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Observer-ratings of ADHD symptoms in adults: normative data, factor structure and convergent validity

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OBSERVER-RATINGS OF ADHD SYMPTOMS IN ADULTS: NORMATIVE DATA, FACTOR STRUCTURE AND CONVERGENT VALIDITY

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by

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DEDICATION

For my mother, Kay Doss.

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ABSTRACT

Obtaining collateral reports from significant others has become increasingly recognized as an important component of assessments for ADHD in adults. The Conners Adult ADHD Rating Scales (CAARS) include both self-report (CAARS-S) and observer-report (CAARS-O) forms. In contrast to the CAARS-S, fewer data have been published with respect to the factor structure, norms, and psychometric properties of the CAARS-O. Thus, the primary aim of this study was to examine how well the 4-factor structure obtained for the CAARS-S could be replicated with data collected from observers reporting on individuals whom they know well using the CAARS-O. The secondary aims included describing the existing norms for the CAARS-O, testing for age and gender effects within those normative data, and examining convergent validity by correlating self- and observer-report data collected on the same subjects. Analyses were based on archival data sets collected as part of the development and norming of the CAARS. These included a sample comprised of 724 adult collateral informants describing 328 men and 396 women using the CAARS-O as well as a sample of 188 adults who completed the CAARS-S and who were also rated on the CAARS-O by a significant other. Results of the confirmatory factor analysis indicated that the 4-factor model found for the CAARS was replicated in the CAARS-O data, with excellent fit for both men and women. Analyses of the normative data for the CAARS-O yielded significant age and gender effects. With respect to convergent validity, significant moderate to high correlations were found between the CAARS-O and CAARS-S across all four factors. Implications of these findings for the conceptualization, assessment, and future study of adult ADHD are discussed.

Introduction

For many decades, Attention Deficit Hyperactivity Disorder (ADHD) was considered to be a self-remitting disorder with symptoms disappearing as the child matured past puberty. However, a considerable body of evidence emerging from longitudinal studies now suggests that significant symptoms of ADHD persist into adulthood for a majority of children diagnosed with ADHD (Adler, 2004; Adler & Cohen, 2004; Barkley, Fischer, Smallish, & Fletcher, 2002; Biederman, Mick, & Faraone, 2000; Dulcan, 1997; Mannuzza & Klein, 2000; McGough & Barkley, 2004). Further support for the chronicity of ADHD comes from recent studies suggesting that it is now one of the most common psychiatric disorders in adulthood (Faraone & Biederman, 2005). Results of a recent study employing sound methodology suggest an adult ADHD prevalence rate of about 4.4% or as many as 7 million individuals in the general population (Kessler et al., 2006). Moreover, this figure is likely to underestimate the number of adults who are adversely affected by features of ADHD, as a fairly large percentage of adults who clearly met criteria for ADHD during childhood continue to struggle with impairing symptoms without currently meeting the full diagnostic criteria for the disorder (Faraone, Biederman, & Mick, 2005).

Follow-up studies also indicate that adults with ADHD often have serious consequences as a result of their symptoms (Wilens, Biederman, & Spencer, 2002). Compared to adults without the disorder, an adult with ADHD is at higher risk for antisocial behaviors, substance abuse, academic underachievement, low occupational attainment, unemployment, divorce, and conflicts with the law (Biederman et al., 2006; Faraone & Biederman, 2005; Kessler et al., 2006; Wilens et al., 2002). Adults with

ADHD are also at higher risk for motor-vehicle accidents, sexually transmitted diseases, unwanted pregnancies, and multiple marriages (Barkley, 2006; Barkley, Fischer, Smallish, & Fletcher, 2006). As is the case with youth, ADHD in adults is often associated with comorbid psychiatric conditions. Studies indicate that 75% of adults with ADHD have at least one comorbid condition (Faraone et al., 2000; Searight, Burke, & Rottnek, 2000). The most frequent comorbid psychiatric conditions include substance abuse disorders (50%), anxiety disorders (40%), major depressive disorder (35%), bipolar disorder (15%), and antisocial personality disorder (10%) (Barkley, Murphy, & Kwasnik, 1996; Biederman et al., 1993; Biederman et al., 2006).

Given the increasing recognition of ADHD in adults as a legitimate and impairing disorder,[1] the number of adult clients presenting for ADHD-related assessments has grown substantially (Kooij et al., 2005; McCann & Roy-Byrne, 2004). The increasing demand for adult ADHD assessments has, in turn, created a pressing need for the field to develop effective assessment strategies and tools for this population (Roy-Byrne et al., 1997).

Diagnostic Criteria

Many of the ideas about the optimal assessment strategies for adult ADHD derive from the current state-of-the-art ADHD assessment in children. Despite age-related changes in both the base rates of symptoms and the ways in which they are expressed, the diagnostic criteria used for adults are essentially identical to those used for children (Adler et al., 2005). At present, the dominant diagnostic system for adult ADHD follows the criteria outlined in the current version of the Diagnostic and Statistical Manual of

[1]A thorough review of the growing literature on ADHD in adulthood is beyond the scope of this document. See Appendix A for a table summarizing the scholarly work pertaining to this topic.

Mental Disorders (*DSM-IV-TR*, American Psychiatric Association [APA], 2000). The *DSM-IV-TR* conceptualizes ADHD as comprised of two dimensions, Inattention and Hyperactivity/Impulsivity (Appendix B). According to the *DSM-IV-TR*, three core elements must be present to make a diagnosis of ADHD in an adult: (a) a majority of symptoms ($\geq$ 6 of 9) in either the Inattention, Hyperactive/Impulsive, or both domains must be persistently present; (b) evidence of childhood onset of some impairing inattentive or hyperactive-impulsive symptoms prior to 7 years of age; and (c) the person must experience significant impairment in at least two settings due to symptoms (APA, 2000).

The diagnostic criteria emphasize the need for evidence of significant functional impairment. In addition, significant symptoms must not be the result of another mental disorder, general medical condition, or acute environmental circumstances (i.e., symptoms must be chronic across the lifespan). An adult with a majority of symptoms in the Inattentive domain, but few or no symptoms in the Hyperactive-Impulsive domain, would receive a diagnosis of *ADHD, Inattentive Type*. Conversely, an adult endorsing a majority of symptoms in the Hyperactive/Impulsive domain, but few or no symptoms in the Inattentive domain, would receive a diagnosis of *ADHD, Hyperactive-Impulsive Type*. Adults who report a majority of symptoms across both domains receive diagnoses of *ADHD, Combined Type*. Finally, a diagnosis of *ADHD, In Partial Remission* is used for individuals who currently display ADHD symptoms, but who no longer meet the full criteria for the disorder (APA, 2000).

Unique Challenges of Assessing Adults with ADHD

Currently, diagnosing ADHD in adults presents a unique set of challenges that has not been adequately addressed in the literature. One such challenge relates to the aforementioned requirement that the presence of impairing symptoms of ADHD needs to be established prior to the age of 7 years. For many adults presenting for an ADHD evaluation, this requirement necessitates that the individual be able to recall specific aspects of his or her early childhood functioning. Such retrospective recall of symptoms is problematic, as it has been shown to be highly vulnerable to historical inaccuracy, incompleteness, or distortion (Hardt & Rutter, 2004; Lewandowski et al., 2000; Zucker, Morris, Ingram, Morris, & Bakeman, 2002). Compounding these issues for adults presenting for ADHD assessments is that executive functioning deficits associated with the disorder may contribute to limited self-awareness such that self-report data become even more highly suspect (Barkley et al., 2002; Knouse, Bagwell, Barkley, & Murphy, 2005).

Another complication associated with the diagnosis of ADHD in adults is that the *DSM-IV-TR* criteria have not been adjusted for age and therefore often do not capture the changing symptom presentation in adulthood (Faraone et al., 2000). Longitudinal studies indicate that, despite their general persistence, the expression of the core childhood symptoms of ADHD changes over time (Adler et al., 2005; Biederman et al., 2000). In many cases, the more overt features of behavioral impulsivity (e.g., physical aggression, grabbing things from others) diminish, while verbal and cognitive forms of impulsivity (e.g., interrupting, a hasty response style, poor planning) persist (Faraone et al., 2000; Mackin & Horner, 2005; Wasserstein, 2005).

It is also typically the case that, while overt motoric hyperactivity declines with maturation, many adults with ADHD continue to struggle with feelings of internal restlessness (Michaelson et al., 2003). Unfortunately, the diagnostic requirement that symptoms be present to a degree that is inconsistent with a person's developmental level is often challenging to establish, as there is currently a paucity of normative data to help practitioners understand how the presenting symptoms of adult ADHD may be inconsistent with normal developmental levels (Faraone et al., 2000).

Finally, concerns also exist about the appropriateness of the *DSM-IV-TR* diagnostic criteria in terms of developmental thresholds for adults (Faraone, Spencer, Montano, & Biederman, 2004; Kooij et al., 2005; Wasserstein, 2005). The current *DSM-IV-TR* criteria have been criticized for a lack of developmental sensitivity to an adult population. *DSM-IV-TR* ADHD symptom thresholds are based exclusively on samples of children and may therefore be too stringent for adult populations where the base rates of these symptoms are lower (Barkley et al., 2002). Age-relative thresholds are not provided by the *DSM-IV-TR*. Therefore, the application of a fixed threshold (e.g., $\geq$ 6 of 9 symptoms) developed for use with youth to an adult population may significantly underdiagnose actual cases of adult ADHD (Faraone et al., 2000; Faraone et al., 2005; Mannuzza, Klein, & Moulton, 2003; McGough & Barkley, 2004).

Need for Collateral Reports

The gathering of collateral data in addition to self-report data is encouraged throughout the field of assessment (Achenbach, Krukowski, Dumenci, & Ivanova, 2005). Ideally, information gathered from other informants supplements self-report data by providing overlapping but partially independent and non-redundant information that

otherwise would not have been available to the clinician. The results of some studies have strongly suggested that the gathering of additional reports serves this very purpose. Achenbach et al. (2005) conducted a meta-analysis of 51,000 articles relating to the agreement between adult self- and other-report information across diagnoses. The authors found moderate correlations between these two sources of information, which argue for the necessity of gathering multi-informant data. This may include gathering information from a patient's parents to help establish a childhood history of symptoms as well as obtaining current functioning information from an employer, friend, or partner (Dulcan, 1997; Wasserstein, 2005). Additionally, gathering information from multiple informants helps to offset some of the biases (e.g., social desirability, magnifying or minimizing symptoms) and other limitations (e.g., limited or faulty retrospective recall of historical data) associated with self-report data (Conners, 1998; Wender, 1995).

Thus, both clinical recommendations and empirical data indicate that the assessment of ADHD should include gathering reports from informants other than the subject of the evaluation (Adler, 2004; Barkley et al., 2002; Dulcan, 1997; Mannuzza, Klein, Klein, Bessler, & Shrout, 2002; Searight et al., 2000). Such reports are likely to include information pertaining to the number and severity of current symptoms, a history of symptoms, the level of impairment due to symptoms, and information on possible comorbid disorders.

When assessing youth, practitioners typically have access to the reports of multiple adults (e.g., parents, teachers) in addition to the self-report of symptoms generated by the child or adolescent. However, in an adult assessment, diagnosis often relies solely on an individual's self-report of symptoms, which can pose several

problems. First, sole reliance on adult self-report complicates gathering information pertaining to the diagnostic requirement that adults experienced impairing symptoms of ADHD in early childhood. As discussed above, the accuracy of retrospective self-reports of ADHD symptoms has been questioned, as such self-reports are subject to inaccurate, incomplete, and distorted recall (Barkley, 2006; Mannuzza et al., 2002; Shaffer, 1994).

A second difficulty with self-reported symptoms in adult ADHD is that individuals with ADHD may have difficulty not only with accurately reporting their childhood symptoms but also with reporting their current symptoms due to limited self-awareness of behaviors that have been present since early childhood (Wender, 1995; Zucker et al., 2002). Indeed, evidence from anecdotal reports and empirical studies substantiate these difficulties with self-evaluation within the adult ADHD population (e.g., Denckla, 1991; Hallowell & Ratey, 1994). The underreporting of symptoms, as well as a tendency for ADHD adults to have limited self-awareness, may result in an underestimate of the number and severity of symptoms (Kessler et al., 2006). The underestimation or misrepresentation of symptoms for adults with ADHD may then lead to inaccurate diagnoses and inappropriate or inadequate recommendations for treatment.

Thus, limitations associated with the validity of self-report make this source of information insufficient when assessing adults for ADHD. To address these limitations, many researchers and clinicians enlist the help of a significant other to corroborate and supplement the report of the patient before making a diagnosis of ADHD (Barkley et al., 2002; Mannuzza et al., 2003; Wender, 1995). Though often not followed in clinical practice, the *DSM-IV-TR* recommends obtaining collateral reports when considering a diagnosis of adult ADHD (APA, 2000).

Current Guidelines for the Assessment of Adult ADHD

Current professional guidelines pertaining to the assessment of adult ADHD emerging from both clinicians and researchers are converging in recommending a multimodal approach that closely parallels that recommended for children. These guidelines are consistent in suggesting that clinical interviews, symptom rating scales, lab-based or clinical testing, and a review of records represent the current state of the art for adult ADHD assessment (Dulcan, 1997; Wasserstein, 2005). As one component of multimodal assessment, a detailed structured or semi-structured clinical interview should be used to establish the presence of current ADHD symptoms, obtain a careful history of the onset and course of such symptoms, and gather information on the level of impairment that the symptoms may have caused across domains of functioning (e.g., school, work, social). The clinical interview should also serve to explore the possibility of other diagnoses, either as comorbidities or as alternative explanations for presenting symptoms. To date, a thorough clinical interview remains the bedrock of adult ADHD diagnosis (Adler & Cohen, 2004).

A second component of a multimodal approach may include testing, e.g., the use of computerized tests of attention and vigilance, intelligence and academic achievement tests, and neuropsychological tests. However, studies concerning the use of such tests as diagnostic tools for adult ADHD have yet to demonstrate adequate sensitivity and specificity for diagnostic purposes, although some computerized tests such as the Test of Variables of Attention (TOVA; Greenberg & Kindschi, 1996) and Conners Continuous Performance Test-II (CPT-II; Conners & Multi-Health Systems Staff, 2000) are

frequently used to supplement more qualitative data or to help diagnose co-occurring learning disorders with ADHD (McGough & Barkley, 2004; Wilens et al., 2002).

A third assessment component may be a review of the patient's records for any prior signs of attention/concentration or hyperactivity-impulsivity problems (e.g., reports from school, work, or medical records). A review of records is by no means to be used as the predominant information for diagnoses but should serve as an adjunct to document a chronicity of impairment across the lifespan (Adler, 2004; Adler & Cohen, 2004; Wasserstein, 2005). A final and, according to most existing practice guidelines, critical part of the assessment is the use of rating scales (Conners, 1999; Schoechlin & Engel, 2005). A more detailed discussion of the nature and use of rating scales in assessing adults for ADHD follows.

Use of Rating Scales in the Assessment of ADHD in Adults

The instruments most often used in assessing ADHD in both youth and adults are self- and observer-rating scales. Rating scales permit data to be gathered on symptomatology that may inadvertently be missed during a clinical interview. They also allow assessment of a wider range of symptoms than is often possible in clinical interviews, due to time constraints. In addition, rating scales enable quantification of qualitative aspects of behavior that can then be compared to normative data. Using only the *DSM-IV-TR* ADHD criteria or a clinical interview in evaluation is limited in that neither allow for a comparison to a normative group (APA, 2000).

Because ADHD symptoms are readily recognized in many normally functioning adults (e.g., disorganization, problems with attention and distractibility), it is critical for assessors to have a way to establish deviance (Conners, 1999). Rating scales have

typically been standardized through administration to a large normative group, which makes them a ready tool for establishing deviance via a comparison to persons of a similar age and the same gender. Rating scales also represent a time efficient and inexpensive method for assessing both present and past symptoms in multiple domains as well as the patterning and severity of symptoms (Conners, 1999).

Although a wide variety of child-related rating scales for assessing ADHD exist, rating scales designed specifically for use with adults have only recently been developed. Currently, a limited number of rating scales designed to address ADHD symptoms in adults exist (Appendix C). These scales vary considerably in terms of their standardization samples and psychometric properties as well as the degree to which they have been adopted into clinical practice. One of the adult ADHD rating scales that has well-established psychometric properties and that has been fairly widely adopted for use in both research and clinical settings is the Conners Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1999; McCann & Roy-Byrne, 2004).

CAARS is a set of self-report and observer-report instruments designed to assess a range of symptoms and behaviors related to ADHD in adults (Conners, Erhardt, & Sparrow, 1999), while specifically including the *DSM-IV* (APA, 1994) diagnostic criteria (Wasserstein, 2005). The various self-report forms of the CAARS present symptoms and associated features of adult ADHD and ask the respondent to rate how much or how frequently each item describes him or herself on a 0 (“not at all”) to 3 (“very much”) scale. The normative sample for the self-report version of the CAARS consisted of 1,026 normal adults between the ages of 18 and 80 years (mean age of 38.99 for males and 38.84 for females) from various parts of the U.S. and Canada.

The Self-Report version of the CAARS includes long, short, and screening versions of the basic instrument that are each to be completed by the individual under evaluation. The long form, which consists of all of the available subscales and indices, contains 66 items that address a wide spectrum of ADHD symptoms and associated features. The factor-derived subscales include Inattention/Memory Problems, Hyperactivity/Restlessness, Impulsivity/Emotional Lability, and Problems with Self-Concept. This factor structure has been examined and largely replicated with other clinical populations (Cleland, Magura, Foote, Rosenblum, & Kosanke, 2006). Three CAARS long-form subscales (i.e., Inattentive, Hyperactive-Impulsive, and Total) assess *DSM-IV* criteria (APA, 1994). An empirically derived ADHD Index, consisting of 12 items, is provided as a means of identifying those adults who are likely to be diagnosed with ADHD. Additionally, there is an Inconsistency Index designed to be used as a validity measure by identifying random or careless responding.

The initial psychometric properties of the CAARS Self-Report measure were reported to be sound in a series of studies by Erhardt, Epstein, Conners, Parker, and Sitarenios (1999). Other independent reviews of the CAARS Self-Report measure also indicate that it possesses sound psychometric properties (Plake, Impara, & Spies, 2003). Erhardt et al. (1999) found the CAARS to have high internal reliability with coefficient alphas for the four subscales ranging from .86 to .92 for both males and females. These same authors also reported that the CAARS has strong temporal reliability over an interval of approximately one month, with test-retest correlations ranging from .80 to .91 for the four subscales.

Concurrent validity was examined by comparing contemporaneously collected scores on the CAARS with those of the Wender Utah Rating Scale (WURS; Ward, Wender, & Reimherr, 1993). Moderate but significant correlations were found (ranging from .37 to .67) between the factor scores from the CAARS and the total score on the WURS. In light of the fact that the WURS assesses retrospectively recalled symptoms from childhood, whereas the CAARS measures current symptoms, such moderate correlations were expected. With respect to an initial examination of criterion validity, a sample of adults with well-diagnosed ADHD scored significantly higher on all four CAARS factors than did a matched normal sample (Erhardt et al., 1999). These same authors also reported the results of discriminant function analyses showing that the CAARS has a diagnostic sensitivity of 82%, specificity of 87%, and an overall correct classification rate of 85% (for ADHD vs. normal control subjects).

As discussed above, obtaining information from observers well familiar with the adult presenting for assessment is included as a critical component of current best practice guidelines for assessing adult ADHD (Adler & Cohen, 2004; Mannuzza et al., 2002; McGough & Barkley, 2004; Searight et al., 2000). One of the unique features of the CAARS that distinguishes it from other available rating scales is that it offers a parallel “observer” version to be completed by a significant other. The CAARS Observer-Report form was developed to elicit additional patient information from a collateral point of view to facilitate the type of multi-informant assessment that is critical for obtaining an accurate and comprehensive clinical picture. Given the importance of incorporating collateral reports, as well as the encouraging psychometric properties of the

self-report CAARS measure, it is important that the norms, factor structure, and validity of the CAARS Observer-Report version be explored as well (Cleland et al., 2006).

Aims of the Present Study

This archival study had one primary aim and two secondary aims. The primary aim was to examine the factor structure of the Observer-Report data as compared to the 4-factor structure found for the Self-Report version. The secondary aims involved summarizing two groups of findings that have yet to be published in any peer-reviewed articles. The first of these aims was to describe the existing norms for the CAARS Observer-Report form. The second was to examine convergent validity by determining the correlation between self- and other-report data collected on the same subjects.

Method

This study used archival data collected on both the Conners Adult ADHD Rating Scales Self-Report (CAARS-S) and the Conners Adult ADHD Rating Scales-Observer-Report (CAARS-O). Analyses pertaining to the primary aims of the study (presented above) were conducted on data collected as part of the development and norming of the CAARS measures by their publisher, Multi-Health Systems, in collaboration with the authors of the measure.

Procedures and Participants

To achieve its aims, the study drew upon three data sets collected as part of the development and norming of the CAARS measures. Permission to access the archival data was obtained from both the publisher and from one of the authors of the measure (Appendix D). The CAARS-S and CAARS-O were both normed on nonclinical, community-based adult samples from several locations in the United States and Canada.

Each data collection site had an administrator who organized the administration of the CAARS scales for multiple adults. Informed consent was obtained from the participants. The CAARS scales were administered to the participants in a quiet, distraction-free environment. Most participants completed the CAARS-S pertaining to themselves. However, in some cases, data were collected from matched pairs of subjects, with one individual completing the self-report form of the CAARS (CAARS-S), while the other member of the pair, typically a spouse or romantic partner who was highly familiar with the participant, completed the observer version of the scale (CAARS-O). The information available on the normative samples for both the CAARS-S and the CAARS-O is limited to only the most basic demographic data (e.g., gender, age). The normative sample for the CAARS Self-Report Form (CAARS-S) included 1,026 adults (466 men, 560 women) ranging in age from 18 to 80 years. The mean age for men was 38.99 (SD = 12.54) and the mean age for women was 38.84 (SD = 12.32) years (Table 1).

Table 1

Normative Sample for the CAARS Self-Report Form

Age Group	Men	Women	Total
18- to 29-year-old	117	144	261
30- to 39-year-old	142	154	296
40- to 49-year-old	117	162	279
50 years or older	90	100	190
Total	466	560	1,026

Note. From Conners' Adult ADHD Rating Scales (CAARS), by D. Conners, D. Erhardt, and E. Sparrow, 1999. Tonawanda, NY: Multi-Health Systems, Inc., Copyright 1999.

The CAARS Observer-Report Form (CAARS-O) normative sample used in the current study included 724 adults, with 328 men and 396 women ranging in age from 18 to 81 years. The mean age for men was 39.42 years (SD 12.63) and the mean age for women was 40.55 years (SD = 12.01) (Table 2).

Table 2

Age and Gender of the Normative Sample for the CAARS Observer-Report Form

Age Group	Men	Women	Total
18- to 29-year old	79	74	153
30- to 39-year old	93	105	198
40- to 49-year old	86	133	219
50 years or older	70	84	154
Total	323	386	709*

Note. *Ages were not provided for 5 males and 10 females from the total sample of 724.

The examination of convergent validity was based on a dataset in which CAARS-S and CAARS-O forms were completed on the same participants. These data emerged from a sample of 188 adults (including 98 males and 90 females) who completed the CAARS-S, who were also rated on the CAARS-O by a spouse or significant other (typically a boyfriend or girlfriend). This sample completed a preliminary version of the CAARS forms that did not include the items on the *DSM-IV* ADHD Symptom scales.

Measures

The two measures used in this archival study were the CAARS-S and the CAARS-O (Appendix E). The development and content of the CAARS-S were described above. The CAARS-O retains the same set and ordering of items developed for the

CAARS-S and uses the same 4-point Likert scales for responses. However, the instructions are modified to direct the respondent to rate another specific person rather than him or herself. Additionally, the wording of items was modified slightly to allow the respondent to rate another individual.

Data Analysis

In addition to describing the norms for the CAARS Observer form, the present study sought to evaluate the psychometric properties of this measure. Of particular interest was using confirmatory factor analyses to examine the replicability of the 4-factor model (found previously for the CAARS-S) for the CAARS observer items. Twelve items were specified to load on each of the inattention/memory problems, hyperactivity/restlessness, and impulsivity/emotional lability factors; an additional six items were specified for the problems with self-concept factor. The model permitted all four factors to correlate, items were assigned a zero loading across each of the alternative three factors, and the error terms for each item were assumed to be uncorrelated. Separate analyses were conducted for men and women.

The following indicators were used for the factor analytic analysis: goodness of fit index (GFI; Bentler, 1983; Tanaka & Huba, 1989), adjusted goodness of fit index (AGFI; Tanaka & Huba, 1989), normed fit index (NFI; Bentler & Bonett, 1980), and comparative fit index (CFI; Bentler, 1988). All analyses were conducted using Statistical 6.0 (StatSoft, 2002). Based on the recommendations of Anderson and Gerbing (1984), Bentler (1992), Cole (1987), and Marsh, Balla, and McDonald (1988), the following criteria were used to indicate the goodness-of-fit of the model to the data: NFI > .90; CFI > .90; GFI > 0.85; and AGFI > 0.80.

With respect to the aim of describing the CAARS-O normative data, means and standard deviations were computed for the various CAARS-Observer subscales (separately by gender and age group). Additionally, to examine possible gender and age-related differences within the normative sample, a series of gender by age group (e.g., 18 to 29 years vs. 30 to 39 years vs. 40 to 49 years vs. 50 years and older) analyses of variance were conducted with each of the CAARS-O scales as the dependent variable. Analyses pertaining to the examination of the convergent validity of the CAARS-O measure comprised computing correlations between the self-report and observer ratings (separately by gender) for each of the four CAARS subscales.

Results

Factor Structure

The primary aim of this study involved examining the replicability of the 4-factor model obtained for the CAARS Self-Report form in the CAARS Obsever-Report form. The 4-factor model for the CAARS observer items was tested using confirmatory factor analysis and found to have an excellent fit to the data for men (GFI = .980, AGFI = .977, NFI = .976, and CFI = 996) and women (GFI = .972, AGFI = .968, NFI = .965, and CFI = 987). Table 3 presents the parameter estimates for the items from the CFI. The parameter estimates for all items were moderate to high with no exceptions.

Table 3

Parameter Estimates for the CAARS Observer Items by Gender

Item	Male	Female
Inattention/Memory Problems Factor		
3. Doesn't plan ahead	.61*	.66*
7. Doesn't finish things	.72*	.69*
11. Disorganized	.69*	.69*
16. Hard time keeping track	.85*	.74*
18. Forgets to remember things	.68*	.70*
32. Loses things	.67*	.62*
36. Changes plans/jobs in midstream	.77*	.63*
40. Can't get things done unless deadline	.75*	.61*
44. Trouble getting started on task	.69*	.62*
49. Absent-minded in daily activities	.70*	.69*
51. Depends on others to keep life in order	.70*	.63*
66. Misjudges how long it takes to do something	.64*	.68*
Hyperactivity/Restlessness Factor		
1. Likes to be doing active things	.39*	.46*
5. Risk-taker	.53*	.34*
13. Hard time staying in one place	.79*	.81*
17. Always moving	.76*	.77*
20. Bored easily	.82*	.73*
25. Seeks out fast paced activities	.60*	.53*
27. Restless even when sitting still	.78*	.82*
31. Dislikes quiet activities	.67*	.62*
46. Takes great effort to sit still	.84*	.81*
54. Squirms or fidgets	.70*	.68*
57. Can't sit still very long	.76*	.75*
59. Likes to be up and on the go	.55*	.60*

(table continues)

Item	Male	Female
Impulsivity/Emotional Lability Factor		
4. Blurts out things	.69*	.66*
8. Easily frustrated	.83*	.75*
12. Says things without thinking	.71*	.72*
19. Short fuse	.68*	.56*
23. Tantrums	.73*	.70*
30. Many things set off	.81*	.76*
35. Interrupts others	.65*	.57*
39. Make comments regretted later	.73*	.69*
43. Steps on people's toes	.72*	.63*
47. Moods unpredictable	.77*	.77*
52. Annoys other people	.68*	.69*
61. Irritable	.80*	.70*
Problem with Self-Concept Factor		
6. Gets down on self	.84*	.85*
15. Not sure of self	.81*	.76*
26. Avoids new challenges	.71*	.67*
37. Appears unsure of self	.77*	.77*
56. Expresses lack of confidence	.73*	.79*
63. Lack of confidence	.87*	.78*

Note. * $p < .05$.

Table 4 presents the parameter estimates between factors from the CFI of the 4-factor model for the CAARS observer form. Parameter estimates between factors were also moderate to high for both men and women.

Table 4

Parameter Estimates for the 4-Factor Model of the CAARS Observer Form

	1	2	3	4
1. Inattention/Memory Problems	--	.57*	.59*	.59*
2. Hyperactivity/Restlessness	.51*	--	.53*	.36*
3. Impulsivity/Emotional Lability	.62*	.68*	--	.53*
4. Problem with Self-Concept	.63*	.46*	.58*	--

Note. Males below the diagonal and females above; * $p < .01$.

Normative Data

A secondary aim of this study was to describe and examine the CAARS Observer normative data. Means and standard deviations for the various CAARS Observer subscales (separately by gender and age group) are presented in Table 5, representing normative data for the CAARS-O.

Table 5

Means and Standard Deviations for the CAARS-O and CAARS

	CAARS-O				CAARS-S			
	Men		Women		Men		Women	
Subscale	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
18- to 29-year old								
Inattention/Memory Problems	13.01	6.96	9.93	7.45	13.64	6.88	10.05	6.28
Hyperactivity/Restlessness	13.71	6.84	11.54	6.99	16.69	7.32	13.12	7.36
Impulsivity/Emotional Lability	11.88	7.86	10.84	7.34	13.24	6.80	10.20	5.41
Problem with Self-Concept	5.34	4.32	5.63	4.10	6.62	4.24	7.26	4.27
30- to 39-year old								
Inattention/Memory Problems	11.18	7.82	8.49	6.54	11.36	6.24	9.70	6.48
Hyperactivity/Restlessness	12.17	7.31	10.45	7.72	14.25	7.39	13.30	7.48
Impulsivity/Emotional Lability	10.27	7.80	9.69	7.28	11.41	7.12	11.08	5.64
Problem with Self-Concept	5.13	4.41	5.97	4.62	5.64	4.39	6.86	4.03
40- to 49-year old								
Inattention/Memory Problems	11.79	8.45	7.68	6.22	11.28	6.44	9.33	6.02
Hyperactivity/Restlessness	9.67	7.72	8.92	6.65	12.21	6.87	10.85	6.53
Impulsivity/Emotional Lability	10.36	7.89	8.16	6.51	10.44	5.42	9.84	5.45
Problem with Self-Concept	5.10	4.16	4.64	3.98	5.85	3.95	6.62	4.43
50+ years old								
Inattention/Memory Problems	9.20	7.22	7.96	6.57	9.45	6.56	9.42	6.61
Hyperactivity/Restlessness	8.20	6.11	9.44	7.30	11.01	7.26	11.08	7.27
Impulsivity/Emotional Lability	8.90	7.42	8.98	6.62	9.39	6.46	9.87	5.54
Problem with Self-Concept	4.27	4.26	5.20	4.40	4.46	3.34	6.04	4.19
Total Sample								
Inattention/Memory Problems	11.49	7.68	8.51	6.74				
Hyperactivity/Restlessness	11.09	7.27	10.07	7.19				
Impulsivity/Emotional Lability	10.52	7.81	9.39	7.00				
Problem with Self-Concept	5.02	4.30	5.33	4.28				

Note. The normative sample of the CAARS-S consisted of 1026 adults describing 466 men and 560 women ranging in age from 18 to 80 years. The mean age for men described was 38.99 (SD = 12.54) and the mean age for women described was 38.84 (SD = 12.32) years. The normative sample for the CAARS-O consisted of 724 adults describing 328 men and 396 women ranging in age from 18 to 81 years. The mean age for men described was 39.42 (SD = 12.63) years and the mean age for women described was 40.55 (SD = 12.01) years.

Findings from the previously described gender by age group analyses of variance revealed a significant main effect for gender on the Inattention factor ($F(1,941) = 30.79$, $p < .0001$), with males scoring higher than females. The main effect for gender on the Impulsivity/Emotional Lability factor was marginally significant ($F(1,941) = 3.83$, $p = .0507$), with males scoring higher than females. No gender effects were found for the Hyperactivity/Restlessness factor ($F(1941) = 2.92$, $p = .088$) or for the Problems with Self-Concept factor ($F(1,941) = 0.08$, $p = .7815$).

There was a significant main effect for age on the Inattention factor ($F(3,939) = 7.57$, $p < .0001$), Hyperactivity/Restlessness factor ($F(3,939) = 8.8$, $p < .0001$), Impulsivity factor ($F(3,939) = 9.52$, $p < .0001$), and the Problems with Self-Concept factor ($F(3,939) = 9.54$, $p < .0001$). Multiple comparisons using the Scheffe's test were conducted to determine which age groups were significantly different from one another for each of the four CAARS-O factors.

For the Inattention factor, the youngest age group (18- to 29-year-olds) scored higher than all other age groups (18 to 29 vs. 30 to 39, $p = .0496$; 19 to 29 vs. 40 to 49, $p = .0043$; 18 to 29 vs. 50 and above, $p = .0003$). For the Hyperactivity/ Restlessness factor, the two younger groups (18 to 29 and 30 to 39) scored higher than did the two older age groups (40 to 49 and 50 and above; 18 to 29 vs. 40 to 49, $p = 0.001$; 18 to 29 vs. 50 and above, $p = .0006$; 30 to 39 vs. 40 to 49, $p = .0457$; 30 to 39 vs. 50 and above, $p = .0289$).

For the Impulsivity/Emotional Lability factor, the youngest age group of 18- to 29-year-olds scored much higher than did all other age groups (18 to 29 vs. 30 to 39, $p = .0119$; 18 to 29 vs. 40 to 49, $p = .0001$; 18 to 29 vs. 50 and above, $p = .0002$). Finally, for the Self-Concept factor, the younger groups again tended to score higher (18 to 29 vs. 40

to 49, $p = .0009$; 18 to 29 vs. 50 and above, $p = .001$; 30 to 39 vs. 50 and above, $p = .019$). These multiple comparisons suggest that there tends to be a negative linear relation between age and rating scores across all four factors. The interaction of gender and age group was not significant for any of the four CAARS-O factors.

Convergent Validity

Convergent validity was examined by computing correlations between self- and other-report data collected on the same subjects. Table 6 presents the correlations between the self-report- and observer-ratings by gender for the CAARS scales. Overall, moderate to high correlations were found between self-report- and observer-report for the same scale (e.g., Inattention/Memory self-report ratings correlated with Inattention/ Memory observer ratings). For men, the four correlations ranged from .55 to .63, and for women from .42 to .59.

Table 6

Correlations Between the CAARS Self-Report and Observer-Report Scales

Observer-Report	Self-Report							
	1		2		3		4	
	F	M	F	M	F	M	F	M
1. Inattention/memory problems	.56*	.63*	.28*	.23*	.25*	.31*	.39*	.46*
2. Hyperactivity/Restlessness	.32*	.34*	.59*	.62*	.33*	.46*	.20*	.37*
3. Impulsivity/Emotional Lability	.33*	.40*	.38*	.41*	.42*	.59*	.33*	.45*
4. Problems with self concept	.37*	.41*	.22*	.20*	.22*	.35*	.58*	.55*

Note. * $p < .05$.

Discussion

Summary of Findings

In a previous study examining the CAARS-Self Report measure for adults (CAARS-S; Conners et al., 1999), exploratory factor analysis of both normal population adults and those referred for assessment of ADHD revealed that the symptoms of ADHD tapped by the measure resolve into the following four dimensions: (a) *Inattention/ Memory Problems*, a cognitive dimension including inattention, memory and executive functioning problems; (b) *Hyperactivity/Restlessness*, a hyperactivity factor comprising both physical and mental forms of restlessness; (c) *Impulsivity/Emotional Lability*, a factor reflecting verbal impulsivity, low frustration tolerance, and moodiness; and (d) *Problems with Self-Concept*, a factor that includes features relating to poor self-esteem, self-criticism and the failure to address challenges. The current study used a confirmatory factor analysis to examine how well these factors replicate with data collected from observers reporting on individuals whom they know well using the CAARS Observer-Report form (CAARS-O). Results of this analysis indicated that the 4-factor model described above for the CAARS-S did indeed replicate in the CAARS-O data, with excellent fit for both men and women.

In addition to providing descriptive information on of the normative data for the CAARS-O, the gender by age group analyses of variance conducted as part of the current study yielded several significant findings. In general, a negative linear relationship was found between symptom endorsement and age, such that as the age of the person being rated increased, symptoms as reported by that person's significant other on the CAARS-O decreased. More specifically, the youngest group of subjects (ages 18 to 29) was rated

as more symptomatic than all older groups (ages 30 to 39, 40 to 49, 50+) on the Inattention/Memory Problems factor, the Impulsivity/Emotional Lability factor, and the Problems with Self-Concept factor. In addition, the two younger age groups (ages 18 to 29 and 30 to 39) were rated as being significantly more symptomatic than were the two older groups of subjects (ages 40 to 49 and 50+) on the Hyperactivity/Restlessness factor. With regard to gender differences, observers rated males as more symptomatic than females on the Inattention/Memory Problems factor. Although no gender differences were found on the other three factors, there was a marginally significant effect for gender on the Impulsivity/Emotional Lability factor, with males being rated as more symptomatic than females. With respect to the examination of convergent validity, significant moderate to high correlations were found between the Self-Report and Observer-Report versions of the CAARS across all four factors.

Commentary on Findings

To the author's knowledge, the current study represents the first factor analysis of an adult ADHD scale designed to be completed by a significant other. As noted above, the results for the observer-report version of the CAARS replicate for both men and women the 4-factor model found for the self-report version of this scale (Conners et al., 1999). This replication supports the hypothesis that these factors reliably capture core dimensions of ADHD psychopathology in adults.

The first factor identified on the CAARS-O, Inattention/Memory Problems, includes a number of items that typically represent inattention, memory and higher order, or executive functioning skills (e.g., planning, organization, working memory). There are also items relating to motivation (e.g. .difficulty getting started on tasks, needing

deadlines to complete tasks). In addition to these various cognitive limitations, per se, the Inattention/Memory Problems factor also includes items that reflect some typical consequences for adults suffering from these deficits (e.g., relying on others to compensate, changing jobs).

The second factor, Hyperactivity/Restlessness, encompasses both cognitive and behavioral items. Items address both gross motor hyperactivity (e.g., always moving, trouble staying seated) and the subjective feeling of restlessness (e.g., great effort required to sit still, internal restlessness) often associated with adult ADHD. Interestingly, items reflecting risk-taking, gravitating toward fast-paced activities, and other features that appear to relate to the personality trait of "novelty seeking" (Cloninger, 1986) also load on the Hyperactivity/Restlessness factor.

The third factor, Impulsivity/Emotional Lability, represents difficulties with mood regulation, verbal impulsivity, and frustration tolerance. The fourth factor, Problems with Self-Concept, contains items that center on a lack of confidence in one's abilities and self-criticism. This factor appears to capture an adverse outcome of life experiences that many adults with ADHD face in trying to cope with their symptoms.

The *DSM-IV* (APA, 1994), based conceptualization of ADHD and numerous factor analytic studies of ADHD in youth, suggests that ADHD in childhood is best conceptualized as comprising two dimensions: Inattention and Hyperactivity/Impulsivity (Burns, Boe, Walsh, Sommers-Flanagan, & Teegarden, 2001; Collett, Crowley, Gimpel, & Greenson, 2000; DuPaul, Anastopoulos et al., 1998; Lahey et al., 1994). That is, although the two factors may appear conceptually distinctive, factor analytic findings overwhelmingly suggest that symptoms of hyperactivity and impulsivity do not comprise

separate factors but tend to load on a common dimension reflecting disinhibited or impulsive behaviors (Achenbach & Edelbrock, 1983; Conners, 2008; DuPaul, 1991; DuPaul, Anastopoulos et al., 1998; Lahey et al., 1994; Milich & Kramer, 1984). However, there is emerging evidence that this two-dimensional conceptualization of ADHD in youth may not be as applicable to adults with the disorder. For example, findings from two confirmatory factor analytic studies conducted with young adults (ages 17 to 55) by Span, Earleywine, and Strybel (2002) suggest that a three-factor conceptualization of ADHD comprised of separate dimensions of inattention, hyperactivity, and impulsivity provides a better fit for adult ADHD symptoms than does either a single- or two-factor model.

The results of the current study, along with those based on the Self-Report version of the CAARS (Conners et al., 1999), are consistent with Span et al.'s (2002) findings suggesting that hyperactivity and impulsivity may be best regarded as distinct factors in adult ADHD. This significant difference in how ADHD appears to be best conceptualized in adults as compared to children may be the result of developmental changes in the expression of the disorder in that its symptomatology evolves over time with maturation into adulthood. As manifestations of hyperactivity, restlessness, and impulsivity change with age, they may become more differentiated.

It is also noteworthy from a developmental perspective that a fourth factor, Reflecting Problems with Self-Concept, emerged in both the initial factor analysis of the CAARS Self-Report data (Conners et al., 1999) and the confirmatory factor analysis conducted on the CAARS Observer-Report data in the current study. This finding may reflect the emergence of impaired self-image and low confidence as a common

component of the disorder in adulthood, most likely reflecting a long history of having suffered adverse consequences and negative personal feedback related to other ADHD symptoms.

Age Effects

Although it is now well established that significant symptoms of ADHD persist into adulthood (Barkley, Fischer, Edelbrock, & Smallish, 1990; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1998; Rasmussen & Gillberg, 2000; Weiss & Hechtman, 1993), it has become equally clear that those symptoms do not remain stable over time. Findings from the current study underscore the developmental instability of symptoms of ADHD and, more specifically, suggest a general decline in symptoms across the adult age span. In this sense, our findings are consistent with studies suggesting a substantial age-related decline in ADHD symptoms among both normal populations (DuPaul, Power, Anastopoulos, & Reid, 1998) and those with ADHD (Hart, Lahey, Loeber, Appelgate, & Frick, 1995; Mannuzza et al., 1998).

In reflecting on the results of a number of studies following up samples of children diagnosed with ADHD into young adulthood (Barkley et al., 2002; Mannuzza & Gittelman, 1986; Mannuzza et al., 2003), Barkley (2006) raises the possibility that the apparent age-related decline of ADHD symptoms may, in part, be a methodological artifact. Specifically, as the sample moves from adolescence into young adulthood, data collection methods typically transition from other-report (e.g., parents) to self-report, meaning that, if young adults have a tendency to underreport the number or severity of symptoms they suffer relative to what would be reported by their parents, this would lead to spurious results suggesting that symptom levels had declined with age. Although the

current findings and those from Conners et al. (1999) are cross-sectional rather than longitudinal in nature, they nonetheless fail to support this hypothesis, as they suggest, at least among general population samples, that a decline in ADHD symptoms does occur across the adult age span, whether the data are based on self-reports or those from significant others. Although the source of data is undoubtedly relevant (and perhaps even more so for teens and young adults), the current findings suggest that a genuine decline in ADHD symptoms does appear to occur with age among the general population.

It is also worth noting that the actual follow-up studies of children diagnosed with ADHD have, to date, only tracked samples into their mid-twenties (Barkley et al., 2002; Mannuzza et al., 1998; Rasmussen & Gillberg, 2000; Weiss, Hechtman, Milroy, & Perlman, 1985). Thus, as these studies continue and data are collected from these samples as they progress through adulthood, it will be interesting to determine whether the general diminution of symptoms suggested by the cross-sectional ratings data in the current study are replicated.

Gender Effects

Most studies examining gender differences in ADHD among children find that the expression of the disorder is largely similar for males and females but that the severity of core symptoms may be generally lower for girls (Collett et al., 2000; Gaub & Carlson, 1997; Gershon, 2002). Although longitudinal studies have established the common persistence of childhood ADHD symptoms into adulthood (Adler, 2004; Adler & Cohen, 2004; Barkley et al., 2002; Biederman et al., 2000; Dulcan, 1997; Mannuzza & Klein, 2000; McGough & Barkley, 2004), no studies of adult ADHD have explicitly examined gender differences with respect to phenomenology, symptom severity, or associated

impairment. Findings from the current study suggest that, at least among a general population sample, males and females do not differ with respect to the factors that best account for common ADHD symptoms or in terms of the severity of their symptoms related to Hyperactivity/Restlessness, Impulsivity/Emotional Lability, or Problems with Self-Concept. It is notable that observers of males were found to report significantly more symptoms in the Inattention/Memory Problems domain than were observers of females. It will be interesting to see whether future studies replicate this finding in clinical samples of adults with ADHD, thereby suggesting the persistence of childhood gender differences in the severity of symptoms in this particular domain.

Convergent Validity

Assessing the agreement between different informants (multi-method) reporting on the same behavioral symptoms (mono-trait) is an essential element to establishing a measure's convergent validity (Campbell & Fiske, 1959). The present study represents the first examination within a general population sample of the convergent validity of the observer-report version of the CAARS (CAARS-O) by examining its correlation with the self-report version of the measure (CAARS-S).[2] These correlations, averaged across all four of the CAARS factors, were .57 (.54 for women; .60 for men). These findings suggest a higher level of cross-informant agreement than that typically found in studies involving children and adolescents for which agreement is generally low, with correlations on the order of .27 to .34 (Achenbach, McConaughy, & Howell, 1987;

[2]A study conducted by Kooij et al. (2008) also obtained convergent validity data on the obesrver report version of the CAARS (CAARS-O) by comparing self-report ratings to collateral ratings provided by partners and parents. However, whereas the current study employed a general population sample, the participants in the Kooij et al. (2008) study were adults diagnosed with ADHD and their significant others.

Vaughn, Riccio, Hynd, & Hall, 1997; Wolraich et al., 2004). The present cross-informant correlations are also somewhat higher than those typically found in studies of adults with internalizing (*M* r = .428) and externalizing problems (*M* r = .438) (Achenbach et al., 2005). It is possible that the higher cross-informant correlations among adults, in contrast to those of children and adolescents, reflect age-related declines in the underreporting of symptoms.

It is also notable that the current findings largely replicate encouraging results from the small number of existing studies that have examined the concordance of self- and informant-ratings of ADHD symptoms in adults (Belendiuk, Clarke, Chronis, & Raggi, 2007; Kooij et al., 2008; Murphy & Schachar, 2000; Zucker et al., 2002). Although only one of these studies (viz., Kooij et al., 2008) examined cross-informant concordance utilizing the CAARS-S and CAARS-O, all found significant, moderately high correlations similar to those found in the present study. These moderately sized correlations are reflective of a level of cross-informant consistency sufficiently adequate to support the convergent validity of the CAARS-O but are not so high as to render the self- and other-report versions of the CAARS measure as largely redundant. In other words, both individuals reporting on themselves and significant others sharing their impressions appear to recognize and to be willing to report the presence of ADHD symptoms.

However, they are providing somewhat different pictures of these symptoms such that the additional information provided by the collateral informant may well have incremental clinical utility in informing the diagnostic process. Thus, the current results

provide additional support for the need to systematically obtain information from a collateral informant as a routine part of adult ADHD evaluations.

Limitations

Archival research is associated with a number of methodological limitations (Shaughnessy & Zechmiester, 1994). Among these are the investigator's lack of control over the selection of measures, procedures for data collection, sample size, and sample characteristics. Prominent among these in the current study are limitations associated with the sample. Demographic information regarding the participants in the current study is limited to gender and age. Thus, information on other important characteristics of the sample, most notably ethnicity and socioeconomic status, is unavailable. Although the normative sample for the CAARS-O was obtained from sites throughout North America, the very limited demographic information makes it impossible to judge how representative these participants are of the general population adults to whom the results are intended to generalize. This limitation also precluded analyses to examine whether the factor structure or the effects related to age and gender might have differed across ethnic or socio-economic groups.

Descriptive information on the sample used to assess the convergent validity of the CAARS-O is similarly limited. Further, because this convergent validity sample comprised adults from the general population, it is unknown to what extent the encouraging findings would generalize to the clinical population of adults presenting for evaluations of ADHD.

Future Directions

A number of directions for future study can be identified on the basis of the current findings. The psychometric properties of the Observer-Report version of the CAARS should be further examined. Such study should include evaluation of the temporal stability of the CAARS-O scores over various lengths of time. Given that the ADHD-features assessed by this measure are presumed to be relatively trait-like, one would expect that the test-retest reliability would be quite high. Additionally, further evaluation of convergent validity, other psychometric properties, and the diagnostic sensitivity and specificity of the CAARS-O should be explored using clinical samples of carefully diagnosed adults with ADHD. Given that the results of factor analytic studies are often unstable, it will be important to replicate the factor analysis conducted as part of the present study both with more clearly defined general population samples and with a variety of clinical samples (Cherry, 2000).

Although research into ADHD in adulthood has increased rapidly over the past decade, we still know relatively little about the nature of ADHD symptoms among individuals across the adult age range. Given the indication in the current study that the symptoms of ADHD vary across the adults age range (at least in a community sample assessed cross-sectionally), it will be important to establish norms for ADHD-like symptoms among non-disordered adults of differing ages. Such norms will improve the ability of both clinicians and researchers to determine when reported levels of ADHD symptoms among adults should be regarded as developmentally deviant.

In addition, further examination of gender differences in the presentation of adult ADHD should be a priority area for future study. Considerable data exist concerning

gender differences in symptom expression among children and adolescents with ADHD. Because very little information exists regarding such gender differences in adults with ADHD, it will again be important for clinicians and researchers to have normative information regarding the presence and severity of ADHD symptoms by gender to more accurately assess the disorder in adults.

As a clearer picture of the nature and patterning of the symptomatology of adult ADHD emerges, it will be important to assess the degree to which our current conceptualizations of ADHD, based largely on the study of youth with the disorder, can be extended to their adult counterparts. For instance, evidence suggests that impulsivity is the factor that best distinguishes childhood ADHD from other clinical conditions and from non-disordered states (Barkley, 2006). However, it is unknown whether this finding applies to adults. It is possible that future study of the expression of ADHD in adults will uncover somewhat unique symptoms that are not currently reflected in the childhood-derived criteria for the disorder. Therefore, such study will be critical to determining whether distinct diagnostic criteria should be developed and applied to adults.

Finally, with respect to clinical practice, the results of the current study support the emerging consensus that corroboration is needed to substantiate client self-report of ADHD symptoms (Achenbach et al., 2005). Thus, clinicians assessing adults for ADHD should routinely supplement self-report measures with collateral information from one or more individuals familiar with the client's functioning.

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APPENDIX A

Literature Review

Section A. Empirical Literature

Author	Title / Year	Sample	Measures	Key Findings
Achenbach, T. M., Krukowski, R. A., Dumenci, L., & Ivanova, M. Y.	Assessment of adult psychopathology: Meta-analysis and implications of cross-informant correlations. (2005).	51 articles published over 10 yrs. in 52 peer-reviewed journals re: correlations between self-report and informant reports => 8800 candidate articles	Meta-analysis of cross informant correlations based on studies involving various measures.	-Self-report may often provide a different picture of adult functioning than reports by other informants. -Unfortunately, relatively little attention has been paid to findings that diagnoses based solely on self-reports agree poorly with multiple sources of information. -Thorough clinical interview aided by the use of rating scales for current symptoms and collateral information about childhood from parents or siblings forms the basis of the assessment.
Adler, L. A., Spencer, T., Faraone, S. V., Reimherr, F. W., Kelsey, D., Michelson, D., et al.	Training raters to assess adult ADHD: Reliability of ratings. (2005).	91 raters (investigation of agreement and reliability of rater standardization)	ADHD Rating Scale-Investigator administered (ADHDRS-IVs-Inv), Conners Adult ADHD Diagnostic Interview for DSM-IV-TR (Conners Diagnostic Interview), Conners Adult ADHD Rating Scale-Observer: Screening Version (CAARS-O:SV)	-Clinical interview is the bedrock of adult ADHD diagnosis however; rating scales can be useful in the diagnostic process. -CAARS can be used to assess current symptoms using self-report and observer rated forms -Collateral information obtained from a parent or older sibling is extremely useful in the diagnostic process. -CAARS: Observer Scale Screening Version can be used to indicate presence, severity, and impairment of ADHD symptoms in childhood and adulthood.

Author	Title / Year	Sample	Measures	Key Findings
Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K.	The persistence of attention-deficit/ hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. (2002).	n = 147 hyperactive n = 71 community control subjects ages 19-25 91% males, 9% females 94% Caucasian, 5% African American, 1% Hispanic	Structured Interviews using DSM-III and DSM-IV symptom lists; Conners' Parent Rating Scale-R; Home Situations Questionnaires; Werry-Weiss-Peters Activity Rating Scale	-Findings suggest that caution should be used in relying solely on adult recollections of childhood ADHD in forming a clinical diagnosis of adult ADHD. -Self-report childhood recollections tend to underestimate the severity of the disorder as compared to Parent report information. -The use of additional sources of information and corroboration of self-reports by others is recommended.
Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K.	Young adult outcome of hyperactive children: Adaptive functioning in major life activities. (2006).	n = 149 hyperactive n = 72 community controls ages 19-25 91% male and 9% female 94% white, 5% African American, 1% Hispanic	Employer Ratings of Job Performance; High School Transcripts; Criminal Records; Young Adult Self-Report Form, Child Behavior Checklist (YASR)	-Findings corroborate prior research of adverse outcomes in adaptive functioning in major life activities (e.g., education, social, financial and sexual functioning).
Barkley, R. A., Murphy, K., & Kwasnik, D.	Psychological adjustment and adaptive impairments in young adults with ADHD. (1996).	n = 25 young adults with ADHD n = 23 community controls ages 17-30	Structured Psychiatric Interviews (SCID); Self-report ratings of psychological distress; Symptom Checklist 90 Revised (SCL-90R); Conner's CPT; FAS; Aphasia Screening Test; WAIS-R Digit Span Subtest; Simon Game (developed by the authors for this study).	-Psychiatric and psychological ADHD difficulties found in young adults are qualitatively similar to those seen in children with the disorder.
Biederman, J., Faraone, S. V., Spencer, T., & Wilens,	Patterns of psychiatric comorbidity, cognition, and	n = 84 adults with childhood diagnoses of ADHD compared	Structured Psychiatric Interviews (SCID); KSADS-E	-Referred and non-referred adults with ADHD were similar to one another but

Author	Title / Year	Sample	Measures	Key Findings
T. E., Norman, D., Lapey, K. A., et al.	psychological functioning in adults with attention deficit hyperactivity disorder. (1993).	to n = 140 pre-existing study group of referred children with ADHD and their n = 43 non-referred adult relatives with ADHD n = 248 of the adult relatives of normal comparison children without ADHD	supplemental modules from the Schedule for Affective Disorders and Schizophrenia in School-Age Children-Epidemiological Version); WRAT-R; Gillmore Oral Reading Test; WAIS-R Digit Span, Block Design, Vocabulary, Arithmetic, and Digit Symbol subtests; Reynolds; Global Assessment of Functioning Scale; Hollingshead Four-Factor Index of Social Status	more disturbed and impaired than the comparison subjects without the disorder. -Findings further support the validity of the diagnosis for adults.
Biederman, J., Mick, E., & Faraone, S. V.	Age-dependent decline of symptoms of attention deficit hyperactivity disorder: Impact of remission definition and symptom type. (2000).	n = 128 clinically referred males measured five times over four years Caucasian only ages 6-20	Schedule for Affective Disorders and Schizophrenia in School-Age Children Epidemiological Version (KSADS-E); DSM-III symptoms grouped into clusters	-Definition of remission affected rates of symptom decline for the ADHD core symptoms. -Symptoms of inattention remitted for fewer subjects than did symptoms of hyperactivity and/or impulsivity. -Majority of subjects continued to struggle with a substantial number of ADHD symptoms and high levels of dysfunction despite a sizeable rate of syndromatic remission by age 20.
Biederman, J., Monuteaux, M. C., Mick, E., Spencer, T., Wilens, T. E., Silva, J. M., et al.	Young adult outcome of attention deficit hyperactivity disorder: A controlled 10-year follow-up study. (2006).	n = 140 males with ADHD n = 120 males without ADHD Caucasian ages 6-18	Structured Interview (SCID); supplemental modules from KSADS-E	-By a mean age of 21, ADHD youth were at high risk for a wide range of adverse psychiatric outcomes including antisocial, addictive, mood and anxiety disorders. -Prevalence numbers may be lower than if reports were based on

Author	Title / Year	Sample	Measures	Key Findings
				self-report only versus if parents or spouses were incorporated.
Cleland, C., Magura, S., Foote, J., Rosenblum, A., & Kosanke, N.	Factor structure of the Conners' Adult ADHD Rating Scale (CAARS) for substance users. (2006).	n = 206 adults with DSM-IV Substance Abuse Diagnoses	CAARS-Self-Report Short Version	-CAARS is useful for measuring ADHD symptomatology among substance users. -Factor structure for the Self-Report Version largely replicated with a substance abusing population.
Conners, C. K., Erhardt, D., Epstein, J. N., Parker, J. D. A., Sitarenios, R., & Sparrow, E.	Self-ratings of ADHD symptoms in adults I: Factor structure and normative data. (1999).	n = 839 normative sample 394 males and 444 females (1 participant's gender was not recorded) n = 167 clinical sample 97 males and 70 females ages 18-81	Conners Adult ADHD Rating Scale [CAARS]	-CAARS may provide a useful dimensional measurement system for research and clinical applications covering core symptoms and adding content unique to the expression of ADHD in adults. -Provides four factors (1) Inattention/ Cognitive Problems, (2) Hyperactivity/ Restlessness, (3) Impulsivity/ Emotional Lability, and (4) Problems with Self-Control.
Erhardt, D., Epstein, J. N., Conners, C. K., Parker, J. D. A., & Sitarenios, G.	Self-ratings of ADHD symptoms in adults: II. Reliability, validity, and diagnostic sensitivity. (1999).	Conners' Adult ADHD Rating Scales [CAARS]	-Coefficient alphas ranged .86 to .92; median test-retest reliability for the four factors was .89; -All four factors were significantly correlated with an established measure used in the evaluation of ADHD in adults.	-CAARS provides researchers and clinicians with a carefully constructed and psychometrically sound scale for the evaluation of current ADHD symptoms in adults.
Faraone, S. V., & Biederman, J.	What is the prevalence of adult ADHD? Results of a population screen of 966 adults.	n = 966 randomly selected adults from which n = 100 met criteria for ADHD diagnoses	Using data obtained through telephone surveys, authors assessed for Adult ADHD using DSM-	-Found the prevalence of childhood and persistent adult ADHD to be 2.9%

Author	Title / Year	Sample	Measures	Key Findings
	(2005).	48 male and 52 females	IV Criteria	using a narrow definition of ADHD (person reported symptoms as present sometimes or often). -ADHD is one of the most common psychiatric disorders of adulthood therefore screening should be routinely conducted in psychiatric referral settings. -This can easily be accomplished with the use of rating scales.
Kane, R., Mikalac, C., Benjamin, S., & Barkley, R. A.	Assessment and treatment of adults with ADHD. (1990).	n = 3197 18 to 47 years old representative of the U.S. population	Diagnostic assessment and interview: Diagnostic Interview Schedule for DSM-IV; Adult ADHD Clinical Diagnostic Scale v.1.2; ADHD Rating Sale; Adult Clinical Diagnostic Scale -World Health Organization (WHO) - Composite International Diagnostic Interview (CIDI) v.3.0; Structured Clinical Interview for DSM-IV (SCID); WHO Disability Assessment Schedule	-36.3% of respondents with retrospectively assessed childhood ADHD met DSM-IV criteria for current ADHD. -Childhood severity and childhood treatment significantly predicted outcome.
Kessler, R. C., Adler, L. A., Barkley, R. A., Biederman, J., Conners, C. K, Demler, O., et al.	The prevalence and correlates of adult ADHD in the United States: Results from the national comorbidity survey replication. (2006).	n = 3199 from National Comorbidity Survey ages 18-44	Diagnostic Interview Schedule from the DSM-IV; Adult ADHD Clinical Diagnostic Scale version 1.2; ADHD Rating Scale; Adult Clinical Diagnostic Scale; World	-Efforts are needed to increase the detection and treatment for adult ADHD. -Found that their estimates of prevalence were probably conservative due to underestimation in

Author	Title / Year	Sample	Measures	Key Findings
			Health Organization (WHO) Composite International Diagnostic Interview (CIDI) version 3.0; Structured Clinical Interview for DSM-IV (SCID); WHO Disability Assessment Schedule	self-reports by adults. -Noted that study of self- and informant-assessments of adult ADHD and non-clinical subjects showed fairly strong associations between the two reports.
Kessler, R. C., Adler, L. A., Barkley, R. A., Biederman, J., Conners, C. K., Faraone, S. V., et al.	Patterns and predictors of attention-deficit/hyperactivity disorder persistence into adulthood: Results from the national comorbidity survey replication. (2005).	n = 3197 subjects from the National Comorbidity Survey ages 18-44 Representative of the U.S. Population	(WHO) CIDI, SCID, family history interview	-36.3% of respondents with retrospectively assessed childhood ADHD met DSM-IV criteria for current ADHD. -Childhood severity and childhood treatment for ADHD significantly predicted persistence. -No other variables significantly predicted persistence even though they were significantly associated with ADHD.
Knouse, L. E., Bagwell, C. L., Barkley, R. A., & Murphy, K. R.	Accuracy of self-evaluation in adults with ADHD: Evidence from a driving study. (2005).	n = 44 adults diagnosed with ADHD Mean age = 31.52 (SD =10.2) n = 44 control group adults Mean age = 32.34 (SD = 9.46) 84% Caucasian	Questionnaires about driving history; Driving Behavior Survey	-Overestimation of performance by adults with ADHD, possibly due to a limited self-awareness, inaccuracies in self-estimates and meta-cognitive deficits (executive functioning).
Kooij, J. J., Buitelaar, J. K., Edwin, J., Van Den Oord, E. J., Furer, J. W., Rijnders, C. A., et al.	Internal and external validity of attention-deficit hyperactivity disorder in a population-based sample of adults. (2005).	n = 1813 adults ages 18-75 from a Dutch based sample; data collected in the context of the Nijmegen Health Area Study 2 (NHA-2) designed to assess the prevalence and	Self-report data of ADHD Symptoms using Dutch version of DSM-III and DSM-IV rating scales; General Health Questionnaire (GHQ-28)	-Results supported internal and external validity of ADHD in adults. -ADHD is not merely a child psychiatric disorder that persists into young adulthood, but an important and unique manifestation of psychopathology

Author	Title / Year	Sample	Measures	Key Findings
		distribution of psychiatric morbidity		across the life-span.
Levy, F., Hay, D. A. McStephen, M., Wood, C., & Waldsman, I.	Attention-deficit hyperactivity disorder: A category or continuum? Genetic analysis of a large-scale twin study. (1997).	n = 1938 families with twins and siblings ages 4-12 recruited from the Australian National Health and Medical Research Council Twin Registry; final sample was 1919 males twins 1957 female twins 597 male siblings 594 female sibs (MZ & DZ)	Mail survey of DSM-III-R based maternal rating scales called the Australian Twin Behavior Rating Scale; DISC-Parent Version (PC-DISC)	-ADHD is best viewed as the extreme of a behavior that varies genetically throughout the entire population rather than a disorder with discrete determinants. -Exceptionally high heritability rates compared with other behavior disorders whether a continuum (trait) or categorical (diagnostic) approach is used to categorize ADHD.
Lewandowski, L., Codding, R., Gordon, M., Marcoe, M., Needham, L., & Rentas, J.	Self-reported LD and ADHD symptoms in college students. (2000).	n = 373 college students in a psychology class 54% females 46% males ages 18-49 81% Caucasian, 6.5% African American, 4% Hispanic, 2.5% Multiracial	Authors created a rating scale covering 15 items pertaining to LD Symptoms; Also used a checklist (developed by Murphy, Gordon, & Barkley, 2000) with 18 items pertaining to DSM-IV criteria for Adult ADHD symptom assessment.	-Self-report of ADHD and LD symptoms in the general population is common. Thus reliance on Self-Report information alone may not yield accurate results (would end in more "false positive" ADHD diagnoses). -Self-report information must be corroborated through independent sources to improve diagnostic inaccuracy.
Mackin, R. S. & Horner, M. D.	Relationship of the Wender Utah Rating Scale to objective measures of attention. (2005).	n = 35 male Veteran Affairs outpatients n = 14 diagnosed with ADHD n = 21 non-ADHD Mean age = 41.8 (SD = 11.6) 83% Caucasian, 11% African American, 6% Unspecified Ethnicity	Wender Utah Rating Scales (WURS); Trail-Making Test; Gordon Diagnostic System, WAIS-R Digit Span and Digit Symbol subtests; Wechsler Memory Scales-Revised (WMS-R) Mental Control Subtest	-Current attention functioning is not likely to influence the retrospective report of childhood ADHD symptoms.
Mannuzza, S., Klein, R., Bessler, A.,	Adult psychiatric status of hyperactive boys	n = 104 Caucasian males evaluated in childhood for	Semi-structured interview using DSM-III-R	-Children with ADHD are at a significantly higher

Author	Title / Year	Sample	Measures	Key Findings
Malloy, P., LaPadula, M.	grown up. (1998).	ADHD at ages 6-11 n = 78 Caucasian males ages 16-21 Comparison Group All interviewed at 15-year follow-up points		risk for a specific negative course marked by antisocial and substance related disorders.
Mannuzza, S., Klein, R. G., Klein, D. F., Bessler, A., & Shrout, P.	Accuracy of adult recall of childhood attention deficit hyperactivity disorder. (2002).	From a controlled prospective 10-year follow-up of male children with ADHD n = 176 probands n = 168 non-ADHD comparison group Caucasian ages 16-23	Schedule for the Assessment of Conduct, Hyperactivity, Anxiety, Mood and Psychoactive Substances	-Retrospective diagnosis of childhood ADHD made on the basis of self-report will in most cases be invalid. -Obtaining contemporaneous information on childhood history of ADHD is vital to diagnostic process.
McCann, B. S. & Roy-Byrne, P.	Screening and diagnostic utility of self-report attention deficit hyperactivity disorder scales in adults. (2004).	Examined diagnostic screening utility in 82 adults presenting for and ADHD evaluation between 1997-1999 Caucasian 96.3%, 59% male Mean age = 37.5 (SD = 10.1)	Adult Rating Scale [ARS], Attention-Deficit Scales for Adults [ADSA], and a symptom inventory for ADHD (clinical interview)	-All 3 instruments were sensitive to the presence of ADHD symptoms in adults; correctly identified 78% to 92% patients with ADHD, but a high proportion of individuals with non-ADHD diagnoses screened positive; incorrectly identified between 36% and 67% of non-ADHD patients.
Michaelson, D., Adler L., Spencer T., Reimherr, F. W., West, S. A., Allen, A. J., et al.	Atomoxetine in adults with ADHD: two randomized, placebo controlled studies. (2003).	Adults with ADHD Study 1: n = 280 n = 141 patients randomized to Atomoxetine n = 1 39 placebo Study 2 n = 256 n = 129 to Atomoxetine n = 127 placebo	Conners' Adult ADHD Diagnostic Interview for DSM-IV (CAAR-D); Structured Clinical Interview for DSM-IV(SCID); Clinician Global Impression of Severity Scale (CGI-S); CAARS-Self-Report Version; Wender-Reimherr Adult Attention Deficit Disorder Scale (WRAADS); Hamilton	-In both Study 1 and Study 2, Atomoxetine was statistically superior to placebo in reducing inattentive and hyperactive/impulsive symptoms. -CAARS Investigator Rated Scale and CAARS Self-report Scales were used as the primary measures of outcome.

Author	Title / Year	Sample	Measures	Key Findings
			Depression and Hamilton Anxiety Indices	
Murphy, P.	The concordance between self-ratings of childhood and current symptoms of attention deficit hyperactivity disorder. (2003).	n = 85 subjects 51 males and 34 females ages 23-53 Not assessed for ADHD	DSM-IV criteria broken down into two questionnaires-Childhood Behavior Questionnaire and Current Behavior Questionnaire	-Results show the need for obtaining childhood and current accounts of behavior in assessing for adult ADHD.
Murphy, P., & Schachar, R.	Use of self-ratings in the assessment of symptoms of attention deficit hyperactivity disorder in adults. (2000).	2 studies (1) n = 50 adult subjects and subjects' parents (2) n = 100 adult subjects completed questionnaires of their own current ADHD symptoms the subject's partner also completed a questionnaire rating the subjects' current ADHD symptoms	Questionnaires based on DSM-IV criteria for ADHD	-Although patients reported more symptoms and a greater frequency that parents and significant others did, the correlations between patients' and informants' symptom ratings were statistically significant ($p<.001$). -Clinicians should gather both self-report and collateral ratings for adult patients' childhood and current behavior whenever possible.
Roy-Byrne, P., Scheele, L., Brinkley, J., Ward, N., Wiatrak, C., Russo, J., et al.	Adult attention-deficit hyperactivity disorder: Assessment guidelines based on clinical presentation to a specialty clinic. (1997).	n = 143 adults presenting for ADHD evaluation 32% met diagnostic criteria 36% with current ADHD –like features did not meet criteria due to either lack of childhood history or substance abuse comorbidity Caucasian; 98 males, 45 females ages 18-64	WRAT-3; Continuous Performance Test; WURS; Brief Symptom Inventory/Symptom Checklist 53; Drug Abuse Screening Test (DAST); Alcohol Use Disorder Inventory Test (AUDIT); Social Adjustment Scale, Self-Report Version (SAS-S); Structured Clinical Interview for DSM-III-R	-A few rating scales and lifetime history characteristics help to clarify the difficult diagnostic distinction between adult patients who do and do not have ADHD.
Schoechlin, C., & Engel, R. R.	Neuropsychological performance in adult attention-deficit hyperactivity disorder: Meta-	A meta-analysis of 24 empirical studies reporting results of 50 standardized tests	Quantitative review of existing data in 24 studies	-A significant deficit in neurocognitive functions is measurable in adult ADHD patients

Author	Title / Year	Sample	Measures	Key Findings
	analysis of empirical data. (2005).	comparing adult ADHD patients and controls; categorizes each neuropsychological measure into 1 of 10 neuropsychological domains		mainly characterized by impaired verbal memory and low scores on tasks requiring focus and sustained attention. -The pivotal instruments most often used in the diagnostic process are observer and self-rating scales for both children and adults. - Rating scales designed to be completed in classroom and/or homes are easy to use with children, but less so with adults. -Neurocognitive symptoms in general can be assessed not only by observer- or self-report, but also be objective neuropsychological tests.
Ward, M. F., Wender, P. H. ,& Reimherr, F. W.	The Wender Utah Rating Scale: An aid in the retrospective diagnosis of childhood attention deficit hyperactivity disorder. (1993).	n = 81 adult outpatients with ADHD 45 male and 36 female Mean age = 30.7 (SD = 5.7) n = 100 normal adults 50 males and 50 females Mean age 42.5 (SD =5.4) n = 70 psychiatric adult outpatients with depression 23 males and 46 females Mean age = 39.8 (SD = 9.9)	WURS Parent Rating Scale	-WURS is sensitive in identifying childhood ADHD and may be useful in recognizing ADHD in patients with ambiguous adult psychopathology.
Young, S.	The YAQ-S and YAQ-I: The development of self and informant questionnaires	n = 223 participants n = 150 informants All from clinic referrals and	Young ADHD Questionnaire-Self-Report (YAQ-S); Young ADHD Questionnaire-	-Adult ADHD poses significant difficulty for diagnosis because clinicians are required to retrospectively

Author	Title / Year	Sample	Measures	Key Findings
	reporting on current adult ADHD symptomatology, comorbid and associated problems. (2004).	healthy community controls.	Informant-Report (YAQ-I)	determine whether the disorder was present in childhood, often in the absence of childhood documentation. -Generally young adults may have difficulty identifying ADHD symptoms (many of which relate to cognitive problems) compared to recognizing problems related to their emotional functioning, delinquency, and social functioning.
Zucker, M., Morris, M. K., Ingram, S. M., Morris, R. D., & Bakeman, R.	Concordance of self- and informant ratings of adults' current and childhood attention-deficit/hyperactivity disorder symptoms. (2002).	n = 281 From a database containing the results of psychoeducational evaluations of college students who presented with academic difficulties to an on-campus assessment clinic between 1993 and 2001.	Symptom Checklist Revised (SCL-90-R); Structured Clinical Interview for DSM-IV Screen; ADHD Behavior Checklist for Adults Semi-Structured Interview; WAIS-R or WAIS-III; Academic Achievement Testing (unspecified tests); Neuropsychological Assessment Battery "assessing a broad range of cognitive domains;" Behavioral Observations "gathered throughout the interview and standardized testing procedures;" Informant Report Versions of ADHD Behavior Checklist for Adults.	-Concordance levels were similar for current and childhood symptoms. -Moderate positive correlations were found between self- and informant ratings on both subscales for certain symptoms. -Sex and ADHD diagnosis moderated concordance with similar effect sizes. -Overall the results have implications for the use of behavior rating scales in diagnosing ADHD, raise questions about the validity of self-report ratings and support the need to investigate different variables which may impact concordance.

Section B. Non-Empirical Literature

Author	Title / Year	Purpose	Key Findings	Comments
Adler, L. A.	Clinical presentations of adult patients with ADHD. (2004).	Using Kiddie Schedule for Affective Disorders And Schizophrenia [KSADS]; and Attention Deficit Hyperactivity Disorder Rating Scale [ADHD-RS] authors examined the presenting symptoms of adults with ADHD.	-The symptoms of adult ADHD have similar core symptoms as children with ADHD, but symptoms naturally evolve as the individual matures and copes with the symptoms.	-Retrospective reporting can uncover a history of childhood ADHD symptoms that is a requisite for an adult psychiatric diagnosis. Therefore Adult ADHD is an identifiable and treatable disorder.
Adler, L. A., Barkley, R. A., Wilens, T., & Ginsberg, D. L.	Differential diagnosis of attention-deficit hyperactivity disorder and comorbid conditions [monograph]. (2006).	Via a panel discussion, provides statistics relating to comorbidity in adults.	-The evaluation of adults with ADHD requires screening for comorbid medical, psychiatric and learning disorders, executive functioning and a history of school impairment; -States that the core symptoms of ADHD are present, to some extent in all individuals, however it is the consistency and severity of impairment that separates ADHD from normal behavior; -Thorough clinical interviewing is key.	
Adler, L., & Cohen, J.	Diagnosis and evaluation of adults with attention-deficit/hyperactivity disorder. (2004).	Reviews and critiques current diagnostic instruments and procedures for Adult ADHD (including, clinical interviewing, rating scales, and neuropsychological tests).	-A thorough clinical interview aided by the use of rating scales for current symptoms and collateral information about childhood from parents or siblings forms the	Concludes that collateral information about childhood symptoms is necessary for an accurate adult ADHD diagnosis.

Author	Title / Year	Purpose	Key Findings	Comments
			backbone of the assessment; -The CAARS can be used to assess current symptoms using the self-report, observer-rated and clinician administered forms; ---Collateral information obtained from a parent or older sibling is extremely helpful; -Describes adult ADHD symptomatology; -CAARS Observer Screening Version is a method often used to indicate the presence, severity, and impairment of ADHD symptoms in childhood and adulthood.	
Barkley, R. A.	Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment, (3rd ed.). (2006).	Provides an overview of the nature, assessment, and treatment of ADHD.		
Conners, C. K.	Rating scales in attention-deficit/hyperactivity disorder: Use in assessment and treatment monitoring. (1998).	Addresses some of the critical issues in the use of rating scales and describes recent developments that reflect the changes in diagnostic criteria and social composition of normative scales. Also covers new scales for adolescent and adult ADHD.	-ADHD rating scales offer important information on dimensionalities of behavior that have been well-established by decades of empirical work. However, rating scales are not meant to be used alone to diagnose ADHD.	Helps to elucidate the point that although rating scales can be useful in the evaluation process, they are not meant to be used as the sole diagnostic instrument.
Conners, C. K.	Clinical use of rating scales in diagnosis and treatment of attention-deficit/hyperactivity disorder. (1999).	Provides an overview of the difficulties of diagnosing ADHD in adults and the utility of rating scales in providing	-Rating scales, including the Conners' Adult ADHD Rating Scales [CAARS],	Underscores ease and utility of ADHD rating scales in clinical

Author	Title / Year	Purpose	Key Findings	Comments
		a more accurate picture of presenting ADHD symptoms.	provide important empirical data to complement the more amorphous medical diagnostic criteria used in the DSM-IV.	settings.
DeGeorge, M. K.	[Review of the book Conners' adult ADHD rating scales (CAARS)]. (2003).	Describes the design and purpose of the Conners ADHD Rating Scales in adults and provides measures of reliability and validity statistics for the instrument.	-The reliability of the CAARS ranged from moderate to high for internal consistency and low to moderate for mean inter-item correlations; -The CAARS was found to correlate moderately with one other measure of adult ADHD and discriminates between clinical and non-clinical groups.	
Denckla, M. B.	Attention deficit hyperactivity disorder-residual type. (1991).	Reviews retrospective and longitudinal data that suggest that a residual type of ADHD can be recognized.	-Noted difficulties with obtaining reliable and valid historical information.	
Dulcan, M. K.	AACAP Official Action Paper: Practice parameters for the assessment and treatment of children, adolescents, and adults with Attention-Deficit/Hyperactivity Disorder. (1997).	Reviews literature from 1985 to 1996 on children, adolescents and adults with ADHD for ADHD (Inattentive, Hyperactive/Impulsive, or Combined types) for prevalence, assessment and treatment.	-Provides an outline of practice parameters for the assessment of children, adolescents and adults with ADHD based on a review of literature. -With regard to adults with ADHD it notes that because patients with ADHD often have limited insight into their difficulties and may be poor reporters, obtaining information from a spouse or significant other, parent or employer is vital.	

Author	Title / Year	Purpose	Key Findings	Comments
Faraone, S. V., Biederman, J., & Mick, E.	The age-dependent decline of attention deficit hyperactivity disorder: A meta-analysis of follow-up studies. (2005).	Prior data Medline search of scientific literature to identifying outcome studies of ADHD; Uses DSM-II, DSM-III, DSM-III-R, DSM-IV Criteria to measure symptomatic (partial) v. syndromatic (full) criteria for ADHD.	-Evidence for ADHD lessens with age, possibly due to developmental insensitivity of diagnostic criteria for the disorder.	
Faraone, S. V., Biederman, J., Spencer, T., Wilens, T., Seidman, L. J., Mick, E., et al.	Attention deficit/hyperactivity disorder in adults: An overview. (2000).	Review of outcome studies related to ADHD in adults.	-Presents an argument for further study into adult ADHD diagnostics -Highlights the developmental insensitivity of the DSM-IV.	
Faraone, S. V., Spencer, T. J., Montano, B., & Biederman, J.	Attention-deficit/hyperactivity disorder in adults: A survey of current practice in psychiatry and primary care. (2004).	Review by 50 psychiatrists and 50 primary care providers of 537 and 317 medical records (respectively) of adults with ADHD	-Concluded that adult ADHD is a substantial source of morbidity in both psychiatric and primary care settings. -At the same time, because the outward manifestations of Adult ADHD symptoms decline with age, adult ADHD remains a largely hidden and underdiagnosed disorder.	
Hallowell, E. M., & Ratey, J. J.	Driven to distraction. (1994).	Presents methods for identification and diagnosis of adult ADHD as well as treatment strategies.	-Suggests that questionnaires should include the observations from parent's friends and family members in order to be more diagnostically accurate.	
Hardt, J., & Rutter, M.	Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. (2004).	Reviews the validity of retrospective symptom self-reporting in adults.	-Concludes that retrospective studies do have a worthwhile place in research. However, further research is needed	

Author	Title / Year	Purpose	Key Findings	Comments
			to examine possible biases in reporting. -Little weight can be on the retrospective reports of details in childhood experiences or on reports that rely heavily on judgment or interpretation.	
Jackson, B., & Farrugia, D.	Diagnosis and treatment of adults with attention deficit disorder. (1997).	Discusses the identification and diagnosis of adult ADHD and comorbid disorders. Also discusses counseling strategies for adults with ADHD.	-ADHD is not typically considered in adult counseling sessions, therefore adults with ADHD tend to go untreated and the severity of the symptoms increases. -It is important for those treating adult ADHD sufferers to be able to diagnose and understand the disorder in order to be effective.	
Mannuzza, S., & Klein, R.	Long-term prognosis in attention-deficit/hyperactivity disorder. (2000).	Reviews controlled, prospective follow-up studies of children with ADHD into adolescence and adulthood.	-Finds that adults with ADHD complete less formal schooling and hold lower ranking occupations -Adults with ADHD often continue to exhibit poor social skills and antisocial personality traits -Notes that childhood ADHD does not preclude achieving one's educational or vocational goals.	
Mannuzza, S., Klein, R., & Moulton, J	Persistence of Attention-Deficit/Hyperactivity Disorder into	4 follow-up studies of children with ADHD into adulthood are examined; Review of factors that	-Four factors are identified (1) ascertainment procedure, (2)	

Author	Title / Year	Purpose	Key Findings	Comments
	adulthood: What have we learned from the prospective follow-up studies? (2003).	may account for disparate persistence rates and provides recommendations for conducting follow-up studies of children with ADHD.	attrition rate, (3) reporting source and, (4) disorder criteria; -With respect to reporting source, authors found a tendency for parents to report substantially more ADHD symptoms in their adult offspring than the individuals report themselves; -Ideally both informants should be interviewed to increase diagnostic accuracy.	
McGough, J. J., & Barkley, R. A.	Diagnostic controversies in adult attention deficit hyperactivity disorder. (2004).	Discusses the use of the Wender Utah criteria; DSM-IV criteria; and laboratory-based assessment strategies (e.g., neuropsychiatric tests, EEG, neuroimaging-SPECT scans in assessing adult ADHD.	-Both the Wender Utah and the DSM-IV criteria identify clinically impaired adults with ADHD; -Lab-based assessments should not be used alone to diagnose ADHD.	ADHD remains a clinical diagnosis requiring information from multiple sources.
Meyer, G. J., Finn, S. E., Eyde, L. D., Kay, G. G., Moreland, K. K., Dies, R. R., et al.	Psychological testing and psychological assessment: A review of evidence and issues. (2001).	Summarizes evidence and issues associated with psychological assessment. Reviews more than 125 meta-analyses on test validity and 800 samples examining multi-method assessment strategies.	-Parents are often poor historians and or biased presenters of information; -Any single assessment method provides a partial or incomplete representation of the characteristics it intends to measure; -Diagnostic validity is compromised when information is derived from a single method of assessment (i.e. self-report only); -A growing body of literature supports the value	

Author	Title / Year	Purpose	Key Findings	Comments
			of combining data from more than one type of assessment method, even when these methods disagree across or within individuals.	
Murphy, K. R., & Adler, L. A.	Assessing attention-deficit/hyperactivity disorder in adults: Focus on rating scales. (2004).	Examines the usefulness of rating scales; CAARS, Brown Attention Deficit Disorder Scale for Adults, WURS, ADHD Rating Scale, ADHD Rating Scale -IV, Current Symptoms Scale, Adult ADHD Self-Report Scale v.1.1 Symptoms Checklist.	-Evidence from sources other than the patient is needed as retrospective information given about childhood and present symptoms might not be accurate or reliable.	
Searight, H. R.	Recommendations of diagnosis of adult ADHD to prevent the social costs of undertreatment. (2006, Issue 1, May).	Examines the prevalence of ADHD in adults, diagnostic adaptations necessary for adult assessment and tools available for effective diagnosis, the comorbidities associated with ADHD and the social costs incurred when ADHD remains untreated.	-Input from informants such as a spouse, significant other, or work supervisor, is a helpful supplement to self-report information.	
Searight, H. R., Burke, J. M., & Rottnek, F.	Adult ADHD: Evaluation and treatment in family medicine. (2000).	Helps elucidate diagnostic issues related to adult ADHD; diagnostic criteria and symptoms, evaluation processes, differential diagnoses, pharmacotherapy treatments and other treatments.	-Notes that because adults with ADHD may not appreciate their symptoms, the patient's spouse or another significant person in the patient's life should ideally be included in the interview.	
Shaffer, D.	Attention deficit hyperactivity disorder in adults. (1994).	Reviews the status of ADHD in adults with regard to classification, diagnosis and treatment.	-Highlights the need for epidemiological research to determine the prevalence and patterns of adult ADHD; -States that treatment studies need to go beyond	

Author	Title / Year	Purpose	Key Findings	Comments
			assessment of effects on inattention and motor activity to determine whether stimulants have an effect on comorbid conditions.	
Wasserstein, J.	Diagnostic issues for adolescents and adults with ADHD. (2005).	Presents how to recognize and diagnose ADHD in adults including core symptom presentation during childhood, appropriate family history, the management of comorbidity and the evolving role of diagnostic testing.	-No clear guidelines for the diagnosis of ADHD in adults for whom the DSM-IV criteria are developmentally inappropriate. -Role of testing is evolving - formal assessment is most indicated for treatment planning and ambiguous diagnostic situations.	
Wender, P. H.	Attention deficit hyperactivity disorder in adults. (1995).	Describes the chronicity of ADHD symptoms into adulthood and associated comorbidities often diagnosed in adults and treatment options.	-All aspects of an individual's life must be considered in the diagnosis and treatment of adult ADHD.	
Wender , P. H., Wood, D. R., & Reimherr, F. W.	Pharmacological treatment of attention deficit disorder, residual type (ADD-RT) in adults. (1985).	Discusses pharmacotherapy for adult ADHD, residual type.	-Concludes that adult ADHD can be successfully treated using stimulant medications. -Also examines diagnostic criteria for adult ADHD.	
Wilens, T. E., Biederman, J., & Spencer, T .J.	Attention deficit/hyperactivity disorder across the lifespan. (2002).	Presents diagnostic considerations; psychiatric comorbidity patterns, biological etiology, and treatment of ADHD across a human lifespan.	-Recommends that all aspects of an individual's life should be considered in the diagnosis and treatment of adult ADHD.	
Wilens, T. E., Faraone, S. V., & Biederman, J.	Attention-Deficit/Hyperactivity Disorder in adults. (2004).	Discusses the diagnostic issues in adult ADHD.	-Concludes that adult ADHD can be reliably and validly diagnosed.	

APPENDIX B

Attention Deficit Hyperactivity Disorder Diagnostic Criteria (APA, 2000)

Attention Deficit Hyperactivity Disorder

Either (1) or (2):

(1) six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities

(b) often has difficulty sustaining attention in tasks or play activities

(c) often does not seem to listen when spoken to directly

(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)

(e) often has difficulty organizing tasks and activities

(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)

(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)

(h) is often easily distracted by extraneous stimuli

(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a developmental level that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat

(b) often leaves seat in classroom or in other situations in which remaining seated is expected

(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to a subjective feelings of restlessness)

(d) often has difficulty playing or engaging in leisure activities quietly

(e) is often "on the go" or often acts as if "driven by a motor"

(f) often talks excessively

Impulsivity

(g) often blurts out answers before questions have been completed

(h) often has difficulty awaiting turn

(i) often interrupts or intrudes on others (e.g., butts into conversations or games

A. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

B. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work], and at home).

C. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

D. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Code based on type:

314.01 Attention Deficit/Hyperactivity Disorder, Combined Type: if both Criteria A1 and A2 are met for the past 6 months

314.00 Attention Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months

314.01 Attention Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months

Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, "In Partial Remission" should be specified.

314.9 Attention Deficit/Hyperactivity Disorder, Not Otherwise Specified

This category is for disorders with prominent symptoms of inattention or hyperactivity-impulsivity that do not meet criteria for Attention Deficit/Hyperactivity Disorder. Examples include:

1. Individuals whose symptoms and impairment meet the criteria for Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type but whose age at onset is 7 years or after.

2. Individuals with clinically significant impairment who present with inattention and whose symptom pattern does not meet the full criteria for the disorder but who have a behavioral pattern marked by sluggishness, daydreaming, and hypoactivity.

APPENDIX C

Adult ADHD Rating Scales

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
ADHD Rating Scale (ADHD RS-IV)[d] (DuPaul, Power, Anasto-poulous, & Reid, 1998) Publisher: The Guilford Press (manual and forms)	Self-Report Form	Normative data for children and adolescents N = 2000 (1040 males, 948 females, 12 un-specified); ages 4-19 (M = 10.6, SD = 3.6); attending K-12th grade Caucasian 70.2%, African-American 15.9%, Latino 5.3%, Asian-American 5.0%, Native American 0.7%, Other 3.1%	18 items	0-3 (never or rarely, sometimes, often, very often)	Inattentive and Hyperactive-Impulsive Symptoms (DSM-IV-TR)[e]	<u>Reliability</u>: Internal Consistency - *yes* Test-retest - *yes* <u>Validity</u>: Convergent - *yes* Construct - *yes* Discriminant - *yes*
Adult Attention Deficit Disorders Evaluation Scale (A-ADDES) (McCarney & Anderson, 1996)	Self-Report Form, Home-Report Form (spouse or other close relative/ friend), and Work-Report	<u>Self-Report</u> Normative Data: N = 2,249; ages 18-71+ years; 31.4% male, 68.6% female; 85.1% Caucasian, 7.4% African American, 3.3% Hispanic, 0.5% American Indian,	Self-Report: 58 items Work-Report: 54 items Home-Report: 46 items	0-4 (behavior occurs one to several times per month, per week, per day, per hour)	Inattentive and Hyperactive-Impulsive Symptoms (DSM-IV)[e]	<u>Self-Report Form</u>: <u>Reliability</u>: Internal Consistency - *yes* Test-retest - *yes* <u>Validity</u>: Convergent - *yes* Construct - *yes* Discriminant - *yes*

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
Publisher: Hawthorne Educational Services Inc.	Form (employer/ supervisor)	3.8% Other <u>Home-Report</u> Normative Data: N = 2,003; ages 18-65; 35.9% male, 64.1% female; 86.7% Caucasian, 6.3% African American, 2.9% Hispanic, 0.4% American Indian, 3.9% Other <u>Work-Report</u> Normative Data: N = 1,867; ages 18-65 years; 30.8% male, 69.2% female; 86.6% Caucasian, 6.7% African American, 2.6% Hispanic, 0.3% American Indian, 3.8% Other				
Attention Deficit Scales for Adults (ADSA)	Self-Report Form	306 adults (139 females and 167 males) 17 years or older with a mean age of	54 items	1-5 (never, seldom, sometimes, often, always)	Clinical Subscales - Total score, 9 content subscales including Attention-	<u>Reliability:</u> Internal Consistency - *yes* Test-retest - *not available*

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
(Triolo & Murphy, 1996) Publisher: Brunner/ Mazel Inc.		33.95 (the authors did not specify an age range in the manual) 82% of norm group were Caucasian, Black 13.7%, Hispanic 1.6%, Asian 1.3%, Native American 0.7%, Other 0.3%, No Response 0.3%			Focus/Concentra-tion, Behavior-Disorganized Activity, Interpersonal, Coordination, Academic Theme, Emotive, Consistency/ Long-Term, Childhood, and Negative Social[f]	<u>Validity</u>: Convergent - *not available* Construct - *not available* Discriminant - *yes*
Adult ADHD Self-Report Scale v.1.1 Symptom Checklist (ASRS-v1.1) (World Health Organization; Adler, Kessler, & Spencer, 2003) www.med.nyu.edu/Psych/t	Self-Report Form (2 forms full and screen)	The ASRS in not a commercially available measure. Efforts to contact the authors about the normative sample were unsuccessful.	18 item full form 6 item screen	0-4 (never, rarely, sometimes, often, and very often)	Inattentive and Hyperactive-Impulsive Symptoms (DSM-IV-TR)[e]	<u>Reliability</u>: Internal Consistency - *yes* Test-retest - *yes* <u>Validity</u>: Convergent - *yes* Construct - *yes* Discriminant - *yes*

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
raining/adhd.html						
Brown Attention-Deficit Disorder Rating Scale for Adults (Brown, 1996; Brown, 2005) Publisher: The Psychologi-cal Corporation	Self Report Form	285 adults between the ages of 18-40+ years (167 males, 118 females); 75% Caucasian, 14% African American, 11% Hispanic	40 items (Prior to DSM-IV) (mostly focuses on inattention symptoms)	0-3 (never, once a week or less, twice a week, and almost daily).	Putative Factors: Assesses 5 dimensions of symptoms, organizing work, sustaining attention and concentration, alertness and effort, managing frustration and other emotions, and using working memory.[f]	<u>Reliability</u>: Internal Consistency - *yes* Test-retest -*yes* <u>Validity</u>: Convergent - *yes* Construct - *yes* Discriminant -*yes*
Conners Adult ADHD Rating Scales (CAARS); CAARS-Observer Screening Version (CAARS-O:SV) (Conners,	3 Self-Report Forms (Long, Short, and Screening), 3 Observer-Report Forms (Long, Short, and Screening)	Self Report Form N = 1026 adults (466 males, 560 females), ages 18-80 Observer Report Form N = 943 (433 males, 510 females), ages 18-72	Long Forms (Self and Observer) 66 items Short Forms (Self and Observer) 26 items Screening Forms (Self	Self Report 0-4 (not at all, just a little, pretty much, and very much). Observer 0-3	Self-Report Form: Four Factor Model, DSM-IV Inattention/ Cognitive Problems, Hyperactivity/ Restlessness, Impulsivity/ Emotional Lability, Problems with Self-Concept[e]	<u>Reliability:</u> Internal Consistency - *yes* Test-retest - *yes* <u>Validity:</u> Convergent -*yes* Construct - *yes* Discriminant - *yes*

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
Erhardt, & Sparrow, 1999) Publisher: Multi-Health Systems Inc.			and Observer) 30 items	symptom ratings based on severity and frequency		
Current Symptoms Scale (CSS) (Barkley & Murphy, 1998) Publisher: The Guilford Press (manual and forms)	Self-Report Form, Current (Other) Form, and Childhood Symptoms Scale (Other)	720 Adults applying for driver's license renewal in the state of Massachusetts, ages 17-50+	18 items (assesses presence of ADHD symptoms over the past 6 months)	0-3 (never or rarely, sometimes, often, very often)	Inattention, Hyperactivity-Impulsivity, Oppositional-Defiant Symptoms (DSM-IV)[e]	Self- Report Form: <u>Reliability:</u> Internal Consistency -*yes* Test-retest -*yes* <u>Validity:</u> Convergent -*yes* Construct - *yes* Discriminant - *yes*
Wender Utah Rating Scale (WURS) (Ward, Wender, & Riemherr, 1993)	Self-Report Form	251 Total Adults: 81 Adult outpatients, 45 male and 36 female, age M = 30.7 SD = 5.7 100 "Normal" adults, 50 males and 50 females,	61 items 25 item short version Rating scale items assess retrospective,	0-4 (not at all, very slightly, mildly, moder-ately, quite a bit, or very much)	Inattention, Hyperactivity-Impulsivity, Emotional Dysregulation and Conduct Problems[e]	<u>Reliability:</u> Internal Consistency - *yes* Test-retest - *not available*

Scale[a]	Informant(s)	Normative Sample(s)[b] *n* & Age Range	Number of Items	Response Format	Factors	Psychometrics[c]
		age M = 42.5, SD = 5.4 70 Psychiatric outpatients with unipolar depression, 23 males and 47 females, age M = 39.8 SD = 9.9	childhood ADHD symptoms only (does not assess current, adult ADHD symptoms)			<u>Validity:</u> Convergent - *not available* Construct - *yes* Discriminant - *yes*

Note. ADHD = attention-deficit/hyperactivity disorder.

[a] The following table is not intended to provide an exhaustive list of every rating scale designed for or applied to adult ADHD. It is intended to highlight those that are either commercially available or widely and frequently appearing in the literature on adult ADHD.

[b] Information in this column pertains to the general population normative sample of presumed, non-disturbed adults. Some measures also have collected data on clinical samples that will not be summarized here.

[c] Because a detailed review of the actual psychometric findings for each of the measures exceeds the space limitations of this table, this column will indicate the availability (yes) or unavailability (no) of the various types of psychometric data on the measures described.

[d] Although the ADDRS-IV and the ADHDRS-IV-Inv. were initially designed for use with children and adolescents and normed on these groups, the measures are included in this table because adapted versions of these scales are commonly applied to adults.

[e] Empirically-based factors.

[f] Rationally-based factors.

APPENDIX D

Permission to Access CAARS Data

PEPPERDINE UNIVERSITY
Graduate School of Education and Psychology
SAN FERNANDO VALLEY CENTER

May 8, 2008

RE: Ani Doss' dissertation project

To Whom It May Concern:

This letter is to confirm that Ani Doss, for the purpose of her dissertation project, has been granted permission by me to access and analyze archived data pertaining to the Conners Adult ADHD Rating Scale (CAARS) measures, of which I am a co-author. The CAARS measures are published by Multi-Health Systems, Inc. (MHS), which also originally collected and now maintains the archived data base that Ani will be using for her dissertation. I have spoken to Gill Sitarenios, Director of Research and Development at MHS, who confirmed that Ani has permission to access these data under my supervision for the purpose of her dissertation research. MHS will provide separate documentation confirming that such permission has been granted.

Sincerely,

Drew Erhardt, Ph.D.
Professor of Psychology
Pepperdine University
Graduate School of Education & Psychology
16830 Ventura Blvd., Suite 200
Encino, CA 91436
Phone: 818-501-1608
Fax: 818-501-1631
Email: derhardt@pepperdine.edu

From: Gill Sitarenios [mailto:gill.sitarenios@mhs.com]
Sent: Fri 5/23/2008 7:43 AM
To: Erhardt, Drew
Cc: Lisa Sorensen
Subject: RE: CAARS Project

Hi Drew,

I am sending this email to confirm that MHS provides authorization for use of the data set (see below) that I sent to you earlier for the sole purpose of the research being conducted by you and your graduate student on the CAARS observer form psychometric properties.

Regards,

Gill Sitarenios, Ph.D.

Director of Research & Development

Multi-Health Systems Inc.

3770 Victoria Park Avenue,

Toronto, Ontario

M2H 3M6

Phone (from US): 1-800-456-3003

Phone (from Canada): 1-800-268-6011

Phone (international): 416-492-2627
Fax: 416-492-3343

APPENDIX E

CAARS-Self-Report: Long Version (CAARS-S:L) and

CAARS-Observer: Long Version (CAARS-O:L)

CAARS–Self-Report: Long Version (CAARS–S:L)

by C. K. Conners, Ph.D., D. Erhardt, Ph.D., & E. P. Sparrow, M.A.

Name:_____ **Gender: M F** (Circle One)

Birthdate:____/____/____ (Month Day Year) **Age:**_____ **Today's Date:**____/____/____ (Month Day Year)

Instructions: Listed below are items concerning behaviors or problems sometimes experienced by adults. Read each item carefully and decide how much or how frequently each item describes you recently. Indicate your response for each item by circling the number that corresponds to your choice. Use the following scale: 0 = Not at all, never; 1 = Just a little, once in a while; 2 = Pretty much, often; and 3 = Very much, very frequently.

	Not at all, never	Just a little, once in a while	Pretty much, often	Very much, very frequently
1. I like to be doing active things.	0	1	2	3
2. I lose things necessary for tasks or activities (e.g., to-do lists, pencils, books, or tools).	0	1	2	3
3. I don't plan ahead.	0	1	2	3
4. I blurt out things.	0	1	2	3
5. I am a risk-taker or a daredevil.	0	1	2	3
6. I get down on myself.	0	1	2	3
7. I don't finish things I start.	0	1	2	3
8. I am easily frustrated.	0	1	2	3
9. I talk too much.	0	1	2	3
10. I am always on the go, as if driven by a motor.	0	1	2	3
11. I'm disorganized.	0	1	2	3
12. I say things without thinking.	0	1	2	3
13. It's hard for me to stay in one place very long.	0	1	2	3
14. I have trouble doing leisure activities quietly.	0	1	2	3
15. I'm not sure of myself.	0	1	2	3
16. It's hard for me to keep track of several things at once.	0	1	2	3
17. I'm always moving even when I should be still.	0	1	2	3
18. I forget to remember things.	0	1	2	3
19. I have a short fuse/hot temper.	0	1	2	3
20. I'm bored easily.	0	1	2	3
21. I leave my seat when I am not supposed to.	0	1	2	3
22. I have trouble waiting in line or taking turns with others.	0	1	2	3
23. I still throw tantrums.	0	1	2	3
24. I have trouble keeping my attention focused when working.	0	1	2	3
25. I seek out fast paced, exciting activities.	0	1	2	3
26. I avoid new challenges because I lack faith in my abilities.	0	1	2	3
27. I feel restless inside even if I am sitting still.	0	1	2	3
28. Things I hear or see distract me from what I'm doing.	0	1	2	3
29. I am forgetful in my daily activities.	0	1	2	3
30. Many things set me off easily.	0	1	2	3
31. I dislike quiet, introspective activities.	0	1	2	3
32. I lose things that I need.	0	1	2	3
33. I have trouble listening to what other people are saying.	0	1	2	3

Items continued on back page...

CAARS–Self-Report: Long Version (CAARS–S:L)

by C. K. Conners, Ph.D., D. Erhardt, Ph.D., & E. P. Sparrow, M.A.

	Not at all, never	Just a little, once in a while	Pretty much, often	Very much, very frequently
34. I am an underachiever.	0	1	2	3
35. I interrupt others when talking.	0	1	2	3
36. I change plans/jobs in midstream.	0	1	2	3
37. I act okay on the outside, but inside I'm unsure of myself.	0	1	2	3
38. I am always on the go.	0	1	2	3
39. I make comments/remarks that I wish I could take back.	0	1	2	3
40. I can't get things done unless there's an absolute deadline.	0	1	2	3
41. I fidget (with my hands or feet) or squirm in my seat.	0	1	2	3
42. I make careless mistakes or have trouble paying close attention to detail.	0	1	2	3
43. I step on people's toes without meaning to.	0	1	2	3
44. I have trouble getting started on a task.	0	1	2	3
45. I intrude on others' activities.	0	1	2	3
46. It takes a great deal of effort for me to sit still.	0	1	2	3
47. My moods are unpredictable.	0	1	2	3
48. I don't like homework or job activities where I have to think a lot.	0	1	2	3
49. I'm absent-minded in daily activities.	0	1	2	3
50. I am restless or overactive.	0	1	2	3
51. I depend on others to keep my life in order and attend to the details.	0	1	2	3
52. I annoy other people without meaning to.	0	1	2	3
53. Sometimes my attention narrows so much that I'm oblivious to everything else; other times it's so broad that everything distracts me.	0	1	2	3
54. I tend to squirm or fidget.	0	1	2	3
55. I can't keep my mind on something unless it's really interesting.	0	1	2	3
56. I wish I had greater confidence in my abilities.	0	1	2	3
57. I can't sit still for very long.	0	1	2	3
58. I give answers to questions before the questions have been completed.	0	1	2	3
59. I like to be up and on the go rather than being in one place.	0	1	2	3
60. I have trouble finishing job tasks or schoolwork.	0	1	2	3
61. I am irritable.	0	1	2	3
62. I interrupt others when they are working or playing.	0	1	2	3
63. My past failures make it hard for me to believe in myself.	0	1	2	3
64. I am distracted when things are going on around me.	0	1	2	3
65. I have problems organizing my tasks and activities.	0	1	2	3
66. I misjudge how long it takes to do something or go somewhere.	0	1	2	3

CAARS–Observer: Long Version (CAARS–O:L)

by C. K. Conners, Ph.D., D. Erhardt, Ph.D., & E. P. Sparrow, M.A.

Person Being Described	Observer
Name: _____	Your Name: _____
Gender: M F (Circle One) Age:_____	Gender: M F (Circle One) Age:_____

Today's Date:____/____/____ (Month Day Year) I am this person's: ❒ spouse ❒ parent ❒ sibling ❒ other: _____

Instructions: Listed below are items concerning behaviors or problems sometimes experienced by adults. Read each item carefully and decide how much or how frequently each item describes this person recently. Indicate your response for each item by circling the number that corresponds to your choice. Use the following scale: 0 = Not at all, never; 1 = Just a little, once in a while; 2 = Pretty much, often; and 3 = Very much, very frequently.

The person being described...	Not at all, never	Just a little, once in a while	Pretty much, often	Very much, very frequently
1. likes to be doing active things.	0	1	2	3
2. loses things necessary for tasks or activities (e.g., to-do lists, pencils, books, or tools).	0	1	2	3
3. doesn't plan ahead.	0	1	2	3
4. blurts out things.	0	1	2	3
5. is a risk-taker or a daredevil.	0	1	2	3
6. gets down on self.	0	1	2	3
7. doesn't finish things.	0	1	2	3
8. is easily frustrated.	0	1	2	3
9. talks too much.	0	1	2	3
10. is always on the go, as if driven by a motor.	0	1	2	3
11. is disorganized.	0	1	2	3
12. says things without thinking.	0	1	2	3
13. has a hard time staying in one place very long.	0	1	2	3
14. gets rowdy or boisterous during leisure activities.	0	1	2	3
15. is not sure of self.	0	1	2	3
16. has a hard time keeping track of several things at once.	0	1	2	3
17. is always moving even when attempting to be still.	0	1	2	3
18. forgets to remember things.	0	1	2	3
19. has a short fuse/hot temper.	0	1	2	3
20. is bored easily.	0	1	2	3
21. leaves seat when not supposed to.	0	1	2	3
22. has trouble waiting in line or taking turns with others.	0	1	2	3
23. throws tantrums.	0	1	2	3
24. has trouble keeping attention focused when working or at leisure.	0	1	2	3
25. seeks out fast paced, exciting activities.	0	1	2	3
26. avoids new challenges because of lack of faith in his/her abilities.	0	1	2	3
27. appears to be restless inside even when sitting still.	0	1	2	3
28. is distracted by sights or sounds when trying to concentrate.	0	1	2	3
29. is forgetful in daily activities.	0	1	2	3
30. is set off easily by many things.	0	1	2	3
31. dislikes quiet, introspective activities.	0	1	2	3
32. loses things needed for work or tasks.	0	1	2	3
33. has trouble listening to what other people are saying.	0	1	2	3

Items continued on back page...

CAARS–Observer Scale (Long Version)

by C. Keith Conners, Ph.D., D. Erhardt, Ph.D., & E. P. Sparrow

	Not at all, never	Just a little, once in a while	Pretty much, often	Very much, very frequently
34. is an underachiever.	0	1	2	3
35. interrupts others when talking.	0	1	2	3
36. changes plans/jobs in midstream.	0	1	2	3
37. acts okay on the outside, but appears unsure of self.	0	1	2	3
38. is always on the go.	0	1	2	3
39. makes comments or remarks that are regretted later.	0	1	2	3
40. can't get things done unless there's an absolute deadline.	0	1	2	3
41. fidgets (with hands or feet) or squirms in seat.	0	1	2	3
42. makes careless mistakes or has trouble paying close attention to details.	0	1	2	3
43. steps on people's toes without meaning to.	0	1	2	3
44. has trouble getting started on a task.	0	1	2	3
45. intrudes on others' activities.	0	1	2	3
46. appears to exert a great deal of effort when trying to sit still.	0	1	2	3
47. has unpredictable moods.	0	1	2	3
48. doesn't like academic studies/work projects where effort at thinking a lot is required.	0	1	2	3
49. is absent-minded in daily activities.	0	1	2	3
50. is restless or overactive.	0	1	2	3
51. depends on others to keep life in order and attend to the details.	0	1	2	3
52. unintentionally annoys other people.	0	1	2	3
53. sometimes overfocuses on details, at other times appears distracted by everything going on around him/her.	0	1	2	3
54. tends to squirm or fidget.	0	1	2	3
55. can't keep his/her mind on something unless it's really interesting.	0	1	2	3
56. expresses lack of confidence in his/her abilities.	0	1	2	3
57. can't sit still for very long.	0	1	2	3
58. gives answers to questions before the questions have been completed.	0	1	2	3
59. likes to be up and on the go rather than being in one place.	0	1	2	3
60. has trouble finishing job tasks or schoolwork.	0	1	2	3
61. is irritable.	0	1	2	3
62. interrupts others when they are working or busy.	0	1	2	3
63. expresses lack of confidence in self because of past failures.	0	1	2	3
64. appears distracted when things are going on around him/her.	0	1	2	3
65. has problems organizing tasks and activities.	0	1	2	3
66. misjudges how long it takes to do something or go somewhere.	0	1	2	3