Implications of Early Versus Late Onset of Attention-Deficit/Hyperactivity Disorder Symptoms

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ABSTRACT

Objective: The current diagnostic criteria for attention-deficit/hyperactivity disorder (ADHD) require that symptoms emerge prior to age 7 in order for a formal diagnosis to be considered. However, this age-of-onset criterion (AOC) has recently been questioned on both theoretical and empirical grounds. **Method:** Data from 4 annual waves of interviews with 9- to 16-year-olds from the Great Smoky Mountains Study were analyzed. **Results:** Confirming previous studies, a majority of youths who had enough symptoms to meet criteria for ADHD were reported to have first exhibited these symptoms prior to age 7. Early onset of ADHD symptoms was associated with worse clinical outcomes in youths with the combined subtype of ADHD but not youths with the inattentive subtype. **Conclusions:** Findings support the continued inclusion of the AOC for the assessment of the combined but not necessarily the inattentive subtype of ADHD. Too few youths had a late onset of solely hyperactive-impulsive symptoms to evaluate the AOC for that group. However, regardless of the age of onset, youths who had elevated levels of ADHD symptoms were at increased risk for negative outcomes that may necessitate intervention. *J. Am. Acad. Child Adolesc. Psychiatry*, 2000, 39(12):1512–1519. **Key Words:** attention-deficit/hyperactivity disorder, assessment, community, epidemiology.

The last 3 revisions of the *DSM* criteria for attention-deficit/hyperactivity disorder (ADHD) have included an age-of-onset criterion (AOC) requiring that symptoms be present before age 7 (American Psychiatric Association, 1980, 1987, 1994). *DSM-IV* additionally stipulated that symptoms should cause impairment prior to age 7 (American Psychiatric Association, 1994).

The assumption that ADHD symptoms must emerge in early childhood to be considered valid for diagnosis has recently been challenged on both theoretical and empirical grounds. Barkley and Biederman (1997) noted 3 common justifications for the current AOC: (1) the finding that most children with a diagnosis of ADHD first exhibited their symptoms in early childhood, (2) concern that "ADHD" symptoms that appear after age 7 may be due to school failure or stress, and (3) the belief that requiring an AOC for ADHD would ensure that researchers were studying homogenous samples. However, they emphasized both the need for a more systematic evaluation of the age of onset of ADHD symptoms and the possibility that the AOC might serve to deny diagnoses (and services) to youths who suffer from ADHD-related difficulties. It is also common practice in the research literature to assess ADHD symptoms using parent and teacher questionnaires as proxies for diagnosis, even though such questionnaires usually ignore the AOC (Boyle et al., 1997). The primary goal of the current study is to determine whether early- versus late-onset ADHD is differentially associated with a variety of clinically relevant outcome measures.

To date, few studies have empirically evaluated the AOC. McGee and colleagues' (1992) prospective general population study identified 3 groups of boys with ADHD at age 11. The groups were identified as first exhibiting elevated ADHD symptoms by age 3 (n = 12), between ages 5 and 6 (n = 13), and between ages 6 and 7 (n = 15). Although all 3 groups would meet the current AOC, the 2 earliest-onset groups had worse functioning on cognitive

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and early language measures, higher rates of subsequent comorbidity, and more family disadvantage. However, the latest onset group had higher levels of inattentive behaviors and more reading problems than the remainder of the sample, who never had elevated levels of ADHD symptoms. This study suggested that early-onset ADHD is associated with more deleterious outcomes.

A follow-up study of the same sample involved adolescent self-reported ADHD (Schaughency et al., 1994). Three groups of adolescents who differed with respect to having either a history of ADHD or self-reported elevated levels of ADHD symptoms were compared on a variety of outcome measures. The general pattern of findings suggested 2 important results. First, youths with elevated ADHD symptoms (by any report, at any age) were more impaired and more likely to have a comorbid diagnosis than adolescents who never had ADHD symptoms. Second, among youths who self-reported high levels of ADHD symptoms in adolescence, those with a history of ADHD were more impaired and had higher rates of comorbidity than those without a history of ADHD. Although this study was limited by the use of adolescent self-report of ADHD symptoms, which is not universally regarded as being useful for diagnostic purposes (Loeber et al., 1989), it was important in that it demonstrated that, although an early onset of ADHD symptoms may be associated with worse functioning, elevated levels of ADHD symptoms at any time were associated with impairments relative to a nonsymptomatic comparison group.

Taylor and colleagues (Taylor, 1999; Taylor et al., 1986) also documented the need for systematic study of early versus late onset of ADHD symptoms. Consistent with results reported by McGee et al. (1992), Taylor et al. (1986) identified a subgroup of hyperactive children whose symptoms had a later onset and were limited to the school setting. More recently Taylor (1999) emphasized that the age of symptom onset may be important with respect to the neurological mechanisms that are implicated in the etiology of ADHD.

A limitation of all of these studies is that ADHD symptomatology was indexed as a unidimensional construct. The *DSM-IV* reconceptualizes ADHD as a 2-dimensional disorder that gives rise to inattentive, hyperactive-impulsive, and combined subtypes (Lahey et al., 1994). Recent studies have corroborated the value of this 2-dimensional approach relative to alternative taxonomies (August and Garfinkel, 1993) and have demonstrated that the *DSM-IV* subtypes have distinctive patterns of comorbidity and cognitive functioning (Marks et al., 1999; McBurnett et al., 1999). A second goal of the current study is to explore the implications of the AOC separately by ADHD subtype.

Only one study has directly addressed the utility of the current AOC with consideration of separate *DSM-IV* subtypes. Applegate et al. (1997) reported that a number of children who had elevated levels of ADHD and who were experiencing ADHD-related impairment had a parent-reported age of onset of ADHD symptoms *after* age 7. Four important findings emerged from the Applegate et al. study: (1) although a majority of children exhibited their first symptom by age 9, a minority were reported to first exhibit symptoms as late as 15 years of age; (2) regardless of age of onset, children who had elevated rates of ADHD symptoms were more impaired than children who did not have elevated symptoms; (3) the 2 groups of children who had elevated rates of ADHD symptoms but differed in their ages of onset did *not* differ from each other on indices of comorbidity or impairment; and (4) requiring an AOC less than 7 years of age decreased the reliability of agreement with clinician validation diagnoses.

Although this study provided strong support for Barkley and Biederman's (1997) proposal regarding the abandonment of the current AOC, 2 limitations are noteworthy. First, the study was based on a clinic sample and such samples are known to be a substantially biased subset of all cases in the general population (Costello and Janiszewski, 1990; Goodman et al., 1997). Since children are typically referred to clinics when they are experiencing peak levels of impairment, the failure to find differences between groups with elevated ADHD symptoms may have been due to ceiling effects. A second limitation concerns the reliance on clinician diagnosis as a validation of true disorder. The unreliability of clinician judgment is well documented (Gould et al., 1988; Remschmidt, 1988; Tversky and Kahneman, 1974). A third goal of the current study is to examine the AOC in a representative community sample using a variety of clinically relevant outcome measures that do not rely on unstructured clinician judgments.

METHOD

Sample

The Great Smoky Mountains Study is an ongoing, longitudinal study of the development of psychiatric disorders and need for mental health services in rural and urban youths. Full details of the study design can be found elsewhere (Costello et al., 1996).

Briefly, a representative sample of 4,500 students aged 9, 11, and 13 years, recruited through the Student Information Management System of the public school systems of 11 counties in western North Carolina, was selected using a household equal probability design. A screening questionnaire, consisting mainly of questions about behavioral problems, was administered to a parent, by telephone or in person. All children scoring above a predetermined cutpoint, plus a 1 in 10 random sample of the rest, were recruited for detailed interviews. In addition, an oversample of all 9-, 11-, and 13-year-old American Indian children (n = 431) living in the area were recruited for the interview phase; 349 took part in the study. The overall response rate was 80% (n = 1,422). In all, the sample included 4,964 annual observations of the 1,422 subjects. Across 4 waves, 70% of all interviews with eligible subjects were completed. At the end of 4 years, information was available on the age range 9 through 16, with overlapping data from 2 age cohorts at ages 11, 12, 13, and 14.

Measures

Child and Adolescent Psychiatric Assessment. The Child and Adolescent Psychiatric Assessment (CAPA) (Angold et al., 1995) is a psychiatric interview for children aged 9 and older, and their parents, that elicits information about symptoms that contribute to a wide range of diagnoses. The CAPA combines the characteristics of an "interviewer-based" and a "respondent-based" interview. Like respondent-based interviews, the CAPA uses a highly structured protocol, with required questions and probes. However, as in an interviewer-based interview, the onus throughout is on the interviewer to ensure that subjects (1) understand the question being asked, (2) provide clear information on behavior or feelings relevant to the symptom, and (3) have the symptom at a prespecified level of severity as defined in an extensive glossary. Diagnoses and symptom scales are generated by computer algorithms. All diagnoses, except for ADHD, are based on information from both the parent and child. The diagnosis of ADHD is based on reports from the parent interview only, because of the poor validity of child-based ADHD ratings. Information regarding the validity and reliability of the CAPA has been reported elsewhere (Angold and Costello, 2000; Angold et al., 1995).

Impairment Scale. Psychosocial impairment secondary to psychiatric symptoms in 17 areas of functioning related to life at home, at school, and elsewhere was also rated according to a series of definitions and rules specified in the CAPA glossary and the interview schedule. In general, some decrement in actual function had to be described for a positive rating to be given (see Angold et al., 1995, for a full description of the concept of impairment implemented in the CAPA). Once impairment had been identified, interviewers questioned participants about what aspects of their symptoms had led to that impairment. For the purposes of this study, both the number of areas of impairment due to ADHD and in total were used as dependent variables.

Child and Adolescent Services Assessment. The Child and Adolescent Services Assessment (CASA) (Ascher et al., 1996) collects parent and child reports on use of mental health services, including services provided by the specialty mental health sector, schools, child welfare, primary health care, juvenile justice, and informal community sources. Information regarding the reliability of the CASA has been reported elsewhere (Farmer et al., 1994). For the purposes of this study, both the presence of any service utilization and the number of settings in which a participant was seen during the 3 months that preceded interviews are used as dependent variables. Service use was regarded as being present if reported by either parent or child.

Child and Adolescent Impact Assessment. The Child and Adolescent Impact Assessment (formerly the Child and Adolescent Burden Assessment) (Angold et al., 1998; Messer et al., 1996) was completed by parents at the end of the diagnostic interview. Parents were asked about 24 potential perceived impacts—that is, problems or difficulties in their own lives that they perceived as being caused or exacerbated by their child's behavioral or emotional problems. The areas covered included expense and financial difficulties; problems in their relationships with their spouse, family, or social network members; restrictions on activities; and several dimensions involving decreased feelings of well-being and competence. For the purposes of this study, the total number of areas of negative impact on parents was summed and used as a continuous measure.

Grouping Strategy

Youths were assigned to groups based on (1) whether they exhibited elevated ADHD symptoms (i.e., 6 or more inattentive and/or 6 or more hyperactive-impulsive symptoms, per *DSM-IV*) at one or more assessments and (2) their earliest reported age of symptom onset. The presence of elevated symptoms was based on 15 of the 18 *DSM-IV* ADHD symptoms that were available at the first assessment and 17 of the 18 *DSM-IV* symptoms that were available at the second through fourth assessments. Reports of ADHD symptom onset were based on parent retrospective reports. When parents reported conflicting ages of onset across assessments, their earliest reported age of onset was used to create groups. Together these criteria were used to classify youths into 1 of 7 mutually exclusive groups: (1) early-onset inattentive subtype (EIN; n = 28); (2) early-onset hyperactive-impulsive subtype (EHI; n = 22); (3) early-onset combined subtype (ECO; n = 35); (4) late-onset inattentive subtype (LIN; n = 10); (5) late-onset hyperactive-impulsive subtype (LHI; n = 2); (6) late-onset combined subtype (LCO; n = 5); and (7) a comparison group that never had elevated ADHD symptoms (COMP; n = 1,317). Sixteen participants met full symptom criteria for ADHD at more than one annual assessment. Each was included in one of the combined symptom groups (ECO or LCO). Data were excluded for one participant for whom the age of symptom onset was missing. Demographic information for all groups is provided in Table 1.

TABLE 1
Demographics for Entire Sample at First Assessment

	Inattentive Type		Hyperactive-Impulsive Type		Combined Type		Total Sample
	Early	Late	Early	Late	Early	Late	
n	28	10	22	2	35	5	1,419
Sex (% male)	68	80	77	100	83	100	56
Race (% white)	93	80	73	50	89	80	69
Age (years)	10.1 (1.1)	11.0 (1.1)	9.7 (0.9)	9.7 (0.7)	10.0 (0.8)	9.8 (0.6)	

Analytic Strategy

The goals of the current study were met by comparing groups on a variety of outcome measures. All comparisons used multiple observations from the repeated assessments. To accommodate the nonindependence of repeated observations and to generate unbiased weighted population parameter estimates with correct standard errors, all analyses were implemented using generalized estimation equations with corresponding "sandwich" variance estimators (GEE) (see Diggle et al., 1994) as implemented by PROC GENMOD in SAS.

For each outcome variable, 3 a priori pairwise contrasts were estimated. The first contrast compared the early-onset group with the comparison group. The second contrast compared the late-onset group with the comparison group. The third contrast compared the early-onset group with the late-onset group. Treatment of dichotomous dependent variables in the GEE framework is analogous to using logistic regression. Coefficients for dichotomous dependent variables are odds ratios and are interpreted as the odds of one group experiencing the outcome relative to the odds of a reference group experiencing the outcome. Treatment of dependent variables consisting of count data in the GEE framework is analogous to Poisson regression. Coefficients for count data are exponentiated betas (expβ) and are interpreted as the change in the log mean of the outcome for one group relative to a reference group. Pairwise contrasts were estimated such that the nonsymptomatic and late-onset symptomatic groups always served as the reference group. Thus coefficients are interpreted as the likelihood of experiencing a negative outcome given either elevated or early-onset ADHD symptoms. Within each GEE model, sex and age were included as covariates because a number of the outcomes considered are known to be related to these variables.

RESULTS

Distribution of ADHD Symptom Onset

Prior to estimating any models, the distributions of the ages of symptom onset for the inattentive, hyperactive-impulsive, and combined subtype groups were examined separately. Both the first available (i.e., onset reported at first assessment that elevated symptoms were endorsed) and earliest ever (i.e., across all assessments) reported ages of onset were plotted in Figure 1, although only the latter was used in creating groups. Three findings are evident from Figure 1. First, a substantial proportion of parents reported that ADHD symptoms had "always" been present and were unable to identify a specific year. This corroborates the widely held belief that in most cases ADHD is typically reported to first occur early in childhood. Second, a higher proportion of youths were reported to have "always" had ADHD symptoms when data from multiple assessments were used. This is consistent with previous research regarding the relatively poor accuracy of parent-reported symptom onset (Angold et al., 1996). Third, while 26% of youths in the inattentive symptom group were reported to first exhibit their symptoms after age 7, only 13% and 8% of youths in the combined

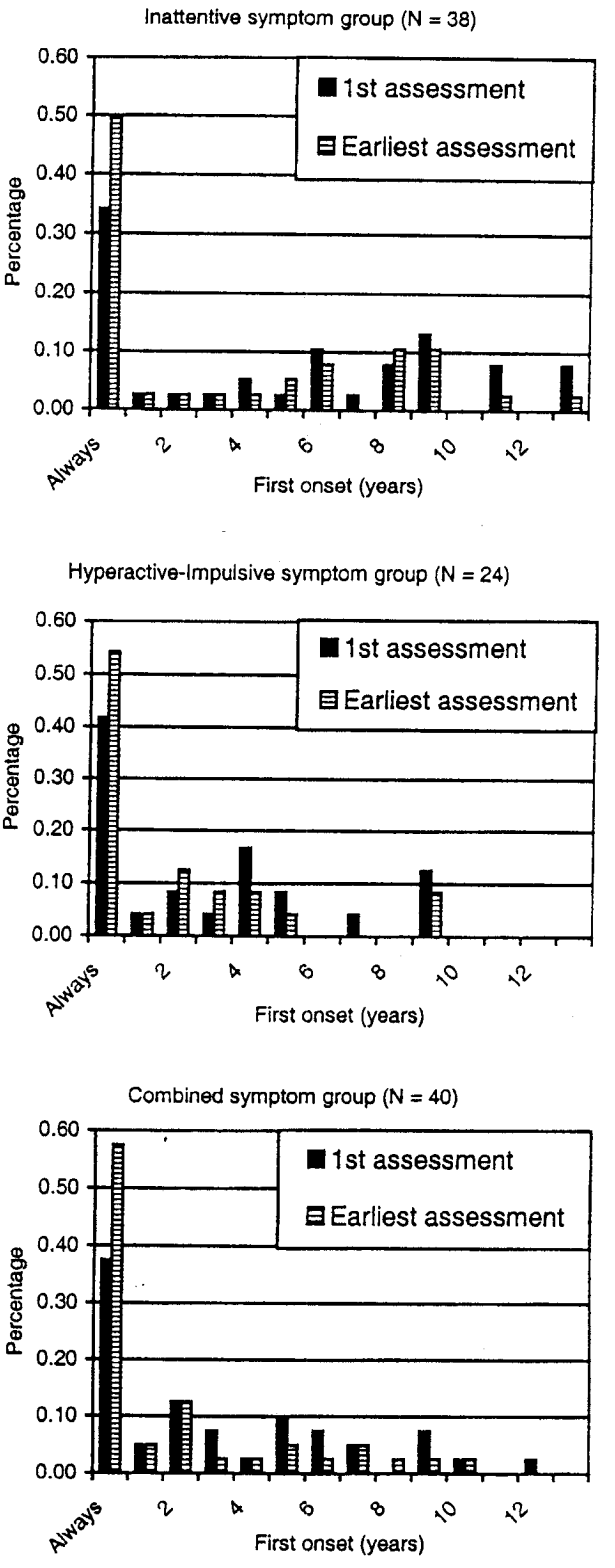

Fig. 1 Age of onset of attention-deficit/hyperactivity disorder symptoms by *DSM-IV* subtype.

symptom and hyperactive-impulsive symptom groups, respectively, did so. Although this suggests that youths who only have elevated levels of inattentive symptoms have a later average age of ADHD symptom onset, these percentages were not significantly different. Because only 2 of the 24 children in the hyperactive-impulsive subtype had a late onset of symptoms, this group was dropped from further consideration.

Group Comparisons Involving Inattentive Subtypes

A summary of descriptive and test statistics for this section is provided in Table 2.

Early-Onset Versus Nonsymptomatic Groups. Relative to the COMP group, the EIN group was significantly more likely to be impaired in 2 or more settings, to have used at least one service in the previous 3 months, to have used a greater number of services in the previous 3 months, to have experienced more impairment due to ADHD and more impairment from any cause, to have resulted in a greater number of negative parent impacts, and to have comorbid oppositional defiant disorder (ODD).

Late-Onset Versus Nonsymptomatic Groups. Relative to the COMP group, the LIN group was significantly more likely to be impaired in 2 or more settings, to have used at least one service in the previous 3 months, to have used a greater number of services in the previous 3 months, to have had more impairment due to ADHD and more impairment from any cause, and to have comorbid depression. There was also a trend for them to have resulted in a greater number of negative parent impacts.

Early-Onset Versus Late-Onset Groups. Relative to the LIN group, the EIN group was significantly more likely to be impaired in 2 or more settings. There was also a trend for the EIN group to have been more likely to have used at least one service in the previous 3 months.

Group Comparisons Involving Combined Symptom Groups

A summary of descriptive and test statistics for this section is provided in Table 3.

Early-Onset Versus Nonsymptomatic Groups. Relative to the COMP group, the ECO group was significantly more likely to be impaired in 2 or more settings, to have used at least one service in the previous 3 months, to have used a greater number of services in the previous 3 months, to have experienced more impairment due to ADHD and more impairment due to any cause, to have resulted in a greater number of negative parent impacts, and to have comorbid conduct disorder (CD), ODD, or anxiety disorder. Although models involving a diagnosis of depression proved nonestimable, it is noteworthy that in 9% of the ECO group's observations these criteria were met, compared with 2% of observations in the COMP group.

Late-Onset Versus Nonsymptomatic Groups. Relative to the COMP group, the LCO group was significantly more

TABLE 2
Inattentive Symptom Group Comparisons

	Descriptive Statistics			A Priori Contrasts: Parameter Estimates		
Criterion	Early (%)	Late (%)	Comparison (%)	I	II	III
ODD	11	6	4	3.3**	1.0	3.3
CD	6	6	4	1.3	2.2	0.6
AX	6	6	3	1.4	3.0	0.5
DD	5	9	2	2.5	9.4***	0.3
Impairment in 2 settings (%)	48	14	6	17.3†	3.2**	5.4**
Service us past 3 months (%)	54	40	21	6.8†	3.7†	1.9*
	Mean (SD)	Mean (SD)	Mean (SD)			
No. of impairments (total)	1.6 (2.6)	3.3 (3.6)	0.9 (2.1)	2.0***	4.0†	0.5
No. of impairments (ADHD)	0.3 (0.8)	0.4 (0.7)	0.02 (0.2)	10.1†	16.1†	0.6
No. of service settings	1.0 (0.9)	0.7 (0.6)	0.2 (0.7)	4.2†	3.1†	1.4
No. of parental impacts	3.3 (2.8)	2.0 (1.0)	1.3 (2.3)	2.4**	1.7*	1.4

Note: ODD = oppositional defiant disorder; CD = conduct disorder; AX = any anxiety disorder; DD = depression; ADHD = attention-deficit/hyperactivity disorder; Early = elevated ADHD symptoms with onset before age 7 years; Late = elevated ADHD symptoms with onset after age 7 years; contrast I = early vs. comparison; contrast II = late vs. comparison; contrast III = early vs. late. All parameter estimates are adjusted for the sex and age of the child. *N*'s vary due to missing data.

* $p < 10$; ** $p < .05$; *** $p < .01$; † $p < .0001$.

TABLE 3
Combined Symptom Group Comparisons

Criterion	Descriptive Statistics: Early (%)	Late (%)	Comparison (%)	A Priori Contrasts: Parameter Estimates: I	II	III
ODD	23	5	4	12.5†	0.8	16.0**
CD	26	11	4	12.4†	1.0	12.2**
AX	9	5	3	4.1***	0.7	5.9
DD[a]	9	0	2	—	—	—
Impairment in 2 settings (%)	67	56	6	38.6†	22.3†	1.7
Any service use (%)	61	37	21	8.0†	3.3†	2.4**
	Mean (SD)	Mean (SD)	Mean (SD)			
No. of impairments (total)	3.7 (3.8)	2.1 (2.1)	0.9 (2.1)	4.6†	2.5†	1.8
No. of impairments (ADHD)	0.8 (1.1)	0.7 (0.8)	0.02 (0.2)	31.0†	20.8†	1.5
No. of service settings	1.3 (1.0)	0.5 (0.5)	0.2 (0.7)	5.4†	2.4†	2.2**
No. of parental impacts	4.5 (3.1)	0.8 (1.1)	1.3 (2.3)	3.0†	0.4**	8.3†

Note: ODD = oppositional defiant disorder; CD = conduct disorder; AX = any anxiety disorder; DD = depression; ADHD = attention-deficit/hyperactivity disorder; Early = elevated ADHD symptoms with onset before age 7 years; Late = elevated ADHD symptoms with onset after age 7 years; contrast I = early vs. comparison; contrast II = late vs. comparison; contrast III = early vs. late. All parameter estimates are adjusted for the sex and age of the child. *N*'s vary due to missing data.

[a] Model not estimated because of zero cell.

** $p < .05$; *** $p < .01$; † $p < .0001$.

likely to be impaired in 2 or more settings, to have used at least one service in the previous 3 months, to have used a greater number of services in the previous 3 months, and to have had more impairment due to ADHD. Contrary to expectations, the COMP group caused a greater number of negative parental impacts than the LCO group.

Early-Onset Versus Late-Onset Groups. Relative to the LCO group, the ECO group was significantly more likely to have used at least one service in the previous 3 months, to have used a greater number of services in the previous 3 months, to have resulted in a greater number of negative parental impacts, and to have comorbid CD and ODD. Although models involving a diagnosis of depression proved nonestimable, it is noteworthy that in 9% of the ECO group's observations these criteria were met compared with 0% of observations for the LCO group.

DISCUSSION

The assumption that "true" ADHD emerges before age 7 has recently been questioned on both theoretical and empirical grounds (Barkley and Biederman, 1997). Furthermore, because many studies use parent and teacher questionnaires to approximate diagnoses, the AOC for ADHD is often neglected. The primary goals of the current study were to identify the proportion of youths who first exhibit elevated levels of ADHD symptoms after age 7 and to determine whether the age of symptom onset was differentially associated with clinically relevant outcomes.

Consistent with previous research (e.g., Applegate et al., 1997), a majority of youths with ADHD were reported to first exhibit these symptoms in early childhood. Furthermore, most parents were unable to identify a specific date of symptom onset. Instead symptoms were often reported to have "always" been present. Although descriptive data suggested that youths in the inattentive symptom group were more likely to first exhibit symptoms after age 7 (i.e., 26% compared with 8% and 13% for youths in hyperactive-impulsive and combined symptom groups, respectively), between-group differences were not statistically significant.

Comparisons of the early- and late-onset inattentive groups (EIN and LIN) with youths who did not have elevated ADHD symptoms (COMP group) revealed that elevated levels of inattentive symptoms, regardless of their age of onset, were associated with more impairment, service utilization, and negative impact on parental functioning. Furthermore, while the EIN group was at increased risk for comorbid ODD, the LIN group was at increased risk for comorbid depression. Direct comparisons of the EIN and LIN groups revealed that the former was more likely to have received services in the previous 3

months and was more likely to have had parent-reported problems in 2 or more settings. The EIN and LIN groups did not differ on any measure of comorbidity, impairment, or impact on parental functioning. This pattern of findings is consistent with Barkley and Biederman's (1997) recommendations regarding the abandonment or modification of the current AOC as it applies to youths with the inattentive subtype of ADHD. Enforcement of the current AOC results in the underidentification of youths in the LIN group who clearly experience ADHD-related problems at a rate comparable with that of their early-onset peers.

Comparisons of the early- and late-onset combined subtype groups (ECO and LCO) with the COMP group revealed that elevated levels of combined (i.e., both inattentive and hyperactive-impulsive) symptoms, regardless of their age of onset, were associated with more impairment and service utilization. Furthermore, the ECO group caused a greater number of negative impacts for their parents and was at increased risk for comorbid ODD, CD, anxiety disorders, and depression. Direct comparisons of the ECO and LCO groups revealed that the ECO group was at dramatically higher risk for ODD and CD and, although not formally testable, were more likely to have comorbid depression. Relative to the LCO group, the ECO group was also more likely to receive services, to use a greater number of services, and to have a greater number of negative impacts on their parents' functioning. This pattern of findings is *not* consistent with Barkley and Biederman's (1997) recommendations regarding the abandonment or modification of the current AOC as it applies to youths with the combined subtype of ADHD. Enforcement of the current AOC avoids identifying a more heterogeneous population of youths with combined symptoms, particularly with respect to comorbidity and negative parental impacts. This finding also has implications for studies that rely solely on parent and/or teacher rating scales to identify ADHD cases for research purposes. Since rating scales typically do not assess the age of symptom onset, these studies may be identifying more heterogeneous samples than studies using clinical interviews.

As has been found previously (Applegate et al., 1997), comparisons of youths with early- and late-onset hyperactive-impulsive type ADHD were not feasible. More than 90% of youths with hyperactive-impulsive type ADHD were reported to first exhibit symptoms prior to age 7. The enforcement of the current AOC for this group, therefore, appears to be a moot issue. This finding indirectly supports Barkley and Biederman's (1997) recommendations regarding the abandonment or modification of the current AOC for youths with hyperactive-impulsive type ADHD.

Limitations

This study is not without limitations. The first concerns the likely underidentification of youths exhibiting elevated levels of ADHD symptoms. Inasmuch as the first wave of data collection preceded the publication of *DSM-IV,* only 15 of 18 symptoms were available at this assessment and only 17 of 18 symptoms were available during the second through fourth assessments. Furthermore, although parent-reported ADHD is highly predictive of teacher-reported ADHD (Biederman et al., 1990, 1993), the sole reliance on parent report in this study likely underestimated the proportion of youths who had elevated levels of ADHD symptoms.

The second limitation concerns a recent change in the AOC in moving from *DSM-III-R* to *DSM-IV.* Specifically, *DSM-IV* stipulates that not only do symptoms have to have emerged prior to age 7, but they must also have caused impairment prior to age 7 in order for a diagnosis to be made. The current study is limited to an evaluation of parent reports of symptom onset, not onset of impairment.

Clinical Implications

These findings suggest that the AOC has different clinical implications depending on ADHD subtype. For youths with the inattentive subtype, the AOC is not associated with different clinical outcomes. For those with the combined subtype, the AOC identifies youths who experience worse clinical outcomes than their late-onset peers. However, there was a clear need for services among youths with elevated ADHD symptoms regardless of symptom type or age of onset. Relative to the COMP group, the ADHD subtype groups experienced a range of impairments in multiple settings and had more negative impacts on parental functioning. Although the effects were less pronounced for late-onset groups, ADHD was also associated with higher rates of comorbidity. The current findings suggest that in settings in which a diagnosis is necessary for service delivery, a diagnosis of ADHD not otherwise specified should be made for youths with late onset of symptoms.

For a diagnostic criterion to be clinically useful, it must be reliably measurable. Earlier work has shown modest reliability of the dating of ADHD symptom

onset (Green et al., 1991). However, even when AOC information is collected with structured research instruments, it can only be regarded as an approximation of the truth (Angold et al., 1996). Thus, although an early onset of ADHD symptoms is clinically meaningful for youths with the combined subtype, it is clearly a difficult criterion to ascertain. Greater efforts are needed to facilitate the accurate recall of symptom onset in future research.

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Eating Disorders: Psyche or Soma? Anne Ward, Jane Tiller, Janet Treasure, Gerald Russell

Speculation about the etiology of eating disorders has gone through different phases, variously favoring familial, organic, and psychosocial factors. Recent evidence has particularly contributed to our understanding of the organic view. We review the evidence for an organic contribution to the illness and present a series of cases in which organic factors were present. The cases illustrate the complex interaction between biological and psychological factors. In particular, a growth hormone-producing pituitary adenoma was discovered in a patient following successful treatment of her bulimia by psychological means alone. Etiological theories of eating disorders need to encompass both organic and psychosocial factors, allowed to interact in complex ways. Focusing exclusively on either aspect is a disservice to our patients. **Int J Eat Disord** 2000;27:279–287. Copyright 2000 by John Wiley & Sons, Inc. Reprinted by permission of Wiley-Liss, Inc., a subsidiary of John Wiley & Sons, Inc.