

# Symptoms of ADHD and Academic Concerns in College Students With and Without ADHD Diagnoses

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**Objective:** Previous research has found ADHD symptoms to be common in the general population but has not compared endorsement of symptoms between ADHD and non-ADHD groups. This study examines self-reported ADHD symptoms and academic complaints in college students. **Method:** Students without ( $n = 496$ ) and with ADHD ( $n = 38$ ) completed a questionnaire covering the 18 ADHD symptoms in the *Diagnostic and Statistical Manual of Mental Disorders* and academic and test-taking concerns. **Results and Conclusion:** Students with ADHD diagnoses reported significantly more ADHD symptoms and academic concerns, but none of the 18 symptoms or 6 concerns proved to be both sensitive and specific to ADHD. Poor specificity of symptoms and academic complaints casts doubt on the utility of this self-reported information in diagnosis, particularly if used alone and without regard to severity or extent of impairment. (*J. of Att. Dis.* 2008; 12(2) 156-161)

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The growing literature on attention-deficit/hyperactivity disorder (ADHD) in adults (e.g., Barkley, 2006; Barkley, Murphy, & Fischer, 2007; Goldstein & Ellison, 2002; Weiss, Hechtman, & Weiss, 1999) shows general consensus on several points: Most children and adolescents with ADHD continue to experience symptoms into adulthood, a significant number of adults who meet criteria for ADHD were never formally diagnosed as children, and the disorder is a strong risk factor for poor educational, occupational, and interpersonal relationship outcomes. Despite this growing consensus on the nature of ADHD in adults, there has not been similar agreement concerning proper assessment techniques for this population. Scholars are divided on several points, including how early in life a patient's symptoms must begin, what reference group should be used in determining the patient's degree of clinical impairment, and how useful self-reports are in the diagnostic process (for discussion

of these and other issues, see Faraone et al., 2006; Murphy & Gordon, 2006). In this brief report, we describe the results of a study focusing on the latter issue, a study in which we examined self-reports of symptoms in college students with and without diagnoses of ADHD.

## Self-Reports in the Assessment of Adult ADHD

One major difference between child and adult diagnostic assessment is the weight placed on information gained through the clinical interview and other self-report information (e.g., rating scales). Clinicians making diagnoses of ADHD in adults may have access only to

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information from surveys completed by the patient, and although behavioral manifestation is the ultimate indicator of any psychiatric disorder, perceived disturbance is considered sufficient to make a diagnosis. Although the average college student may be a better judge and a more accurate reporter of his or her own symptoms than the average 8-year-old child, there are a variety of limitations to information gained through self-reports of adults, some of which are unique to adult assessment of ADHD (Murphy & Gordon, 2006).

First, because ADHD typically begins in childhood, the assessment of this disorder almost always includes questions about the patient's early history. Given the reconstructive nature of autobiographical memory, patients' accounts of their childhood symptoms are subject to a variety of distorting biases that are different for each patient (Henry, Moffitt, Caspi, Langley, & Silva, 1994; Mannuzza, Klein, & Klein, 2002). Second, adults may be aware of benefits that follow from a diagnosis of ADHD, including extra time on examinations, tutoring services, and access to medication, and this may influence their reporting of symptoms in conscious and non-conscious ways. A final concern is that patients being assessed will report symptoms that are not specific to individuals with the disorder. For instance, inattention is a feature of ADHD, but it is also a feature of other disorders (e.g., anxiety, depression) and is a feature of many people who do not have any clinically significant psychopathology (Gordon & Barkley, 1999).

### Self-Reports of ADHD Symptoms in Adult Populations

Several studies have directly examined the problem of specificity by determining the prevalence of ADHD symptoms in nonreferred adult samples. The first team of investigators to do so (Weyandt, Linterman, & Rice, 1995) administered two ADHD rating scales to a large sample ( $n = 770$ ) of college students and found between 7% and 9% of their sample reported clinically significant levels of symptoms, leading the investigators to conclude that "ADHD symptoms may be relatively common in college students" (p. 300).

A similar conclusion was reached by Murphy and colleagues (Murphy & Barkley, 1996; Murphy, Gordon, & Barkley, 2000), who used a rating scale based on the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* (American Psychiatric Association, 1994), in which their participants (720 adults renewing their driver's licenses) rated the degree to which they experienced the 18 symptoms from the *DSM-IV* ADHD criteria on a 4-point scale (*rarely/never*,

*sometimes, often, very often*). A symptom was considered present only if *often* or *very often* was selected. Although less than 1% of the sample met the researchers' stringent criteria for the combined subtype of ADHD and only slightly more met the criteria for the inattentive (1.3%) and hyperactive-impulsive (2.5%) subtypes, more than two thirds of the participants endorsed six or more of the ADHD symptoms at the *sometimes* level or higher, showing that the symptoms themselves are relatively common in the general population.

Heiligenstein, Conyers, Berns, Miller, and Smith (1998) and DuPaul and colleagues (2001) examined the prevalence of ADHD symptoms in college students. They initially found low rates of students meeting standard criteria for ADHD, leading them to modify the cutoff scores for diagnosis. In both cases, this yielded significantly higher rates of students meeting their ADHD criteria. Both studies showed the malleability in diagnosis dependent on the interpretation of symptom reports.

Most recently, Faraone and Biederman (2005) conducted a phone survey of 966 adults using random-digit dialing. Participants were asked about each of the 18 *DSM-IV* symptoms of ADHD, and two diagnostic cutoffs were used: A "narrow screening cutoff" counted a symptom as present if it occurred *often*, whereas a "broad screening cutoff" counted a symptom as present if it occurred *sometimes or often*. The different cutoffs again yielded vastly divergent estimates of ADHD prevalence: 16.4% (broad) versus 2.9% (narrow).

The results of these five studies suggest that the stringency of ADHD diagnostic criteria determines the prevalence of "ADHD" and that when the standards are lenient, very high rates of "ADHD" are observed. In this connection, it is important to note that all of the estimates reported in the preceding studies, even those based on the strictest symptom requirements, are overestimates because the other diagnostic criteria of the *DSM* (i.e., impairment across settings, onset before age 7, symptoms not explained better by another disorder) were not applied. In particular, the impairment requirement has been shown to substantially lower apparent rates of psychopathology (e.g., Gathje, Lewandowski, & Gordon, in press; McArdle, Prosser, & Kolvin, 2004), in part because symptom severity and impairment are only moderately correlated (Gordon et al., 2006; Kessler et al., 2006).

### The Present Study

In the present study, we attempted to extend previous findings in several ways. First, we used a symptom questionnaire with only a binary response option similar to

Faraone and Biederman's (2005) "broad" criteria for ADHD. As noted in previous research, most 4-point ADHD scales are reduced to a binary decision: clinically symptomatic or not. In settings such as general physicians' offices, where many ADHD diagnoses are made and treatments proffered, standardized rating scales are less common than brief symptom interviews requiring only yes or no responses to the presence of symptoms (Wasserman et al., 1999). Survey researchers have demonstrated the importance of response options in shaping participants' replies to questions (for reviews, see Choi & Pak, 2005; Krosnick, 1999), and our binary response option was hypothesized to increase participants' reports of symptoms.

Second, because we were primarily interested in the degree to which symptom reports distinguish individuals who have ADHD from others, we included a group of individuals who had received professional diagnoses of ADHD. We hypothesized that, although endorsement of individual ADHD symptoms would not be uncommon in individuals without ADHD diagnoses, the total symptom counts would continue to discriminate effectively between those with and without ADHD diagnoses.

Last, we examined the extent to which individuals with and without ADHD reported experiencing difficulties with academic tasks. Much recent work has focused on the measurement of functional impairment in adults with ADHD (e.g., Lewandowski, Lovett, Gordon, & Antshel, 2006; Stavro, Ettenhofer, & Nigg, 2007; Toner, O'Donoghue, & Houghton, 2006). In college, academic impairment is a domain of special interest and often leads college students with ADHD to seek accommodations and other services.

## Method

### Participants

All participants were recruited from sections of an introductory psychology course at Syracuse University during a 6-year period (2000 to 2005). We repeatedly sampled the class until we obtained an adequate number of students with ADHD diagnoses. A total of 534 students (294 females, 240 males) participated (200 students were invited to each of six sessions, for a yield of 44.5%), ranging in age from 18 to 49 ( $M = 19.2$  years). Most participants (66.0%) were first-year students, 20.0% were sophomores, and 14.0% were juniors, seniors, or others (e.g., nonmatriculated students). In addition, 81.0% of the sample were Caucasian, followed by African American (6.5%), Asian American (6.0%), Hispanic American (4.0%), and multiracial (2.5%). Of this sample, 38

students had been professionally diagnosed as having only ADHD, and each provided documentation of the disorder to the university Office of Disability Services. The documentation included a current professional evaluation, evidence of past and current impairment, testing pertinent to *DSM-IV* diagnostic criteria, a specific diagnosis, patterns of symptoms across the life span, and demonstration of substantial limitation in learning.

### Measure

Participants completed a rating scale containing the 18 items taken from the *DSM-IV* checklist for ADHD used by Murphy and colleagues (2000). We interpreted the checklist in binary fashion: *rarely/never* has the symptom versus *often/always*. In addition, we added items that reflect common academic and test-taking complaints. This was done by performing a documentation review on 100 files from students who had received test accommodations in college and/or graduate school. We took the six most common complaints in students' personal statements and converted them to Likert-type scale items identical to the ADHD items (e.g., "I do not perform well on timed standardized tests").

In addition to the rating scale, participants completed a brief questionnaire containing questions about demographic information (gender, age, ethnicity, year in school), academic information (estimated college GPA, SAT scores, past or present use of special education services, past or present use of testing accommodations), and whether the participant had ever received a "professional diagnosis of ADD or ADHD."

### Procedure

Students completed the scale and questionnaire in groups ranging from 25 to 100 at a time. The first author was present during data collection and explained procedures to participants. Brief instructions were given orally but were also written on the questionnaire. Participants took approximately 15 minutes to complete the scale and questionnaire.

## Results

Results indicated that college students with ADHD reported significantly more symptoms ( $M = 8.96$ ) of both ADHD types than did their nondisabled peers, although typical college students endorsed an average of 4.5 out of the 18 symptoms, yielding a large effect size difference of  $d = 1.26$  (see Table 1). The item endorsement frequencies suggested that none of the ADHD criteria were

**Table 1**  
Average Number of Endorsed ADHD  
Items for Each Group

Item Type	ADHD		Nondisabled		<i>t</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
<i>n</i>	38		496			
ADHD total	8.80	3.8	4.45	3.3	6.55***	1.22
Inattention score	4.71	2.2	2.29	2.1	6.68***	1.13
Hyper/impulsive score	4.09	2.4	2.16	1.8	4.91***	0.91

\*\*\* $p < .001$ .

**Table 2**  
Frequency of ADHD Symptom Endorsements  
in Each Group

Item	% ADHD	% Nondisabled
Have difficulty sustaining attention to tasks or other activities	91.4	33.4
Have difficulty listening when spoken to directly	32.4	11.4
Trouble following through on instructions and fail to finish schoolwork	36.1	14.1
Have difficulty organizing tasks and activities	27.0	16.9
Avoid, dislike, reluctant to do work that requires sustained mental effort	50.0	28.0
Lose things necessary for tasks or activities	40.5	18.3
Easily distracted	91.9	54.1
Forgetful in daily activities	48.6	26.4
Fidget with hands or feet or squirm in seat	89.2	54.8
Leave seat in classroom or situations in which it is inappropriate	25.0	6.3
Have difficulty doing fun things or engaging in leisure activities quietly	21.6	7.7
Feel restless	78.4	37.3
Feel "on the go" or act as if "driven by a motor"	59.5	38.0
Talk excessively	41.7	22.4
Blurt out answers before questions have been completed	27.0	14.6
Have difficulty awaiting turn	32.4	15.9
Interrupts or intrudes on others	48.6	22.6
Fail to give close attention to details or make careless mistakes	73.0	30.6

both sensitive and specific to ADHD (see Table 2). For instance, each item that was endorsed by the majority of individuals with ADHD was also endorsed by at least 30% of the nondisabled group. In addition, several items were not endorsed by the majority of individuals with

**Table 3**  
Frequency of Academic Complaints in Each Group

Item	% ADHD	% Nondisabled
Read material over and over to understand it	80.6	52.5
Do not perform well on timed standardized tests	67.7	45.4
Work harder than other people to get good grades	56.8	47.5
Have trouble finishing timed tests	64.9	28.6
Takes me longer to complete assignments than others	78.4	30.0
Rarely read in my spare time	73.0	58.9

ADHD diagnoses, whereas two items were endorsed by more than half of the nondisabled students ("easily distracted" and "fidgets/squirms in seat").

We also examined sensitivity and specificity in terms of a clinical criterion cutoff. Based on a total of six symptoms, the diagnostic sensitivity was .84 and specificity was .70, and no other cutoff score improved the categorization. The positive predictive power was only .52, indicating that endorsement of six or more symptoms would not yield a confident diagnosis of ADHD. The negative predictive power based on this cutoff was .93, suggesting that persons with fewer than six symptoms most likely would not have ADHD. A similar pattern was noted with regard to academic and test-taking concerns: Students with ADHD more frequently endorsed these concerns, yet nondisabled students generally had fairly high endorsement rates as well (see Table 3). These data also indicated poor specificity of self-reported academic concerns.

A linear discriminant analysis was performed to determine how inattentive and hyperactive-impulsive symptoms may have differentially contributed to the differences between the groups. Each participant's numbers of inattentive symptoms and number of hyperactive-impulsive symptoms were the two predictors of ADHD status. As expected, the single discriminant function was significant, Wilks's  $\Lambda = .898$ ,  $\chi^2(2) = 57.0$ ,  $p < .001$ , and the function correctly classified 93.3% of participants when actual group sizes were used to calculate participants' prior probabilities of group membership. The two domains of symptoms provided similar amounts of information discriminating the two groups; the standardized discriminant function coefficients were .64 and .55 for inattentive and hyperactive-impulsive symptoms, respectively, suggesting that participants' levels of inattention may have had somewhat more discriminating power.

## Discussion

The findings suggest that, when using a typical ADHD symptom questionnaire, both ADHD and typical students endorse significant rates of symptoms. Although those with ADHD reported more symptoms than did peers, the students without diagnoses of ADHD had a base rate of 4.5 symptoms reported. Our results converge with previous research (DuPaul et al., 2001; Heiligenstein et al., 1998; Murphy et al., 2000) showing that ADHD symptoms are fairly common in the general population. The present study extended this research by ensuring that the nonspecific nature of ADHD symptoms does not keep total symptom counts from being of diagnostic value. Just as Faraone and colleagues (2006) found that “subthreshold” diagnoses were of dubious validity, we found that high symptom counts were required to protect against false positives. In addition, our results suggest that inattention and hyperactivity–impulsivity symptoms each contribute to discriminating between ADHD and non-ADHD groups, with inattention evidencing slightly more predictive value in the present sample.

The ADHD students in this study all met *DSM-IV* criteria for the diagnosis according to university documentation and were all receiving test accommodations in college. They corroborated our informal survey results that indicated such students struggle with timed tests, do not finish tests on time, take longer to complete assignments, and think they work harder to get good grades than do their nondisabled peers. However, many students in the nondisabled group also felt these problems applied to them. It appears that perceptions of academic and test-taking problems are also widely held. Thus, a complaint such as “I have to read material over and over to understand it,” a common concern of students receiving test accommodations, is not specific to students with an acknowledged disability.

The findings in this brief report are of a preliminary nature. This study was based on a convenience sample of university students, and we did not test to verify diagnostic status of either group; therefore, some of the “nondisabled” group may have had undiagnosed ADHD and some of the “ADHD” group may have been misdiagnosed (or may no longer meet criteria even if they once did). Also, we used a binary response option that may have made for an overly broad definition for ADHD symptom endorsement. Similarly, we did not assess impairment broadly (other than examining academic complaints) or age of symptom onset, keeping us from being able to make clinical diagnostic judgments ourselves. Finally,

because we oversampled participants with ADHD, our proportion of ADHD students in the study does not reflect national prevalence.

Despite these limitations, our findings suggest that most people report some types of ADHD symptoms, although these perceptions are more common in those with ADHD. Similarly, students with ADHD are more likely to perceive academic or test-taking problems, although such complaints are not specific to those with disabilities. The current data add to a line of research findings that suggests caution in interpreting the perceptions, complaints, and self-reports of college students who are seeking a diagnosis and/or accommodations. Although interviews and self-ratings are important aspects of a comprehensive assessment, such data often are not interpreted in the context of high base rates in the normal population. A thorough assessment of adult ADHD should extend beyond the recollections and perceptions of the person seeking test accommodations. Alternatively, clinicians may want to use more stringent self-report criteria before accepting a symptom as real. It might be useful to weigh each symptom in terms of its frequency (often), duration (chronic), and intensity (impairing) so that we can guard against false positives in ADHD diagnosis.

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