

## Practice-Based Diagnostic Continuity in the Assessment of Attention-Deficit/Hyperactivity Disorder in Preschool-Age Children

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Attention-Deficit/Hyperactivity Disorder (ADHD) is the current DSM-IV category for a specific, neuropsychological, behavioral, and developmental disorder seen in both children and adults. In this practice-based research synthesis, diagnostic continuity, which may begin with recognizing and accurately assessing attention-deficit/hyperactivity disorder early in a child's life, is investigated. Based on the literature surrounding ADHD and related disorders, assessment practices increasing the probability of a sustainable diagnosis may, and probably should include: (1) attending to a child's medical, developmental, behavioral, social, and educational history; (2) utilizing parents, teachers or caretakers, trained diagnosticians, and the children themselves, for input into the assessment; and (3) using reliable and valid diagnostic measures consistently across assessments. However, while there seems to be consensus literature supporting the use of these practices, and recognition that sustainable diagnosis is an important consideration in the validation of assessment practices, the studies included in this synthesis provide very limited evidence of a link between the use of these practices to diagnose ADHD and the continuity of diagnosis.

### Purpose

The purpose of this practice-based research synthesis is to determine whether there is evidence to support the continuity and consistency of specific diagnostic practices for Attention-Deficit/Hyperactivity Disorder (ADD or ADHD), Hyperkinetic Disorder (HKD), hard-to-manage behavior, or externalizing disorders related to hyperactivity when initial assessments are made with children who are five years of age or younger. The conduct of this synthesis is guided by a framework developed by Dunst, Trivette, and Cutspec (2002) that focuses on the degree to which variations in the practices of diagnosing ADHD are associated with variations in the continuity of diagnosis. In general terms, a practice-based research synthesis differs from more traditional meta-analyses by systematically unpacking and examining the characteristics of practices that are related to differences in outcomes or consequences. Specifically, this type of analysis focuses more on an understanding of how the same or similar characteristics exert the same or similar observable effects and not solely on statistical or observation-based relationships between or among these variables.

### Background

A literature search identified over 10,000 publications on the topic of Attention-Deficit/Hyperactivity Disorder;

however, less than 10% of these publications are focused on preschool-age children. The significance of the lack of attention directed toward this age group can be found in general agreement across existing research that the onset of ADD/ADHD occurs before age seven and the mean onset of symptoms is between three and four years (Anastopoulos & Shelton, 2001; Applegate et al., 1997; Barkley, Fischer, Edelbrock, & Smallish, 1990; Hazell, 2000; Jensen & Cooper, 2002). Further, while studies suggest that two thirds of children diagnosed with ADD or ADHD after age seven would have been identifiable during the preschool years (Applegate et al., 1997; Barkley, 1981), there is surprisingly little information available on the early manifestations and developmental course of this disorder in preschool-age children (Barkley, 1998; Campbell, Ewing, Breaux, & Szumowski, 1986; Jensen & Cooper, 2002).

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Consensus literature suggests that by evaluating certain behaviors in infants (e.g., inattention, overactivity) and toddlers (e.g., distractibility, disorganized behavior) and other behaviors in preschoolers (e.g., impulsivity, discipline problems, poor peer relations), it is possible to identify a group of children who have a higher risk for receiving a diagnosis of ADD, ADHD, HKD, hard-to-manage, or an externalizing disorder related to hyperactivity in later childhood (Barkley, 1998; Biederman & Faraone, 1996; Jensen & Cooper, 2002; Lahey et al., 1998). The importance of early diagnosis is summarized by Kessler (2000) who has argued that ADD/ADHD is best defined as a lifespan disorder and Barkley (1998) and Jensen and Cooper (2002) who have concluded that there is no question that ADHD is a syndrome that begins in early childhood.

According to Barkley et al. (1990, p. 546), longitudinal or follow-up studies of this disorder “generally indicate that between 30% and 50% of these children [diagnosed prior to age seven] continue to be impaired by their symptoms in adolescence or to meet current diagnostic criteria for Attention Deficit Disorder with Hyperactivity (Gittelman et al., 1985; Lambert et al., 1987).” Many children initially diagnosed with this disorder will not meet established criteria at follow-up, primarily because of low levels of behavior problems at the time of initial assessment, treatment obtained following initial assessment, and educational accommodations as a child reaches school age. Those who continue to meet established criteria tend to show greater severity of symptoms (particularly those related to hyperactivity and impulsivity) at the time of initial diagnosis (Barkley, 2002; Barkley et al., 1990; Beitchman, Wekerle, & Hood, 1987; Hazell, 2000; Jensen & Cooper, 2002; McGee, Partridge, Williams, & Silva, 1991; Palfrey, Levine, Walker, & Sullivan, 1985).

While researchers have examined diagnostic practices and the impact of treatments for elementary-school-aged children, “less is known about the assessment and treatment of ADHD among younger children” (Arons, Katz-Leavy, Wittig, & Holden, 2002, p. 57). Challenges that make accurate diagnosis of ADHD difficult in children younger than age six include distinguishing between appropriate and inappropriate developmental behaviors, issues of comorbidity, and the environmental contexts used in the diagnostic process (e.g., environmental situations requiring greater degrees of concentration and mental discipline) (Arons et al., 2002). Despite the serious consequences that can result from ADD/ADHD, “studies indicate that less than half of those with the disorder are receiving treatment” (“International Consensus Statement on ADHD,” 2002, p. 90). Further, “children with severe symptoms of both ADHD and oppositional behavior that emerge during the preschool period appear to be at highest risk for ongoing problems requiring comprehensive intervention” (Pierce, Ewing, & Campbell, 1999, p. 56).

### **Diagnostic Criteria**

Based on the most widely used assessment guidelines (DSM-III, DSM-III-R, DSM-IV, and ICD-10), for a diagnosis of ADHD to occur: (1) a child must have six or more of the nine symptoms listed in the DSM or ICD-10 for at least six months, (2) at least some symptoms (number or degree has not been established) must have been present before the age of six (World Health Organization, 1992) or seven years (American Psychiatric Association, 1994), (3) the behavior used to meet the criteria must be maladaptive and inconsistent with the child’s developmental level and intellectual ability, (4) functional impairment must be present in two or more settings (home, preschool or childcare, and/or community), and (5) this impairment must be documented independently by parents, teachers and/or caregivers, trained diagnosticians, and if appropriate, the child, in these settings (American Psychiatric Association, 1994; World Health Organization, 1992).

### **Diagnostic Practices**

The two most commonly used guidelines for diagnosing ADD, ADHD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity are the *Diagnostic and Statistical Manual of Mental Disorders –IV* (DSM-IV) (American Psychiatric Association, 1994) and the *International Classification of Diseases* (ICD-10) (World Health Organization, 1992). The DSM-IV is used mostly in the United States, whereas the ICD-10 is more commonly used in Europe. Prior to 1980, when the DSM-III (the first DSM to include ADHD as a diagnosis) was published, a variety of other assessment tools were used (Barkley, 1981; Behar, 1977; Goyette, Conners, & Ulrich, 1978; Pelham & Bender, 1982; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000).

*DSM-IV.* According to *DSM-IV*, children diagnosed with this disorder are assigned one of three subtypes: primarily inattentive (ADHD-IA), hyperactive/impulsive (ADHD-H/I), or combined (ADHD-C). Additionally, researchers suggest that a separate cluster of symptoms describing a *sluggish cognitive temperament* (Lahey et al., 1998) are used to identify a meaningful subgroup within the primarily inattentive subtype that is associated with a distinct pattern of functional impairment.

*ICD-10.* In the ICD-10, a more stringent set of criteria is used to guide the diagnosis of hyperkinetic disorder (HKD). According to the World Health Organization (1992), this diagnosis is used to identify children who are severely hyperactive (whereas ADD/ADHD is perceived as a more inclusive category allowing for a broader range of problems and causes). Additionally, ICD-10 criteria (a minimum number of symptoms of inattention, hyperactivity, and impulsivity each have to be present) must be documented independently by both parents and teachers. As a

result, the ICD-10 definition identifies a smaller number of children than does the DSM-IV definition (Lahey & Willcutt, 2002). It is not yet clear if the more restrictive definition leads to more or less accurate identification of impaired children and adolescents (Lahey & Willcutt, 2002).

After decades of differences, the DSM-IV and ICD-10 manuals now list the same symptoms for ADHD and HKD; however, inclusion and exclusion criteria are still different for making categorical diagnoses (Swanson & Castellanos, 2002). Readers should consult Jensen and Cooper (2002) for detailed summaries of diagnostic criteria for both measures.

**Consensus diagnostic characteristics.** Based on existing literature about ADHD and related disorders, there seems to be a consensus regarding exemplary diagnostic characteristics that *may* help to guide the identification and assessment of ADD, ADHD, HKD, hard-to-manage behavior, and/or externalizing disorders related to hyperactivity in preschool-age children. These characteristics include: (1) collecting data about the children's histories, including medical records, developmental history, behavioral patterns, social skills, education, and psychological history; (2) utilizing parents, teachers or caretakers, trained diagnosticians, and the children being assessed (if appropriate) for input into the assessment; and (3) using reliable and valid standardized diagnostic measures (American Academy of Pediatrics Committee on Quality Improvement, 2000; Dulcan & Work Group on Quality Issues, 1997; Hazell, 2000; "International Consensus Statement on ADHD," 2002; Jensen & Cooper, 2002; McGoey, Eckert, & DuPaul, 2002; National Institute of Mental Health, 2003; National Institutes of Health, 1998). However, in preschool-age children, it is necessary to qualify the potential use of these diagnostic practices because they are drawn from consensus statements based on children age 6–12.

## Search Strategy

### Search Terms

To identify relevant studies, the following terms were used to conduct a web-based search: attention-deficit disorder, attention-deficit/hyperactivity disorder, hyperkinesis, hyperkinetic, hyperactivity, impulsivity, inattention, distractibility, minimal brain dysfunction, hard-to-manage, externalizing disorders, and overactivity. The search was delimited by adding infants or toddlers or preschool children or young children as a Boolean condition, and the terms measurement, assessment, diagnosis, longitudinal, and follow-up were used to further restrict the search.

### Sources

Psychological Abstracts (PsycINFO), MEDLINE, The Cochrane Library, Social Sciences Citation Index, Educational Resources Information Center (ERIC) database, and Books-in-Print were the primary information databases

searched for relevant studies. A secondary search was made of an EndNote bibliographic information database maintained by the Puckett Institute.

In addition, comprehensive hand searches were done of the reference sections of more than 90 journal articles, book chapters, books, conference papers, and PowerPoint presentations to locate additional studies. Repeated sweeps of various electronic databases using newly identified search terms and examinations of the reference sections of newly identified publications were made until no further investigations were located.

### Selection Criteria

To be included in this synthesis, studies had to meet the following criteria: (1) studies needed to focus on the diagnosis and assessment of ADD, ADHD, HKD, hard-to-manage behavior, or externalizing disorders related to hyperactivity in preschool-age children (even if other types of disabilities may have been included in the sample); (2) diagnostic practices regarding the assessment of ADD, ADHD, HKD, hard-to-manage, or externalizing disorders were included or could be deduced from the information provided; (3) outcomes, including both diagnosis and continuity of diagnosis, were described; and (4) follow-up data, collected two years or longer following initial assessment, were included as part of the data analysis. It was not a criterion for studies to include or measure the three consensus-based diagnostic practices (utilizing multiple sources of input, using reliable and valid measures, and attending to multiple facets of developmental histories), rather, these data were extrapolated from the studies.

## Search Results

A total of nine research studies that met the inclusion criteria were located. Three other research reviews that focused on ADHD/ADD and preschool-age children were also located (see Dulcan & Work Group on Quality Issues, 1997; Hazell, 2000; McGoey et al., 2002) but were not included because the studies reviewed did not meet all of the inclusion criteria for this practice-based research synthesis (if a study included in one or more of these reviews *did* meet inclusion criteria, it was included in this review).

### Participants

The studies included approximately 1,652 preschool children in initial assessments and approximately 1,358 to 1,482 young children and adolescents at follow-up (see Table 1). The totals are approximate due to evidence that four studies used the same initial sample and data. The number of participants for these studies was only counted once. Several of these studies added additional participants at different times; however, it was not possible to track reliable data regarding the addition and attrition of

these children at different follow-up intervals. While there was an overall attrition rate of 18% across studies, most researchers reported higher attrition in diagnostic groups rather than control groups. For example, Winsler, Diaz, Atencio, McCarthy, and Chabay (2000) reported a 37% rate of attrition in the persistent problem group and a 10% rate in the control group. While additional participants were added to this study, the impact of the attrition was not described in sufficient detail.

Only 3 of 9 studies addressed whether the children who had been diagnosed with ADD, ADHD, HKD, hard-to-manage behavior, or externalizing disorders related to hyperactivity, received treatment following the initial assessment. For example, according to Campbell and Ewing (1990), “children in the persistent problem group were more likely to be receiving either remedial services or spending at least part of their day in a special class” (p. 879). Further, these participants and their families were also more likely to have received other clinical/mental health services, and five of the participants in the persistent problem group had been prescribed medication (Campbell & Ewing, 1990). This problem is further confounded by the fact that the same children were used in 4 of the 9 studies included in this synthesis. It appears these factors influenced continuity of diagnosis; however, the authors did not provide sufficient information to determine the level or origins of this influence.

At the time of initial assessments, participants ranged in age from 2 weeks to 46 months. At the follow-up data collection points, the participants ranged in age from 14.5 months to 15 years. Of the studies in which gender was reported, more boys (63%) than girls (37%) were initially assessed. Two studies (using the same participants) included only males. Two studies did not specify gender totals for one or more data-collection points. The number of follow-up assessments in each study ranged from 1 to 5, with time intervals spanning 2 to 12 years.

One of the nine studies drew its entire sample from admissions to a psychiatric preschool program. In the other studies, participants were either parent or teacher referred or recruited from early childhood education programs, pediatrician’s offices, and hospitals (children who were born during a specified time period).

### **Research Designs**

All of the studies included in this research synthesis utilized quasi-experimental longitudinal group designs (see Table 2). All nine studies incorporated follow-up assessments with one to six follow-up time points. Length of time between baseline and follow-up assessments ranged from 2 to 12 years.

### **Practices**

The research studies included in this synthesis were assessed according to whether the following consensus-

based diagnostic practices were incorporated into assessments for ADHD (or related disorders):

*Child’s history.* Based on the information provided in the studies, the dimensions of assessment for a young child being tested for ADHD disorders included: information about a child’s psychological history (N = 6 of 9 studies); medical condition and history, as determined by a physical and neurological examination and any other appropriate referrals (N = 2 of 9); developmental history (N = 9 of 9); descriptions of behavior across settings (N = 9 of 9); social skills, including family, friendship, and peer relations (N = 9 of 9); and education (a review of classroom or childcare observations and prior testing, including estimates of intellectual capabilities and strengths and weaknesses of academic achievement) (N = 9 of 9).

*Utilizing parents, teachers, and clinicians.* All of the studies included parent interviews or input from parent questionnaires (N = 9 of 9) as part of the diagnostic process. Teacher or caregiver data were used in 7 of the 9 studies. Additionally, 5 of the 9 studies included ratings from clinicians, trained interviewers, and/or trained observers in the diagnostic process in one or more data-collection points. A delineation of who participated in the data collection for each study included in this synthesis is provided in Table 1.

*Reliable and valid outcome measures.* In 7 of the 9 studies included in this synthesis, the Behar, SNAP, DSM-III, DSM-III-R, or DSM-IV Diagnostic Criteria were used as part of the initial assessment process (see Table 2). Likewise, 7 out of 9 studies used one or more of these measures at some point during follow-up assessments (however, this utilization was not consistent across time intervals).

Four out of 9 studies described the reliability measures used and provided reliability data. Two out of 9 studies described secondary reliability through the use of established instruments or by mentioning the inclusion of, but not detailing, reliability practices. Three of 9 studies did not report reliability practices or data.

### **Outcomes**

Outcomes included diagnosis and continuity of diagnosis for ADD, ADHD, hard-to-manage or externalizing disorders, when initial assessments were made with preschool-age children. Seven of the nine studies included descriptions of the methods used to assess and reassess ADD, ADHD, hard-to-manage behaviors, and/or externalizing disorders related to hyperactivity in preschool-age children, and also reported findings of diagnostic sustainability.

### **Synthesis Findings**

Table 3 summarizes the findings from the synthesis. The findings include a description of the degree to which

continuity of diagnosis was reported and the extent to which the results reported by the authors may be challenged or compromised by rival explanations.

The findings for this synthesis are based on whether there is evidence to support the use of consensus-based practices (attention to a child's multifaceted history, using multiple raters during data collection, and using reliable diagnostic measures) for the assessment of ADD, ADHD, HDK, hard-to-manage, and/or externalizing disorders related to hyperactivity across the studies reviewed. This in turn, was evaluated based on the consistency of the diagnosis of ADD/ADHD beginning during the preschool years and continuing over a minimum of two years. Although diagnostic-practice characteristics can be discerned through the cumulative research reviewed, and all of the studies made claims of diagnostic continuity, the degree of continuity does not support the use of the consensus-based practices that have been described.

## **Results**

*Primary findings.* Continuity of diagnosis (with the first follow-up assessment occurring at least two years following the initial diagnosis) for groups of young children sharing similar characteristics (e.g., an initial diagnosis of ADD, ADHD, hard-to-manage, or externalizing disorders) was reported in 9 out of 9 studies included in this synthesis. However, this continuity should be interpreted within the contexts of additional participant characteristics (e.g., population sample compared to parent or teacher referral, attrition rates, whether participants received treatment following the initial assessment), methods of data collection (whether established measures were used and if so, if they were used consistently across follow-up intervals and included developmentally sensitive descriptions and definitions of problem behaviors), sources of information (who provided data leading to diagnosis and whether this input was consistent across follow-up assessments), and processes of analysis (whether percentages of continuity were based on assessments within behavior-problem groups or across entire samples).

The studies included in this synthesis were so diverse regarding the parameters within which continuity was established, summarizing the results was difficult and could be misleading to readers. For example, Beitchman et al. (1987) showed continuity of diagnosis in 48% of the children studied. The way in which the authors reached this percentage was based on the characteristics of the participants who were placed in one or more of five diagnostic categories (of which ADD with and without hyperactivity was one). When the initial assessments were concluded, 31 participants were categorized as ADD. Two children with an initial diagnosis of ADD had an unspecified disorder at the follow-up assessment and 14 of the original 31 received the same diagnosis. The "unspecified

children" (N = 2) were placed in the "delay" group and added to the ADD total (N = 14) at follow-up (16 of the original 31 equals 48% of the participants initially diagnosed with ADD with or without hyperactivity). Additionally, "methods used to assess persistence of symptoms and disorder across time as well as comorbid psychiatric disorders are not similar or identical across studies, making straightforward comparisons of the results across those studies difficult" (Barkley, 2002, p. 4-2).

Similar problems in data analysis were found in 7 of the 8 remaining studies. Future research on diagnostic sustainability with children who have been diagnosed with ADHD, ADD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity should take into consideration alternative explanations that may account for results obtained through the research.

## **Rival Explanations**

Possible threats to internal and external validity and rival explanations for the continuity of diagnosis for ADD/ADHD may be present in the nine studies included in the synthesis (see Table 3). In addition to the ways in which data was analyzed and reported, high attrition rates, overlapping samples, and problems that may occur as the result of confounding comorbidity threatened the validity of the studies included by providing potential alternative explanations for the results.

*Threats to the validity of studies.* Diagnostic continuity is dependent on the degree to which consensus-based assessment practices (including conceptual guidelines such as the DSM-IV) are developmentally sensitive and produce stable results. The operationalization of ADD, ADHD, HKD, hard-to-manage, and externalizing disorders continues to evolve, requiring longitudinal studies to adapt to the changes. Furthermore, when diagnosis is impacted by problems associated with comorbidity (as hyperactive-type disorders often are), researchers are further challenged to separate out the characteristics of each disorder, and how each should be measured, followed up, and reliably reported.

In addition to inconsistency regarding diagnostic criteria, without exception, follow-up assessments did not use all of the same instruments across follow-up points, making judgments regarding the stability of the diagnosis highly problematic. One study included all of the outcome measures used in initial assessments in the follow-up evaluation; however, additional instruments were used in the diagnostic process and data were incorporated into diagnoses.

It is necessary to use developmentally appropriate outcome measures (which may require a change or adaptation in instruments), and diagnosis at any particular age must address the sensitivity of the data and data-collection methods used to determine the persistence of the

disorder. Barkley (2002) has called into question the practice of making direct calculations of the “stability, persistence, and desistence” (p. 4-2) of ADD, ADHD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity when follow-up studies do not use the same diagnostic practices as those in baseline studies. According to Barkley, “the percentage of subjects having an outcome at one follow-up phase cannot be directly compared with that same disorder in the same sample at another phase without some qualification on this issue” (p. 4-2).

Finally, while all of the studies reported on the validity of including multiple raters in the diagnostic process (parents, teachers or caregivers, trained diagnosticians, and the children themselves), the findings revealed shifting sources of information about the participants and their diagnoses at different follow-up points. When this input is used as data for determining diagnosis, the results have been problematic. For example, due to the lack of consensus criteria for the diagnosis of hyperactivity, many early studies relied exclusively on referrals from parents or teachers and clinical diagnosis as the primary inclusion criteria (Barkley et al., 1990). Without population samples, standardized diagnostic scales could not be developed and refined.

### **Conclusion**

Longitudinal analyses have indicated that preschoolers whose problems are still evident at school entry (kindergarten or first grade) are much more likely to warrant a diagnosis for ADD, ADHD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity in later childhood and adolescence (Barkley, 2002; Beitchman et al., 1987; Hazell, 2000; Jensen & Cooper, 2002; McGee et al., 1991; Palfrey et al., 1985; Pierce et al., 1999). Additionally, parents who referred their children for assessment rated their children as showing more severe problems (Beitchman et al., 1987; Pierce et al., 1999); symptom severity is perceived to be the best predictor of which preschool children who have been diagnosed with ADD, ADHD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity are likely to have persistent problems (Jensen & Cooper, 2002; Pierce et al., 1999).

Further, while it is often unclear whether problem behavior in preschool children is indicative of an emerging disorder or evidence of a difficult, but transient, phase of development (Campbell, 1990), diagnosis of this disorder should be developmentally relative. The studies included in this synthesis provide evidence of the problems that can occur when this sensitivity is not a condition of assessment.

While the findings from this synthesis indicate that certain kinds of practices are critical for early, comprehensive, and consistent diagnosis of ADHD and related dis-

orders, and provide evidence that supports the presence of precursors of attentional problems that may be present and identifiable during the preschool years, the studies do not provide empirical validation for consensus-based diagnostic practices that have been delineated in the literature. Existing diagnostic practices appear to be highly variable and unreliable when attempting to establish diagnostic continuity.

However, for a small group of preschool-age children who were initially referred by a parent (particularly mothers), rated by both parents and teachers, and assessed as having more severe behavioral problems associated with hyperactivity, impulsivity, and often comorbidity, there is a stronger probability of finding a sustainable diagnosis of ADD, ADHD, HKD, hard-to-manage, or externalizing disorders related to hyperactivity. In contrast, children who were part of population-based samples and perceived as demonstrating less severe symptoms during the preschool years were not as likely to be diagnosed at follow-up intervals.

### ***Implications for Practice***

This practice-based research synthesis is focused on the characteristics that are reported in consensus-based literature as essential for identifying accurate and sustainable assessment practices for this disorder in children five years of age or younger. These characteristics may, and probably should, include: (1) attention to a child’s history (including medical records, developmental history, behavioral patterns, social skills, education, and psychological history); (2) utilizing multiple, consistent sources of information when collecting data (including parents, teachers or caretakers, trained diagnosticians, and the child); and (3) using reliable and valid diagnostic measures (these measures should also be developmentally sensitive and empirically based). These practice characteristics very well may be related to diagnoses of ADHD and related disorders that are sustainable. However, based on the studies included in this synthesis, it is not possible to make the claim that there is empirical support for linking these characteristics with diagnostic continuity.

One reason for concluding these diagnostic practices lack empirical support may be the lack of developmental sensitivity across assessment criteria for this disorder. Diagnostic developmental insensitivity appears to be particularly acute for preschool-age children because none of the fixed diagnostic criteria has been normed for this age group. While some research has been conducted with children age 4 to 6, most studies have not investigated children of this age or younger. Barkley (2002) has drawn a similar conclusion for longitudinal studies involving school-age children; it now appears that the preschool population also requires “developmentally referred and empirically based definitions” of the disorder (p. 4-11).

The consensus-based, diagnostic practice characteristics described in this synthesis *may* lead to an accurate and sustainable diagnosis, especially for preschool-age children with moderate to severe behavioral problems related to hyperactivity. However, the studies included in this synthesis do not provide enough empirical validation to support this claim.

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Table 1  
*Characteristics of the Study Participants*

Study	N <sup>a</sup>	Age	Gender <sup>b</sup>		Data Origins <sup>c</sup>				Child Diagnosis <sup>d</sup>
			M	F	P	T/C	TD	C	
Beitchman et al. (1987)									
T <sub>1</sub>	129	4 years	106	23	Y	Y	Y	Y	23 ADHD; 8 ADD
T <sub>2</sub>	98	10 years	82	16	Y	Y	Y	Y	14 ADD/ADHD
Campbell (1994)									
T <sub>1</sub>	112	46 months	112	0	Y	Y	N	N	112 HtoM
T <sub>2</sub>	105	71 months	105	0	Y	Y	N	N	18 ADHD
Campbell & Ewing (1990)									
T <sub>1</sub>	68	35 months	41	27	Y	Y	N	N	46 Ext. Disorder
T <sub>2</sub>	57	72 months	35	22	Y	Y	N	N	32 Ext. Disorder
T <sub>3</sub>	54	9 years	36	18	Y	Y	N	N	15 ADHD
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T <sub>1</sub>	1037	3 years	536	501	Y	Y	Y	N	21 ADHD; 31 HtoM
T <sub>2</sub>	991	5 years	nsp	nsp	Y	Y	Y	Y	21 ADHD; 31 HtoM
T <sub>3</sub>	954	7 years	nsp	nsp	Y	Y	Y	Y	21 ADHD; 29 HtoM
T <sub>4</sub>	955	9 years	nsp	nsp	Y	Y	Y	Y	21 ADHD; 29 HtoM
T <sub>5</sub>	925	11 years	nsp	nsp	Y	Y	Y	Y	18 ADHD; 21 HtoM
T <sub>6</sub>	976	15 years	nsp	nsp	Y	Y	Y	Y	20 ADHD; 29 HtoM
Palfrey et al. (1985)									
T <sub>1</sub>	224	B-14 months	nsp	nsp	Y	N	Y	N	0 ADHD
T <sub>2</sub>	224	14-29 months	nsp	nsp	Y	N	Y	N	20 ADHD
T <sub>3</sub>	224	30-42 months	nsp	nsp	Y	N	Y	N	21 ADHD
T <sub>4</sub>	174	43 months - K	nsp	nsp	Y	N	Y	N	25 ADHD
T <sub>5</sub>	174	Grade 2	nsp	nsp	Y	N	N	Y	37 ADHD
Pierce et al. (1999) (Study 1)									
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T <sub>3</sub>	59	6 years	37	22	Y	N	Y	N	32 HtoM
T <sub>4</sub>	54	9 years	36	18	Y	N	Y	N	15 ADHD
T <sub>5</sub>	59	13 years	39	25	Y	N	N	Y	18 ADHD
Pierce et al. (1999) (Study 2)									
T <sub>1</sub>	112	34 months	112	0	Y	Y	Y	Y	69 HtoM
T <sub>2</sub>	104	9 years	104	0	Y	Y	Y	Y	64 HtoM
Winsler et al (2000)									
T <sub>1</sub>	82	46.1 months	66	16	Y	Y	N	N	39 ADHD
T <sub>2</sub>	72	65.6 months	57	15	Y	Y	N	N	29 ADHD

<sup>a</sup>N = number of participants in a study

<sup>b</sup>nsp = non-specified gender totals, or information or data not specified in the study

<sup>c</sup>Data Origins = who provided information or data during the course of a study (P = parent; T/C = teacher or caregiver; TD = trained diagnostician; C = child)

<sup>d</sup>Child Diagnosis = the description applied to behavior problem group and the number of participants in that group for each assessment time (ADHD = Attention-Deficit/Hyperactivity Disorder; ADD = Attention-Deficit Disorder; HtoM = Hard-to-Manage; Ext. Disorder = Externalizing Disorder related to hyperactivity)

Table 2  
*Diagnostic Measures*

Study	Research Design	Diagnostic Measures T <sub>1</sub> <sup>a,b,c</sup>	Follow-up Diagnostic Assessments				
			Diagnostic Measures T2	Diagnostic Measures T3	Diagnostic Measures T4	Diagnostic Measures T5	Diagnostic Measures T6
Beitchman et al. (1987)	Quasi-experimental, longitudinal design	DSM-III (interview)	DSM-III (interview)	-	-	-	-
Campbell (1994)	Quasi-experimental, longitudinal design	SNAP	DSM-III-R (interview)	-	-	-	-
Campbell & Ewing (1990)	Quasi-experimental, longitudinal design	Behar PBQ WWP	DSM-III (interview) SNAP WWP	DSM-III (checklist) SNAP NIMH			
Campbell et al. (1986)	Quasi-experimental, longitudinal design	Behar PBQ WWP	DSM-III (interview) WWP SNAP	-	-	-	-
McGee et al. (1991)	Quasi-experimental, longitudinal design	DSM-III (interview)	DSM-III (interview)	DSM-III (interview)	DSM-III (interview)	DSM-III (checklist)	nsp
Palfrey et al. (1985)	Quasi-experimental, longitudinal design	DSM-III (interview)	DSM-III (interview)	DSM-III (interview)	Established measures not used	Established measures not used	-
Pierce et al. (1999) (Study 1)	Quasi-experimental, longitudinal design	Behar PBQ	nsp	DSM-III (checklist) SNAP	DSM-III (checklist) SNAP	DSM-III-R (interview)	-
Pierce et al. (1999) (Study 2)	Quasi-experimental, longitudinal design	DSM-III (interview) SNAP	DSM-III-R (checklist)	-	-	-	-
Winsler et al (2000)	Quasi-experimental, longitudinal design	DSM-III-R (checklist)	Established measures not used	-	-	-	-

<sup>a</sup>DSM-III = *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed. (American Psychiatric Association, 1980), can either be administered during an interview or as a checklist; DSM-III-R = *Diagnostic and Statistical Manual of Mental Disorders*, 3rd Rev. ed. (American Psychiatric Association, 1987); Behar PBQ = Hyperactivity Scale of the Behar Preschool Behavior Questionnaire (Behar, 1977); WWP = Werry-Weiss-Peters Activity Rating Scale (Barkley, 1981); SNAP = SNAP Questionnaire (Pelham & Bender, 1982), a checklist measure that incorporates DSM-III criteria for ADHD along with age-appropriate items assessing peer interaction; NIMH = National Institute of Mental Health Diagnostic Interview Schedule for Children (Shaffer et al., 2000)

<sup>b</sup>nsp = information or data not specified in the study

<sup>c</sup>Additional diagnostic tools (e.g., SES, IQ) were used in each study; however, the focus of these tools was not relevant to the purpose of this synthesis

Table 3  
*Synthesis Findings*

Study	% of Diagnostic Continuity <sup>a</sup>	% of Collective Attrition	Additional Findings	Rival Explanations
Beitchman et al. (1987)	48% of children diagnosed with ADHD or ADD were assessed with the disorder after 5 years	24%	Study found continuity for hyperactivity according to DSM-III criteria; Provided evidence of using the same rater for multiple phases of data collection	Some participants received interventions, therefore leaving the results open to treatment effects; Study was not ADHD-specific; High attrition rate; Due to investigating multiple disorders, comorbidity may have impacted results; Sample may have been overly-inclusive, permitting children with borderline or marginal ADHD characteristics to be included
Campbell (1994)	28% of participants in original hard-to-manage group were diagnosed with ADHD after 2 years	11%	Persistent behavior problems were associated with lower levels of social competence over time; Established the important role that family context plays in the stability of problems and their onset (prevention and intervention programs should take a family systems perspective)	Consistent diagnostic criteria were not utilized; Behavior measured at age 4 was more general than what was measured at age 6; DSM-III criteria were applied retroactively based on other standardized scores; Sample was all male
Campbell & Ewing (1990)	37% of children with externalizing problems in preschool were diagnosed with ADHD at 9 years of age	19%	Externalizing behaviors related to ADHD often shift the focus off internalizing symptoms; both should be considered; Good convergence between interview and questionnaire data	Consistent diagnostic criteria were not utilized; DSM-III criteria were applied retroactively based on other standardized scores
Campbell et al. (1986)	31% of 3 year olds diagnosed with externalizing disorders met criteria for ADD/ADHD after 3 years	19%	Too much emphasis placed on parent and teacher data; Observations and interviews by trained diagnosticians was overlooked	Consistent diagnostic criteria were not utilized; At different points in the study, different percentages of diagnostic continuity were reported for the same point in time
McGee et al. (1991)	2% of population-based sample continued to meet DSM-III criteria for ADHD at each assessment over 12 years; an additional 3% were assessed as difficult-to manage	18%	Preschool hyperactivity is a unique form of the disorder due to confusion with typical development and comorbidity; Raises the question of whether early onset ADHD is qualitatively different than middle childhood onset	Problems with separating out diagnoses due to comorbidity; DSM-III criteria were applied retroactively based on other standardized scores; High attrition in diagnosed group (21 out of original 31 were assessed throughout all phases) may impact findings; SES data included an over-representation of children from the two highest levels of SES

Table 3, continued.

Study	% of Diagnosis Continuity	% of Collective Attrition	Additional Findings	Rival Explanations
Palfrey et al. (1985)	41% of participants met criteria for definite or possible ADHD concerns at some point from B-Kindergarten.	16%	Very few concerns about infant symptoms of ADHD have been raised; Qualitative observations of infant and toddler manifestations may be invaluable	Standardized diagnostic criteria were not utilized; Consistent diagnostic criteria were not utilized
Pierce et al. (1999) (Study 1)	38% of children with externalizing problems in preschool were diagnosed with ADHD after 10 years	20%	There is very little information available on the longitudinal course of behavior problems in preschoolers diagnosed with this disorder and then followed up as many as 10 years after initial assessment	Made use of same sample as Campbell & Ewing (1990) and Campbell et al. (1986); however, consistent reporting did not occur; Diagnostic measures not delineated for all data collection points; DSM-III criteria were applied retroactively based on other standardized scores
Pierce et al. (1999) (Study 2)	19% of children diagnosed with ADHD at age 3 met the criteria for the disorder 6 years later	11%	Early social interventions at home and with peer groups can lower the symptoms of ADHD during follow-up assessments	Consistent diagnostic criteria were not utilized; Made use of same sample as Campbell & Ewing (1990) and Campbell et al. (1986); "Hard-to-manage" and ADHD descriptors used interchangeably, even though symptoms for each were consistent with established diagnoses; Participants did not come from a population-based sample; Sample was all-male
Winsler et al (2000)	67% of children assessed with ADHD-type behaviors at age 3 continued to demonstrate symptoms at age 5	23%	Children seen by preschool teachers as having behavior problems at age 3 are indeed at risk for continuing behavioral difficulties several years later; Young children with behavior problems use private speech for self-regulation; These children also display higher uses of irrelevant speech	Standardized diagnostic criteria were not utilized; Consistent diagnostic criteria were not utilized; High attrition rate led to addition of participants before follow-up assessment; Variation of locations in follow-up data collection occurred

<sup>A</sup>% of diagnostic continuity = percentages are based on the implicit or explicit claims of the authors of the research studies

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Palfrey et al. (1985)	Quasi-experimental, longitudinal design	DSM-III (interview)	DSM-III (interview)	DSM-III (interview)	Established measures not used	Established measures not used	-
Pierce et al. (1999) (Study 1)	Quasi-experimental, longitudinal design	Behar PBQ	nsp	DSM-III (checklist) SNAP	DSM-III (checklist) SNAP	DSM-III-R (interview)	-
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