

ADHD and drug use

Attention-Deficit Hyperactivity Disorder and Drug Use in Adults

Tiffany L. Brondy


University Undergraduate Fellow, 1995-1996

Texas A&M University

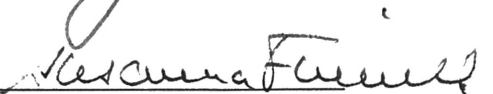
Department of Psychology

APPROVED

Fellows Advisor

Handwritten signature of Emily S. Davidson in cursive script, written over a horizontal line.

Honors Director

Handwritten signature of Rebecca Fennell in cursive script, written over a horizontal line.

Abstract

This study examined the prevalence of Attention-Deficit Hyperactivity Disorder in a non-clinical sample of 271 college students, as well as the relationship between drug use and symptoms of ADHD. A psychological adjustment scale was administered to determine how many subjects showed ADHD symptoms in 2 settings (home and work) according to the DSM-IV criteria. The measure was broken down into six scales: Hyperactivity, Inattention, Impulsivity, Aggression, Anxiety, and Emotional problems. Also, a drug use measure was given to determine drug use within a life time and within the last six months. Results found that only two subjects met DSM-IV criteria for ADHD while 24 met criteria in at least one setting. Of these 24, only five claimed to have been possibly diagnosed with ADHD in childhood. Thus, this study does not support a high prevalence of ADHD among adults. Furthermore, subjects with previous diagnosis showed higher frequencies of Hyperactivity, Inattention, and Impulsivity. It also seems that a previous diagnosis was a better predictor of drug use than self-reported symptoms. Significant correlations were found between Aggression and alcohol and between Impulsivity and alcohol, caffeine, and cigarette use. However, multiple regressions showed that Impulsivity, rather than Aggression was significant, correlating with both alcohol and caffeine use.

The diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) continues to be a controversial one, both in children and adults. The debate has become an issue since people with ADHD can request certain benefits and special treatments. Under the Americans with Disabilities Act, for instance, people with ADHD can request longer test taking periods. Furthermore, many researchers and clinicians feels this disorder is over-diagnosed in both adults and children.

Due to increasing concerns, important additions have been made in the DSM-IV to make meeting criteria more difficult. First, the DSM-IV requires that the symptoms occur in at least two settings. A child hyperactive at school may not necessarily show symptoms at home. Second, the disturbance must cause "...clinically significant distress or impairment, social, academic, or occupational functioning." (American Psychiatric Association, 1994). Hopefully, these new criteria will increase the chances of an accurate diagnosis. In addition, the DSM-IV requires that the onset of the symptoms occur before the age of seven with a duration of at least six months. The DSM-IV divides symptoms into the two groups of inattention and hyperactivity/impulsivity, each of which contain nine symptoms. Inattention includes lack of attention to details, difficulty sustaining attention, difficulty listening, failure to finish, difficulty organizing, a dislike of sustained mental effort, a tendency to lose things, distractibility, and a tendency to forget. Symptoms observed under hyperactivity/ impulsivity include being fidgety, leaving one's seat frequently, running or climbing excessively, being constantly "on the go", talking too much, blurting out answers, having trouble waiting for a turn, and interrupting.

Although ADHD was once believed to exist only in childhood, its

persistence into adulthood is now recognized by most clinicians and researchers. Adult ADHD was first recognized by the DSM-III as Attention Deficit Disorder-Residual Type and required that "...the individual once met the criteria for Attention Deficit Hyperactivity Disorder with Hyperactivity,... (that) signs of hyperactivity are no longer present, but other signs of the illness have persisted to the present without periods of remission, as evidenced by signs of both attentional deficits and impulsivity...(that) symptoms of inattention and impulsivity cause an impairment in social and occupational functioning,...(American Psychiatric Association, 1993). Furthermore, adults show symptoms that are modified to fit more appropriate adult-type behaviors, however, these have not been well specified. Wender explains that "ADHD adults may no longer run about or climb on things excessively, but they continue to be uncomfortable sitting still, dislike being inactive, and find it difficult to relax" (Wender, 1995). A review by Searight, Nahlik, and Campbell (1995) reported that adults suffer from poor concentration, cognitive confusion, and dysphoric mood, as well as difficulty maintaining interpersonal relationships. Most of these symptoms are not specific to ADHD; there continues to be difficulty describing ADHD in adults.

Few studies have followed children diagnosed with ADHD into adulthood, although several have followed them through adolescence. Gittelman, Mannuzza, Shenker, and Bonagura (1985) followed 101 males who had been diagnosed as hyperactive between the ages of 6 and 12 based on parent and teacher ratings. At follow up, when the subjects were between the ages of 16 and 23 (mean age=19), they were given a version of the NIMH Diagnostic Interview Schedule. According to DSM-III criteria, 31% were diagnosed as having the full syndrome

of ADHD, compared to only 3% of the controls. Probands were also shown to have a higher risk for antisocial behavior, substance abuse, and conduct disorder.

In an attempt to replicate these findings, Mannuzza, Klein, Bonagura, Malloy, Giampino, and Addalli (1991) followed a sample of 94 hyperactive boys and 78 controls, ranging in age from 8 to 14. The mean age at follow up was 18. Forty-three per cent of the probands exhibited ADHD, 32% had antisocial personality disorder, and 10% had substance abuse problems.

Barkley, Fischer, Edelbrock, and Smallish (1989) followed up 123 hyperactive subjects and 66 controls from an original sample of 158 hyperactives and 81 normal controls. To be considered hyperactive, the original sample had to have an onset before the age of 6, a 12 month duration, at least 6 of 14 behavioral problems on the Home Situations Questionnaire, scores on the Hyperactivity Index of the Revised Conners Parent Rating Scale, as well as complaints from parents and teachers and no signs of autism, psychosis, or other disorders. At follow up 8 years later, DSM III-R criteria for ADHD was met for 71.5% of the ADHD group. Furthermore, 43% were diagnosed with conduct disorder and 59% met criteria for oppositional defiant disorder, compared to 1.6% and 11% for the controls respectively (1989).

These studies suggest the persistence of ADHD into adolescence to some degree, as well as a greater likelihood to exhibit conduct disorders and substance abuse. There is still a question as to what happens when these adolescents become adults. Unfortunately, studies examining this question are few, but those that have been done have found mixed results. Mannuzza, Klein, Besser, Malloy, LaPadula (1993) conducted a follow up study in which the same subjects followed up by Gittleman et al to a mean age of 19, as previously discussed, were followed up to a mean age of 26. Subjects were administered

the Schedule for the Assessment of Conduct, Hyperactivity, Anxiety, Mood, and Psychoactive Substances. Results show that only 8% were diagnosed as ADHD, while 16% were diagnosed as having a nonalcohol substance abuse problem, and 18% suffered from antisocial personality. Compared to the controls, probands were of lower SES, completed 2.5 years less of school, and were more likely to experience ongoing mental disorders. Based on this and the former study by Gittleman, there appears to be a falling off of the actual disorder between adolescence and adulthood.

Weiss, Hechtman, Milroy, and Perlman (1985) examined 63 adults from an original group of 104 who had been diagnosed hyperactive as children. Ages ranged from 21 to 33. Subjects were evaluated by means of psychiatric interviews using both the DSM III criteria and the SAD-L diagnosis, as well as self-rating scales. Sixty-six per cent of the hyperactive group reported at least one symptom of ADHD compared to 7% of the controls, and 44% were considered restless during the interview compared to 10% of the controls. It should be noted that, although these subjects had higher frequencies of symptoms, they did not appear to meet criteria. Twenty-three per cent, however, were diagnosed with Antisocial Personality Disorder.

Based on the available longitudinal studies of adults, the persistence of ADHD into adulthood seems to be supported for a minority of subjects; however, there are several important considerations to be made before generalizing its prevalence to the general population. First these studies were conducted on clinical samples of subjects diagnosed with ADHD as children. Second, the DSM-IV estimates that ADHD occurs in 3-5% of children from the general population. Third, even if symptoms persist in over half the cases of childhood ADHD, the numbers of adults in the general population who

have ADHD would be rare (about half of this 3 to 5%). Due to the dramatic increase of adults claiming to have ADHD, especially those claiming a first time diagnosis, the controversy has grown.

Another issue that has become a concern is the relationship between ADHD and drug use. Although several studies support such a relationship, this might be explained by the comorbidity between ADHD and conduct disorder that has been frequently supported. This is significant due to the high prevalence of drug use among people diagnosed with a conduct disorder. A study conducted on 111 juveniles referred to juvenile court for possible drug and alcohol problems found that, of 90 subjects with a substance abuse problem, 91% demonstrated conduct disorder, 68% showed aggressive conduct disorder, and 23% had ADHD (Milin, Halikas, Meller, & Morse 1991). Rounsaville, Anton, Carroll, Budde, Prusoff, and Gawin found that, from a sample of 298 cocaine abusers seeking treatment, 34.9% had a history of ADHD in childhood (1991). Furthermore, Mannuzza et al. demonstrated that one third of a sample of ADHD children were more likely to have ongoing mental disorders, such as antisocial and nonalcohol substance abuse disorders as adults (1993).

The purpose of the present study was to determine the prevalence of current symptoms for ADHD in a non-clinical sample. A second hypothesis was that subjects exhibiting the most symptoms would be more likely to use drugs, especially those who were diagnosed with ADHD in childhood.

Methods

Subjects

Subjects included 290 students from introductory psychology classes at Texas A&M. Nineteen were omitted from the analyses due to incomplete responses. One hundred and twenty-five males and 146 females were included in

the final data set. The average age of the sample was 19.

Psychological Adjustment Scale

The psychological adjustment scale consists of 56 items and is a revision of a scale by Lambert and Sandoval (1990). It was designed to measure symptoms of ADHD in adults according to the DSM-IV criteria. Sample questions are presented in Table 1. Subjects are asked to indicate whether the sentence describes them, "not at all", "a little", "quite a bit", or "very much", when they are either at work or school and when they are at home or in a social setting. Thus, this questionnaire is consistent with the DSM-IV criteria, requiring the persistence of symptoms in two settings. Subjects were also asked to indicate whether they had ever been diagnosed with Attention Deficit Hyperactivity Disorder and whether they had ever taken medication for ADHD. The questionnaire also contains items concerning other psychological disorders such as aggression, anxiety, and emotional problems. Not only do such questions distract attention from the main purpose of the questionnaire, but may demonstrate comorbidity between symptoms of ADHD and other disorders.

Insert Table 1 about here

Drug Use Measure

The measure for drug use includes 22 items concerning the use of marijuana, psychedelics, uppers, methedrine, amphetamines, barbiturates, tranquilizers without a prescription, ecstasy, cocaine, crack, heroin, methadone, opium, and morphine. Subjects reported how often they had used drugs within the last six months and in their entire lives on a 0 to 5 scale (0=not at all, 1=once or twice, 2=three to nine times, 3=ten to nineteen

times, 4=twenty to thirty-nine times, 5=forty or more times). For alcohol and caffeine, subjects were asked to indicate how often, during the last six months, they consumed the drug (0=not at all, 1=once or twice, 2=a few times, 3=about once a month, 4=a few times a month, 5=about once a week, 6=a few times a week, 7=almost daily, 8=daily, 9=several times daily) and how much they consumed in one sitting (0=none, 1=half a drink, 2=one drink, 3=two or three drinks, 4=four or five drinks, 5=about six drinks, 6=between seven and twelve drinks, 7=thirteen or more drinks). They were also asked how many cigarettes, pipes or cigars, and dip they used daily.

Procedures

Subjects were given two questionnaires as part of prescreening in one of four sessions. To ensure anonymity, subjects were asked to write their responses directly on the questionnaire. By doing so, their answers could not be as easily viewed by their neighbors as if they had filled out a scantron. After completing the questionnaire, subjects were also instructed to put the questionnaire into an envelope and turn it in separately from the signed consent form. They were instructed to keep a copy of the consent form and debriefing.

Results

The variables for the psychological adjustment scale were compiled into six scales: Hyperactivity (9 items), Inattention (11 items), Impulsivity (10 items), Aggression (14 items), and Anxiety (6 items). Each one of these scales was considered for both the home and work settings, thus creating a total of 12 scales: Hyperactivity in the home (HHYP) and at work (WHYP), Inattention at home (HATT) and at work (WATT), Impulsivity at home (HIMP) and at work (WIMP), Aggression at home (HAGG) and at work (WAGG), Anxiety at home (HANX) and at

work (WANX), and Emotional problems at home (HEMO) and at work (WEMO).

Internal Consistency The internal consistency estimate (Cronbach's coefficient alphas) for each scale and across settings are presented in Table 2. Most were between .70 and .80.

Means and Standard Deviations All of the means and standard deviations for the psychological adjustment scale are indicated in Table 2.

Insert Table 2 about here

Drug use Illegal drug use was extremely rare among this sample of college students. The frequency of drug use in the last six months was so small, only drug use during a life time is included in Table 3. Marijuana was the most commonly used drug with 12.2% of the sample (33 subjects) having used it at least once in the past six months, and 19.1% (52 subjects) having used it in their entire lives.

Insert Table 3 about here

Prevalence of ADHD Symptoms

Two groups of subjects were of particular interest. One was subjects who had a previous diagnosis of ADHD in childhood (N=17). The other group was subjects who self-reported currently meeting criteria as measured on the psychological adjustment scale. Subjects were asked to indicate if they had been previously diagnosed with ADHD, by indicating either "yes", "no", or "not sure".

Seventeen subjects indicated that they might have been diagnosed, seven of which were certain and 11 which were not sure. For analyses, these two

categories were collapsed to produce a sample of 17. Criterion for each scale was met when two-thirds of the symptoms included in each scale received an answer of 2 or greater on a 4 point scale. Seven of the 9 symptoms needed to be met for a diagnosis of Hyperactivity, 8 of the 11 for Inattention, and of 7 the 10 for Impulsivity. According to the self-report, ten subjects met criteria in both settings. However, due to such small numbers, all subjects who met criteria in only one setting were analyzed (N=24). Results are shown in Table 4. For Hyperactivity in the home setting, 9 subjects met criteria (4 males and 5 females) and 7 met criteria in the work setting. For Inattention, only 4 met criteria in the home setting (1 female and 3 males) while only 2 met criteria in the work setting. For Impulsivity, 13 met criteria in the home (6 males and 7 females) while only 3 met criteria at work.

Insert Table 4 about here

Previously Diagnosed, ADHD Symptoms, and Drug Use

Of the 17 subjects who reported that they might have been previously diagnosed with ADHD, only 5 met criteria in one setting based on the self-report. Again, higher levels of symptoms and drug use seemed possible and a MANOVA was used to determine if there were significant differences. Wilk's Lambda was significant ($F(1,19)=2.577$, $p<.005$). Univariate analysis showed significance for Hyperactivity in both the home, $F(1,270)=8.68$, $p<.0035$ and work setting, $F(1,270)=9.55$, $p<.0022$. Also, a significant difference was found for Inattention in both settings, $F(1,270)=13.68$, $p<.0002$ at home, and $F(1,270)=18.74$, $p<.0001$ at work or school. Impulsivity also showed significance in both settings, $F(1,270)=9.73$, $p<.002$ at home and

$F(1,270)=8.95$, $p<.003$ at work or school. Thus, significant differences were found for all of the ADHD scales. Differences in Aggression were significant in only the home setting, $F(1,270)=.5.47$, $p<.02$ and Anxiety was significant in the work or school setting, $F(1,270)=4.31$, $p<.04$. Finally, Emotional problems were significant in both settings, $F(1,270)=22.57$, $p<.0001$ in the home and $F(1,270)=9.43$, $p<.002$ in the work setting. Of the drugs, only the amount of caffeine per sitting came close to being significant, $F(1,270)=3.42$, $p<.06$. Compared to the whole sample, those who believed themselves to be previously diagnosed with ADHD scored significantly higher on all three ADHD scales in both settings; however, these results should also be interpreted with caution due to the very large difference in sample size. We created five random samples ($n=17$) matched for age and gender within the limits of our sample. We conducted MANOVAS, but these did not show significant effects due to loss of power. A more appropriate strategy is to estimate effect size for each sample. These effect sizes and the mean effect size across the five samples are presented in Table 5. Cohen (1988) suggests that effects between 0 and .30 are small, those between .30 and .50 are moderate, and above .50 are large. By comparing overall effect sizes of the 17 with the means of the overall effect sizes of the control groups, it is evident that the previously diagnosed group shows higher frequencies of symptoms, although some variation occurs.

Insert Table 5 about here

For drug use, scores indicating CAFFSIX, CAFFAMT, TOBASIX, and CIGDAILY were a good deal higher for the previously diagnosed group, while MARIL, ALCSEX, and ALCAMT were only slightly lower. Results are given in Table 6.

Insert Table 6 about here

Subjects Self-Reporting Current Diagnosis, ADHD Symptoms, and Drug Use

Twenty-four subjects met current criteria. However, it seemed possible that this group might show higher levels of drug use, therefore a MANOVA was conducted to determine if drug use was more frequent among this group. Due to low drug use, the only drugs included in the analysis were marijuana, lifetime use only (MARIL), alcohol and caffeine use in the last six months (ALCSIX and CAFFSIX, respectively), as well as the amount consumed at one sitting for each (ALCAMT and CAFFAMT), tobacco use for the last six months (TOBASIX), and the number of cigarettes smoked daily (CIGDAILY). Although the Wilk's Lambda was significant ($F(1,7)=2.16, p<.0376$), no single drug showed significance. This may have been due to all effects going in the direction of higher drug use, but only alcohol consumption for the last six months showed marginal significance ($F(1,270)=3.72, p<.0547$). These results should be interpreted with caution due to unequal sample sizes. Therefore, five random samples matched for were created and MANOVAS were conducted for each. Due to dramatic loss of power, no overall effects were found. A more appropriate strategy is to estimate effect size for each sample. These effect sizes are presented in Table 7. By comparing overall effect size, it appears that subjects meeting criteria in one setting according to self-reports did not have higher drug use frequencies. In fact, they were nearly equal to the controls with the exception of caffeine in the last six months.

Insert Table 7 about here

Previously Diagnosed Subjects Compared to Self-Reported

Differences in overall effect sizes between the subjects meeting criteria in one setting were not as large as those differences for the previously diagnosed group. In fact, those self-diagnosed on the scales were nearly equal to the controls for all drug use except caffeine in the last six months. Therefore, it seems that drug use is not much different for these subjects. Instead, previous diagnosis seems to be a much better predictor of both drug use and ADHD symptoms.

Correlations Between all Scales

Zero order correlations for the psychological adjustment scales across settings are listed in Table 8 and Table 9. All correlations were significant. In general, cross-setting correlations were highest, but cross-scale correlations were relatively high. Hyperactivity, Inattention, and Impulsivity were highly correlated with each other. Impulsivity was also as highly correlated with Aggression as it was with Hyperactivity and Inattention, both within and across settings.

Insert Tables 8 and 9 about here

Zero order correlations between the scales and drug use are given in Table 10. Only correlations across settings are given due to similarities between them. Significant correlations were found between Impulsivity and CAFFSIX, ALCSIX, CAFFAMT, ALCAMT, and CIGDAILY. Aggression was significantly correlated with

ALCSIX and ALCAMT. No other scales correlated with drug use.

Insert Table 10 about here

Regression

Multiple regressions were run for each drug that showed a significant correlation with any of the scales. Table 11 presents the results for ALCSIX. The overall multiple correlation was $R=.276$ with an adjusted $R^2=.097$, $F(6,264)=4.717$, $p<.0001$. Only Impulsivity was significantly associated with ALCSIX. The results of the regression for ALCAMT are shown in Table 12. The multiple overall correlation was $R=.250$ with an adjusted $R^2=.0835$, $F(6,264)=4.008$, $p<.0007$. Again, only Impulsivity was significant. Table 13 shows the results for CIGDAILY. The overall multiple correlation was $R=.176$ with an adjusted $R^2=.052$, $F(6,264)=2.433$, $p<.0263$. Impulsivity was again the only significant symptom. Overall, no symptom except for Impulsivity was significant.

Insert Tables 11, 12, and 13 about here

Discussion

The present study attempted to answer several questions concerning the diagnosis of ADHD in adulthood. It examined a sample of college students from the general population to estimate the prevalence of ADHD in a non-clinical sample of adults. It was also predicted that people rating themselves as

showing more symptoms on the psychological adjustment scale would have higher frequencies of drug use. However, of the 271 subjects analyzed, only two met the DSM-IV criteria since it requires that a diagnosis be made in two settings. For this reason, subjects who met criteria for one setting were analyzed, bringing the number to 24. Subjects in this sample showed very low frequencies of Hyperactivity, Inattention, and Impulsivity. Only 17 subjects reported having been diagnosed with ADHD previously. There was some minimum overlap between these two groups, with only 5 of the 17 subjects reporting a high enough rate of symptoms to be diagnosed in one setting. Twelve of the 17 did not even meet criteria to be considered ADHD in even one setting. Furthermore, it should also be pointed out that of the 271 subjects analyzed, only 2 met criteria in both settings and 24 in one setting. Thus, this study does not support a high prevalence of ADHD among adults, even those with a previous diagnosis in childhood. However, there are several explanations that might account for this. The sample was taken from college students. It may be less likely that people with ADHD will be found in such a location. As Mannuzza, et al. pointed out, ADHD probands completed 2.5 years formal schooling than normal controls (1993).

When MANOVAS were run on subjects meeting criteria in one setting, only one significant overall effect occurred. When the sample was compared to five control groups, significance disappeared, most likely because of loss of power. Therefore, overall effect sizes were calculated for both the experimental groups and the five control groups. The mean overall effect of the controls were compared to the entire sample. We found that drug use, with the exception of caffeine consumed in the last six months, was similar for both groups. Similarities in drug use might be explained by the fact that most

of the experimental group were not really diagnosed with ADHD according to DSM-IV criteria. It is possible that these 24 differed only slightly from the controls for the ADHD scales, but enough to put them into our experimental group. Another possibility is that a higher frequency of ADHD symptoms does not predict drug use.

Similar procedures were followed for subjects who claimed to be previously diagnosed. It was expected that people diagnosed with ADHD as children would score higher on the psychological adjustment scale for Hyperactivity, Inattention, and Impulsivity, as well as have higher frequencies of drug use. This hypothesis was supported for the three ADHD scales, but not for drug use when MANOVAS were run for the entire sample; however, significant effects disappeared when those who reported a childhood diagnosis of ADHD were compared with a matched control group instead of the entire sample. Again, overall effects were calculated and compared between the experimental group and controls. CAFFSIX, CAFFAMT, TOBASIX, and CIGDAILY were much higher for the experimental groups while ALCSIX, ALCAMT, and MARIL were only slightly lower. One explanation is that subjects previously diagnosed with ADHD never received treatment and are using caffeine and nicotine to self-medicate. The differences for ALCSIX, ALCAMT, and MARIL might be due to chance because of the small differences. Furthermore, the overall effects for this group were much greater than the overall effects of people meeting criteria on the psychological adjustment scale. Thus, a previous diagnosis of ADHD seems to be a better predictor of drug use than self-reported current symptoms.

Significant correlations occurred between Impulsivity and CAFFSIX, ALCSIX, CAFFAMT, ALCAMT, and CIGDAILY, while Aggression was correlated with

both ALCSIX and ALCAMT. Multiple regressions were run for each of these drugs. They showed that Impulsivity rather than Aggression, was significant. Therefore, Impulsivity seems to be a better predictor of drug use than Aggression, and other ADHD symptoms (Hyperactivity and Inattention) which did not show any significant correlations at all. This relationship was also supported by Kellan, Ensinger, and Simon (1980). They found high rates of substance abuse in adolescents who were considered more impulsive, aggressive, and inattentive. Although the present study did not support a significant relationship between Inattention, Aggression, and drug use, both studies did support an association between Impulsivity and drug use. These findings are not inconsistent with the research as it has been shown that Impulsivity is associated with conduct disorder which has been associated with drug use. Therefore, it seems possible that Impulsivity is the link between drug use and both ADHD and conduct disorder. As previously mentioned, Milin found that 91% of substance abusing juveniles were diagnosed with conduct disorder. Furthermore, comorbidity between ADHD and conduct disorder has also been supported. Szatmari, Offord, and Boyle (1993) found that 40% of ADHD children were also diagnosed with conduct disorder while Sandberg, Wieselberg, and Shaffer (1980) found 50% of hyperactive subjects, ages 5 to 9, had a conduct disorder. In a longitudinal study by Herrero, Hechtman, and Weiss (1994), hyperactive subjects between the ages of 6 and 12 were followed up for 15 years and then grouped according to the presence and persistence of behavior related problems. Seventy percent of the subjects who were diagnosed with antisocial personality or behavior problems at the 15-year follow up showed moderate to severe symptoms of hyperactivity. The degree of hyperactivity was significantly lower in groups where behavior related problems did not occur or

did not persist. Furthermore, Wilens, Biederman, Spencer, and Frances (1994) reviewed several longitudinal studies on children at risk for substance abuse disorders. They found strong support that comorbid ADHD and conduct disorder are a significant antecedent to substance use disorders.

This connection might explain why our sample of self-diagnosed subjects had lower frequencies of drug use. Perhaps they did not score as highly on Impulsivity as they did for Hyperactivity and Inattention.

References

American Psychiatric Association (1980). Diagnostic and Statistical Manual of Mental Disorders. 3rd ed. Washington, DC: American Psychiatric Association.

American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association.

Barkley, R.A., Fischer, M., Edelbrock, C.S., & Smallish, L. (1989). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. The American Academy of Child and Adolescent Psychiatry, 29, 546-557.

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences 2nd ed. Hillsdale, NJ.: L. Erlbaum Association.

Gittelman, R., Mannuzza, S., Shenker, R., & Bonagura, N. (1985). Hyperactive boys almost grown up: I. Psychiatric status. Archives of General Psychiatry, 42, 937-947.

Herrero, M.E., Hechtman, L., & Weiss G. (1993). Antisocial disorders in hyperactive subjects from childhood to adulthood: Predictive factors and characterizations of subgroups. American Journal of Orthopsychiatric, 64, 570-571.

Kellam, S.G., Ensminger, M.E., & Simon, M.B. (1980). Mental health in first grade in first grade and teenage drug, alcohol, and cigarette use. Drug and Alcohol Dependence, 5, 273-304.

Lambert, N.M., Sandoval, J., Hartsough, C.S. (1990). Children's Attention and Adjustment Survey. Minnesota: Circle Pines.

Mannuzza, S., Klein, R.G., Bessler, A., Malloy, P., & LaPadula, M.

(1993). Adult outcome of hyperactive boys: Educational achievement, occupational rank, and psychiatric status. Archives of General Psychiatry, 50, 565-576.

Mannuzza, S., Klein, R.G., Bonagura, N., Malloy, P., Giampino, T.L., Addalli, K.A. (1991). Hyperactive boys almost grown up: v. replication of psychiatric status. Archives of General Psychiatry, 48, 77-83.

Milin, R., Halikas, J.A., Meller, J.E., & Morse, C. (1991). Psychopathology among substance abusing juvenile offenders. Journal of the American Academy of Child and Adolescent Psychiatry, 30, 569-574.

Rounsaville, B.J., Anton, S.F., Carroll, K., Budde, D., Prusoff, B.A., & Gawin, F. (1991). Psychiatric diagnosis of treatment-seeking cocaine abusers. Archives of General Psychiatry, 48, 43-51.

Sandburg, S.T., Wieselberg, M., & Shaffer, D. (1980). Hyperkinetic and conduct problem children in a primary school population: some epidemiological considerations. Journal of Child Psychology and Psychiatry, 21, 293-311.

Searight, H.R., Nahlik, J.E., and Campbell, D.C. (1994). Attention-deficit/ hyperactivity disorder: assessment, diagnosis, and management. The Journal of Family Practice, 40, 270-279.

Szatmari, P., Offord, D.R. & Boyle, M.H. (1989). Ontario child health study: prevalence of attention deficit disorder with hyperactivity. Journal of Child Psychology and Psychiatry, 30, 219-230.

Wender, P. (1995). Attention deficit hyperactivity disorder in adults. New York: Oxford University Press.

Weiss, G., Hechtman, L., Milroy, T., & Perlman, T. (1984). Psychiatric status of hyperactives as adults: A controlled prospective 15-year follow up of 63 hyperactive children. Journal of the American Academy of Child

Psychiatry, 24, 211-220.

Wilens, T., Biedman, J., Spencer, T., & Frances, R. (1994). Comorbidity of attention-deficit hyperactivity and psychoactive substance use disorders.

Hospital and Community Psychiatry, 45, 421-435.

Table 1

Sample items from the psychological adjustment scale

1. Do you often feel unable to sit still; that is, are you often restless and fidgety?
2. Do you have difficulty staying with an activity; that is, are you more comfortable frequently moving from activity to activity?.
3. Are you often impatient with other people about getting things done as quickly as you think they could be done?

Table 2

Means, Standard Deviations, and Alpha's for the Psychological Adjustment Scales

	<u>Mean</u>	<u>SD</u>	<u>Alpha</u>
<u>Home</u>			
Attention	.76	.45	.81
Impulsivity	1.0	.45	.74
Hyperactivity	1.1	.47	.66
Aggression	.83	.40	.77
Anxiety	.92	.51	.71
Emotional	.87	.61	.56
<u>Work</u>			
Attention	.78	.45	.81
Impulsivity	.83	.41	.71
Hyperactivity	1.0	.44	.64
Aggression	.68	.36	.75
Anxiety	.88	.50	.72
Emotional	.56	.53	.57
<u>Both</u>			
Attention	.77	.44	.90
Impulsivity	.93	.41	.85
Hyperactivity	1.0	.44	.82
Aggression	.78	.37	.87
Anxiety	.95	.51	.85
Emotional	.72	.53	.78

Table 3
Frequency of Drug Use (life time)

<u>Drug</u>	Used at least once %(n)	Never used %(n)
Marijuana	19.1 (52)	80.8 (219)
Psychedelics (LSD)	4.0 (11)	95.9 (260)
Uppers (Methedrine Amphetamine)	1.5 (4)	98.5 (267)
Downers- Barbiturates	1.1 (3)	98.9 (268)
Tranquilizers	.4 (1)	99.6 (270)
Ecstasy	1.8 (5)	98.2 (266)
Cocaine	.8 (2)	99.3 (269)
Crack	0	100 (271)
Heroin- (Methadone, Opium, Morphine)	.7 (2)	99.3 (269)
Inhalants- (Gas or Glue)	3.3 (9)	96.7 (262)
Codeine	4.5 (12)	95.6 (259)

Table 4

Frequency of Meeting Criteria for Hyperactivity, Inattention, Impulsivity, Aggression, Anxiety, and Emotional Problems in either the Home or Work Setting

	Home	Work
	%(n)	%(n)
Hyperactivity	3.32 (9)	2.58 (7)
Inattention	1.48 (4)	.74 (2)
Impulsivity	4.80 (13)	1.11 (3)

Table 5
Overall Effects for Previously Diagnosed Subjects

Scale	All	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Mean
Hhyp	.727	.292	.328	.851	.748	.722	.588
Hatt	.916	.613	.693	1.104	.933	.564	.781
Himp	.770	.593	.422	.801	.837	.775	.686
Whyp	.761	.501	.286	.873	.744	.754	.632
Watt	1.051	.804	.850	1.175	.927	.839	.919
Wimp	.738	.528	.570	.912	.938	.907	.771
Hagg	.580	.398	.134	.640	.723	.617	.502
Hanx	.318	.009	.060	.423	.149	.227	.174
Hemo	1.146	1.219	.664	1.012	.944	.829	.934
Wagg	.354	.058	.113	.501	.722	.466	.372
Wanx	.517	.052	.445	.711	.400	.573	.436
Wemo	.758	.702	.428	1.034	.647	.638	.690

Table 6

Subjects Previously Diagnosed Compared to Controls for Drug use

Drugs	All	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Mean
Maril	.226	.624	.509	0	.234	.367	.347
Alcsix	.097	.697	.268	.118	.055	.149	.257
Alcamt	.006	.544	.033	.032	.091	.191	.178
Caffsix	2.177	.351	.221	.087	.347	.458	.298
Caffamt	.973	.604	.505	.270	.266	.973	.524
Tobasix	2.563	.413	.401	.083	.081	.197	.235
Cigdaily	1.649	.392	.026	.035	.592	.592	.327

Table 7

Subjects Self-Reporting Symptoms Compared to Controls for Drug Use

Drugs	All	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Means
MARIL	.068	.222	0	.047	.405	.049	.145
ALCSIX	.411	.420	.251	.335	.454	.583	.409
ALCAMT	.082	.172	.024	.324	.023	.186	.146
CAFFSIX	.589	.041	.021	.053	.036	.041	.038
CAFFAMT	.025	.245	.123	.109	.042	.059	.116
TOBASIX	.117	.265	.314	.246	.306	.298	.286
CIGDAILY	.382	.071	.301	.166	.216	.417	.234

Table 8

Correlations for ADHD Subscales of the Psychological Adjustment Scale

Variable	1	2	3	4	5
1.Hhypmean					
2.Hattmean	.50*				
3.Himpmean	.59*	.51*			
4.Whypmean	.88*	.49*	.58*		
5.Wattmean	.44*	.86*	.45*	.47*	
6.Wimpmean	.53*	.46*	.84*	.61*	.45*

Table 9

Correlations for the Psychological Adjustment Scale

Variables	1	2	3	4	5
1.HAGGMEAN					
2.HANXMEAN	.26*				
3.HEMOMEAN	.54*	.38*			
4.WAGGMEAN	.84*	.25*	.41*		
5.WANXMEAN	.27*	.87*	.34*	.29*	
6.WEMOMEAN	.45*	.33*	.75*	.52*	.32*

Table 10

Correlations for Subscales of the Psychological Adjustment Scale and Drug use

Variable	Hypmean	Attmean	Impmean	Aggmean	Anxmean	Emomean
1.Maril	.08	-.02	.03	-.03	-.04	.02
2.Alcsix	.12	.04	.28*	.17*	.17	.08
3.Alcamt	.08	.08	.25*	.15*	.15	.08
4.Caffsix	.05	.08	.09	.10	.10	.06
5.Caffamt	-.02	-.03	0	.03	.03	.06
6.Tobasix	-.02	0	.09	.09	.09	.01
7.Cigdaily	-.01	0	.17*	.11	.11	.07

Table 11

Summary of Multiple Regressions for ALCSIX

Variables	B	SE	Beta	t
HYPMEAN	-.243	.371	-.053	-.656
ATTMEAN	-.355	.362	-.077	-.981
IMPMEAN	1.926	.444	.393	4.337
AGGMEAN	-.057	.479	-.01	-.119
ANXMEAN	-.339	.277	-.085	-1.224
EMOMEAN	-.059	.277	-.015	-.211

Table 12
 Summary of Multiple Regression for ALCAMT

Variables	B	SE	BETA	t
HYPMEAN	-.504	.339	-.121	-1.484
ATTMEAN	.074	.332	.018	.222
IMPMEAN	1.6	.406	.359	3.939
AGGMEAN	.06	.439	.012	.137
ANXMEAN	-.379	.253	-.105	-1.496
EMOMEAN	-.087	.254	-.025	-.341

Table 13

Summary of Multiple Regressions for CIGDAILY

Variables	B	SE	BETA	t
HYPMEAN	.167	.310	-.137	-1.653
ATTMEAN	-.512	.302	-.042	-.521
IMPMEAN	1.100	.371	.275	2.969
AGGMEAN	.123	.400	.028	.307
ANXMEAN	-.306	.231	-.094	-1.324
EMOMEAN	.07	.231	.023	.304