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Presenting ADHD symptoms and subtypes in clinically referred adults with ADHD

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Objective: *Despite the increasing recognition of persistent ADHD into adulthood, there is a paucity of information available on its clinical presentation in adults. To this end, we evaluated ADHD symptoms in a large group of outpatient adults with ADHD attending to issues of psychiatric comorbidity, gender, and age.* ***Methods:*** *We assessed 149 clinically referred outpatient ADHD adults (mean age [±SD] of 37 ±11 years) using structured diagnostic interviews for psychopathology including current and childhood ADHD symptoms. Using DSM III-R symptoms, we determined DSM-IV subtypes by proxy.* ***Results:*** *Inattentive symptoms were most frequently endorsed in over 90% of ADHD adults. An assessment of current ADHD symptoms showed that 56% of adults had the combined ADHD subtype, 37% the inattentive only subtype, and 2% the hyperactive/impulsive subtype. Psychiatric comorbidity with ADHD was more prominent in adults with hyperactivity-impulsivity as part of their clinical picture. Whereas females had fewer childhood hyperactive-impulsive symptoms than males, there were no gender differences in their current ADHD presentation.* ***Conclusion:*** *Findings from the current study suggest that the vast majority of adults with ADHD present with prominent symptoms of inattention. Given that ADHD adults are presenting from multiple domains, clinicians should carefully query for the inattentive aspects of ADHD when evaluating these individuals.*

Adults with attention-deficit/hyperactivity disorder (ADHD) are increasingly presenting for evaluation and treatment of their disorder. This appears to be related to the heightened media attention on the subject (Hallowell & Ratey, 1994), clinical awareness of the chronicity of the disorder (Weiss & Hechtman, 1986; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993; Biederman, 1998), and identification of the disorder in adults with other psychiatric disorders (Schubiner et al., 1995; Alpert et al., 1996; Wilens, Biederman, Mick, Faraone, & Spencer, 1997). Despite this awareness, many practitioners remain reluctant to assess individuals for ADHD, in part related to the relative lack of data on the presenting symptoms of ADHD in adulthood.

Prospectively collected data suggest that ADHD persists into young adulthood in 10% to 85% of childhood cases (Weiss & Hechtman, 1986; Mannuzza et al., 1993; Biederman et al., 1995; Biederman et al., 1996) and that 4.7% of adults may have ADHD (Murphy & Barkley, 1996). Recent longitudinal studies also show a developmental influence on ADHD symptoms (Achenbach, Howell, McConaughy, & Stanger, 1995; Hart, Lahey, Loeber, Applegate, & Frick, 1995). These data suggest a decay of ADHD symptoms over time with more persistence of the inattentive symptoms of ADHD relative to the hyperactive/impulsive symptoms (Brown & Gammon, 1995; Achenbach et al., 1995; Hart et al., 1995). These findings are consistent with recent data in adults showing a reduction in the total number of ADHD symptoms in younger versus older adult groups (Murphy & Barkley, 1996; Barkley & Biederman, 1997).

The literature also suggests that children with psychiatric comorbidities such as conduct disorder may be at higher risk for the persistence of specific subtypes of

ADHD (Hart et al., 1995; Biederman et al., 1996) suggesting that comorbid psychopathology may influence the presentation of ADHD in adults. Additionally, gender differences may also affect the presentation of ADHD. Although controversy exists as to the extent of inattention and level of intellectual impairments between girls and boys with ADHD (Biederman et al., 1997), Gaub and Carlson (1997) reported that in clinically referred samples of ADHD children, males were consistently more hyperactive and had more externalizing comorbid behaviors than their female counterparts. However, these gender differences refer to juvenile ADHD, and the influence of gender on the presentation of ADHD in adults remains unstudied.

Thus, despite the increasing recognition of persistent ADHD into adulthood, there is a paucity of information available on its clinical presentation in adults. To better understand the symptom profile of adults with ADHD, we systematically assessed DSM III-R ADHD symptoms and DSM-IV ADHD subtypes in a large group of ADHD adults. We evaluated the influence psychiatric comorbidity, gender, and age bestowed on the presentation of ADHD in adults. Based on the literature, we hypothesized that inattentive symptoms would be more prominent relative to hyperactive/impulsive symptoms in a sample of clinically referred adults with childhood-onset and persistent ADHD.

Methods

Subjects were outpatient ADHD adults between 19 and 60 years of age who were ascertained from consecutive clinical referrals to a clinical psychopharmacology clinic. As part of our standard clinical assessment, all patients underwent an evaluation process comprising a structured diagnostic interview and a psychiatric examination. We received institutional review board approval to systematically review records of all ADHD adults on whom these clinical assessments were available.

The structured diagnostic interview used was the Structured Clinical Interview for DSM III-R (SCID) (Spitzer, Williams, Gibbon, & First, 1990), supplemented for childhood disorders by unmodified modules from the Kiddie SADS-E (Epidemiologic Version; Orvaschel, 1985). These assessments were completed using DSM III-R criteria. To receive a full diagnosis of adult ADHD, the subject must a) meet full DSM III-R diagnostic criteria by the age of seven (at least eight of 14 symptoms; Agrawal & Kaushal, 1987) and present with the full diagnosis currently (within the past month); b) describe a chronic course of ADHD symptomatology from childhood to adulthood, and c) endorse moderate to severe level of overall impaired functioning sometime during their lifetime attributed to the ADHD symptoms.

All interviews were completed by raters who had been trained and supervised by the senior investigators (TW, JB, TS). Raters were blind to the clinical diagnosis apart from their knowledge that the adult had been referred to a psychopharmacology clinic. All cases were presented to a diagnostic sign-off committee composed of board certified child psychiatrists and psychologists chaired by the service chief (JB). Diagnoses presented for review were considered positive only if a consensus was achieved that criteria were met to a degree that would be considered clinically meaningful. By "clinically meaningful" we mean that the diagnosis should be a clinical concern due to the nature of the symptoms, the associated impairment, and the coherence of the clinical picture.

Diagnostic reliability of the structured interviews was well established in a previous sample of 62 interviews of adults with ADHD using the same diagnostic procedures as those used in this study. Diagnostic reliability between raters and board certified child and adolescent psychiatrists was excellent. All kappas were higher than 0.81 with the exception of antisocial personality which was 0.71. The mean kappa was 0.91. A kappa of 1.0 was obtained for ADHD with a 95% confidence interval of 0.8–1.0 (Spencer et al., 1995). Socioeconomic status was measured by the Hollingshead Four Factor Index of Social Status with low values indicating high socioeconomic status (Hollingshead, 1975).

Because our sample was assessed for the DSM III-R definitions of ADHD, we used the DSM III-R symptoms to create "proxies" of the DSM-IV subtypes. Biederman et al. (1997) previously tested the correspondence between the DSM III-R and DSM-IV subtypes. The kappa coefficients assessing the agreement between DSM-IV proxy subtypes and the actual DSM-IV subtypes was 0.71 (kappa = 0.71, $z = 15$, $p < 0.0001$). These analyses determined that the predictive accuracy of the "proxy" method was high enough to confidently convert DSM III-R symptoms to DSM-IV subtypes for retroactive analysis. The findings by Biederman and colleagues were similar to those of Lahey et al. (1994), demonstrating diagnostic continuity between the two classification systems. We applied this method of converting DSM III-R symptoms to DSM-IV symptoms to our data by first classifying the DSM III-R symptoms as either inattentive or hyperactive-impulsive. We then defined a case as *inattentive* if it had 4 of the 6 inattention symptoms, *hyperactive* if it had 5 of

the 8 hyperactive symptoms, and *combined* if both thresholds were met. DSM-IV criteria require a lower absolute number of symptoms to meet the diagnosis of ADHD, but the proportion of symptoms required is the same as in the DSM III-R.

Categorical data were analyzed using the Pearson's X^2 test and continuous variables by t test analyses as indicated. All statistical tests were performed using Stata Statistical Software (release 5.0, 1997). We set statistical significance at the 5% level. Data are expressed as mean ±*SD* unless otherwise specified.

Results

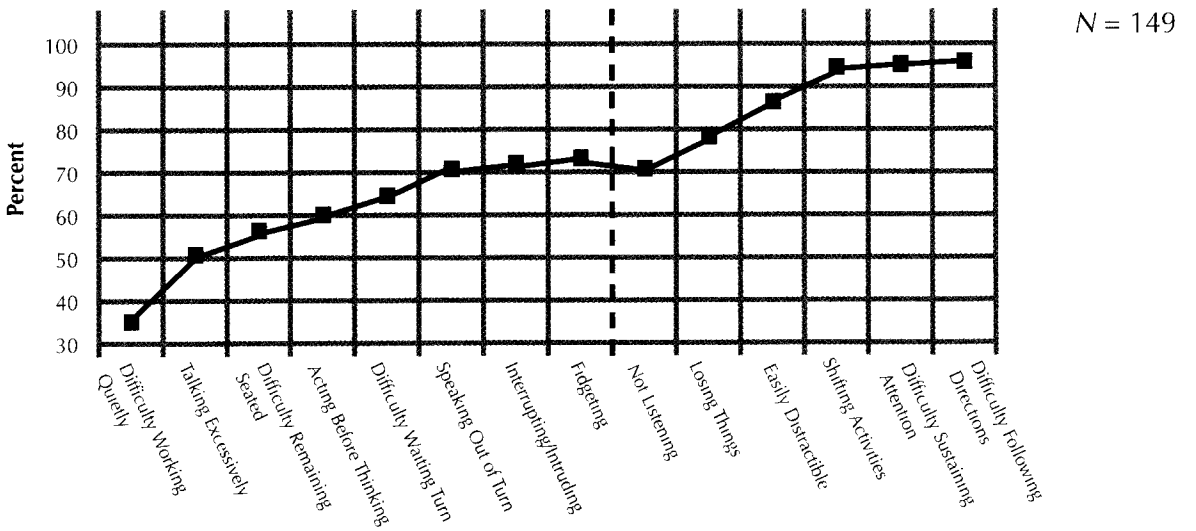
In this clinically referred group, there were 149 adults of which 59% (N = 88) were male and 41% (N = 61) were female. The mean age of the sample was 37 ±11 years. The mean SES of the sample was 2.0 ±1.0. There were no differences in SES between gender or subtypes of ADHD (Table 1). This was a highly comorbid group of adults; 3% had no psychiatric comorbidity, 11% had a lifetime history of one comorbid psychiatric disorder, 12% had two, 18% had three, and 56% had four or more psychiatric comorbidities. When asked about the level of overall impairment related directly to their ADHD symptoms in childhood, 51% (N = 75) of our ADHD sample endorsed severe impairment and 49% (N = 73) moderate impairment. Likewise, when asked about the level of impairment caused by their ADHD symptoms within the past month, 29% (N = 41) endorsed severe impairment, 54% (N = 78) moderate impairment, and 16% (N = 23) mild impairment.

Table 1
Clinical characteristics

	N=149	
	Mean	SD±
SES	2	1
Age	37	11
	N	%
Gender		
Males	88	59
Childhood Subtypes		
Inattentive	35	23
Hyper/Impulsive	3	2
Combined	111	75
Current Subtypes		
Inattentive	55	37
Hyper/Impulsive	3	2
Combined	84	56
NOS	7	5

An analysis of individual DSM III-R ADHD symptoms which were present in childhood and persistent into adulthood indicated that inattentive symptoms were most frequently endorsed (Figure 1). The most commonly reported inattentive symptoms (endorsed by an average of 92% of our sample) were difficulty sustaining attention, shifting activities frequently, and difficulty following

Figure 1
Presenting DSM III-R symptoms of adult ADHD



through on tasks. Although the symptoms that comprise the hyperactive/impulsive subtype were not as robustly endorsed as the inattentive symptoms, a majority of adults reported long-standing difficulties with fidgeting, interrupting or intruding, speaking out of turn, and difficulty waiting their turn. In this clinically referred sample, there was no association of age and the number or type of endorsed ADHD symptoms (p's > 0.05). Furthermore, contrary to previous findings (Murphy & Barkley, 1996), we found no overall differences in terms of symptom recall in younger (ages 17–30) versus more mature adults (ages ≥ 51).

By analyzing the differences between childhood and current (past 30 days) reports we found a consistent, 11% reduction in the number of reported DSM III-R ADHD symptoms. When clustering DSM III-R symptoms as inattentive or hyperactive/impulsive, we found a 5% decrease in the inattentive symptoms, and a 15% decrease in the hyperactive/impulsive symptoms.

Inattentive and hyperactive/impulsive subtypes were determined by converting DSM III-R symptoms to DSM-IV subtypes (Biederman et al., 1997). Applying this conversion method to our data, we found that currently 56% (N = 84) of adults endorsed the combined subtype, 37% the inattentive only subtype, and 2% the hyperactive/impulsive only subtype. Thus, 93% of ADHD adults currently endorsed an ADHD subtype with a preponderance of inattentive symptoms, and 58% endorsed an ADHD subtype that includes symptoms of hyperactivity-impulsivity. Comparing childhood to current ADHD subtypes, 14% of our ADHD adults had an increase in the inattentive subtype, whereas 19% had a reduction in the combined subtype.

We analyzed our data to determine if gender was related to ADHD symptom presentation. In terms of specific childhood DSM III-R symptomatology, males endorsed having difficulty playing/working quietly (65% versus 35%, $p < 0.04$) and blurting out answers/speaking out of turn (63% versus 37%, $p < 0.03$) more frequently than females. We found no significant gender differences in reported current ADHD symptomatology. The only significant gender difference in subtype presentation was that women met childhood criteria for the inattentive subtype significantly more often than men ($p < 0.05$).

As previously reported (JB), high lifetime rates of psychopathology were found in our adult ADHD sample (Table 2). Adults with a combined type of ADHD had higher rates of oppositional, bipolar, and substance use disorders compared to those with the inattentive or hyperactive/impulsive only subtypes. Although the hyperactive/impulsive subtype is limited by a small sample size, when compared to the inattentive group, the hyperactive/impulsive subtype had higher rates of oppositional, obsessive compulsive, and post traumatic stress disorder.

We analyzed our data to determine if gender was related to psychiatric comorbidity. As anticipated, men had higher rates of comorbidity with conduct disorder, antisocial disorder, alcohol and drug dependence, and stuttering ($p \leq 0.01$). Women had higher rates of major depression and bulimia ($p \leq 0.01$), as well as simple phobia ($p \leq 0.05$).

There were notable differences in the academics based on ADHD subtypes. Twenty-two percent of adults with the combined subtype had a history of having been placed in special classes, while only 3% of inattentive-only adults indicated a similar need ($p < 0.01$). There were no between group differences in either having repeated a grade or in receiving extra help through primary and secondary schools ($p > 0.05$).

Discussion

The results of the current study indicate that clinically referred adults with ADHD have prominent symptoms of inattention. Using a method of determining DSM-IV subtypes by "proxy," a great majority of ADHD adults had either the predominately inattentive or combined subtypes. Females tended to have fewer hyperactive symptoms than males. Psychiatric comorbidity was more commonly found in subjects with hyperactivity-impulsivity as part of their adult ADHD presentation.

Our findings are consistent with prospectively derived data in clinical and epidemiologically based samples of ADHD children, adolescents, and young adults in which an overall reduction in symptoms of ADHD over time was reported (Mannuzza et al., 1993; Hart et al., 1995; Murphy & Barkley, 1996; Levy, Hay, McStephen, Wood, & Waldman, 1997). Moreover, specific decreases in the hyperactive and impulsive symptom clusters compared to the inattentive clusters were evident over time (Achenbach et al., 1995; Hart et al., 1995; Levy et al., 1997).

Similar to our results, studies of the prevalence of DSM-IV subtypes in clinically referred ADHD children and adolescents at our site (Biederman et al., 1997), and in field trials of DSM-IV (Lahey et al., 1994), show that the combined type is the most prevalent type of ADHD (55% and 61%, respectively) followed by the inattentive (27% and 30%, respectively), and the hyperactive-impulsive

Table 2
Psychopathology in ADHD adults: DSM III-R subtypes by proxy used to determine type

	Combined Type N=111 (75% of sample)		*Inattentive Type Only* N=35 (23% of sample)		*Hyper/ Impulsive Type Only* N=3 (2% of sample)		*Overall Significance*
Disorders	***N***	***%***	***N***	***%***	***N***	***%***	***df=2***
Disruptive Disorders							
Conduct Disorder	33	30	7	20	1	33	0.503
Antisocial Disorder	22	20	7	20	1	33	0.854
Oppositional Disorder	34	40[a']	4	16[b]	2	67	0.015
Mood Disorders							
Major Depression (Severe)	70	63	22	63	1	33	0.576
Dysthymia	25	23	4	11	1	33	0.298
Bipolar (combined I&II)	19	17[a']	1	3[b']	1	33	0.067
Anxiety Disorders							
Multiple (≥ 2) Anxiety Disorders	39	35	8	23	1	33	0.399
Panic Disorder	13	11	4	11	1	33	0.529
Agoraphobia	13	11	3	9	1	33	0.424
Overanxious Disorder	29	33	6	26	0	0	0.504
Simple Phobia	13	12	7	20	0	0	0.368
Social Phobia	27	24	11	31	0	0	0.416
Separation Anxiety	7	8	0	0	0	0	0.346
Generalized Anxiety	23	21	3	9	1	33	0.210
Anorexia	1	1	0	0	0	0	0.840
Bulimia	4	4	3	9	0	0	0.452
Obsessive Compulsive Disorder	8	7	1	3[b']	1	33	0.118
Substance Use Disorders							
Alcohol Abuse	17	15	4	11	0	0	0.659
Alcohol Dependence	45	41	11	31	0	0	0.226
Substance Abuse	50	45[a]	7	20	0	0	0.011
Substance Dependence	34	31[a']	4	11	0	0	0.045
Any Abuse or Dependence	76	69[a]	15	43[b]	0	0	0.002
Other							
Psychosis	5	5	0	0	0	0	0.412
Post Traumatic Stress Disorder	10	9	1	3[b']	1	33	0.143
Repeat Grade	27	24	11	31	1	33	0.678
Special Class	24	22[a]	1	3	0	0	0.026
Extra Help	51	46	15	43	1	3	0.874

[a] $p \leq 0.01$ vs. Inattentive Subtype Only by Pearson's Chi-Square Test
[b] $p \leq 0.01$ vs. Hyperactive/Impulsive Subtype Only by Pearson's Chi-Square Test

[a'] $p \leq 0.01$ vs. Inattentive Subtype Only by Pearson's Chi-Square Test
[b'] $p \leq 0.01$ vs. Hyperactive/Impulsive Subtype Only by Pearson's Chi-Square Test

types (18% and 9%, respectively). Moreover, our findings of a prominence of a subtype including inattention are also reminiscent of community based studies in children reporting high rates of the inattentive subtype (5.4%) followed by the combined (3.6%) subtype compared to the hyperactive-impulsive (2.4%) type (Wolraich, Hannah, Pinnock, Baumgaetel, & Brown, 1996). Additionally, our findings are similar to those of a study that assessed the non-referred adult relatives of girls with ADHD. Using DSM-IV diagnostics, we found that the ADHD adult relatives presented with a preponderance of inattentive symptoms: 13% had the inattentive subtype, 9.4% the combined subtype, and 1.6 % the hyperactive/ impulsive subtype (Biederman et al., 1997).

In our sample, the overwhelming majority of ADHD adults endorsed prominent inattentive symptoms which were subsumed in either the inattentive or combined subtypes (93%). Our findings are consistent with aggregate studies in which the majority of children and adolescents had criteria for a subtype of ADHD with inattention (Lahey et al., 1994). That inattentive symptoms predominate also supports recent findings of impaired neuropsychological functioning, working memory, and executive functioning in ADHD adults (Seidman, Biederman, Weber, Hatch, & Faraone, in press).

Unlike Murphy and Barkley (1990), we did not find a large degree of the predominant hyperactive/impulsive subtype in presenting symptoms of ADHD adults, nor did we find that age at presentation had a significant effect on the subtype classification. Differences in these study findings may be related to the use of DSM III-R proxy to determine DSM-IV subtypes and differing ascertainment. Whereas the current study was derived from clinically referred subjects, the study by Murphy and Barkley was derived from non-referred subjects renewing their driving licenses. As noted by Murphy and Barkley, their study was a survey of symptom frequency in a large group of adults in which 34 met the symptom criteria for ADHD, but other clinical diagnostics were not included. Our study included patients who currently had a full diagnosis of ADHD; therefore, we are unable to determine the number of older adults who may have been excluded because they did not currently meet full criteria for ADHD. Clearly, further work needs to be completed to better understand the epidemiology of ADHD rates and subtypes in adults of varying age.

Although there were no current gender differences in ADHD symptoms, women with ADHD reported fewer lifetime hyperactive-impulsive symptoms than their male counterparts. These findings are consistent with findings by other groups who found similar differences in past and current symptoms of ADHD in adults based on gender (Murphy & Barkley, 1996; Gaub & Carlson, 1997). Likewise, our findings of fewer hyperactive/impulsive subtypes are similar to those observed in prospective studies of girls with ADHD. Clearly, further prospective work on the rates and patterns of persistence of ADHD in females needs to be undertaken.

The results of this study need to be tempered against their substantial limitations. DSM-IV subtypes were determined by proxy of DSM III-R symptoms based on validation studies completed in children. The use of DSM-IV subtypes may have over-identified specific subtypes of ADHD, particularly of the inattentive only subtype (Faraone, Biederman, Weber, & Russell, 1998). Moreover, this method may have underidentified hyperactive/impulsive subtypes. The findings of this study are based on observations from a clinically referred population and, therefore, may not generalize to all adults with ADHD. The symptoms reported by these adults may not have been entirely accurate given the retrospective recall required of past symptoms. However, previous studies have documented the validity of using retrospective recall of ADHD symptoms and impairment in the diagnosis of ADHD adults (Ward, Wender, & Reimherr, 1993; Stein et al., 1995). In addition, given the overrepresentation of mood disorders in the inattentive subtype, there may have been overlap of symptoms between ADHD and mood disorders.

Despite these limitations, findings from the current study suggest that the vast majority of adults with ADHD present with symptoms of inattention. Given the high prevalence of ADHD occurring in mental health and substance abuse domains, more emphasis on the inattentive aspects of ADHD need to be highlighted when making the diagnosis. Further studies directly assessing DSM-IV symptomatology and correlating these findings with gender, age, and neuropsychological impairment in ADHD adults need to be undertaken.

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