohol problems.

"Studying the relationship between treatment and substance use/abuse outcomes is an extremely important and complicated area for future study in the area of ADHD research," said Molina. "We feel that the literature in this area is young with a need for replication and further study." Molina said they are examining this question now and they hope to have their own findings to report within the year.

Meanwhile, these researchers are currently following over 350 children with ADHD and 240 children without ADHD through adolescence and into young adulthood, Molina said.

"We have a very extensive protocol, which will allow us to test a wide range of hypotheses regarding vulnerability to alcoholism and drug abuse in this population," Molina said.

Molina added: "We will be able to determine whether early use and abuse in adolescence by these children persists into adulthood."

Molina B, Pelham, W Jr.: Childhood predictors of adolescent substance use in a longitudinal study of children with ADHD. *Journal of Abnormal Psychology* 2003; 112 (3): 497-507. Correspondence to: Brooke S. G. Molina, Western Psychiatric Institute and Clinic, 3811 O'Hara Street, Pittsburgh, Pennsylvania 15213; e-mail: molinab@msx.upmc.edu

## What's New in Research

### Greater brain response to alcohol ads in teens with AUD

Teens with alcohol use disorder (AUD) have stronger reactions to alcohol-related images and advertisements than their non-drinking peers, according to new research.

Susan F. Tapert, Ph.D., of Veterans Affairs San Diego Healthcare System, San Diego, and colleagues

employed functional MRI to examine changes in brain activity in 30 high school students (ages 14 to 17 years) as they were shown advertisements for alcoholic and non-alcoholic beverages. Half of the students had a history of AUD and half had no history of the disorder.

The study found that teens with an AUD showed substantially greater

brain activity in response to advertisements for alcoholic beverage than teens without AUD, mostly in the left anterior, limbic, and visual system areas of the brain. According to the researchers, the degree of brain response to the alcohol-related advertisements was highest in teens who consumed more drinks per month and reported greater cravings for alcohol.

