OXFORD
UNIVERSITY PRESS

Archives of Clinical Neuropsychology 26 (2011) 165–175

Archives of CLINICAL NEUROPSYCHOLOGY

Detection of Response Bias and Noncredible Performance in Adult Attention-Deficit/Hyperactivity Disorder

J. Christopher Young [1,*], Alan M. Gross [2]

[1] *Memphis Veterans Affairs Medical Center, Memphis, TN, USA*
[2] *Department of Psychology, University of Mississippi, University, MS, USA*

*Corresponding author at: Memphis Veterans Affairs Medical Center, 1030 Jefferson Ave, Memphis, TN 38104, USA. Tel.: +1-901-523-8990; fax: +1-901-577-7371.
E-mail address: cyoungphd@gmail.com (J.C. Young).

Accepted 19 February 2011

Abstract

Adults with attention-deficit/hyperactivity disorder (ADHD) are frequently prescribed stimulant medication and eligible for accommodations at work or school that serve as potent incentives to feign ADHD symptoms. The current investigation examined the predictive validity of Minnesota Multiphasic Personality Inventory-2 (MMPI-2) validity scales in detecting and accurately classifying individuals attempting to feign ADHD. An archival ADHD clinical group ($n = 34$), normal control group ($n = 37$), and group instructed to feign ADHD symptoms ($n = 32$) completed the MMPI-2 and ADHD Current and Childhood Symptoms Scales. Behavior rating scales were unable to differentiate the clinical group from the simulated malingering group. Logistic regressions revealed that Infrequency-Psychopathology scale best detected response bias, followed by Infrequency scale, Back-Infrequency scale, Response Bias Scale (RBS), Henry–Heilbronner Index scale (HHI), and Fake Bad Scale (FBS). Results also indicate that recommended cutoffs for HHI, RBS, and FBS display inadequate sensitivity and specificity. Nevertheless, the MMPI-2 offers a number of validity indices that may assist in detecting individuals attempting to feign ADHD.

Keywords: ADHD; MMPI-2; Symptom Validity Test; Malingering

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is increasingly recognized as a disorder that persists into adulthood. Prevalence data indicate 4.4% of adults meet diagnostic criteria for ADHD (Kessler et al., 2006), with longitudinal studies estimating that as many as two thirds of individuals diagnosed with ADHD during childhood have symptoms that persist into adulthood (Barkley, Fischer, Smallish, & Fletcher, 2002). Adults with ADHD often experience academic and vocational difficulties, interpersonal and familial conflicts and stress, substance abuse difficulties, and increased driving risks (Barkley et al., 2002; Braun et al., 2004; Daly, 2006; Davidson, 2008; McGough & Barkley, 2004; Murphy & Barkley, 1996a, 1996b). Resultantly, individuals with ADHD are entitled to specific accommodations and services under federal law (Individuals with Disabilities Education Act, 2004; American with Disabilities Act, 1990) as well as access to prescription stimulant medication. Although these accommodations and interventions may be clinically warranted and result in improved quality of life, they also provide powerful incentives for individuals to feign symptoms (Alfano & Boone, 2007; Harrison, 2006; Sullivan, May, & Galbally, 2007).

The recognition that ADHD persists into adulthood has coincided with an increase in adults seeking assessments for ADHD (Harrison, Edwards, & Parker, 2007; McGough & Barkley, 2004). Unfortunately, emerging research indicates that 25%–30% of individuals presenting at university clinics for ADHD evaluations are feigning or exaggerating symptoms, which is not dissimilar to base rates found in the medicolegal evaluation contexts (Mittenberg, Patton, Canyock, & Condit, 2002; Suhr, Hammers, Dobbins-Buckland, Zimak, & Hughes, 2008; Sullivan et al., 2007). Among the incentives for feigning symptoms,

doi:10.1093/arclin/acr013 Advance Access publication on 25 March 2011

a number of non-ADHD college students use stimulant medications for recreational purposes and as a study aid for the benefit of improved attention and vigilance (Barrett, Darredeau, Bordy, & Pihl, 2005; Conti, 2004; Harrison, 2006). Individuals may also be motivated to obtain stimulant medication for the purpose of illegal sale (Barrett et al., 2005; Poulin, 2001). Extensive academic accommodations also provide powerful incentives as these may significantly enhance an individual's academic achievement (Alfano & Boone, 2007; Frazier, Frazier, Busch, Kerwood, & Demareed, 2008). Additionally, adults with ADHD may be awarded disability compensation in some instances (Harrison, 2006). As such, it is reasonable for clinicians to have a heightened suspicion of symptom exaggeration and noncredible performance if an adolescent or adult with no previously documented history of ADHD pursues disability services, medication, or compensation related to a diagnosis of ADHD. Despite these aforementioned concerns and the issuing of policy papers by the National Academy of Neuropsychology (Bush et al., 2005) and the American Academy of Clinical Neuropsychology (AACN, 2007) indicating the need for inclusion of measures of effort and response bias in test batteries, there is a dearth of research examining detection of noncredible performance in ADHD assessment (Alfano & Boone, 2007; Frazier et al., 2008; Suhr et al., 2008).

A potential explanation for the limited research is that Symptom Validity Tests (SVTs) are viewed as neuropsychological measures, and clinicians performing more traditional psychoeducational assessment are not comfortable administering and interpreting these tests and indices. Related, neuropsychological assessment is not perceived as being essential for diagnosis of ADHD (Suhr et al., 2008), and individual neuropsychological measures have failed to display adequate predictive validity in the diagnosis of ADHD (Braun et al., 2004; Harrison et al., 2007; Seidman et al., 2004; Sullivan et al., 2007). A potential explanation for these varied findings is that ADHD is a heterogeneous disorder that involves multiple neurocognitive functions and individuals with ADHD can have different constellations of intact and impaired functions (Nigg, 2005). As a consequence, neuropsychological measures are often discounted and unused, and clinicians rely solely on interview and self-report behavior checklists for diagnosis (Suhr et al., 2008).

Behavior checklists are the most commonly employed measures in the assessment of ADHD (Harrison et al., 2007). Clinicians ideally obtain self-report and third-person report of symptoms through these checklists; however, recall of symptom onset and course, as well as corroboration of difficulties from another source or records, can often be difficult to achieve (McGough & Barkley, 2004; Weisler & Goodman, 2008). Regarding the utility of behavior checklists in ADHD evaluations, Braun and colleagues (2004) and Harrison and colleagues (2007) caution that checklists alone are inadequate to diagnose ADHD as self-report checklists may overestimate pathology given that adults with no concern of ADHD may endorse clinically significant levels of symptoms on the ADHD self-report checklist (Harrison, 2004; McCann & Roy-Byrne, 2004; Murphy & Barkley, 1996a; Suhr et al., 2008). Related, adults are often poor historians and may underestimate or overestimate the severity of symptoms during childhood (Barkley et al., 2002). Conversely, it has been asserted that parents of adults referred for ADHD evaluations may be poor informants since behaviors of childhood are remote in memory and parents may have little knowledge of their adult child's current level of functioning due to less frequent contact with the referred individual (Lee, Oakland, Jackson, & Glutting, 2008). Another related concern is that self-report and third-person report may be inconsistent or modestly correlated (Barkley et al., 2002; Dias et al., 2008; Glutting, Youngstrom, & Watkins, 2005). Last, self-report measures have been found to be quite susceptible to exaggeration or false reporting of symptoms (Harrison et al., 2007; Jachimowicz & Geiselman, 2004; Quinn, 2003).

Previous studies examining the detection of noncredible performance in ADHD have utilized a variety of measures (e.g., behavior checklists, neuropsychological tests, SVTs) and sample groups (e.g., ADHD clinical, analog malingering, normal control). Findings indicate that individuals assigned to feign ADHD in analog studies are readily able to complete behavior checklists in a manner consistent with ADHD (Harrison et al., 2007; Jachimowicz & Geiselman, 2004; Quinn, 2003). Similarly, individuals evaluated in clinical settings and believed to be exaggerating symptoms due to SVT failure were able to complete behavior checklists in a manner suggesting the presence of ADHD (Suhr et al., 2008; Sullivan et al., 2007). Despite responding in a manner that resulted in elevations consistent with a clinical ADHD sample, the distinctiveness of response patterns of individuals feigning symptoms appears variable. For example, Harrison and colleagues (2007) and Sullivan and colleagues (2007) found that those feigning ADHD in analog and clinical settings, respectively, reported significantly greater symptoms than clinical groups using the Conners' Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1998). In contrast, others have found that individuals with ADHD responded on CAARS and ADHD behavior checklist (Murphy & Barkley, 1996b) in a manner that was indistinguishable from individuals feigning symptoms in analog and clinical settings (Quinn, 2003; Suhr et al., 2008).

The utility of free-standing and embedded SVTs in detecting response bias in ADHD evaluations has received recent attention. Sullivan and colleagues (2007) and Suhr and colleagues (2008) found that 24.5% and 31%, respectively, of individuals referred for ADHD evaluations failed the Word Memory Test (WMT; Green, 2003). Suhr and colleagues (2008) also examined the operational characteristics of several embedded indices (i.e., Exaggeration Index of the Auditory Verbal Learning Task, Recognition of Auditory Verbal Learning Task, Digit Span Age-Corrected Scale Score, Wechsler Adult Intelligence

Scale-third edition [WAIS-III] Working Memory Index, and WAIS-III Vocabulary-Digit Span Scaled Score Difference) of response bias based on group classification (Failed WMT, Failed WMT and diagnosed with ADHD, Failed WMT and diagnosed with other disorder) and determined that the aforementioned embedded indices displayed strong specificity but poor sensitivity. Lastly, Frazier and colleagues (2008) used an analog design (Control, Simulated ADHD, Simulated LD) and found that the Validity Indicator Profile non-verbal total and Victoria SVT hard item scale most effectively differentiated individuals feigning ADHD from control group participants.

The largest body of research examining noncredible performance has been with the Minnesota Multiphasic Personality Inventory (MMPI)/MMPI-2; however, the focus of these studies has typically been the detection of feigned cognitive impairment, chronic pain, or one of several psychopathologies (e.g., post-traumatic stress disorder, depression, schizophrenia; Rogers, Sewell, Martin, & Vitacco, 2003). Related, the MMPI-2 and other forms of personality testing are frequently employed in clinical assessments for ADHD due to its comorbidity with other psychological disorders (Woods, Lovejoy, & Ball, 2002), yet review of extant literature failed to identify any investigations examining the utility of MMPI-2 validity scales in the detection of noncredible responding in ADHD assessment. The purpose of the current investigation was to examine the predictive validity of selected MMPI-2 validity scales in the detection of feigned ADHD symptom report.

Method

Participants

Ninety-six participants were recruited from the undergraduate population at a public university located in the southeastern United States to participate in this institutional review board approved study. Participants were students in psychology classes and were recruited through posted notices in which they earned course credit for their research participation. Individuals ($n = 18$) reporting a history of ADHD, learning disability, or other diagnosed psychological disorder were excluded prior to data analyses. Individuals ($n = 9$) responding in an inconsistent or random manner that significantly elevates the inconsistency scales of variable response inconsistency scale (VRIN) and true response inconsistency scale (TRIN) ($T > 80$) were removed and not included in subsequent analyses. Participants meeting inclusion criteria ($n = 69$) ranged in age from 18 to 25 years of age, with a mean age of 18.97 ($SD = 1.29$). There were 48 male (69.6%) and 21 female (30.4%) participants. The sample was approximately 72% Caucasian, 20% African American, 6% Asian/Pacific Islander, and 1% Hispanic.

In addition to the aforementioned participants, confidential chart review in the campus psychological assessment center identified 39 individuals diagnosed with ADHD and administered the MMPI-2 as part of the assessment process. Assessments for ADHD and learning disabilities within this clinic typically include clinical interview of the referred individual and a third-person respondent, typically a parent, who has knowledge of childhood behaviors and usually adult behaviors depending on the level of contact given that the assessed individual is a college student. Measures of intelligence and academic achievement, continuous performance tests, personality questionnaires, and behavior checklists are also included in the assessment process; however, this clinic does not historically utilize free-standing or embedded indices of effort beyond traditional validity scales on administered personality questionnaires. Diagnoses are determined by a faculty-supervised assessment team, noting that it is not uncommon for individuals referred for ADHD to receive alternative diagnoses or additional diagnoses of a specific learning disability or psychiatric disorder. Given that the clinic does not utilize an external criterion of effort, individuals administered the WAIS-III/WAIS-IV and having a Reliable Digit Span (RDS) <7 ($n = 2$) were removed prior to analyses, noting that seven subjects were administered the Woodcock-Johnson III tests of cognitive abilities and RDS could not be obtained. No individuals in the archival clinical group had VRIN or TRIN scales that exceeded cutoff ($T > 80$). Additionally, individuals older than 25 years ($n = 3$) were removed prior to analyses since they are generally much older than participants recruited from psychology classes. Individuals meeting inclusion criteria ($n = 34$) ranged in age from 18 to 25 years, with a mean age of 20.29 ($SD = 1.87$). There were 25 male (73.5%) and 9 female (26.5%) participants. The archival group was approximately 97% Caucasian and 3% African American.

Measures

Minnesota Multiphasic Personality Inventory-2. The MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) is cited as being the most widely used and extensively validated psychological measure in forensic assessment (Staudenmayer & Phillips, 2007). Although traditional MMPI validity scales, particularly the Infrequency (F) and Back-Infrequency (Fb; Butcher et al., 1989) scales, have been found to be good indices of symptom exaggeration and response bias (Gervais, Ben-Porath, Wygant, & Green, 2007; Larrabee, 2003a), a number of theoretically and empirically derived MMPI scales have subsequently been developed and may display superior predictive validity in some settings (Larrabee, 2003a). Specifically, the Fake Bad

Scale (FBS; Lees-Haley, English, & Glenn, 1991), Response Bias Scale (RBS; Gervais et al., 2007), and Henry–Heilbronner Index (HHI; Henry, Heilbronner, Mittenberg, & Enders, 2006) have been developed for the purpose of detecting feigned cognitive and somatic symptoms and have been validated in samples involved in compensation claims and litigation. Additionally, the Infrequency-Psychopathology (Fp; Arbisi & Ben-Porath, 1995) was developed principally to distinguish between legitimate and feigned psychopathology (Graham, 2000; Rogers et al., 2003). Operational characteristics were examined using recommended cutoffs for RBS ($\geq$17, Gervais et al., 2007), HHI ($\geq$8, Henry et al., 2006), and FBS ($\geq$23, Greiffenstein, Fox, & Lees-Haley, 2007).

ADHD Current and Childhood Symptoms Scales-Self-Report Forms. The ADHD Current and Childhood Symptoms Scales-Self-Report Forms (Barkley & Murphy, 2006), are self-report behavior rating scales designed to assess symptoms of ADHD and are based on diagnostic and statistical manual of mental disorders-IV diagnostic criteria. The Current Symptoms Scale contains 18 items related to inattention (nine items) and hyperactivity (nine items), 10 items assessing the degree to which ADHD symptoms are negatively impacting vocational, educational, and interpersonal functioning, and 8 items assessing symptoms of Oppositional Defiant Disorder (ODD). The Current Symptoms Scale requests the individual to make these evaluations based on their functioning over the past 6 months. The Childhood Symptoms Scale utilizes identical ADHD and ODD items but uses different questions to assess the degree to which ADHD symptoms affected academic, extracurricular activities, and interpersonal functioning. Respondents are instructed to respond in a manner that "best describes your behavior when you were a child age 5–12 years." Additionally, the Childhood Symptoms Scale has 15 items presented in a forced-choice format (yes/no) that assess the presence of specific behaviors commonly associated with ODD and Conduct Disorder. Psychometrically, men have been found to endorse significantly higher scores regarding the severity of hyperactive symptoms ($p = .04$) on the Current Symptoms Scale, the severity ($p < .001$) and number ($p < .001$) of inattentive symptoms on the Childhood Symptoms Scale, and the severity ($p < .001$) and number ($p < .002$) of hyperactive symptoms on the Childhood Symptoms Scale. The Childhood Symptoms Scale and Current Symptoms Scales also displayed predictive validity as the endorsement of clinically significant symptoms on either scale displayed small but significant correlations with education ($r = -.17$ to $-.24$) and socioeconomic status ($r = -.10$ to $-.18$; Murphy & Barkley, 1996b). Both measures also have displayed interrater reliability as parent or spouse report of current symptoms, and childhood symptoms were strongly correlated (.75 and.74, respectively) with self-report of symptoms (Murphy & Barkley, 1996a). For the purpose of the current investigation, analyses examined the number and severity of symptoms reported on the Inattention and Hyperactive-Impulsive subscales.

Reliable Digit Span (WAIS-III, Digit Span subtest). RDS (Greiffenstein, Baker, & Gola, 1994) is a well-validated measure of noncredible performance that is "calculated by summing the longest string of digits repeated without error over two trials under both forward and backward conditions" (pp. 219–220). Principally, RDS has been used to detect noncredible performance in feigned traumatic brain injury; however, it has also been used in the context of simulator studies (Heinly, Greve, Bianchini, Love, & Brennan, 2005; Mathias, Greve, Bianchini, Houston, & Crouch, 2002; Strauss et al., 1999, 2002). The RDS has displayed a strong ability to correctly discriminate credible performance using a score of $\leq$7 to suggest noncredible performance (Heinly et al., 2005); however, others have found that a cutoff score of 7 results in inadequate specificity and recommend using a cutoff score of $\leq$6 (Babikian, Boone, Lu, & Arnold, 2006). For the purpose of the current study, a criterion of $\leq$6 was used to minimize the likelihood of making a false-positive classification.

Behavior Assessment System for Children, Second Edition, Self-Report College Form. The Behavior Assessment System for Children, Second Edition, Self-Report College (BASC-2 SRP-COL; Reynolds & Kamphaus, 2004) is a 185-item self-report measure designed to assess a range of internalizing and externalizing behaviors. Regarding psychometrics, test–retest reliability was generally good with most scales displaying reliability $>$0.8 and examination of convergent validity with MMPI-2 clinical scales indicated variable relationship strengths ranging from 0.35 (SRP-COL Somatization–MMPI-2 Hypochondriasis) to 0.81 (SRP-COL Anxiety–MMPI-2 Anxiety content scale; Reynolds & Kamphaus, 2004). The SRP-COL form also contains three validity indices to assess for a credible pattern of responding. For the purposes of the present study, the SRP-COL was administered prior to experimental manipulation and provided information of underlying psychopathology in the control and ADHD simulation groups.

Procedure

Participants were randomly assigned to the control group or analog malingering group via computerized random number selection. Previously described instruments were administered for the purposes of the current study and were not administered

within the context of a more extensive neuropsychological test battery. All participants completed a brief demographic questionnaire and the SRP-COL prior to random group assignment. Following review of instructions indicating group assignment and pertinent information, participants were given a packet containing the MMPI-2 and ADHD measures, which were ordered in a counterbalance format.

Instructions to the randomly assigned participants (control group and noncredible ADHD group). Individuals assigned to the malingering group were provided a unique set of instructions that were adapted from instructions used in previous studies using simulators of ADHD instructed to feign symptoms (T.W.F. Frazier, personal communication, August 7, 2009; Frazier et al., 2008; Quinn, 2003). These instructions provided a brief vignette relating a scenario in which a friend describes the potential benefits of being diagnosed with ADHD, such as academic accommodations, stimulant medication, and monetary compensation and a list of ADHD symptoms. The participant was instructed to feign the symptoms as convincingly as possible and to attempt to avoid reporting symptoms that are not representative of ADHD. The participant was told that the administrator was not aware of his or her instructions and should not inform the administrator of these instructions. Finally, the participant was told that he or she would have a few minutes to review and think about these instructions before beginning the testing process.

Participants in the control group received instructions describing the testing process and asked them to take a few minutes to review a brief article on psychological assessment (Frazier et al., 2008). The instructions indicated that the participant would subsequently be administered a number of psychological measures and should put forth their best effort on all measures. The instructions also indicated that participants should respond as accurately as possible. Participants were informed that the examiner was unaware of the instruction they received and should not inform the administrator of these instructions.

Results

Demographic variables were examined for significant between group differences. Analysis of variance (ANOVA) revealed differences in age, $F(2,100) = 8.94$, $p < .001$, and ethnicity, $F(2,100) = 3.77$, $p = .026$, but not for gender or grade point average. *Post hoc* analyses further revealed that the ADHD clinical group was significantly older than either the control ($p < .001$) or malingering ($p = .005$) groups and a significantly greater proportion of the clinical group was Caucasian (malingering, $p = .036$; control, $p =$ ns). The control and malingering groups did not differ in age or ethnic distribution. All recruited individuals completed the BASC-2 SRP-COL prior to being assigned to either the malingering or control groups to evaluate for the presence of underlying psychopathology. No scales on the BASC-2 SRP-COL were significantly elevated or approached significance.

ADHD Symptom Endorsement

On the ADHD Current and Childhood Symptoms Scales, ANOVA indicated the presence of significant between group differences for the number, $F(2,98) = 34.68$, $p < .001$, and severity, $F(2,98) = 36.27$, $p < .001$, of current inattentive symptoms endorsed, as well as for the number, $F(2,97) = 41.79$, $p < .001$, and severity, $F(2,97) = 37.94$, $p < .001$, of childhood inattentive symptoms. Regarding hyperactive symptoms, significant group differences were observed on number—current, $F(2,98) = 25.30$, $p < .001$; childhood, $F(2,97) = 22.26$, $p < .001$—and severity—current, $F(2,98) = 25.22$, $p < .001$; childhood, $F(2, 97) = 23.53$, $p < .001$—of reported symptoms.

Post hoc analyses (Tukey HSD) revealed that the clinical and malingering groups endorsed significantly higher ($p < .001$) symptom quantity and severity when compared with the control group on all current and childhood inattentive and hyperactive subscales. In contrast, the clinical and malingering groups did not significantly differ on any of ADHD subscales, with only severity of current hyperactive ($p = .092$) symptoms approaching significance. Please refer to Table 1 for means and standard deviations of ADHD scales.

Group Differences on MMPI-2 Validity Scales

ANOVA of MMPI-2 validity scales revealed significant between groups differences on: F scale, $F(2,100) = 22.63$, $p < .001$; Fb scale, $F(2,100) = 17.35$, $p < .001$; Fp scale, $F(2,100) = 23.63$, $p < .001$; FBS, $F(2,100) = 9.78$, $p = .001$; RBS, $F(2,100) = 22.41$, $p < .001$; and HHI scale, $F(2,100) = 23.74$, $p < .001$. Subsequent *post hoc* analyses (Tukey HSD) found that the response patterns of the malingering group resulted in significantly higher scores on F ($p < .001$), Fb ($p < .001$), Fp ($p < .001$), RBS ($p < .001$), and HHI ($p \leq .001$) when compared with the clinical and control groups. Although the malingering group scores were also significantly higher than the control group on FBS ($p < .001$), the malingering and clinical

Table 1. Group means and standard deviations of ADHD current and childhood symptoms scales

	CO Mean (*SD*)	AC Mean (*SD*)	SM Mean (*SD*)
Current Symptoms Scale			
Inattentive (Number)	1.54 (2.49)	5.28 (2.26)	6.59 (3.10)
Inattentive (Severity)	6.81 (6.25)	15.75 (4.50)	18.19 (6.63)
Hyperactive (Number)	1.57 (2.49)	4.59 (2.53)	6.00 (2.96)
Hyperactive (Severity)	6.62 (5.92)	13.78 (5.89)	16.56 (6.30)
Childhood Symptoms Scale			
Inattentive (Number)	1.76 (2.41)	6.81 (2.21)	6.56 (3.12)
Inattentive (Severity)	7.57 (6.17)	19.35 (5.61)	18.44 (7.01)
Hyperactive (Number)	2.51 (2.74)	6.42 (2.64)	6.34 (3.00)
Hyperactive (Severity)	8.84 (6.82)	18.52 (6.56)	17.97 (6.45)

Notes: ADHD = attention-deficit/hyperactivity disorder; CO = Control Group; AC = ADHD Clinical Group; PM = Simulated Malingering Group.

Table 2. Group means and standard deviations for MMPI-2 validity scales

	Control		ADHD clinical		Simulated malingering	
	Mean	*SD*	Mean	*SD*	Mean	*SD*
F	59.5	20.0	60.9	14.6	89.5	25.7
Fb	63.0	21.0	56.8	15.8	86.7	27.3
Fp	57.9	14.8	53.3	11.0	82.2	26.4
FBS	48.9	11.0	55.2	13.2	62.1	12.7
RBS	56.5	13.2	63.9	9.7	77.9	16.5
HHI	3.7	2.7	5.9	2.7	8.4	3.2

Notes: MMPI-2 = Minnesota Multiphasic Personality Inventory-2; ADHD = attention-deficit/hyperactivity disorder; FBS = Fake Bad Scale; Fp = Infrequency-Psychopathology; RBS = Response Bias Scale; HHI = Henry–Heilbronner Index; Fb = Back-Infrequency; F = Infrequency. All MMPI-2 validity scales shown as linear *T* scores except HHI shown as a raw score.

groups did not significantly differ on FBS. The clinical and control groups did not differ on the F, Fb, and Fp scales, FBS, and RBS; however, the response pattern of the clinical group resulted in significantly higher scores on HHI ($p = .005$) when compared with the control group. Please refer to Table 2 for means and standard deviations of MMPI-2 validity scales.

Predictive Validity of MMPI-2 Subscales

Multivariable multinomial logistic regression, which included all MMPI-2 validity scales, revealed that only Fp (Wald $\chi^2 = 3.96$, $p = .047$, OR = 1.07) significantly differentiated the malingering group from the clinical group, whereas RBS (Wald $\chi^2 = 5.55$, $p = .018$, OR = 0.92), Fb (Wald $\chi^2 = 5.36$, $p = .021$, OR = 1.07), and HHI (Wald $\chi^2 = 5.29$, $p = .021$, OR = 0.66) significantly discriminated between the control and the clinical groups. Subsequent multinominal logistic regressions of individual MMPI-2 validity scales revealed that only RBS, FBS, and HHI displayed predictive validity between all three groups; however, all of the scales were individually able to discriminate between the malingering and clinical groups (Table 3).

Following the aforementioned logistic regressions, a series of hierarchical logistic regression examined the incremental validity of Fp in the prediction of malingering after controlling for the variance of other individual validity scales that were able to significantly differentiate between the clinical and the malingering groups. The other scales (i.e., F, RBS, Fb, FBS, and HHI) were individually entered in block 1, and Fp was added in block 2. Subsequently, the order of entry was reversed to examine whether other validity scales displayed incremental validity beyond that accounted for by Fp. It was found that Fp had incremental validity beyond most other significant validity scales (i.e., Fb, FBS, RBS, HHI), excluding F (Table 4). In contrast, none of the other validity scales displayed incremental validity after controlling for Fp in block 1. Given that RBS was the fourth best validity scale at differentiating the malingering group, analyses of its incremental validity were not warranted.

Additional hierarchical logistic regressions were performed to determine whether RBS, HHI, or Fb displayed incremental validity in discriminating between the control and the clinical groups. It was found that HHI and Fb displayed incremental validity over RBS and each other, respectively, whereas RBS only displayed incremental validity over Fb (Table 5).

Table 3. Multinomial logistic regression of MMPI-2 validity scales

Scale	Comparison	Wald χ^2	*p*-value	OR
F	CO–AC	0.14	ns	0.99
	SM–AC	15.82	<.001	1.05
Fb	CO–AC	2.02	ns	1.02
	SM–AC	15.62	<.001	1.06
Fp	CO–AC	1.94	ns	1.03
	SM–AC	16.45	<.001	1.09
RBS	CO–AC	6.12	.013	0.95
	SM–AC	10.79	.001	1.07
HHI	CO–AC	9.32	.002	0.73
	SM–AC	9.04	.003	1.31
FBS	CO–AC	4.64	.031	0.96
	SM–AC	4.36	.037	1.04

Notes: MMPI-2 = Minnesota Multiphasic Personality Inventory-2; FBS = Fake Bad Scale; Fp = Infrequency-Psychopathology; RBS = Response Bias Scale; HHI = Henry–Heilbronner Index; Fb = Back-Infrequency; F = Infrequency; CO = Control Group, AC = ADHD Clinical Group, SM = Simulated Malingering Group.

Table 4. Hierarchical logistic regression for prediction of response bias (malingering × clinical groups)

Model	Block	Scale	Model χ^2 (*df*)	*p*-value	χ^2-change (*df*)	*p*-value	R^2	R^2-change
1	1	F	24.99 (1)	<.001	3.75 (1)	.053	.32	.03
	2	Fp	28.74 (2)	<.001			.35	
2	1	Fp	28.28 (1)	<.001	0.46 (1)	ns	.35	.00
	2	F	28.74 (2)	<.001			.35	
3	1	RBS	16.63 (1)	<.001	11.66 (1)	<.001	.22	.13
	2	Fp	28.29 (2)	<.001			.35	
4	1	Fp	28.28 (1)	<.001	0.01 (1)	ns	.35	.00
	2	RBS	28.29 (2)	<.001			.35	
5	1	Fb	24.36 (1)	<.001	4.70 (1)	.03	.31	.05
	2	Fp	29.06 (2)	<.001			.36	
6	1	Fp	28.28 (1)	<.001	0.78 (1)	ns	.35	.01
	2	Fb	29.06 (2)	<.001			.36	
7	1	HHI	11.68 (1)	.001	16.70 (1)	<.001	.16	.19
	2	Fp	28.38 (2)	<.001			.35	
8	1	Fp	28.28 (1)	<.001	0.10 (1)	ns	.35	.00
	2	HHI	28.38 (2)	<.001			.35	
9	1	FBS	4.57 (1)	.033	23.72 (1)	<.001	.07	.28
	2	Fp	28.29 (2)	<.001			.35	
10	1	Fp	28.28 (1)	<.001	0.01 (1)	ns	.35	.00
	2	FBS	28.29 (2)	<.001			.35	

Notes: FBS = Fake Bad Scale; Fp = Infrequency-Psychopathology; RBS = Response Bias Scale; HHI = Henry–Heilbronner Index; Fb = Back-Infrequency; F = Infrequency. Cox and Snell R^2 utilized.

Table 5. Hierarchical logistic regression for prediction of ADHD (clinical × control groups)

Model	Block	Scale	Model χ^2 (*df*)	*p*-value	χ^2-change (*df*)	*p*-value	R^2-value	R^2-change
1	1	Fb	2.03 (1)	.15	16.02 (1)	<.001	.03	.20
	2	RBS	18.05 (2)	<.001			.23	
2	1	RBS	6.89 (1)	.009	11.16 (1)	<.001	.09	.14
	2	Fb	18.05 (2)	<.001			.23	
3	1	HHI	10.91 (1)	.001	0.60 (1)	ns	.14	.01
	2	RBS	11.51 (2)	.003			.15	
4	1	RBS	6.89 (1)	.009	4.62 (1)	.032	.09	.06
	2	HHI	11.51 (2)	.003			.15	
5	1	Fb	2.03 (1)	.15	18.72 (1)	<.001	.03	.22
	2	HHI	20.77 (2)	<.001			.25	
6	1	HHI	10.91 (1)	.001	9.86 (1)	.002	.14	.11
	2	Fb	20.77 (2)	.03			.25	

Notes: RBS = Response Bias Scale; HHI = Henry–Heilbronner Index; Fb = Back-Infrequency. Cox and Snell R^2 utilized.

Table 6. Operational characteristics and cutoffs for MMPI-2 validity scales to identify response bias (malingering × clinical/control)

	Cutoff	Sensitivity	Specificity	PPP	NPP
Fp	≥5	59.4	94.4	82.6	83.8
	≥6	50.0	95.8	84.2	81.0
	≥7	40.6	95.8	81.3	78.2
HHI	≥8	53.1	82.6	58.6	79.2
	≥9	46.9	88.7	65.2	78.8
RBS	≥11	46.9	87.3	62.5	78.5
	≥12	43.8	91.5	70.0	78.3
	≥13	37.5	94.4	75.0	77.0
	≥14	31.3	97.2	83.3	75.8
	≥15	25.0	98.6	88.9	74.5
	≥16	18.75	100	100	73.2
	≥17	12.5	100	100	71.7
FBS	≥19	37.5	90.1	63.2	76.2
	≥20	34.4	93.0	68.8	75.9
	≥21	21.9	94.4	63.6	72.8
	≥22	21.9	95.8	70.0	73.1
	≥23	15.6	97.3	71.4	72.4

Notes: FBS = Fake Bad Scale; Fp = Infrequency-Psychopathology; RBS = Response Bias Scale; HHI = Henry–Heilbronner Index; MMPI-2 = Minnesota Multiphasic Personality Inventory-2; PPP = positive predictive power; NPP = negative predictive power. $N = 103$.

Group Classification (Sensitivity, Specificity, Positive Predictive Power, and Negative Predictive Power)

Specificity, sensitivity, positive predictive power (PPP), and negative predictive power (NPP) were determined for HHI and Fp, as well as RBS and FBS. Specificity refers to the percentage of true negatives (e.g., ADHD clinical group, control group) that are correctly identified. Sensitivity refers to the percentage of true positives (e.g., ADHD simulator group) correctly identified. PPP describes the proportion of true positives out of all participants identified as feigning ADHD as determined by the various MMPI-2 validity indices. NPP describes the proportion of true negatives out of all participants identified as credibly responding to the MMPI as determined by the MMPI-2 validity indices (Gervais et al., 2007; Quinn, 2003).

It was found that Fp displayed the best balance of specificity (0.94) and sensitivity (0.59) at the raw score cutoff of 5. At this cutoff, Fp had PPP of 0.83 and NPP of 0.84. In contrast, HHI displayed inadequate specificity (0.83) but adequate sensitivity (0.53) at the recommended cutoff of 8. PPP and NPP for HHI ≥ 8 was 0.59 and 0.79, respectively. Moving to a more conservative cutoff of ≥9 increased specificity to a more acceptable level (0.89) while maintaining modest sensitivity (0.47). Review of group means indicates that the malingering group's mean HHI score exceeded the recommended cutoff ($M = 8.41$, $SD = 3.16$); however, it is also noted that 17% ($n = 12$) of the clinical/control combined group also had an HHI raw score above the recommended cutoff.

Investigation of recommended cutoff scores for FBS and RBS indicated that these measures are relatively insensitive to identifying individuals feigning ADHD. Regarding classification accuracy for RBS, no individuals in either the control or the clinical groups endorsed enough items to exceed the recommended cutoff. Further, only 13% ($n = 4$) of individuals in the malingering group endorsed a clinically significant number of items. As such, the observed specificity of 1.00 and sensitivity of 0.13 is not particularly meaningful. Exploration of alternative cutoffs indicated that the cutoff for RBS would have to be lowered to 11 (sensitivity = 0.47, specificity = 0.87) or 12 (sensitivity = 0.44, specificity = 0.92) to obtain adequate operational characteristics; however, this seem impractical given that the recommended cutoff has performed well in other evaluation contexts (e.g., civil and criminal litigation). A similar effect was found with FBS as only 2 of 71 participants in the clinical and control groups and 5 of 32 individuals in the malingering group exceeded the recommended cutoff of 23 (Greiffenstein et al., 2007). As such, FBS displayed excellent specificity (0.97) but poor sensitivity (0.16) at the recommended cutoff. Exploration of alternative cutoffs found that a cutoff score of 19 improved sensitivity to 0.38 while maintaining strong specificity (0.90). Operational characteristics for above scales are shown in Table 6.

Discussion

Diagnosis of ADHD is most frequently made through the use of clinical interview and behavioral rating scales. The present study, as well as several past studies (Jachimowicz & Geiselman, 2004; Quinn, 2003; Suhr et al., 2008), reveals that behavior rating scales are easily feigned in a manner consistent with a clinical group of adults with ADHD. Consistent with expectations,

the response pattern of individuals attempting to feign ADHD symptoms resulted in elevations on all subscales of the ADHD Current and Childhood Symptoms Scales that were essentially indistinguishable from the ADHD clinical group. Similar to most other ADHD behavior rating scales, this measure does not have validity indices and those with such indices are principally focused on identifying inconsistent responding rather than detection of symptom feigning or exaggeration.

Although instructions given to the malingering group outlined ADHD symptoms and motivations to malinger, this information was not unlike what is readily available on the internet. Further, it is reasonable to speculate that the attention that ADHD receives in the media, as well as through observation of coworkers and fellow students receiving accommodations, encourages individuals to think about ADHD and whether they have similar symptoms. Herein lays a significant challenge to clinicians as everyone has moments of inattention, distractibility, and excitability, and it should be assumed that even the most well-intentioned adults seeking an assessment for ADHD have done some level of "research" into their perceived problems. Prior research has also made clear that there is a subset of individuals who pursue diagnoses and accompanying accommodations under false pretenses, and these data suggest that a modest level of knowledge may facilitate the ease with which people can complete a symptom checklist and feign ADHD. Current findings indicate that the previous standard of diagnosing ADHD based exclusively on the use of clinical interview and behavioral rating scales is insufficient and inclusion of SVT measures should be considered in the assessment of adult ADHD.

The MMPI-2 was examined as a viable addition to the standard ADHD assessment battery given its validated utility in detecting response bias and ease of administration. The current findings firmly support its application in adult ADHD assessment given the number of validity scales (i.e., Fp, FBS, RBS, HHI, F, Fb) that were able to differentiate between the clinical and the malingering groups. These scales were originally developed to assess atypical or infrequent responding in psychiatric samples (i.e., F, Fb, Fp) and in those with somatic and cognitive complaints (i.e., FBS, RBS, HHI); however, present findings also suggest that these scales effectively differentiate between ADHD clinical and malingering samples. Given that Fp and F most effectively differentiated between the malingering and the clinical groups, followed relatively closely by RBS and Fb, it suggests that individuals feigning ADHD symptoms will more closely resemble those feigning or exaggerating psychiatric symptoms when compared those feigning cognitive or somatic complaints. Nevertheless, the malingering group also endorsed items consistent with the feigning of cognitive and somatic complaints suggesting that there is heterogeneity in the strategies employed for feigning symptoms. Alternatively, individuals feigning symptoms may also endorse a more diverse set of atypical items resulting in the varied types of validity scales that are elevated. Regardless, the number and variety of validity scales displaying significant elevation in the malingering group suggests that the MMPI-2 is sensitive to detecting a number of different strategies or forms of response bias.

Although the above findings suggest that inclusion of the MMPI-2 in adult ADHD assessment has merit, not all findings were consistent with expectations. Exploration of recommended and alternative cutoff scores of validity scales found that Fp ($\geq$5) and HHI ($\geq$9) displayed good specificity and adequate sensitivity at a reasonable cutoff score (Fp $\geq$ 5); however, other scales (i.e., RBS and FBS) expected to display a strong predictive validity displayed inadequate sensitivity and specificity at recommended cutoffs, and there was little reason to recommend alternative cutoff scores given how drastically cutoffs would have to be lowered to improve operational characteristics. Potential explanation for the lack of elevation on the RBS and FBS is that these scales were developed principally to assess exaggerated somatic and cognitive complaints and individuals reviewing ADHD simulation instructions, which included description of symptoms, more readily perceived maladaptive externalizing behaviors, such as hyperactivity and disorganization, as being more representative of ADHD than cognitive or somatic complaints. In retrospect, this is not particularly surprising and the significance of Fp and F makes sense given that they were developed to assess invalid reporting of psychopathology. With regard to the HHI, its efficacy in detecting response bias is potentially attributable to capturing aspects of both cognitive and somatic complaints whereas RBS and FBS may capture more unidimensional aspects of feigned cognitive and somatic symptoms, respectively.

Although the present study represents a significant extension in the SVT literature regarding detection of feigned ADHD, the findings are tempered by a number of limitations. Similar to other analog studies, it is difficult to gage how invested those in the malingering group were in convincingly feigning ADHD. Individuals had incentive to participate in the study but there was no incentive to respond in a particularly convincing manner. Related, measures administered to the control and simulation groups were not part of a comprehensive neuropsychological assessment; thus, participants feigning ADHD directed their biased responding on a narrow set of measures. This potentially limits the generalizability of findings as response patterns may change if one was attempting to feign symptoms consistently across an extensive battery, as would be utilized in a standard clinical evaluation. This study would also have benefited from inclusion of a true malingering group who presented at the campus assessment clinic requesting an ADHD evaluation but failed SVTs besides the MMPI-2. A related limitation is that the archival clinical ADHD group were not administered SVTs, and though several individuals were removed due to low RDS scores, it is possible that a number of individuals with ADHD diagnoses were feigning the disorder. Future studies examining the utility of the MMPI-2 in detecting feigned ADHD would benefit from including one or more free-standing or

embedded SVTs to ensure diagnostic accuracy and offer convergent validity to the current findings. The strategy also would be consistent with the recommendations of Larrabee (2003b) and Victor, Boone, Serpa, Buehler, and Ziegler (2009) that determination of invalid or noncredible responding is best determined by failure on two or more indices of effort or response bias. Last, current results represent response patterns and strategies of college students thereby limiting generalizability of findings. As such, replication of findings in other samples, such as adults requesting accommodations from employers for ADHD, would be beneficial.

The use of symptom validity testing is now recognized as an essential part of any neuropsychological assessment given the high base rates of malingering and atypical responding. Although litigating individuals claiming mild traumatic brain injury have received the most research attention, it is essential for the clinical and research community to recognize that other disorders and diagnoses present powerful incentives for symptom fabrication and exaggeration. The MMPI-2 is frequently employed in ADHD assessment given the frequency of comorbidity with other disorders. The present study supports broadening its application as it contains multiple indices of atypical responding that are sensitive to elevation in individuals feigning related symptoms.

Conflict of Interest

None declared.

References

Alfano, K., & Boone, K. B. (2007). The use of effort tests in the context of actual versus feigned attention-deficit/hyperactivity disorder and learning disability. In *Assessment of feigned cognitive impairment: A neuropsychological perspective* (pp. 366–383). New York: Guilford Press.

American Academy of Clinical Neuropsychology Board of Directors. (2007). American Academy of Clinical Neuropsychology (AACN) practice guidelines for neuropsychological assessment and consultation. *The Clinical Neuropsychologist*, *21*, 209–231.

Arbisi, P. A., & Ben-Porath, Y. S. (1995). An MMPI-2 infrequent response scale for use with psychopathological populations: The infrequency psychopathology scale, F(p). *Psychological Assessment*, *7*, 424–431.

Babikian, T., Boone, K., Lu, P., & Arnold, G. (2006). Sensitivity and specificity of various Digit Span scores in the detection of suspect effort. *The Clinical Neuropsychologist*, *20*, 145–159.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2002). The persistence of attention-deficit/hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. *Journal of Abnormal Psychology*, *111*, 279–289.

Barkley, R. A., & Murphy, K. R. (2006). *Attention deficit hyperactivity disorder: A clinical workbook* (3rd ed.). New York: Guilford Publications.

Barrett, S. P., Darredeau, C., Bordy, L. E., & Pihl, R. O. (2005). Characteristics of methylphenidate misuse in a university student sample. *Canadian Journal of Psychiatry*, *50*, 457–461.

Braun, D. L., Dulit, R. A., Adler, D. A., Berlant, J., Dixon, L., Fornari, V., et al. (2004). Attention-Deficit/Hyperactivity Disorder in adults: Clinical information for primary care physicians. *Primary Psychiatry*, *11*, 56–65.

Bush, S. S., Ruff, R. M., Tröster, A. I., Barth, J. T., Koffler, S. P., Pliskin, N. H., et al. (2005). Symptom validity assessment: Practice issues and medical necessity (NAN Policy & Planning Committee). *Archives of Clinical Neuropsychology*, *20*, 419–426.

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *Minnesota Multiphasic Personality Inventory (MMPI-2). Manual for administration and scoring*. Minneapolis: University of Minnesota Press.

Conners, C. K., Erhardt, D., & Sparrow, E. P. (1998). *Conners' adult attention rating scale - self-report: Long version*. North Tonawanda, NY: Multi-Health Systems.

Conti, R. P. (2004). Malingered ADHD in adolescents diagnosed with conduct disorder: A brief note. *Psychological Reports*, *94*, 987–988.

Daly, D. (2006). Attention deficit hyperactivity disorder: A review of the essential facts. *Child: Care, Health and Development*, *32*, 193–204.

Davidson, M. A. (2008). ADHD in adults: A review of the literature. *Journal of Attention Disorder*, *11*, 628–641.

Dias, G., Mattos, P., Coutinho, G., Segenreich, D., Saboya, E., & Ayrãa, V. (2008). Agreement rates between parent and self-report on past ADHD symptoms in an adult clinical sample. *Journal of Attention Disorders*, *12*, 70–75.

Frazier, T. W., Frazier, A. R., Busch, R. M., Kerwood, M. A., & Demareed, H. A. (2008). Detection of simulated ADHD and reading disorder using symptom validity measures. *Archives of Clinical Neuropsychology*, *23*, 501–509.

Gervais, R. O., Ben-Porath, Y. S., Wygant, D. B., & Green, P. (2007). Development and validation of a Response Bias Scale (RBS) for the MMPI-2. *Assessment*, *14*, 196–208.

Glutting, J. J., Youngstrom, E. A., & Watkins, M. W. (2005). ADHD and college students: Exploratory and confirmatory factor structures with student and parent data. *Psychological Assessment*, *17*, 44–55.

Graham, J. R. (2000). *MMPI-2: Assessing personality and psychopathology* (3rd ed.). New York: Oxford University Press.

Green, P. (2003). *Word Memory Test for Windows: User's manual and program*. Edmonton: Green's Publishing.

Greiffenstein, M. F., Baker, W. J., & Gola, T. (1994). Validation of malingered amnesia measures with a large clinical sample. *Psychological Assessment*, *6*, 218–224.

Greiffenstein, M. F., Fox, D., & Lees-Haley, P. R. (2007). The MMPI-2 Fake Bad Scale in detection of noncredible brain injury claims. In K. Boone (Ed.), *Assessment of feigned cognitive impairment: A neuropsychological perspective* (pp. 210–235). New York: Guilford Press.

Harrison, A. G. (2004). An investigation of reported symptoms of ADHD in a university population. *ADHD Report*, *12*, 8–11.

Harrison, A. G. (2006). Adults faking ADHD: You must be kidding! *ADHD Report*, *14*, 1–7.
Harrison, A. G., Edwards, M. J., & Parker, K. C. H. (2007). Identifying students faking ADHD: Preliminary findings and strategies for detection. *Archives of Clinical Neuropsychology*, *22*, 577–588.
Heinly, M. T., Greve, K. W., Bianchini, K. J., Love, J. L., & Brennan, A. (2005). WAIS Digit Span-based indicators of malingered neurocognitive dysfunction: Classification accuracy in traumatic brain injury. *Assessment*, *12*, 429–444.
Henry, G. K., Heilbronner, R. L., Mittenberg, W., & Enders, C. (2006). The Henry–Heilbronner Index: A 15-item empirically derived MMPI-2 subscale for identifying probable malingering in personal injury litigants and disability claimants. *The Clinical Neuropsychologist*, *20*, 786–797.
Jachimowicz, G., & Geiselman, R. E. (2004). Comparison of ease of falsification of Attention Deficit Hyperactivity Disorder diagnosis using standard behavioral rating scales. *Cognitive Science Online*, *2*, 6–20.
Kessler, R. C., Adler, L., Barkley, R., Biederman, J., Conners, C. K., Demler, O., et al. (2006). The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey Replication. *American Journal of Psychiatry*, *163*, 716–723.
Larrabee, G. J. (2003a). Exaggerated MMPI-2 symptoms report in personal injury litigants with malingered neurocognitive deficit. *Archives of Clinical Neuropsychology*, *18*, 673–686.
Larrabee, G. J. (2003b). Detection of malingering using atypical performance patterns on standard neuropsychological tests. *The Clinical Neuropsychologist*, *17*, 410–425.
Lee, D. H., Oakland, T., Jackson, G., & Glutting, J. (2008). Estimated prevalence of attention-deficit/hyperactivity disorder symptoms among college freshmen: Gender, race, and rater effects. *Journal of Learning Disabilities*, *41*, 371–384.
Lees-Haley, P. R., English, L. T., & Glenn, W. J. (1991). A Fake Bad Scale on the MMPI-2 for personal injury claimants. *Psychological Reports*, *68*, 203–210.
Mathias, C. W., Greve, K. W., Bianchini, K. J., Houston, R. J., & Crouch, J. A. (2002). Detecting malingered neurocognitive dysfunction using the Reliable Digit Span in traumatic brain injury. *Assessment*, *9*, 301–308.
McCann, B. S., & Roy-Byrne, P. (2004). Screening and diagnostic utility of self-report attention deficit hyperactivity disorder scales in adults. *Comprehensive Psychiatry*, *45*, 175–183.
McGough, J. J., & Barkley, R. A. (2004). Diagnostic controversies in adult attention deficit hyperactivity disorder. *American Journal of Psychiatry*, *161*, 1948–1956.
Mittenberg, W., Patton, C., Canyock, E. M., & Condit, D. C. (2002). Base rates of malingering and symptom exaggeration. *Journal of Clinical and Experimental Neuropsychology*, *24*, 1094–1102.
Murphy, K., & Barkley, R. A. (1996a). Attention deficit hyperactivity disorder adults: Comorbidities and adaptive impairments. *Comprehensive Psychiatry*, *37*, 393–401.
Murphy, K., & Barkley, R. A. (1996b). Prevalence of DSM-IV symptoms of ADHD in adult licensed drivers: Implications for clinical diagnosis. *Journal of Attention Disorders*, *1*, 147–161.
Nigg, J. T. (2005). Neuropsychologic theory and findings in attention-deficit/hyperactivity disorder: The state of the field and salient challenges for the coming decade. *Biological Psychiatry*, *57*, 1424–1435.
Poulin, C. (2001). Medical and nonmedical stimulant use among adolescents: From sanctioned to unsanctioned use. *Canadian Medical Association Journal*, *165*, 1039–1044.
Quinn, C. A. (2003). Detection of malingering in assessment of adult ADHD. *Archives of Clinical Neuropsychology*, *18*, 379–395.
Reynolds, C. R., & Kamphaus, R. W. (2004). *BASC-2 Behavior Assessment System for Children, second edition manual*. Circle Pines, MN: American Guidance Service.
Rogers, R., Sewell, K. W., Martin, M. A., & Vitacco, M. J. (2003). Detection of feigned mental disorders: A meta-analysis of the MMPI-2 and malingering. *Assessment*, *10*, 160–177.
Seidman, L. J., Doyle, A., Fried, R., Valera, E., Crum, K., & Matthews, L. (2004). Neuropsychological function in adults with attention-deficit/hyperactivity disorder. *Psychiatric Clinics of North America*, *27*, 261–282.
Staudenmayer, H., & Phillips, S. (2007). MMPI-2 validity, clinical and content scales, and the Fake Bad Scale for personal injury litigants claiming idiopathic environmental intolerance. *Journal of Psychosomatic Research*, *62*, 61–72.
Strauss, E., Hultsch, D. F., Hunter, M., Slick, D. J., Patry, B., & Levy-Bencheton, J. (1999). Using intraindividual variability to detect malingering in cognitive performance. *Clinical Neuropsychologist*, *14*, 420–432.
Strauss, E., Slick, D. J., Levy-Bencheton, J., Hunter, M., MacDonald, S. W. S., & Hultsch, D. F. (2002). Intraindividual variability as an indicator of malingering in head injury. *Archives of Clinical Neuropsychology*, *17*, 423–444.
Suhr, J., Hammers, D., Dobbins-Buckland, K., Zimak, E., & Hughes, C. (2008). The relationship of malingering test failure to self-reported symptoms and neuropsychological findings in adults referred for ADHD evaluation. *Archives of Clinical Neuropsychology*, *23*, 521–530.
Sullivan, B. K., May, K., & Galbally, L. (2007). Symptom exaggeration by college adults in attention-deficit hyperactivity disorder and learning disorder assessments. *Applied Neuropsychology*, *14*, 189–207.
Victor, T. L., Boone, K. B., Serpa, J. G., Buehler, J., & Ziegler, E. A. (2009). Interpreting the meaning of multiple symptom validity test failure. *The Clinical Neuropsychologist*, *23*, 297–313.
Weisler, R. H., & Goodman, D. W. (2008). Assessment and diagnosis of adult ADHD: Clinical challenges and opportunities for improving patient care. *Primary Psychiatry*, *15*, 53–64.
Woods, S. P., Lovejoy, D. W., & Ball, J.D. (2002). Neuropsychological characteristics of adults with ADHD: A comprehensive review of initial studies. *The Clinical Neuropsychologist*, *16*, 12–34.