ASSESSING THE DIAGNOSTIC UTILITY OF PROPOSED ADULT ADHD SYMPTOMS IN A YOUNG ADULT SAMPLE

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CHAPTER I

INTRODUCTION

Construct of ADHD

Attention-deficit/hyperactivity disorder (ADHD) is characterized by the American Psychiatric Association (APA; 2000) as developmentally inappropriate inattention, hyperactivity, and impulsivity that is impairing across various domains of individual functioning. ADHD is categorized as a childhood onset disorder with symptoms of ADHD being defined by the *Diagnostic and Statistical Manual for Mental Disorder-4th Edition, Text Revision (DSM-IV-TR)* (APA, 2000) as occurring before the age of seven. ADHD is a common disorder among children with the APA (2000) estimating that 3% to 7% of the childhood population has ADHD. Impairment in the school-age population is well documented (e.g. Fischer, Barkley, Edelbrock, & Smallish, 1990; Greene et al., 2001; Lahey et al., 1998). Children diagnosed as having ADHD have been rated by teachers to be less liked by classmates, have fewer friends than other children, and suffering from greater social impairment (Gaub & Carlson, 1997; Greene et al., 2001). Furthermore, children diagnosed with ADHD often evidence comorbid symptoms of the other disruptive behavior disorders: conduct disorder (CD) and oppositional defiant disorder (ODD) along with internalizing disorders at a higher rate than the normal population (APA, 2000).

Prevalence and Validity of Adult ADHD

Historically, ADHD was believed to abate once an individual went through puberty and reached adulthood. ADHD was conceptualized as a disorder that occurred in children and

adolescents who would "grow out" of the disorder by adulthood (Wender, 1987; DuPaul, Guevermont, & Barkley, 1991; Nadeau, 1995; Murphy & Barkley, 1996). However, researchers are now estimating that approximately 70% of children experience some lasting impairment into adulthood (Weiss, Hechtman, Milroy, & Perlman, 1985). In fact, four studies estimating the prevalence rates of adult ADHD based on *DSM-IV* (APA, 1994) criteria support the notion that ADHD symptomatology continues across the lifespan. First, as part of the National Comorbidity Survey with a large sample size of 3,199, the prevalence of adult ADHD was estimated to be 4.4% (Kessler et al., 2006). Secondly, Murphy and Barkley (1996) sampled 720 adults either applying for or renewing their drivers' licenses. Each participant had to meet current and childhood diagnostic criteria to be classified as having adult ADHD. In this study, the prevalence rate of adult ADHD was found to be 4.7%. Next, Heilingenstein, Conyers, Berns, and Smith (1998) assessed current ADHD symptomatology among 448 students at a large public university. When using a *DSM-IV* (APA, 1994) cut-off of six either inattentive or hyperactive-impulsive items, the prevalence rate of ADHD was found to be 4%. Finally, Faraone and Biederman (2005) conducted a telephone interview of 966 randomly selected adults and screened them for ADHD. A prevalence rate of 2.9% was found for participants who endorsed a diagnosis of ADHD in childhood and at the time of the study. Taken together, it appears that the prevalence rate of adult ADHD is approximately 3.5-4.5%, making it a fairly common disorder among adults.

Although not completely indicative of a disorder's validity, familial transmission studies could provide further evidence that adult ADHD is a valid disorder. For instance, Biederman et al. (1995) contacted 75 adults from a previous study who were diagnosed with *Diagnostic and Statistical Manual for Mental Disorders, 3rd Edition Revised* (*DSM-III-R*; APA, 1987) ADHD. Of the 75 adults, 31 had children. Of these 74 children, 48 (57%) met criteria for ADHD. In fact, 84% of the adults who had children had at least one child who met *DSM-III-R* criteria for ADHD. In addition, Manshadi, Lippman, O'Daniel, and Blackman (1983) studied the persistence of *DSM, 3rd Edition* (*DSM-III*; APA, 1980) Attention Deficit Disorder (ADD), Residual Type. The authors

found that 41% of the adults' siblings met criteria for ADD compared to 0% of the controls' siblings. Finally, Faraone, Biederman, Feighner, and Montuteaux (2000) examined data from two previous family studies of ADHD. The first study of ADHD boys included 140 ADHD probands, or individuals affected with the disorder, and 120 boys without ADHD. The second study of ADHD girls included 140 ADHD probands and 122 girls without ADHD. Child and adult relatives of both the male and female probands reported statistically significantly more *DSM-IV* (APA, 1994) inattentive symptoms and hyperactive-impulsive symptoms both past and current.

CHAPTER II

REVIEW OF LITERATURE

Pervasive Symptomatology of Adult ADHD

Research suggests that an overwhelming majority of individuals who were diagnosed as children with ADHD are continuing to evidence ADHD symptomatology in adolescence and adulthood (e.g. Barkley, Fischer, Edelbrock, & Smallish, 1990; Gittelman, Mannuzza, Shenker, & Bonagura, 1985; Manuzza et al., 1993; Murphy & Barkley, 1996; Weiss, Hechtman, Milroy, & Perlman, 1986). Weiss, Hechtman, Milroy, and Perlman (1985) conducted a 15 year follow-up study on 63 adults who evidenced severe hyperactive behavior and conduct problems at 6 to 12 years of age. At follow-up, 66% of the individuals with hyperactivity complained of at least one mild to severely disabling symptom of hyperactivity whereas only 7% of the control group had similar complaints. Moreover, significantly more individuals with hyperactivity were diagnosed as having more than one *DSM-III* (APA, 1980) diagnosis including antisocial personality disorder. They also complained of "feeling restless" and were functioning poorly when measured by the *Global Assessment Scale* (*GAS*) when compared to the control group. Likewise, Gittelman et al. (1985) found that 31% of the adults diagnosed as hyperactive at ages 6 to 12 received *DSM-III* attention deficit disorder with hyperactivity (ADD-H) diagnoses at follow-up compared to only 3% of controls. Barkley, Fischer, Edelbrock, and Smallish (1990) also conducted a study examining the status of 123 children with hyperactivity and 66 controls at an 8 year follow-up. The average age at follow-up for the children with hyperactivity was 14.9 years while the control group's age was an average of 13.9 years. The authors found that 71.5% of the adults with

hyperactivity met criteria for *DSM-III-R* (APA, 1987) ADHD while only 3% of the controls were diagnosed with ADHD when using an eight symptom cut-off. Finally, Mannuzza et al. (1993) conducted a study examining 103 boys with hyperactivity, 91 of which who completed a follow-up approximately 16 years later. The authors found a significant difference between the numbers of men with hyperactivity who were either diagnosed with *DSM-III-R* (APA, 1987) ADHD or evidenced clinically impairing ADHD symptomatology when compared to controls. In sum, these five studies strongly suggest that ADHD symptomatology does not fully remit in adulthood but rather appears to persist in the majority of individuals.

Impairment of Adult ADHD

Longitudinal studies examining the persistence of ADHD symptomatology have also shown evidence of impairment persisting across the lifespan and well into adulthood (e. g. Gittelman et al., 1985; Manuzza et al., 1993; Weiss & Hechtman, 1993). For example, Fischer, Barkley, Edelbrock, and Smallish (1990) conducted an 8 year follow-up study of both younger (12-14 year-olds) and older (15-20 year-olds) individuals originally referred for hyperactivity as children. Using the *Wide Range Achievement Test – Revised* (*WRAT-R*; Jastak & Wilkinson, 1984) to assess academic achievement, the individuals with hyperactivity showed significantly worse scores on the *WRAT-R* Spelling, Reading, and Arithmetic subtests than controls. Furthermore, the experimental group performed poorer on a measure of vigilance evidenced by making significantly more errors of omission and commission on the *Continuous Performance Task* (Gordon, 1987). Similarly, Woodward, Fergusson, and Horwood (2000) studied 941 young adults' driving behaviors at 21 years of age who had initially completed inattention measures at the age of 13. Participants were categorized according to the score they received on the inattention measures eight years ago. Results indicated that there were significant linear associations between inattention scores and aversive driving behavior. Specifically, those with higher inattention scores were more likely to be involved in an accident with injuries, drive when drunk or seriously intoxicated, be arrested for drinking and driving, driving without a license,

street racing, and have higher traffic violation scores. Finally, Barkley et al. (1993) conducted a 3 to 5 year follow-up study of driving behaviors of both a previously diagnosed *DSM-III-R* ADHD group (N = 35) and a control group (N = 36). The participants in the ADHD group were significantly more likely to drive without a license, have their license revoked, be involved in two or more motor vehicle crashes, be the subject at fault for an accident, and have either one or more or three or more traffic violations. Although the bulk of these studies examined hyperactive children, *DSM-III* ADD-H symptoms can be compared to current *DSM-IV* ADHD combined diagnostic criteria. Therefore, it is likely that these children not only evidenced hyperactive symptomatology but inattentive symptoms as well.

Literature on the impairment of adult ADHD has not been restricted only to longitudinal studies. In fact, there is a body of cross-sectional research suggesting that adults with ADHD symptomatology also experience significant impairment. Murphy, Barkley, and Bush (2001) compared an ADHD group (N = 105) to a control group (N=64) on measures of executive functioning. Results indicated that the ADHD group performed significantly poorer on measures of interference control (measured by the Stroop), inattention (measured by the CPT and WAIS-III Digit-Symbol Coding), response inhibition (measured by the CPT), and nonverbal working memory (measured by the Simon). These results are fairly consistent with other research in the area of executive functioning in adults with ADHD (e. g. Barkley, Murphy, & Kwasnik, 1996; Corbett & Stanczak, 1999).

Comorbidity is another way of assessing impairment in individuals. Research has shown that significant impairment in the form of comorbid disorders also occurs in individuals with adult ADHD. Barkley, Murphy, and Kwasnik (1996) found that more adults meeting criteria for *DSM*-IV (APA, 1994) met criteria for alcohol dependence or abuse, dysthymia, generalized anxiety disorder (GAD), ODD, learning disorder, and bulimia nervosa than controls. The ADHD group was also found to have committed significantly more antisocial acts including arrests, stealing, and illegal drug possession than the control group. Also, on the *Symptom Checklist 90 –*

Revised (*SCL-90R*; Derogatis, 1986) the ADHD group endorsed significantly more items on every scale then the control group, suggesting more universal impairment across a wide range of domains of functioning. In a study comparing 172 adults with ADHD and 30 clinically referred adults, Murphy and Barkley (1996) found that significantly more adults with ADHD had experienced symptoms of CD, ODD, and alcohol dependence or abuse than controls. A trend was also found for adults with ADHD to endorse more symptoms of antisocial personality disorder (APD) than controls. Furthermore, adults with ADHD had significantly higher scores on six subscales of the *SCL-90-R*, were significantly more likely to have changed jobs, dropped out of college, had fights during school, had lower than average grades, and been suspended than those adults in the control group.

Biederman et al. (1993) found that adults with *DSM-III-R* ADHD were significantly more likely to have a diagnosis of ODD, CD, APD, GAD, or social phobia. The authors also found that adults with ADHD appeared to experience more school dysfunction. Moreover, Gittelman et al. (1985) found that at follow-up, boys with hyperactivity were significantly more likely to have a substance use disorder and/or be involved with drugs than controls. Finally, Barkley and Murphy (2007), based on the literature, estimated that among clinically referred adults with ADHD: 24-35% have had ODD, 17-25% have had CD, 7-44% have APD currently, 21-53% have alcohol abuse or dependence, 24-43% have GAD, 16-31% have major depressive disorder (MDD), and 11-14% are more likely to receive a bipolar disorder diagnosis.

ADHD in College Students

ADHD symptomatology and impairment is also well documented within the college population. In a study examining self-esteem in students self-reported as ADHD in childhood compared to normal controls, the ADHD group reported significantly lower self-esteem (Dooling-Litfin & Rosen, 1997). Similarly, Grenwald-Mayes (2002) found that students previously diagnosed with ADHD reported lower scores on the *Quality of Life Questionnaire* (Evans & Cope, 1989) than typical control students. College students with ADHD

symptomatology have even shown deficits in heterosocial behavior (Canu & Carlson, 2003). In particular, those within the ADHD inattentive type subgroup were rated more negatively by female confederates in a one minute social interaction than controls. The authors therefore argue that college students exhibiting ADHD inattentive type symptomatology may experience rapid negative feedback in social situations when compared to controls.

Impairments in the form of anger problems and overall psychological functioning have also been elucidated. For instance, Ramirez et al. (1997) examined differences between an ADHD group and typical group and found that the ADHD group had significantly more amounts of trait and state anger, higher levels of anger expression, and higher levels of psychopathology in general as measured by the *SCL-90-R* (Derogatis, 1975). Similarly, in a study by Richards, Rosen, and Ramirez (1999) examining widespread pathology in college students via the Global Severity Index of the *SCL-90-R* (Derogatis, 1975) significant impairment within the ADHD group compared to controls was found. Specifically, those participants who endorsed ADHD symptomatology (and were verified by parental reports) had significantly higher scores on the Global Severity Index than controls. Also, participants who endorsed ADHD symptomatology but whose parents did not confirm their symptoms also scored significantly higher than controls. Richards, Deffenbacher, and Rosen (2002) also found that a high symptom ADHD group had significantly higher amounts of driving anger when compared to a low symptom ADHD group. Furthermore, the high ADHD group endorsed more psychopathology as measured by the Global Severity Index and more trait anger than the low symptom ADHD group.

Diagnostic Validity of Adult ADHD

Although it is clear that adults with ADHD experience significant impairment and are at significantly greater risk for a variety of debilitating comorbid disorders, the criteria and process of diagnosing ADHD in adults is in need of elucidation. Current *DSM-IV* (APA, 1994) diagnostic criteria were developed and normed on children and adolescents (Lahey, Applegate, McBurnett, Biederman, Greenhill et al., 1994). Secondly, there appears to be a growing body of evidence

suggesting that *DSM-IV* criteria might be less sensitive for diagnosing adults (e.g. Murphy & Barkley, 1996). Heilingenstein et al. (1998) revealed that using *DSM-IV* criteria for the 448 undergraduates in their sample was too extreme for diagnostic utility (only capturing 4%). The authors argued that using a cut-off of 4 or greater for inattention or hyperactivity would distinguish an individual who evidenced significant impairment. Likewise, Biederman, Mick, and Faraone (2000) followed individuals for four years to examine the persistence of ADHD. The authors defined symptomatic remission as occurring when an individual had fewer symptoms than required for a diagnosis. In turn, functional remission was defined as an individual having fewer than five symptoms of ADHD and scores above 60 on the Global Assessment of Functioning Scale. Strikingly, the authors found that an overall symptomatic remission rate of 60% while only a 10% rate of functional remission. Therefore, even though the individuals were failing to meet criteria for ADHD a substantial majority of them were still experiencing significant impairment. Similar age-dependent declines of individuals failing to meet criteria for ADHD are also reported elsewhere (Murphy and Barkley, 1996; Faraone, Biederman, & Mick, 2000). Other researchers have also argued that using a reduced diagnostic cut-off would be more clinically valid in an adult population (Heilingenstein et al., 1998; Ratey, Greenberg, Bemporad, & Lindem, 1992) while some researchers have suggested that adult ADHD symptoms may manifest in a more understated manner than with children (Wender, Wolf, & Wasserstein, 2001). The above evidence suggests that there is a strong need for specific criteria to be developed and normed on adults with ADHD symptomatology. Developing these diagnostic criteria would aid in identification and potential subsequent treatment of adults or college aged individuals that are still experiencing impairment but do not currently meet diagnostic criteria based on the *DSM-IV* (APA, 1994).

Attempting to satisfy this need, Barkley and Murphy (2006) conducted a study to identify possible symptoms for diagnosing ADHD in adults. The authors gathered symptoms that were commonly presented at an adult ADHD clinic and corresponded to Barkley's (1997) executive

functioning theory of ADHD. The item set tapped verbal impulsiveness, response inhibition, cognitive inhibition, working memory abilities, and numerous other areas. A pool of 91 items was initially compiled and tested via structured interviews on 146 adults with ADHD, 97 adults in a clinical control group, and 109 adults in a community control group.

Adults were only rated as evidencing a symptom if it they endorsed the item as occurring "often" or more frequently within the last six months. Through the structured interview it was found that all items occurred significantly more in the ADHD group than the community control group; however, the items also occurred more often in the clinical control group than the community control group. Therefore, items that occurred in at least two-thirds of the ADHD group and significantly more often in the ADHD group than the clinical control group were maintained, leaving 43 items. Four items were then removed due to close wording with *DSM-IV* (APA, 1994) criteria and the item pool of 39 was analyzed using logistic regression. Results from the regression analyses revealed that five items best discriminated individuals within the ADHD and community control group while six items best discriminated between the ADHD and clinical control group. Two identical items occurred in both groups of items leaving a final item pool of 9 symptoms, most of which reflect deficits in executive functioning.

Barkley and Murphy (2006) also conducted a factor analysis of both the existing 18 *DSM-IV* (APA, 1994) symptoms and the newly proposed 9 items while hypothesizing that a three factor structure would work best for ADHD in adults. The three factors were inattention, hyperactivity-impulsivity, and verbal impulsivity. The new items mostly loaded onto the first factor of attention and explained 44% of the variance while the second factor of hyperactivity-impulsivity explained 7% of the variance. Finally, the third factor, verbal impulsivity, only explained 4% of the variance.

The authors then conducted another logistic regression analysis using the pool of 27 *DSM-IV* (APA, 1994) and newly proposed items to determine which symptoms would have the most diagnostic utility. Four items were best able to discriminate the ADHD group from the

community control group: *being easily distracted, difficulty sustaining attention, difficulty organizing tasks and activities, and poor follow-thorough on promises or commitments*. Furthermore, seven symptoms best distinguished the ADHD group from the clinical control group: *often leaves seat in classroom or in other situations in which remaining seated is expected, makes decisions impulsively, difficulty stopping activities or behaviors, starts projects or tasks without reading or listening to directions carefully, has poor follow-through on promises, has trouble doing things in proper order,* and *drives with excessive speed*. However, the criteria *often leaves seat in classroom or in other situations in which remaining seated is expected* actually served to negatively predict the ADHD group relative to the clinical control group. Therefore, combining the two symptom lists produced a set of nine items; three from the *DSM-IV* criteria and six new items that largely tap executive functioning. Moreover, the list does not contain any hyperactive symptomatology possibly meaning that adults diagnosed with ADHD can only evidence the Inattentive Type of ADHD. Barkley and Murphy (2006) recommend that a diagnostic cutoff of six items out of nine be used and that some symptom impairment was experienced before 16 years of age. Finally, the authors state that the proposed criteria should be cross-validated before being considered for clinical purposes in the *DSM-V*.

The Current Study

Given the clear need for valid diagnostic criteria for assessing ADHD in adults, the current study was designed to cross-validate the proposed adult criteria of Barkley and Murphy (2006) on a college sample. The study could then aid in determining whether the criteria proposed by these authors for adults are reliable and valid for young adults (i.e., college students). Participants were grouped into an ADHD group, a clinical control group, and a typical control group. Participants completed measures of *DSM-IV* (APA, 1994) ADHD symptomatology and the proposed adult ADHD items. Preliminary analyses were conducted to determine differences of age, high school and college GPA, and ACT scores between the ADHD, clinical, and control groups. Analyses were also conducted to determine if the groups differed on *DSM-IV*

hyperactivity and inattention, proposed adult criteria, and impairment scores. Additionally, analyses were conducted to see how the *DSM-IV* criteria and the proposed adult criteria correlated and which items accounted for unique variance in determining impairment. Finally, analyses were conducted to determine whether participants meeting *DSM-IV* criteria or the proposed adult criteria experienced more impairment.

Specific hypotheses were as follows: (a) *DSM-IV* (APA, 1994) criteria and the proposed adult criteria were expected to be significantly correlated; (b) the proposed adult criteria were expected to account for unique variance in impairment scores; (c) Individuals who met *DSM-IV* criteria and the proposed adult criteria were expected to have higher levels of impairment than individuals who only met *DSM-IV* criteria.

CHAPTER III

METHODOLOGY

Participants

Participants were recruited for an ADHD group, a clinical control group, and a typical control group. Participants were recruited from Appalachian State University, Oklahoma State University, and the University of Wyoming. The ADHD group consisted of individuals recruited from student disability services, the university research participant pools, and flyers at all three universities. Individuals were included in the ADHD group even if they also reported comorbid diagnoses (e.g. ADHD and a mood disorder). The clinical control group consisted of men and women who endorsed having a previous learning disorder or mood disorder but not ADHD and was recruited in the same way as the ADHD group.

Participants recruited from student disability services and posted flyers were paid $10.00 for their participation regardless of whether they were placed in the ADHD or clinical control group. Likewise, participants in the typical control group received one hour of course credit for their participation even if they were included into the ADHD or clinical control group based on their item responses. The participant measures took approximately an hour to complete. The money was sent to the participants' home address provided to the experimenter on the debriefing page.

Measures

Participant Demographics Form. Demographic items included participant's sex, date of birth, ethnicity/race, number of years of education completed, high school grade point average

(GPA) range, college GPA range, college entrance exam scores (i.e., ACT and/or SAT), history of receiving treatment (e.g., medication or therapy) for mental health problems, and date of initial ADHD diagnosis and diagnostician (if applicable). High school and college GPA were coded on a 0 to 7 scale in .5 increments. Specifically, the scores were as follows: 0 = 0.0-0.5, 1 = 0.6-1.0, 2 = 1.1-1.5, 3 = 1.6-2.0, 4 = 2.1-2.5, 5 = 2.6-3.0, 6 = 3.1-3.5, and 7 = 3.6-4.0. High school and college GPA were conceptualized as potentially reflecting an individual's level of impairment.

Barkley's Current Symptoms Scale – Self-Report Form (Current Self-Report). This form included 18 ADHD items and 10 impairment items completed by participants. Reporters were instructed to rate their current behavior over the past 6 months. This rating scale closely followed the *DSM-IV-TR (DSM-IV-TR;* APA, 2000*)* for ADHD and ODD diagnoses and took 10 to 15 minutes to complete. Impairment items measured the degree in which a participant's symptoms interfered with their home life, occupation, social interactions, community activities, educational activities, dating or marital relationship, money management, driving of a motor vehicle, recreational activities, and management of daily responsibilities. All items required a choice of four responses including "Never/Rarely," "Sometimes," "Often," or "Very Often."

New Adult ADHD Symptoms. Barkley and Murphy (2006) proposed nine items to address ADHD and executive functioning in adults. Three of these items were taken from the *DSM-IV* (APA, 1994) while the other six were taken from a larger item pool of 91 executive functioning items. These nine items were proposed to have better validity for adults than the *DSM-IV* ADHD items. Participants were asked to complete the scale by indicating how often, within the last six months, they displayed each of the 9 symptoms on a four-point scale including "Never/Rarely," "Sometimes," "Often," or "Very Often."

Procedure for Participants

The current study was completed online. Participants in the ADHD and clinical control groups were recruited through student disability services or through mental health clinics on the three college campuses. As previously stated, participants in the clinical and typical control

groups may have been included in the ADHD group or deleted depending on how the data was examined. The directors of student disability services sent out a listserv e-mail to all students currently receiving services at Oklahoma State University and the University of Wyoming. At Appalachian State University, the same email was distributed to individuals currently receiving tutoring services. The e-mail included a brief outline of the study, details about compensation, and a hyperlink to the experiment website (Appendix A). Participants in the typical control group were recruited through the three university research participant pools. The same brief description of the study and compensation was provided on the participant recruitment website along with a hyperlink to the experiment website.

The first page of the experiment website included the informed consent (Appendix B). The informed consent included an outline of the purpose of the study, procedure, duration, risks, benefits, and compensation. In addition, it stated that participation was voluntary, outlined the limits of confidentiality, and provided researcher contact information. The experiment took less than one hour and the risks were anticipated to be no greater than those involved in a routine psychological examination. Confidentiality was maintained by having participants' results and identifiable information sent to separate password protected databases where each participant could only be identified via an assigned number.

Following informed consent, additional measures described previously were presented (Appendix C): (a) the demographic information page was presented, (b) *Barkley's Current Self-Report* measure was presented, and (c) the *New Adult ADHD Symptoms* were presented.

After completing and submitting all of the above items, participants were presented with a debriefing page. The debriefing page for those recruited through the participant pools stated the purpose of the study and provided places to input participant information including participants' name and university identification number so that extra credit could be issued for participation (Appendix D). The debriefing page for those recruited through disability services and/or campus mental health clinics contained the same information with one exception. Participants were asked

for their home address, rather than their university identification number, so that monetary compensation could be sent instead of extra credit being issued (Appendix E). Participants were also asked to provide information for one person who could attest to their current behavior (within the last 6 months). These collateral informants were then asked to complete measures that would be compared to the participant's answers to examine validity; however, due to a low initial response, collecting data from collateral informants was discontinued. Finally, contact information for the principal investigator, faculty advisor, and IRB chair was provided in case the participant has questions about the research study.

Data Analysis

In the interest of complete analysis, ADHD group membership was assigned in two ways, with each iteration of the data set analyzed separately. The data was examined with: (a) participants from the typical and clinical control group who either endorsed a formal ADHD diagnosis or currently met *DSM-IV* (APA, 1994) criteria for ADHD included in the ADHD group and (b) participants from the participants in the ADHD group only consisted of individuals who currently met *DSM-IV* criteria for ADHD.

When examining the data with control participants who endorsed a formal ADHD diagnosis or currently met *DSM-IV* (APA, 1994) criteria there were 1,047 total participants. Three hundred and fifty-one participants were recruited from Appalachian State University, 358 from Oklahoma State University, and 338 from the University of Wyoming. The ADHD group consisted of 76 men and 97 women. Within the ADHD group, 123 participants endorsed having a formal diagnosis of ADHD while 50 participants currently met ADHD criteria but did not have a formal diagnosis. The clinical control group consisted of 42 men and 96 women and the typical control group consisted of 337 men and 399 women recruited via the university research participant pools. Participant demographics are displayed in Table 1. The ethnic composition of the sample was 85.0% Caucasian, 3.8% African American, 3.6% Hispanic/Latino, 3.2% Native American, 2.0% Asian American, 1.3% biracial, and 0.8% other. There was no significant

difference in the distribution of ethnicity across ADHD, clinical and control groups (X^2 (2, N = 1044) = 0.42, p = .810) when ethnicity was coded as Caucasian vs. non-Caucasian.

When examining the data by including participants in the ADHD group only if they currently met *DSM-IV* (APA, 1994) criteria, there were 981 participants. Three hundred and twenty-eight participants were recruited from Appalachian State University, 331 from Oklahoma State University, and 322 from the University of Wyoming. The ADHD group consisted of 41 men and 66 women. The clinical control group consisted of 42 men and 96 women. The typical control group consisted of 337 men and 399 women recruited via the university research participant pools. Participant demographics are displayed in Table 2. The ethnic composition of the sample was 84.9% Caucasian, 3.9% African American, 3.8% Hispanic/Latino, 3.3% Native American, 1.9% Asian American, 1.4% biracial, and 0.8% other. There was no significant difference in the distribution of ethnicity across ADHD, clinical and control groups (X^2 (2, N = 978) = 0.59, p = .594) when ethnicity was coded as Caucasian vs. non-Caucasian.

CHAPTER IV

FINDINGS

Results

The hypotheses were of the current study were: (a) *DSM-IV* (APA, 1994) criteria and Barkley and Murphy's (2006) proposed adult criteria would be significantly correlated in a young adult college student sample; (b) the proposed adult criteria would account for unique variance in impairment measures; and (c) individuals who met *DSM-IV* criteria and/or the proposed adult criteria would have higher levels of impairment than individuals who only met *DSM-IV* criteria.

Preliminary Analyses

Preliminary analyses were conducted with age, high school grade point average (GPA), college GPA, and ACT scores examined with one-way analysis of variance (ANOVA) tests. Since the year a participant took the SAT was not asked, SAT scores were not examined due to the recent change in the range of possible scores. Tukey's post-hoc pairwise comparisons were used to determine what differences, if any, existed between the ADHD, clinical, and typical control groups. For the following analyses, group (i.e., ADHD, clinical control, typical control) was the IV.

Since the data were analyzed in two separate ways, the results are presented in the same manner. First, results are presented with participants from the typical and clinical control group who either endorsed a formal ADHD diagnosis, or currently met *DSM-IV* (APA, 1994) criteria for ADHD, included in the ADHD group. Second, results are presented with participants in the ADHD group only consisting of individuals who currently met *DSM-IV* criteria for ADHD regardless of whether they reported a formal ADHD diagnosis.

Preliminary analyses with controls who endorsed ADHD included in ADHD group. An ANOVA with age as the dependent variable (DV) revealed a statistically significant main effect $F(2, 1045) = 26.32$, $p < .001$ such that the clinical control group was significantly older than the ADHD and typical control groups. A one-way ANOVA with high school GPA as the DV also revealed a statistically significant main effect $F(2, 1045) = 31.03$, $p < .001$ such that the ADHD group reported statistically significantly lower mean high school GPA than the clinical or typical control group. Similarly, an ANOVA with college GPA as the DV revealed a statistically significant main effect for group $F(2, 1045) = 8.64$, $p < .001$ such that the ADHD group reported statistically significantly lower GPA than the clinical and typical control groups. An ANOVA with ACT score as the DV did not reveal a statistically significant main effect for group, $F(2, 1045) = 1.84$, $p = .160$. Results are displayed in Table 3.

Preliminary analyses with participants grouped based on DSM-IV. An ANOVA with group age as the DV revealed a statistically significant main effect $F(2, 997) = 26.81$, $p < .001$ such that the ADHD and clinical control groups were significantly older than the typical control group. An ANOVA high school GPA range as the DV also revealed a statistically significant main effect $F(2, 997) = 19.35$, $p < .001$. Specifically, the ADHD group had statistically significantly lower mean high school GPA range than either the clinical or typical control groups. Additionally, an ANOVA with college GPA range as the DV showed a statistically significant main effect for group $F(2, 997) = 5.55$, $p = .004$ such that the ADHD group had a significantly lower average GPA than the clinical or typical control groups. Finally, an ANOVA ACT score as the DV did not reveal a statistically significant main effect for group $F(2, 997) = 1.96$, $p = .142$. Results are displayed in Table 4.

Relations among DSM-IV Criteria, Barkley Criteria, and Impairment

To determine whether the ADHD, clinical control, and typical control groups' mean scores differed in regards to *DSM-IV* (APA, 1994) inattention and hyperactivity criteria, the proposed adult criteria, and impairment, one-way ANOVAs with group as the IV were conducted.

ACT scores were not examined because a limited number of participants (approximately 40%) did not report an ACT score.

ANOVA analyses with controls who endorsed ADHD included in the ADHD group. One-way ANOVAs with *DSM-IV* (APA, 1994) inattention criteria, hyperactivity criteria, the proposed adult criteria, and impairment as DVs were conducted. All ANOVA analyses revealed a significant main effect for group ($p < .001$) such that the ADHD group was significantly higher than the clinical or typical control group. The respective means, *F,* and significance values are listed in Table 5.

ANOVA analyses with participants grouped based on DSM-IV. Again, one-way ANOVAs with *DSM-IV* (APA, 1994) inattention criteria, hyperactivity criteria, the proposed adult criteria, and impairment as DVs were conducted. All ANOVAs revealed a significant main effect for group ($p < .001$) such that the ADHD group was significantly higher than the clinical and typical control groups. The respective means, *F*-values, and significance values are listed in Table 6.

Internal Consistency Reliability

Internal consistency reliability is the degree of consistency among the items within a measure (Kazdin, 2003). Cronbach's alpha values were calculated to measure internal consistency. Values of .69 or lower are referred to as "unacceptable," .70 to .79 are referred to as "acceptable," .80 to .89 are referred to as "good," and .90 or higher are referred to as "excellent" (Charter, 2003; Henson, 2001). To establish internal consistency Cronbach's alpha was calculated for *DSM-IV* (APA, 1994) inattention and hyperactivity, the proposed adult items, and impairment.

Internal consistency reliability with controls who endorsed ADHD included in the ADHD group. Internal consistency reliability values for *DSM-IV* (APA, 1994) inattention and hyperactivity, impairment, and the proposed adult criteria are listed in Table 5. Cronbach's alpha scores for *DSM-IV* inattention were good for all groups. Additionally, *DSM-IV* inattention Cronbach's alpha values were higher than those for hyperactivity and the proposed adult criteria.

Cronbach's alpha for *DSM-IV* hyperactivity within the ADHD group was also good; however, the clinical and typical control group demonstrated adequate internal consistency reliability. The proposed adult criteria had good internal consistency reliability across groups.

In order to test the significance of the difference between alpha values, Fisher's *z* transformations were used to compare independent correlations (Cohen & Cohen, 1983). First, Cronbach's alpha for *DSM-IV* (APA, 1994) inattention in the ADHD group was not significantly different when compared to the clinical ($z = 1.35$, $p =$. 089) and typical control ($z = 1.50$, $p = .067$) groups. The internal consistency reliability value for *DSM-IV* hyperactivity in the ADHD group was significantly higher than the clinical control ($z = 2.50$, $p = .006$) and typical control ($z = 3.41$, $p < .001$) groups. Cronbach's alpha for the proposed adult criteria in the ADHD group was not significantly different from the clinical control ($z = 0.27$, $p = .394$) or typical control ($z = 1.03$, $p = .151$) groups.

Internal consistency reliability with participants grouped based on DSM-IV. Internal consistency reliability values for *DSM-IV* (APA, 1994) inattention and hyperactivity, impairment, and the proposed adult criteria are listed in Table 6. Overall, reliability values appeared to be slightly lower when examining the data compared to the other grouping method. Cronbach's alpha scores for *DSM-IV* inattention were higher than those for hyperactivity. Internal consistency reliability scores for *DSM-IV* inattention were good across groups. *DSM-IV* hyperactivity alpha values were adequate across groups. The proposed adult criteria demonstrated good reliability across groups.

In order to test the significance of the difference between alpha values, Fisher's *z* transformations were again used to compare independent correlations (Cohen & Cohen, 1983). Cronbach's alpha for *DSM-IV* (APA, 1994) inattention in the ADHD group was not significantly different from the clinical control ($z = 0$, $p = .5$) or typical control ($z = 0.27$, $p = .393$) group. The internal consistency reliability value for *DSM-IV* hyperactivity in the ADHD group was not significantly higher than the clinical control ($z = 0.16$, $p = .435$) or typical control ($z = 0.21$, $p =$

.418) group. Cronbach's alpha for the proposed adult criteria in the ADHD group was not significantly different than the clinical control ($z = 0.65$, $p = .259$) or typical control ($z = 0.26$, $p = .399$) group.

Comparison of internal consistency reliability. To determine if the internal consistency reliability values were significantly different based on data grouping, Fisher's *z* transformations were again used to compare independent correlations (Cohen & Cohen, 1983). Cronbach's alpha for *DSM-IV* inattention in the ADHD group was not significantly different ($z = 1.26$, $p = .104$) when examining the data with controls who endorsed ADHD included in the ADHD group compared to grouping based on the *DSM-IV*. The internal consistency reliability value for *DSM-IV* hyperactivity in the ADHD group was significantly higher ($z = 2.16$, $p = .015$) when examining the data with controls who endorsed ADHD included in the ADHD group compared to grouping based on the *DSM-IV*. Finally, Cronbach's alpha for the proposed adult criteria in the ADHD group was not significantly different ($z = 0.93$, $p = .177$) when examining the data with controls who endorsed ADHD included in the ADHD group compared to grouping based on the *DSM-IV*.

Correlational Analyses

In order to determine if *DSM-IV* (APA, 1994) inattention and hyperactivity symptoms were correlated with the proposed adult criteria, bivariate correlations were conducted. Due to the overlap of three *DSM-IV* items in the proposed adult criteria, correlation analyses were conducted with those items removed. Additionally, impairment was examined in the correlational analyses. All correlations were significant at the $p < .001$ level. Results of the correlational analyses are displayed in Table 8.

Regression analyses

Regression analyses were conducted to determine whether the *DSM-IV* (APA, 1994) criteria and/or the proposed adult criteria accounted for unique variance in impairment. Once again, due to the overlap between three of the *DSM-IV* and the proposed adult items, analyses

were conducted without the three redundant items. Based on preliminary analyses, age was included in Step 1 of each regression as a covariate. Due to the number of analyses a Bonferroni correction was conducted making the alpha level .01 for the following analyses.

First, impairment was examined as the DV and *DSM-IV* (APA, 1994) inattention and hyperactivity mean scores and the proposed adult criteria reduced item set. The proposed adult criteria ($\beta = .28$, $p < .001$) and *DSM-IV* inattention ($\beta = .37$, $p < .001$) and hyperactivity ($\beta = .20$, $p < .001$) accounted for unique variance in impairment scores.

Next, high school GPA was examined as the DV with the same three IVs entered in Step 2. The proposed adult criteria ($\beta = -.08$, $p = .087$) did not account for unique variance while *DSM-IV* inattention ($\beta = -.24$, $p < .001$) accounted for unique variance in high school GPA. *DSM-IV* hyperactivity was marginally significant ($\beta = .11$, $p = .016$) in high school GPA.

Finally, another linear regression was conducted with the same IVs but college GPA entered as the DV. When using the reduced proposed adult criteria, the proposed adult criteria ($\beta = -.25$, $p < .001$) *DSM-IV* hyperactivity ($\beta = .15$, $p = .002$) accounted for unique variance in college GPA. *DSM-IV* inattention ($\beta = -.11$, $p = .032$) did not account for unique variance.

Comparison of Impairment

To determine whether participants who met *DSM-IV* (APA, 1994) criteria or the proposed adult criteria experienced more impairment, independent samples *t*-tests were conducted. Specifically, impairment was examined between those participants who meet criteria for *DSM-IV* Inattentive Type or Hyperactive Type, the proposed adult criteria, or both *DSM-IV* criteria or the proposed adult criteria, and those who did not meet criteria for any of the previous. Due to the number of analyses, a Bonferroni adjustment was conducted. Therefore, the alpha level was set at .01 for the following analyses.

T-test analyses with controls who endorsed ADHD included in the ADHD group. Individuals who met either Inattentive or Hyperactive Type *DSM-IV* (APA, 1994) criteria ($M = 16.36$, $SD = 5.88$) had significantly higher impairment scores that those who did not meet any

criteria (M = 5.76, SD = 5.88) t(122.90) = -17.96, p < .001, d = 2.14. Participants who met the proposed adult criteria (M = 17.84, SD = 8.85) had significantly higher impairment scores than those who did not meet any criteria (M = 6.09, SD = 5.11), t(1045) = -18.01, p < .001, d = 2.28. Participants who met both *DSM-IV* criteria and the proposed adult criteria (M = 19.88, SD = 4.74) endorsed significantly higher impairment than those who did not meet any criteria (M = 6.22, SD = 5.19) t(1045) = -17.87, p < .001, d = 2.64. Participants who met both *DSM-IV* and the proposed adult criteria (M = 19.88, SD = 4.74) also had significantly higher impairment scores than those who met either *DSM-IV* or the proposed adult criteria (M = 13.31, SD = 5.16) t(124) = -7.16, p < .001, d = 1.32.

T-test analyses with participants grouped based on DSM-IV. Individuals who met either Inattentive or Hyperactive Type *DSM-IV* (APA, 1994) criteria (M = 16.36, SD = 5.88) had significantly higher impairment scores that those who did not meet any criteria (M = 5.47, SD = 4.75) t(123.48) = -18.43, p < .001, d = 2.23. Participants who met the proposed adult criteria (M = 18.43, SD = 5.42) had significantly higher impairment scores than those who did not meet any criteria (M = 5.88, SD = 5.10) t(979) = -18.53, p < .001, d = 2.45. Participants who met both *DSM-IV* criteria and the proposed adult criteria (M = 19.88, SD = 4.74) endorsed significantly higher impairment than those who did not meet any criteria (M = 5.98, SD =5.16) t(979) = -18.27, p < .001, d = 2.71. Finally, participants who met both *DSM-IV* criteria and the proposed adult criteria (M = 19.88, SD = 4.74) had significantly higher impairment scores than those who met either *DSM-IV* or the proposed adult criteria (M = 13.43, SD = 5.00) t(118) = -7.06, p < .001, d = 1.33.

CHAPTER V

CONCLUSION

DSM-IV and Barkley hypotheses

The aim of this study was to test the hypotheses that: (a) *DSM-IV* (APA, 1994) criteria and Barkley and Murphy's (2006) proposed adult criteria were significantly correlated in a young adult college student sample; (b) the proposed adult criteria accounted for unique variance in impairment measures; and (c) individuals who met *DSM-IV* criteria and/or the proposed adult criteria would have higher levels of impairment than individuals who only met *DSM-IV* criteria.

Correlational Analyses

It was hypothesized that *DSM-IV* ADHD criteria and the proposed adult criteria would be significantly correlated. In order to reduce collinearity, the three items from the *DSM-IV* that Barkley and Murphy used in their item set were deleted for these analyses. The proposed adult criteria were more strongly correlated with *DSM-IV* inattention than with *DSM-IV* hyperactivity. As predicted, the proposed adult criteria were significantly correlated with *DSM-IV* inattention and hyperactivity symptoms. The proposed adult criteria were also significantly correlated with impairment.

The finding that *DSM-IV* inattention was more highly correlated with the proposed adult criteria than *DSM-IV* hyperactivity may be due to the hyperactivity items having less relevance for adults than the inattention items and the proposed adult criteria. For instance, questions such as *leave my seat in situations in which remaining seated is expected* and *have difficulty awaiting my turn* can often be seen in children attending school; however, these overt hyperactivity symptoms are less frequent as an individual grows older (Wender, 1987). Although some of these overt symptoms can fade as an individual grows older, other hyperactivity symptoms such as

interrupts or intrudes on others and *feels restless* are thought to be more likely to persist into adulthood and cause continued impairment (e.g. Gittelman et al., 1985; Manuzza et al., 1993). Therefore, there were likely more inattention symptoms that were relevant for young adults than hyperactivity symptoms.

Another possible explanation is that all of the proposed adult items were designed to measure executive functioning and inhibition. Barkley's (1997) model of ADHD centers around behavioral and response inhibition, verbal and nonverbal working memory, self-regulation, and planning; all of which are thought to be involved with executive functioning. Finding stronger correlations between the proposed adult criteria and *DSM-IV* inattention symptoms could be explained by the documented relation between inattention and executive functioning. For example, Fisher, Barkley, Edelbrock, and Smallish (1990) found that individuals with ADHD made more vigilance errors on a *continuous performance task* (Gordon, 1987). Furthermore, studies of excessive speeding and wreckless driving, which are thought to be related to executive functioning, have been shown to be related to inattention rather than hyperactivity (Barkley et al., 1993; Woodward, Fergusson, & Horwood, 2000).

Regression Analyses

Next, it was hypothesized that the proposed adult criteria would account for unique variance in impairment in addition to any variance accounted for by the *DSM-IV* criteria. The proposed adult criteria accounted for unique variance in impairment and college GPA, as predicted, but not in high school GPA. Furthermore, *DSM-IV* inattention accounted for unique variance in impairment and high school GPA while *DSM-IV* hyperactivity accounted for unique variance in all three impairment measures.

Taken together appears that Barkley and Murphy's (2006) proposed adult criteria accounted for unique variance in impairment and college GPA but not high school GPA. The finding that the proposed adult criteria accounted for unique variance in impairment and college GPA provides incremental validity for their use in an adult or college aged population. However,

the finding that *DSM-IV* inattention and hyperactivity also accounted for unique variance suggests that the *DSM-IV* criteria also have diagnostic utility with this age group.

The finding that both the proposed adult criteria and *DSM-IV* criteria may have diagnostic utility fits well with previous research. Historically, one limitation of using *DSM-IV* criteria with adults was the fact that they were developed and field tested on children (Lahey, Applegate, McBurnett, Biederman, Greenhill et al., 1994). Therefore, researchers have questioned the diagnostic utility of *DSM-IV* criteria for adults (Murphy & Barkley, 1996; Barkley & Murphy, 2006). Subsequent studies have shown that *DSM-IV* ADHD symptoms do persist into adulthood for some individuals (e.g. Kessler et al., 2006) but that adult ADHD symptoms may manifest in a more understated manner than with children (Wender, Wolf, & Wassertein, 2001). Therefore, researchers have argued that reduced cutoff scores for adults with ADHD may be necessary and more clinically valid (e.g. Ratey, Greenberg, Bemporad, & Lindem, 1992). For instance, Heilingenstein et al. (1998) argued that a diagnostic cutoff score of four or more symptoms of *DSM-IV* inattention or hyperactivity would be adequate to distinguish a college student from the norm.

Barkley and Murphy (2006) remedied some of these concerns by developing new diagnostic criteria specifically for adults that centered on executive functioning. The authors also demonstrated that their diagnostic criteria can impressively classify and distinguish among individuals with ADHD, other mental health problems, and controls. Barkley and Murphy, however, used a sample with a mean age of 32 to 37 years of age depending on group. The participants in the current study had a mean age of 20. The age differences in the study samples may explain the different findings. In other words, due to a younger sample, both the proposed adult criteria and *DSM-IV* criteria appeared to have diagnostic utility in college-aged individuals. The developmental nature of the proposed adult criteria could also explain the finding that the proposed adult criteria and *DSM-IV* criteria accounted for unique variance in impairment and college GPA while the *DSM-IV* criteria also accounted for unique variance in high school GPA.

Since the proposed adult criteria were created for a different developmental level than the *DSM-IV* criteria, the discrepancies between the two sets of criteria are not surprising. However, this may suggest that the proposed adult criteria have reduced validity when examining impairment at a younger age.

Based on this information, a combination of these two items sets would maximize the probability of identifying a college aged individual who may be experiencing clinically significant and impairing ADHD symptomatology. It appears that both the *DSM-IV* criteria and the proposed criteria should be used for young adults whereas just the new criteria, including the three inattention symptoms might be used for slightly older adults such as those tested by Barkley and Murphy.

Additionally, the regression analyses were once again conducted with only 6 of the proposed adult criteria instead of the full 9. According to Barkley and Murphy (2006), one of the *DSM-IV* items that was included in the proposed adult criteria, *being easily distracted*, was the best predictor of group membership. Therefore, removing that item along with two other *DSM-IV* items from the proposed adult criteria potentially limited the diagnostic criteria compared to the *DSM-IV* criteria. The finding that the proposed adult criteria accounted for unique variance with this handicap provides additional evidence for there diagnostic utility.

Comparison of Impairment

It was hypothesized that those individuals who met both *DSM-IV* criteria and the proposed adult criteria would have higher levels of impairment than individuals who only met *DSM-IV* criteria. The three *DSM-IV* items that Barkley and Murphy used in their item set were not deleted for these analyses because the proposed adult criteria cutoff score of six or more items would not have been valid. For the *t*-test analyses, examining the data based on *DSM-IV* grouping or with controls moved did not impact the results. Individuals who met criteria for either *DSM-IV* Inattentive or Hyperactive Type had significantly higher impairment than those who did not. Participants who met the proposed adult criteria also had significantly higher impairment than

those who did not. As predicted, participants who met both *DSM-IV* and the proposed adult criteria endorsed significantly higher impairment than those who did not meet either criteria set. Furthermore, participants who met both *DSM-IV* criteria and the proposed adult criteria had significantly higher impairment scores than those who met criteria based on one set or the other.

In sum, these analyses strengthen the argument for the continued study of Barkley and Murphy's (2006) proposed adult criteria in adults of varying ages. The findings that individuals who met the proposed adult criteria experienced significantly greater impairment than those who did not and that participants who met both the proposed adult criteria and *DSM-IV* criteria experienced significantly more impairment than those who met either one provides evidence that the proposed adult criteria add utility to the *DSM-IV* items for this age group.

Internal Consistency Reliability

Finally, through the internal consistency reliability analyses a few interesting trends emerged. First, Cronbach's alpha values were consistently lower when examining the data based on *DSM-IV* grouping. This finding possibly occurred due to the smaller *n* in the ADHD group when examining the data based on *DSM-IV* grouping. Having a larger number of individuals in the ADHD group allows for more power. Next, regardless of grouping, *DSM-IV* inattention items appeared to be the most reliable for the ADHD group and typical control group; however, the proposed adult criteria had the highest alpha value for the clinical control group. Additionally, the proposed adult criteria were invariably within one or two points of the *DSM-IV* inattention symptoms. Finally, *DSM-IV* hyperactivity symptoms demonstrated the poorest reliability for the ADHD, clinical, and typical control group. One exception to this occurred for the ADHD group when examining the data with controls moved.

These findings provide additional evidence that *DSM-IV* inattention and executive functioning are related. Since three of the *DSM-IV* inattention symptoms were used in the proposed adult criteria, the finding that the proposed adult criteria had an alpha value of .80 or higher (with one exception) suggests that the items are reliably measuring the same construct

even without the three inattention items included. Furthermore, the findings demonstrated that the proposed adult criteria are internally reliable across groups. When compared to "gold standard" diagnostic criteria such as the *DSM-IV*, the proposed adult criteria are approximately as reliable or better (depending on subtype) across groups. Therefore, these results provide more evidence suggesting that both the proposed adult items and *DSM-IV* inattention items have diagnostic utility for young adults. As suspected, *DSM-IV* hyperactivity symptoms demonstrated adequate reliability but it was not as strong as *DSM-IV* inattention and the proposed adult criteria.

Limitations

One limitation of this study was the method of collecting data. Since this study was completed online, determining the level of attention and concentration participants spent on the study is impossible. To counteract some degree of random responding, participants who left several questions unanswered were deleted from the data set. Specifically, if an individual did not answer three or more questions or appeared to select the same response for the majority of items in the data set (e.g. selecting "often" for all *DSM-IV* items) that participant's data was deleted. However, the possibility still remains that participants randomly responded to questions or did not carefully read through all items before selecting an answer. The researchers were also unable to determine the length of time spent on the survey. Knowing how long it took a given participant to complete all of the measures could provide information to aid in deciding whether to suspect someone of random responding.

Additionally, Barkley and Murphy's (2006) study was completed by interviewing subjects with 91 potential executive functioning items. Although the current study included all 91 items, collecting the data through and online checklist was not an exact replication. Using an interview to assess behavior could improve the likelihood that the participant fully understood the questions and allows the interviewer to expand on the item in order to achieve an accurate response. However, given that Pelham, Fabiano, and Massetti (2005) argue that structured interviews do not provide incremental validity in assessing ADHD, conducting interviews may

not influence the results. Future studies, if conducted online, could implement safeguards such as measuring the length of time spent completing the study to help ensure that valid data is obtained. Moreover, researchers could ask participants to complete the measures in person to eliminate or reduce any distractions that otherwise may be present when completing the measures online.

Three items from the *DSM-IV* (APA, 1994) and Barkley and Murphy's (2006) criteria were the same. One limitation to the current study was that these three questions were asked twice; once with the *DSM* criteria and again with the Barkley and Murphy criteria. When examining the data, the correlations between these items was high (above .80), however, participants did not always give identical responses, suggesting some inconsistency in responses, perhaps stemming from overly rapid responding or incomplete reading of items. Therefore, this could have influenced the results in some manner. Future studies should only ask these three items on one occasion in order to avoid a similar problem during data analysis.

The questions, what type of medication a participant was currently using and what type of treatment a participant was currently undertaking were not asked. With this information, possible analyses could have been conducted to determine what differences, if any, existed between individuals currently taking medication or receiving treatment for ADHD and those who are not. However, given that some individuals were potentially currently on medication and/or receiving treatment for ADHD, the findings of the current study could be magnified if an untreated sample was used.

All students in this study were students from public universities, and, while from three geographical regions (Southeast, Southwest, and Mountain West), the generalizability of the results could be limited. Future studies should also attempt to have a population of students that are more ethnically diverse. Based on the demographic data, the predominant race of the overall sample was Caucasian and other races were underrepresented. Finally, these results may not generalize to same-aged adults who are not in college. Individuals who attend college could be considered higher achieving or better educated than other individuals of the same age.

Implications for Future Research

Due to the high estimated prevalence rate of ADHD (Faraone & Biederman, 2005; Heilingstein et al., 1998; Murphy & Barkley, 2006; Kessler et al., 2006) future studies of adult ADHD are strongly encouraged. One aim of these studies should be to concentrate on delineating the best possible diagnostic criteria for college students with ADHD and adults of other ages. The current study has taken an initial step in demonstrating that Barkley and Murphy's (2006) proposed adult criteria have some diagnostic utility for a college aged sample. Therefore, these individuals are experiencing executive functioning deficits that may not be measured by the *DSM-IV*. What specific items that measure executive functioning best distinguish those college students with ADHD is still a question that has not been answered. Examining the data from the 91 items could be a study that had the potential to answer this question. Specifically, a study that examines the diagnostic utility of the item pool of 91 executive functioning items in college students would be beneficial. This would help determine what specific executive functioning deficits college students with ADHD are experiencing. Establishing which *DSM-IV* items, in conjunction with the executive functioning items, have the greatest utility for college students would also be helpful.

Future studies could also examine if the proposed adult criteria or similar items have diagnostic utility for children and adolescents. As previously stated, Barkley's (1997) theory of ADHD centers around executive functioning deficits, however, as Barkley and Murphy (2006) identify, only three of the current 18 *DSM-IV* (APA, 1994) symptoms assess executive functioning. Additionally, Nigg (2001) completed an exhaustive review on motivational and executive inhibition. Through this review, Nigg concluded that ADHD is potentially a disorder of executive control and inhibition. Thus, using an item pool similar to what Barkley and Murphy (2006) have completed for adults could provide diagnostic information for children or adolescents. Since research has shown that children possess these executive functioning deficits

and issues with inhibition, determining what specific diagnostic items have utility for ADHD is needed.

Conclusions

The current study showed that Barkley and Murphy's (2006) proposed adult criteria have diagnostic utility for a college aged sample. Specifically, Barkley and Murphy's criteria accounted for unique variance in impairment and college GPA, beyond that accounted for by *DSM-IV* inattention and hyperactivity. Barkley and Murphy's criteria also demonstrated good internal consistency reliability for the ADHD, clinical and typical control groups. Finally, individuals meeting Barkley and Murphy's criteria and *DSM-IV* criteria were shown to be experiencing significantly more impairment that those who only met one or the other. These findings demonstrate that executive functioning deficits and inattentive symptoms are a prominent concern for college aged individuals and should be the focus of additional study. It also appears that *DSM-IV* hyperactivity items have limited diagnostic utility for this age group. Based on the information that Barkley and Murphy (2006) provided, it appears that *DSM-IV* ADHD can best be conceptualized as lying on a continuum. Individuals may transition from overt hyperactivity to an increase in inattention and executive functioning deficits. The current study, possessing a younger mean sample age than Barkley and Murphy's study, demonstrates this theory nicely. However, future research should be conducted to confirm the results of this initial study.

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APPENDICES

Appendix A

Invitation to Participate

You are invited to participate in an online research study in the OSU Department of Psychology. This project is designed to understand attention-deficit/hyperactivity disorder (ADHD) in college students. Students with and without ADHD are being asked to participate. This is an online study, and participation will require approximately 60 minutes of your time. You will receive $10.00 as compensation for your time. If you are interested in completing this study**, please copy and paste following link into your Internet Explorer browser:**

If you decide to participate, you must use Internet Explorer.

http://fp.okstate.edu/dbdlab/sct/welcome_to_the_study%20clinical.htm

If you are interested in learning more about this study before completing it, please reply to this email or call (405) 744-2960.

Sincerely,

David Fedele
Psychology Graduate Student

Appendix B

RESEARCH PARTICIPANT CONSENT FORM
Assessment of Attention and Hyperactivity/Impulsivity in College Students
Thad Leffingwell, Ph.D.
Oklahoma State University
Department of Psychology

Purpose of Research. This research project examines attention and hyperactivity/impulsivity in college students.

Specific Procedures to be Used. I understand that the research involves completing several onscreen measures that inquire about my demographic information (e.g., gender, ethnicity, age) and my behavior. You will also be asked to elicit information from one person who can attest to your childhood behavior (family member, close friend, etc.) and one person who can attest to your current behavior (significant other, friend, etc.). Your answers will not be shared with either party and will remain confidential throughout the study. Your name will be included in the recruitment materials sent to both individuals.

Duration of Participation. Participation will take approximately one hour. No follow-up procedures are planned. Participants will be asked to voluntarily give the information of a collateral informant who can attest to their childhood and current behavior. Participants will have the option to elicit this information.

Risks to the Individual. Participants will be asked to disclose information regarding their attention and hyperactivity/impulsivity. Because sensitive information is being obtained, you may experience some distress when completing the items. Therefore, as part of the debriefing, information about where to seek psychological services in this community will be provided. At any time, you may choose to skip questions that you deem as stressful. All questions are voluntary, therefore, skipping questions will not hinder compensation. Overall, the information being requested will put the participants at no greater risk than would typically be encountered during a routine psychological examination.

Benefits to the Individual or Others. I understand that although individual participants may not personally benefit from participation in the present study, the information derived from this project may have important implications for others. Specifically, the information gained may contribute to more accurate assessments of attention and hyperactivity/impulsivity problems in adults.

Compensation. I understand that I will receive $10.00 for one hour of participation.

Voluntary Nature of Participation. I understand that my participation is voluntary, there is no penalty for refusal to participate, and I am free to withdraw my consent and participation in this project at any time without penalty, after notifying the researcher.

Confidentiality. I understand that any data collected as part of my participation in this experiment will be treated as confidential and will receive a code number so that my responses will remain anonymous. The records from this study will be kept private. Any publications resulting from this project will discuss group findings and will notinclude information that will personally identify me. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research.

Contact Information: If I have any questions about this research project, I may contact Dr. Thad Leffingwell, Psychology Department, 215 North Murray Hall, Oklahoma State University, 405-744-7494. If you have questions about your rights as a research volunteer, you may contact Dr. Sue C. Jacobs, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

I HAVE HAD THE OPPORTUNITY TO READ THIS CONSENT FORM, AND I AM PREPARED TO PARTICIPATE IN THIS PROJECT

Yes No

Appendix C

Demographics Questionnaire

Please answer the following questions. All responses will be kept confidential.

1. **Your sex (check one):** ☐ Male ☐ Female

2. **Your age**: ☐

3. **Your ethnicity**:

☐ Caucasian

☐ African-American

☐ Hispanic/Latino

☐ Asian/Asian-American

☐ American Indian Tribe or Nation ☐

☐ Biracial Please describe ☐

☐ Other Please describe ☐

4. **Your highest level of education completed (select one):**

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 (Grade school)

☐ 9 ☐ 10 ☐ 11 ☐ 12 (High school)

☐ 13 ☐ 14 ☐ 15 ☐ 16 (College)

☐ 17 and over (Graduate School)

5. **What was your high school grade point average (GPA)?**

☐ 0.0-0.5 ☐ 0.6-1.0 ☐ 1.1-1.5 ☐ 1.6-2.0 ☐ 2.1-2.5 ☐ 2.6-3.0 ☐ 3.1-3.5 ☐ 3.6-4.0

6. **What is your college grade point average (GPA)?**

☐ 0.0-0.5 ☐ 0.6-1.0 ☐ 1.1-1.5 ☐ 1.6-2.0 ☐ 2.1-2.5 ☐ 2.6-3.0 ☐ 3.1-3.5 ☐ 3.6-4.0

7. **What was your college entrance exam score (if applicable)?**

ACT score ☐

SAT score ☐

8. Have you ever received medication for a mental health problem (such as ADHD, depression or anxiety)?

☐ Yes ☐ No

9. Have you ever received therapy for a mental health problem?

☐ Yes ☐ No

10. Have you ever been given a formal diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) or Attention-Deficit Disorder (ADD)?

☐ Yes ☐ No

If yes, who made the diagnosis?

☐ Medical Doctor (such as pediatrician, family practitioner or psychiatrist) ☐ Doctoral level therapist (such as psychologist)

☐ Master's level therapist (such as counselor or social worker)

11. Have you ever been given a formal diagnosis of any of the following :

☐ Reading Disorder (Dyslexia) ☐ Mathematics Disorder ☐ Mood Disorder/Emotional Problem (Depression, Anxiety, etc.)

☐ Physical Disability (Visual, Motor, Hearing)

Self-Report of Current Behaviors

Instructions: Please select the response that best describes your behavior during the past 6 months.

Items:

1. Fail to give close attention to details or make careless mistakes in my work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

.

2. Fidget with hands or feet or squirm in seat

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. Have difficulty sustaining attention in tasks or fun activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. Leave my seat in situations in which remaining seated is expected

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. Don't seem to listen when spoken to directly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. Feel restless

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. Don't follow through on instructions and fail to finish my work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. Have difficulty engaging in leisure activities or doing fun things quietly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

9. Have difficulty organizing tasks and activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

10. Feel "on the go" or "driven by a motor"

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

11. Avoid, dislike, or am reluctant to engage in work that requires sustained mental effort

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

12. Talk excessively

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

13. Lose things necessary for tasks or activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

14. Blurt out answers before questions have been completed

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

15. Am easily distracted

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

16. Have difficulty waiting my turn

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

17. Am forgetful in daily activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

18. Interrupt or intrude on others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

19. Am often easily distracted by extraneous stimuli

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

20. Make decisions impulsively

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

21. Have difficulty stopping activities or behavior when I should do so

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

22. Start a project or task without reading or listening to directions carefully

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

23. Show poor follow-through on promises or commitments made to others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

24. Have trouble doing things in the proper order or sequence

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

25. Am more likely to drive a motor vehicle much faster than others (excessive speeding)

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

26. Have difficulty sustaining attention in tasks or leisure activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

27. Have difficulty organizing tasks and activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

28. Find it difficult to tolerate waiting; impatient

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

29. Unable to inhibit my reactions or responses to events or others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

30. Have difficulty changing my behavior when I am given feedback about my mistakes

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

31. Easily distracted by irrelevant thoughts when I must concentrate on something

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

32. Prone to daydreaming when I should be concentrating on something

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

33. Procrastinate or put off doing things until the last minute

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

34. Make impulsive comments to others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

35. Likely to take short cuts in my work and not do all that I am supposed to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

36. Likely to skip out on work if its boring or easy to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

37. Can't seem to defer gratification or to put off doing things that are rewarding now so as to work for a later goal

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

38. Likely to do things without considering the consequences for doing them

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

39. Change my plans at the last minute on a whim or last minute impulse

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

40. Poor sense of time

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

41. Waste or mismanage my time

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

42. Fail to consider past relevant events or past personal experiences before responding to situations

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

43. Do not think about the future as much as others of my age seem to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

44. Not prepared for work or assigned tasks

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

45. Fail to meet deadlines for assignments

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

46. Have trouble planning ahead or preparing for upcoming events

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

47. Forget to do things I am supposed to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

48. Have difficulties with mental arithmetic

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

49. Not able to comprehend what I read as well as I should be able to do; have to re-read material to get its meaning

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

50. Can't seem to remember what I previously heard or read about

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

51. Can't seem to accomplish the goals I set for myself

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

52. Late for work or scheduled appointments

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

53. Trouble organizing my thoughts or thinking clearly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

54. Not aware of things I say or do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

55. Can't seem to hold in mind things I need to remember to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

56. Have difficulty being objective about things that affect me

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

57. Find it hard to take other people's perspectives about a problem or situation

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

58. Have difficulty keeping in mind the purpose or goal of my activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

59. Forget the point I was trying to make when talking to others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

60. When shown something complicated to do, cannot keep the information in mind so as to imitate or do it correctly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

61. Give poor attention to details in my work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

62. Find it difficult to keep track of several activities at once

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

63. Can't seem to get things done unless there is an immediate deadline

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

64. Dislike work or school activities where I must think more than usual

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

65. Have difficulty judging how much time it will take to do something or get somewhere

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

66. Have trouble motivating myself to start work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

67. Quick to get angry or become upset

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

68. Easily frustrated

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

69. Over-react emotionally

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

70. Have difficulty motivating myself to stick with my work and get it done

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

71. Can't seem to persist in things I do not find interesting

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

72. Do not put as much effort into my works as I should or than others are able to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

73. Have trouble staying alert or awake in boring situations

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

74. Easily excited by activities going on around me

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

75. Not motivated to prepare in advance for things I know I am supposed to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

76. Can't seem to sustain my concentration on reading, paperwork, lectures, or work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

77. Easily bored

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

78. Others tell me I am lazy or unmotivated

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

79. Have to depend on others to help me get my work done

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

80. Things must have an immediate payoff for me or I do not seem to get them done

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

81. Have trouble completing one activity before starting a new one

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

82. Have difficulty resisting the urge to do something fun or more interesting when I am supposed to be working

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

83. Can't seem to sustain friendships or close relationships as long as other people

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

84. Inconsistent in the quality or quantity of my work performance

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

85. Don't seem to worry about future events as much as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

86. Don't think about or talk things over with myself before doing something

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

87. Unable to work as well as others without supervision or frequent instruction

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

88. Have trouble doing what I tell myself to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

89. Lack self-discipline

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

90. Have difficulty using sound judgment in problem situations or when under stress

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

91. Trouble following the rules in a situation

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

92. Not very flexible in my behavior or approach to a situation; overly rigid in how I like things done

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

93. Have trouble organizing my thoughts

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

94. Have difficulties saying what I want to say

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

95. Unable to come up with or invent as many solutions or problems as others seem to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

96. Often at a loss for words when I want to explain something to others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

97. Have trouble putting my thoughts down in writing as well or as quickly as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

98. Feel I am not as creative or inventive as others of my level of intelligence

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

99. In trying to accomplish goals or assignments, find that I am not able to think of as many ways of doing things as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

100. Have trouble learning new or complex activities as well as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

101. Have difficulty explaining things in their proper order or sequence

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

102. Can't seem to get to the point of my explanations as quickly as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

103. Unable to "think on my feet" or respond as effectively as others to unexpected events

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

104. Clumsy; not as coordinated in my movements as others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

105. Poor or sloppy handwriting

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

106. Have difficulty arranging or doing my work by its priority or importance; can't "prioritize" well

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

107. Slower to react to unexpected events

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

108. Get silly, clown around, or act foolishly when I should be serious

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

109. Can't seem to remember things I have done or places I have been as well as others seem to do

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

110. Accident prone

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

111. Have difficulties managing my money or credit cards

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

112. I am less able to recall events from my childhood compared to others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

How old were you when these problems with attention, impulsiveness, or hyperactivity first began?

☐

To what extent do these problems interfere with your ability to function in each of these areas or life activities?

Problems with attention, impulsivity, and/or hyperactivity interfere...

1. In my home life with my immediate family

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

2. In my work or occupation

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. In my social interactions with others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. In my activities or dealings in the community

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. In any educational activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. In my dating or marital relationship

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. In my management of my money

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. In my driving of a motor vehicle

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

9. In my leisure or recreational activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

10. In my management of my daily responsibilities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

Again, please select the response next to each item that best describes your behavior during the past 6 months.

1. Lose my temper

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

2. Argue with others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. Actively defy or refuse to comply with requests or rules

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. Deliberately annoy people

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. Blame others for my mistakes or misbehavior

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. Am touchy or easily annoyed by others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. Am angry or resentful

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. Am spiteful or vindictive

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

Self-Report of Past Behaviors

Instructions: Please select the response next to each item that best describes your behavior when you were a child ages 5 to 12.

1. Failed to give close attention to details or made careless mistakes in my work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

2. Fidgeted with my hands or feet or squirmed in my seat

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. Had difficulty sustaining my attention in tasks or fun activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. Left my seat in the classroom or in other situations in which remaining seated was expected

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. Didn't seem to listen when spoken to directly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. Felt restless

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. Didn't follow through on instructions and failed to finish my work

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. Had difficulty engaging in leisure activities or doing fun things quietly

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

9. Had difficulty organizing tasks and activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

10. Felt "on the go" or "driven by a motor"

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

11. Avoided, disliked, or was reluctant to engage in work that required sustained mental effort

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

12. Talked excessively

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

13. Lost things necessary for tasks or activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

14. Blurted out answers before questions were completed

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

15. Was easily distracted

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

16. Had difficulty awaiting my turn

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

17. Was forgetful in daily activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

18. Interrupted or intruded on others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

To what extent did these problems you may have just clicked interfere with your ability to function in each of these areas of life activities when you were a child between 5 and 12 years of age?

Problems with attention, impulsivity, and/or hyperactivity interfere...

1. In my home life with my immediate family

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

2. In my social interactions with other children

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. In my activities or dealings in the community

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. In school

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. In sports, clubs, or other organizations

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. In learning to take care of myself

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. In my play, leisure, or recreational activities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. In my handling of my daily chores or other responsibilities

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

Again, please select the response next to each item that best describes your behavior when you were a child ages 5 to 12 years.

1. Lost temper

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

2. Argued with adults

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

3. Actively defied or refused to comply with adults' requests or rules

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

4. Deliberately annoyed people

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

5. Blamed others for my mistakes or misbehavior

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

6. Was touchy or easily annoyed by others

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

7. Was angry or resentful

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

8. Was spiteful or vindictive

☐ Never/Rarely ☐ Sometimes ☐ Often ☐ Very Often

Instructions: Please indicate whether you engaged in any of the following when you were 5 to18 years of age:

1. Often bullied, threatened, or intimidated others.

☐ Yes ☐ No

2. Often initiated physical fights

☐ Yes ☐ No

3. Used a weapon that can cause serious physical harm to others (e.g., a bat, brick, broken bottle, knife, or gun)

☐ Yes ☐ No

4. Was physically cruel to people

☐ Yes ☐ No

5. Was physically cruel to animals

☐ Yes ☐ No

6. Stole while confronting a victim (e.g., mugging, purse snatching, extortion, armed robbery)

☐ Yes ☐ No

7. Forced someone into sexual activity

☐ Yes ☐ No

8. Deliberately engaged in fire setting with the intention of causing serious damage

☐ Yes ☐ No

9. Deliberately destroyed others' property (other than by fire setting)

☐ Yes ☐ No

10. Broke into someone else's house, building, or car

☐ Yes ☐ No

11. Often lied to obtain goods or favors or to avoid obligations (i.e., "conned" others)

☐ Yes ☐ No

12. Stole items of nontrivial value without confronting a victim (e.g., shoplifting, but without breaking and entering; forgery)

Yes No

13. Often stayed out at night despite parental prohibitions

Yes No

If so, at what age did this begin?

14. Ran away from home overnight at least twice while living in parents' home, foster care, or group home

Yes No

If so, how many times?

15. Was often truant from school

Yes No

If so, at what age did this begin?

Click here to Continue

Appendix D

Thank you for your participation. The purpose of this study is to examine the relations among attention, concentration and impulsivity in adults. Through this research we hope to learn better ways of assessing adults for attention-deficit/hyperactivity disorder (ADHD). Please do not discuss the details of this experiment with other potential participants because we will be conducting this study for the next several months. Your cooperation is sincerely appreciated.

To receive course credit for this experiment through Experimetrix, please provide the following:
All information will be kept confidential and will remain separate from experimental responses.

Last Name, First Initial:

OSU Student ID Number:

In addition to submitting your information it would be helpful to list an email and/or mailing address of one person who could answer questions about your behavior between the ages of 5 to 12 (such as a parent, grandparent or older sibling) and one person who could answer questions about your behavior within the last six months (such as a spouse, significant other, close friend, or roommate). We are requesting this information because it has been found helpful for the diagnosis of ADHD. By providing this contact information you are giving us permission to contact these individuals via email or letter to ask them if they would be willing to answer some questions about you. It will be up to each individual to consent to participation. Persons listed will only be contacted for this study and their contact information will not be disseminated. The answers that you have provided will be kept confidential and will not be shared with the individuals listed below.

Contact information for an individual who could answer questions about your childhood behavior:

Name:

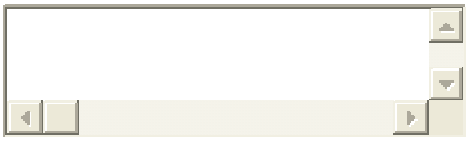
Email address:

Physical address:

Contact information for an individual who could answer questions about your current behavior:

Name:

Email address:

Physical address: 

Submit

Submit and Close Browser to Exit Experiment

This experimental study is unlikely to cause distress greater than that experienced through daily life, but if necessary, please do not hesitate to contact the Psychological Services Center at 744-5975 for an appointment.

For additional information or questions regarding this study contact :

David Fedele, B.S. **Email: david.fedele@okstate.edu**
Oklahoma State University- Psychology Department **Phone: 744-2960**
215 North Murray Hall
Stillwater, OK 74078

Dr. Thad Leffingwell **Email: thad.leffingwell@okstate.edu**
Oklahoma State University- Psychology Department **Phone: 744-7495**
215 North Murray Hall
Stillwater, OK 74078

Institutional Review Board for Human Subject Research
Dr. Sue Jacobs, Chair **Phone: (405)744-1676**

Appendix E

Thank you for your participation. The purpose of this study is to examine the relations among attention, concentration and impulsivity in adults. Through this research we hope to learn better ways of assessing adults for attention-deficit/hyperactivity disorder (ADHD). Please do not discuss the details of this experiment with other potential participants because we will be conducting this study for the next several months. Your cooperation is sincerely appreciated.

To receive financial compensation, please provide the following:
All information will be kept confidential and will remain separate from experimental responses.

Last Name, First Initial:

OSU Student ID Number:

Physical Address:

In addition to submitting your information it would be helpful to list an email and/or mailing address of one person who could answer questions about your behavior between the ages of 5 to 12 (such as a parent, grandparent or older sibling) and one person who could answer questions about your behavior within the last six months (such as a spouse, significant other, close friend, or roommate). We are requesting this information because it has been found helpful for the diagnosis of ADHD. By providing this contact information you are giving us permission to contact these individuals via email or letter to ask them if they would be willing to answer some questions about you. It will be up to each individual to consent to participation. Persons listed will only be contacted for this study and their contact information will not be disseminated. The answers that you have provided will be kept confidential and will not be shared with the individuals listed below.

Contact information for an individual who could answer questions about your childhood behavior:

Name:

Email address:

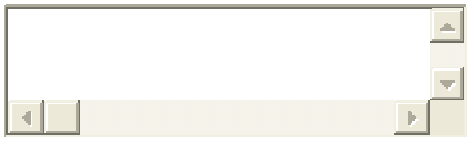
Physical address:

Contact information for an individual who could answer questions about your current behavior:

Name:

Email address:

Physical address:



Submit

Submit and Close Browser to Exit Experiment

This experimental study is unlikely to cause distress greater than that experienced through daily life, but if necessary, please do not hesitate to contact the Psychological Services Center at 744-5975 for an appointment.

For additional information or questions regarding this study contact :

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Institutional Review Board for Human Subject Research
Dr. Sue Jacobs, Chair **Phone: (405)744-1676**

TABLE 1

Number of Participants by Group, Sex, and University with Controls Moved

	ADHD *n* = 173		Clinical *n* = 138		Typical *n* = 736		**Totals** ***N* = 1047**	
	Men	Women	Men	Women	Men	Women	**Men**	**Women**
Appalachian State University (2.6%) *Undergraduate enrollment = 13,525*	19	45	9	22	96	160	**124**	**227**
Oklahoma State University (1.9%) *Undergraduate enrollment = 18,368*	36	33	15	32	131	111	**182**	**176**
University of Wyoming (3.4%) *Undergraduate enrollment = 9,963*	21	19	18	42	110	128	**149**	**189**
Totals	**76**	**97**	**42**	**96**	**337**	**399**	**455**	**592**

TABLE 2

Number of Participants by Group, Sex, and University with DSM-IV ADHD Grouping

	ADHD *n* = 107		Clinical *n* = 138		Typical *n* = 736		**Totals *N* = 981**	
	Men	Women	Men	Women	Men	Women	**Men**	**Women**
Appalachian State University (2.4%) *Undergraduate enrollment = 13,525*	10	31	9	22	96	160	**115**	**213**
Oklahoma State University (1.8%) *Undergraduate enrollment = 18,368*	21	21	15	32	131	111	**167**	**164**
University of Wyoming (3.3%) *Undergraduate enrollment = 9,963*	10	14	18	42	110	128	**138**	**184**
Totals	**41**	**66**	**42**	**96**	**337**	**399**	**420**	**561**

TABLE 3

Descriptive Statistics for ADHD, Clinical and Control Groups with Controls Moved

	ADHD			Clinical			Control			ANOVA		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*F*	*p*	η^2
Age	20.58[a]	3.74	171	21.72[b]	5.59	138	19.66[c]	2.36	735	26.32	< .001	.05
High school GPA	6.79[a]	1.12	170	7.29[b]	.99	136	7.40[b]	0.83	728	31.03	< .001	.06
College GPA	6.03[a]	1.60	168	6.43[b]	1.26	132	6.49[b]	1.21	731	8.64	< .001	.02
ACT	23.96[a]	4.37	89	23.29[a]	4.91	83	24.18[a]	3.60	439	1.84	.160	.01

Note. For high school and college GPA, 0 = 0.0 to 0.5, 1 = 0.6 to 1.0, 2 = 1.1 to 1.5, 3 = 1.6 to 2.0, 4 = 2.1 to 2.5, 5 = 2.6 to 3.0, 6 = 3.1 to 3.5, 7 = 3.6 to 4.0. Means without common superscripts are significantly different.

TABLE 4

Descriptive Statistics for ADHD, Clinical and Control Groups with DSM-IV Grouping

	ADHD			Clinical			Control			ANOVA		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*F*	*p*	η^2
Age	20.88[a]	4.33	107	21.72[ab]	5.59	138	19.66[c]	2.36	735	26.81	< .001	.05
High school GPA range	6.81[a]	1.26	105	7.29[b]	0.99	136	7.40[b]	0.83	728	19.35	< .001	.04
College GPA range	6.05[a]	1.64	106	6.43[ab]	1.26	132	6.49[b]	1.21	731	5.55	.004	.01
ACT	23.97[a]	3.36	58	23.29[a]	4.91	83	24.18[a]	3.60	439	1.96	.142	.01

Note. For high school and college GPA, 0 = 0.0 to 0.5, 1 = 0.6 to 1.0, 2 = 1.1 to 1.5, 3 = 1.6 to 2.0, 4 = 2.1 to 2.5, 5 = 2.6 to 3.0, 6 = 3.1 to 3.5, 7 = 3.6 to 4.0. Means without common superscripts are significantly different.

TABLE 5

Mean Scores for ADHD, Clinical and Control Groups with Controls Moved

	ADHD *n* = 173			Clinical *n* = 138			Control *n* = 736			ANOVA		
	M	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*F*	*p*	η^2
DSM-IV Inattention	1.54[a]	0.61	0.85	0.69[b]	0.43	0.80	0.57[c]	0.40	0.81	328.42	< .001	.39
DSM-IV Hyperactivity	1.43[a]	0.61	0.84	0.75[b]	0.42	0.73	0.61[c]	0.38	0.73	253.15	< .001	.33
Barkley items	1.46[a]	0.61	0.83	0.73[b]	0..48	0.82	0.59[c]	0.43	0.80	241.97	< .001	.32
Impairment	1.39[a]	0.63	0.86	0.75[b]	0.53	0.86	0.51[c]	0.45	0.86	217.66	< .001	.29

Note. For the ADHD group, the *n*s for coefficient alphas ranged from 167 to 171. For the Clinical group, the *n*s for coefficient alphas ranged from 131 to 135. For the Control group, the *n*s for coefficient alphas ranged from 709 to 724. Means were calculated by summing item responses and dividing by the total number of questions. Means could range from 0 to 3 for all dependent variables.

TABLE 6

Mean Scores for ADHD, Clinical and Control Groups with DSM-IV Grouping

	ADHD *n* = 107			Clinical *n* = 138			Control *n* = 736			ANOVA		
	M	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*F*	*p*	η^2
DSM-IV Inattention	1.81[a]	0.54	0.80	0.69[b]	0.43	0.80	0.57[c]	0.40	0.81	395.86	< .001	.45
DSM-IV Hyperactivity	1.75[a]	0.49	0.74	0.75[b]	0.42	0.73	0.61[c]	0.38	0.73	376.50	< .001	.44
Barkley 9 items	1.69[a]	0.55	0.79	0.73[b]	0.48	0.82	0.59[c]	0.43	0.80	275.77	< .001	.36
Impairment	1.64[a]	0.59	0.83	0.75[b]	0.53	0.86	0.51[c]	0.45	0.86	260.52	< .001	.35

Note. For the ADHD group, the *n*s for coefficient alphas ranged from 105 to 107. For the Clinical group, the *n*s for coefficient alphas ranged from 131 to 135. For the Control group, the *n*s for coefficient alphas ranged from 709 to 724. Means were calculated by summing item responses and dividing by the total number of questions. Means could range from 0 to 3 for all dependent variables.

TABLE 7

Correlations

	DSM-IV Inattention	***DSM-IV Hyperactivity***	***Barkley Items (DSM-IV Items Deleted)***	***Impairment***
Current DSM-IV Inattention	1.00			
Current DSM-IV Hyperactivity	0.73*	1.00		
Barkley Items (DSM-IV Items Deleted)	0.78*	0.72*	1.00	
Current Impairment	0.74*	0.68*	0.72*	1.00

*Note. Correlations marked with an * indicated they were significant at the p < .001 level.*

TABLE 9

Summary of Linear Regression Analysis for Variables Predicting Impairment

Step	and Variable	B	SE (B)	β	ΔR2	F for ΔR2
1	Age	.02***	.01	.13	.02	18.32***
2	*DSM-IV* Inattention	.39***	.04	.37		
	DSM-IV Hyperactivity	.23***	.03	.20		
	Barkley & Murphy reduced criteria	.29***	.03	.28	.60	540.19***

Note. 1, 043 participants were included in the analysis.

† p < .10; * p < .05; ** p < .01; *** p < .001.

TABLE 10

Summary of Linear Regression Analysis for Variables Predicting High School GPA

Step	and Variable	B	SE (B)	β	ΔR2	F for ΔR2
1	Age	-.09***	.01	-.30	.09	103.75***
2	*DSM-IV* Inattention	-.39***	.08	-.24		
	DSM-IV Hyperactivity	.19*	.08	.11		
	Barkley & Murphy reduced criteria	-.14†	.08	-.08	.06	22.30***

Note. 1, 030 participants were included in the analysis.

† p < .10; * p < .05; ** p < .01; *** p < .001.

TABLE 11

Summary of Linear Regression Analysis for Variables Predicting College GPA

Step	and Variable	B	SE (B)	β	ΔR2	F for ΔR2
1	Age	.02	.01	.04	.00	1.57
2	*DSM-IV* Inattention	-.26*	.12	-.11		
	DSM-IV Hyperactivity	.36**	.12	.15		
	Barkley & Murphy reduced criteria	-.09***	.02	-.25	.06	22.88***

Note. 1, 029 participants were included in the analysis.

† p < .10; * p < .05; ** p < .01; *** p < .001.

Oklahoma State University Institutional Review Board

Date:	Friday, August 24, 2007
IRB Application No	AS0755
Proposal Title:	Assessing the Diagnostic Utility of Proposed Adult ADHD Symptoms
Reviewed and Processed as:	Expedited

Status Recommended by Reviewer(s): Approved **Protocol Expires: 8/23/2008**

Principal Investigator(s

David Fedele
215 N. Murray
Stillwater, OK 74078

Thad Leffingwell
215 N. Murray
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☑ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C Jacobs

Sue C. Jacobs, Chair
Institutional Review Board

VITA

DAVID ANDREW FEDELE

Candidate for the Degree of

Master of Science

Thesis: ASSESSING THE DIAGNOSTIC UTILITY OF PROPOSED ADULT ADHD SYMPTOMS IN A YOUNG ADULT SAMPLE

Major Field: Clinical Psychology

Biographical:

Personal Data: Born in Jacksonville, Florida on March 3, 1984 to Lynne and Al Fedele.

Education:
Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma July, 2008.

Experience: David completed an honors thesis at Florida State University titled, *Cortisol and Antisocial Behavior: A Meta-analysis*. Since attending Oklahoma State University he has helped with research projects in the Disruptive Behavior Disorders and Pediatric Health Psychology laboratory.

Professional Memberships:
APA Division 53 and 54, Psychology Graduate Student Association

Name: David Fedele Date of Degree: July, 2008

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: ASSESSING THE DIAGNOSTIC UTILITY OF PROPOSED ADULT ADHD SYMPTOMS IN A YOUNG ADULT SAMPLE

Pages in Study: 77 Candidate for the Degree of Master of Science

Major Field: Clinical Psychology

Scope and Method of Study: Attention Deficit/Hyperactivity Disorder (ADHD) affects approximately 4 to 5% of adults. Adults diagnosed with ADHD experience more academic, social, and occupational difficulties than their same age counterparts To address the dearth of scientific knowledge concerning adult ADHD, Barkley and Murphy proposed nine items that had diagnostic utility for diagnosing adult ADHD. These nine items have not been tested in another sample. The current study was aimed to cross-validate the proposed adult ADHD items in a younger adult sample. Participants were recruited for an ADHD group, a clinical control group, and a typical control group. Participants were recruited from three large universities (i.e., one in the Southeast, one in the Southwest, and one in the Mountain West). Participants completed a demographic form, a *DSM-IV* symptom checklist and Barkley and Murphy's proposed criteria.

Findings and Conclusions: Regression analyses were conducted to determine whether the *DSM-IV* criteria and/or the proposed adult criteria accounted for unique variance in impairment. Measures of impairment were a self-reported impairment checklist, high school and college GPA. When impairment was the DV, the proposed adult criteria ($\beta = .28$, $p < .001$), *DSM-IV* inattention ($\beta = .37$, $p < .001$), and *DSM-IV* hyperactivity ($\beta = .20$, $p < .001$) all accounted for unique variance. When high school GPA was the DV, the proposed adult criteria ($\beta = -.08$, $p = .09$) did not account for unique variance but *DSM-IV* inattention ($\beta = -.24$, $p < .001$) and hyperactivity ($\beta = .11$, $p < .02$) did. When college GPA was the DV, the proposed adult criteria ($\beta = -.25$, $p < .001$), *DSM-IV* inattention ($\beta = -.11$, $p = .032$) and hyperactivity ($\beta = .15$, $p = .002$) all accounted for unique variance. Barkley and Murphy (2006) demonstrated that their proposed criterion set, focusing on executive functioning, has diagnostic utility. However, they used a sample with a mean age of 32 to 37 years of age while the current sample had a range of 18 to 57 and a mean age of 20. Perhaps due to the younger sample, both the proposed adult and *DSM-IV* criteria have diagnostic utility. Therefore, the use of both the *DSM-IV* criteria and proposed adult criteria is recommended for college students.

ADVISER'S APPROVAL: Dr. Thad Leffingwell