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THE UTILITY OF ADHD-DIAGNOSTIC AND SYMPTOM VALIDITY MEASURES IN THE ASSESSMENT OF UNDERGRADUATE STUDENT RESPONSE DISTORTION: A CLINICALLY-ENHANCED SIMULATION STUDY

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ABSTRACT OF DISSERTATION

Myriam J. Sollman

The Graduate School
University of Kentucky

2008

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IN THE ASSESSMENT OF UNDERGRADUATE STUDENT RESPONSE
DISTORTION: A CLINICALLY-ENHANCED SIMULATION STUDY

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By
Myriam Jessica Sollman

Lexington, Kentucky

Director: Dr. David T. R. Berry, Professor of Psychology

Lexington, Kentucky

2008

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THE UTILITY OF ADHD-DIAGNOSTIC AND SYMPTOM VALIDITY MEASURES IN THE ASSESSMENT OF UNDERGRADUATE STUDENT RESPONSE DISTORTION: A CLINICALLY-ENHANCED SIMULATION STUDY

This study evaluated the efficacy of various attention-related, neuropsychological, and symptom validity measures in the detection of feigned ADHD in an undergraduate sample. Performance was compared between a group of presumed normal students (HON), a group of diagnostically “clean” ADHD students asked to respond to the best of their ability (ADHD), and a group of motivated, coached feigners (FGN). Feigners were educated about symptoms and characteristics of ADHD, provided with a scenario to help them relate to the plight of a student who might seek diagnosis, admonition to feign believably, and a significant monetary incentive for “successful feigning” (\$45). They were not forewarned about the specific types of tests they would take nor alerted to the presence of malingering detection instruments. Results illustrated that the ADHD symptom-report measures, though sensitive to ADHD, were quite susceptible to faking. The ARS and CAARS—S:L (using a stringent cut score of four or more scale elevations) were successfully faked by 80% and 67% of students, respectively. The Conners CPT, in contrast to those measures, had both limited sensitivity to ADHD and specificity for FGN in this sample. Very high specificity and moderate sensitivity were noted for symptom validity measures across the board, translating into high positive predictive values. Binary logistic regression results indicate that the TOMM Trial 1 coupled with the DMT, LMT, or NV-MSVT may be used to identify feigners with high predictive accuracy.

KEYWORDS: Feigning, Malingering, Symptom Validity, ADHD, Undergraduate

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To Pete,

and all of my other teachers throughout this journey.

*Your heartfelt dedication, direction, and concern
have shaped my life indefinitely.*

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My sincerest gratitude is expressed to several people involved in the completion of this work, and this degree. The project could not have been completed without the involvement of Dr. John Ranseen. I thank him for his many forms of generous support, guidance, and patience throughout the entire process.

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Chapter One

Introduction

ADHD Overview

The most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, 2000) provides the presently-accepted nosology of psychiatric and personality disorders that modern healthcare providers use for diagnosis. The present edition characterizes Attention Deficit Hyperactivity Disorder (ADHD) as a disorder first apparent in childhood; current diagnostic criteria require that developmentally inappropriate symptoms of inattention or disinhibition, hyperactivity, and impulsivity (depending on subtype) not only persist for at least 6 months, but have been present since before the age of seven. Although that age was chosen somewhat arbitrarily according to supporters and critics alike (Gordon & Murphy, 1998), it is generally accepted that the problematic nature of these symptoms first emerges in the early school years (see Barkley, 2006). Researchers theorize that the early onset is attributable to a number of causes, including genetic neurodevelopmental or organizational problems, or early structural damage to the fronto-subcortical circuit (Powell & Voeller, 2004; Swanson & Castellanos, 2002) affecting appropriate acquisition of essential cognitive, behavioral, and emotional regulatory behaviors. Numerous structural and functional neuroimaging studies exist to support the presence of such damage in diagnosed youngsters (see Dickstein, Bannon, Castellanos, & Milham [2006] for a meta-analytic review of the literature). Of course, later ADHD onset is possible, secondary to acquired neurological damage, but at this time there is no DSM-IV category for this condition.

The Impact of ADHD in Educational Settings

Regardless of the specific cause or age of onset of attentional impairment, it is clear that ADHD-characteristic dysfunction may be associated with significant impairment in educational, occupational, and interpersonal functioning as a result of the cognitive, behavioral, and emotional difficulties arising from ADHD. Thus, individuals with the syndrome or disorder have the potential to be significantly disabled, requiring special accommodations in educational settings. The myriad possible causes of such impairment are reflected in substantial base rates of diagnosed ADHD—ranging from 7-

12% of the elementary through high school-aged population, based upon an epidemiological study conducted by the US Centers for Disease Control in 2003 (see Biederman, 2005)—to estimates of 27% of adults,¹ including undiagnosed cases (see Goldstein, 2006). Even at the more conservative estimates, which do not include those young Americans for whom evaluation was out of reach due to economic, cultural, parental, or other reasons, this leaves a great number who may require special accommodations in their educational and occupational endeavors.

When tightening the focus of ADHD-affected individuals to college or university students, it becomes even more difficult to cite a base rate with confidence. Evidence exists that the syndrome may be "outgrown," and particularly that hyperactive symptoms may remit (see Shaw, 2000, for a review; see also Biederman, Farone, Milberger, Curtis, et al., 1996). However, prevalence estimates for adults with ADHD vary widely. Barkley and Murphy (1998) estimated that 60% of childhood-onset patients experience persistent ADHD. A meta-analytic review of the literature conducted by Farone, Biederman, & Mick (2006), provides evidence that only 15% of individuals diagnosed in childhood met full DSM-IV criteria by age 25, with 65% meeting criteria for ADHD "in partial remission." Of note, these estimates do not include adult-onset cases lacking evidence for the disorder in childhood, or "Adult ADHD," as it is termed in today's media. In addition to statistical evidence for the resolution of some cases of ADHD, biological and theoretical reasons for recovery can be derived from examination of the acquired brain injury literature: Dendritic growth may occur, as evidenced in human and other mammalian TBI and stroke research (see Chen, Atkins, Liu, Alonso, Dietrich, & Hu, 2007 for an in-depth review; Scheff, Price, Hicks, Baldwin, Robinson, & Brackney, 2005), and individuals may develop compensatory strategies, as demonstrated in cognitive rehabilitation literature (e.g., Yongue, 2006; Verne, Mezzanato, & Caminti, 2006; Mooney, Speed, & Shepard, 2005; Rath, Simon, Langenbahn, Sherr, & Diller, 2003). Moreover, the acquisition of the necessary cognitive, behavioral, and emotional skills impaired in childhood-onset ADHD may be grossly slowed or delayed, rather than thwarted altogether, for a portion of the affected.

¹ This is an estimate based upon US Census data provided in wikipedia.org, using the estimated 8 million adults referenced in Goldstein (2006). The estimate was derived from DSM-IV symptom telephone surveys of 2.4 million US residents conducted by a Fortune-500 medical company (note conflict of interest).

Despite the challenges in establishing a reliable base rate of ADHD in college-aged population, determining such is highly important for two reasons. First, it may serve as a "check" for the integrity of an individual clinician's use of the diagnosis. Second, it may serve as a signal for other phenomena, such as in the presence of abnormally high local base rates or temporal increases in a base rate. For example, a rise in current ADHD diagnoses from 2% to 20% of a university's medical school population—a group for which high rates of lifelong *impairment* associated with ADHD are unlikely—might indicate the growing popularity of seeking psychostimulant medication. Indeed, a gross increase in the rate of adults, including college students, seeking ADHD diagnostic evaluations has recently been evidenced (see Harrison, 2006). Gordon and Murphy (1998) state that most institutions and testing organizations reported at least a doubling of ADHD-based claims in the mid-to-late 1990s. Many of these individuals were unable to provide adequate childhood histories or any evidence of lifelong impairment (Harrison, 2006). This raises concern that an ADHD diagnosis is being considered by at least some of these adult evaluatees for the first time, and questions as to why that may be direct attention to an issue of growing significance in university settings.

Diagnostic Incentives in University Settings

Significant motivations and incentives exist for seeking a diagnosis of ADHD—accurate or not—in North American higher education facilities. For one, the Americans with Disabilities Act (ADA; 1990, PL 101-336) established that individuals with cognitive and psychiatric disabilities, *relative to the general population*, may be eligible for special accommodations. The ADA does not provide for otherwise unqualified students to be granted an equal opportunity to those meeting the academic and technical standards of a course or program (Keiser, 1998). Instead it calls for the establishment of "Reasonable Accommodations."

Although a structured algorithm for the nature and degree of accommodations that should be provided by educational facilities is not available, these typically involve assistance "taking in the educational nourishment" (Keiser, 1998; p. 46) and receiving fair evaluations, when applied to ADHD-diagnosed students (Keiser, 1998). McGuire (1998) provides a list of common accommodations in such cases, which includes extra

time for written work and tests, no spelling penalty, selective seating, electronic aides including tape recorders, reduced homework, availability of teacher notes, clarification of directions and questions for assignments and exams when a student apparently does not understand, and re-examination where re-teaching has been indicated. Because pharmacotherapy is not considered an ADA accommodation despite the fact that it almost always "wins" in head-to-head comparisons with non-medical interventions by producing more positive effects in a shorter period of time (see Gordon & Murphy, 1998); and because research has not indicated consistently efficacious environmental interventions for ADHD students, meeting the ADA guideline of providing "Reasonable Accommodations" for students with ADHD is difficult. Some universities have chosen liberal approaches to this, perhaps to avoid legal ramifications. Both Harrison (2006) and Jachimowiz and Geiselman (2004) give example accommodations, which extend far beyond extra test time to include free computers, free tutoring services, private dormitory rooms, and significant amounts of financial support. Separate testing rooms may also be provided in many schools, and although this has not been stated outright, this may be appealing to students inclined to cheat.

Jachimowiz and Geiselman (2004) comment that services and supports like those described above are not only a great help to students with disabilities, but would be equally helpful to those without disabilities. They further state that in today's job market, enhancing college performance is helpful to secure employment or to improve chances of attaining admission to graduate programs that may further increase odds of later career and financial success. Based upon these notions, it is no surprise that undergraduates may be consciously or unconsciously motivated to be diagnosed with ADHD. This is only a part of the picture, however.

Beyond the ADA accommodations lies another potentially powerful incentive for students to desire an ADHD diagnosis: psychostimulant medications. Just like steroids may benefit the performance of most athletes, psychostimulants have the potential to assist students regardless of the presence or absence of attentional dysfunction. Stimulants work by enhancing catecholamine activity and probably by increasing the availability of norepinephrine and dopamine at the synaptic cleft (see Solanto, 1998, in Connor, 2006). The result is enhanced neurotransmission and a corresponding increase

in blood flow to the frontal and parietal lobes. In turn, responders experience improved attention and concentration, processing speed, and consequently better learning and memory (see Connor, 2006, for a review of cognitive, learning, and academic improvements). Stimulants may decrease required studying time, freeing more time for socialization or other activities and result in better outcomes such as grades. They do not, however, appear to significantly enhance performance on intellectual testing (Rapport & Kelly, 1991, in Connor, 2006).

In addition to potentially improving academic functioning, psychostimulants may be sought by students for recreational purposes. As with cocaine, prescription stimulants, when inhaled or injected, cause a sense of euphoria. Mixing methylphenidate in particular with large quantities of alcohol is said to enhance this euphoria while diminishing the subjective sense of "drunkenness" (Barrett & Phil, 2002, in Harrison, 2006). Conti (2004) states that there is no better way to obtain a psychostimulant high than legally, particularly when the prescription may be subsidized!

Evidence for both the recreational and academic misuse of prescription stimulants is found throughout the literature. Several studies have reported a nation-wide increase in psychostimulant prescriptions during recent years (see Olfson, 2003; Robison, 2002), and multiple surveys have provided evidence of misuse at the university level. In a survey of 1,025 Northeastern US university students, 16% endorsed misuse or abuse of prescription stimulants, with reported motivations of improving attention and grades (White, Becker-Blease, & Grace-Bishop, 2006). A survey of 10,904 randomly selected college students identified a 6.7% prevalence of non-medical prescription stimulant use, 4.1% in the past year, and 2.1% in the past month (McCabe, Knight, Teter, & Wechsler, 2005). Likewise, an investigation of past-year illicit *methylphenidate* use in 2,250 undergraduates found a base rate of 3% (McCabe, Teter, Boyd, & Guthrie, 2003).

Identifying "Genuine" DSM-IV ADHD

Considering the information provided above, it becomes apparent that college students have significant incentive to seek ADHD diagnosis and treatment, even when they may know they do not require it. Unfortunately, little research exists today on how best to identify genuine ADHD cases, while limiting misdiagnoses.

Arriving at a diagnosis of DSM-IV-defined ADHD is not simple. A sound

determination requires ruling out multiple symptomatically similar conditions including learning disabilities, psychiatric disorders such as anxiety, depression, bipolar disorder, and early psychotic spectrum disorders—a process that involves conducting a very detailed clinical interview, obtaining an adequate history with corroborating evidence, and completing neuropsychological testing (see Gordon & Murphy, 1998). In addition, diagnosis requires establishing that *clinically significant* levels of impairment are *currently* present in social, academic, or occupational settings (see Hagar & Goldstein, 2005, for a discussion of "clinical significance" in undergraduate diagnoses); confirming that evidence for impairment exists in at least two settings (such as home and class); and perhaps most importantly, identifying evidence that impairment existed during childhood.

Lastly, when external incentives such as disability accommodations, study-enhancing medications, and stimulant "highs" are available, the possibility exists that individuals without ADHD may deliberately try to be diagnosed (i.e., malingering) or subconsciously convince themselves (and in the process, others) of the disorder's presence. If possible, clinicians should try to assess the legitimacy of symptoms, including self-presentation on both subjective symptom reports and symptom-related test performance.

This directs attention to two caveats. First, the complexity of this evaluative process is riddled with weaknesses in tests' diagnostic accuracies and abilities to predict levels of impairment in everyday life. Unfortunately, there are no neuropsychological or symptom report tests sensitive *or* specific enough to both ADHD and its rule-out conditions to significantly facilitate this process (see Barkley, 2006; Gordon & Murphy, 1998). Computerized tests of impulsivity and attention have only fair sensitivity to the condition (Homack & Reynolds, 2006), poor specificity to differentiate ADHD from symptomatically similar conditions (Quinn, 2003; Homack & Reynolds, 2006), and poor convergence with other measures (Homack & Reynolds, 2006). Self-report measures of current or childhood symptoms are prone to over-identifying students and adults as having ADHD when they do not—in addition to being insensitive to true ADHD (Harrison, 2006; McCann & Roy-Byrne, 2006).

The second caveat is that very little empirical evidence exists as to the sensitivity and susceptibility of self-report, standard neuropsychological, or feigning tools to exaggerated or faked ADHD. The symptom-report measures and computerized

continuous performance tests, including those with validity scales, have not routinely been assessed for their robustness to faking. With one exception, stand-alone neurocognitive feigning tools have not been evaluated in studies of feigned ADHD. Instead, evaluations of neurocognitive feigning measures have most commonly been conducted in genuinely and allegedly brain-injured samples claiming disability levels warranting unemployment. It cannot be assumed that such measures will generalize to a likely higher-functioning population such as that of college students claiming a relatively partial disability. An evaluative review of the existing literature is provided below.

Previous Undergraduate ADHD Feigning Studies

At this time, only a handful of studies have evaluated one or more measures employed in the diagnosis of ADHD, for susceptibility to feigning using a simulation paradigm in an undergraduate sample. None of these are known-groups evaluations. Table 1-1 provides a summary of each study's methodology, including demographic makeup and specific instruction sets. Study results are provided in Table 1-2, in the form of Hedges' g effect size parameter, (a Cohen's d equivalent corrected for small sample size), and are discussed later.

Methodologies

As can be seen in Table 1-1, the few available studies identified lack consistency in measures, research goal, and methodological rigor. Only three included an ADHD-diagnosed clinical control group. The majority of studies provided feigners with a scenario that may help them relate to their role, information about the nature and symptomatology of ADHD, and an admonition to feign believably. At face value, these are strengths of the studies. However, no study with a clinical control group demonstrated diagnostic consistency, or more importantly, diagnostic certainty on an individual level. For example, Quinn's (2003) ADHD group was "diagnosed" using only a clinical interview and symptom report measure. Similarly, Harrison's (2007) clinical group was identified using only a symptom-report measure and an achievement test. The Booksh study (2005) ADHD group did not undergo a rule-out of psychiatric disorders that may mimic ADHD. In addition to addressing these weaknesses, it can be argued that simple procedures may be added to greatly enhance the ecological validity of ADHD feigning studies. This is discussed in greater detail below.

Table 1-1

Summary of Undergraduate ADHD Feigning Study Characteristics for those Involving a Simulation Group

First Author	Study Design	Group	Recruit From	N	<u>M(SD)</u> Age	% Male	<u>M(SD)</u> IQ est	IQ Source	comp/ inc	mal warn	scen- ario	Preparatory Procedures and Measures	Order of Test
Booksh	Sim	HON	PSY	54	20.4 (2.1)	20%	-	n/a	cc			WAIS-III selections, Connors' CPT, WURS, MINI, WMT, Rey FIT	1. Effort m 2. Rest, random- ized.
		MAL	PSY	55			-	n/a	cc, \$50 raffle	Y	(1)		
		ADHD	archive, Univ AC	56	21.1 (3.1)	30%	-	n/a	n/a			Some overlap with above	Unknown
Fisher	Other ^a	MAL	PSY	88 87	19.6 (2.0)	19%	-	n/a	cc, \$25 raffle	Y	(2)	Read DSM-IV criteria then asked to fake on one measure: CARE or ARS	Only one test admin to each group
Harrison	Sim	HON	PSY	35	18.7 (1.11)	36%	105.8 (6.6)	NAART	cc			NAART; instructions; then CAARS; WJ-III Rdg Flu, Vis Matching & Decision Speed	As listed
		MAL	PSY	35			106.9 (6.5)	NAART	cc	Y	(3)		
		ADHD	archive, Univ AC	72	22.9 (7.0)	46%	106.7 (12.0)	WAIS-III	0			Met DSM-IV criteria & Bush (2005) criteria for symptom validity assessment in absence of formal assessment ^a CAARS, WAIS-III.	Unknown
Jachimowitz	Other ^a	MAL	PSY	20	-	-	-	n/a	cc	N	N	Read DSM-IV criteria then asked to fake on one measure: CAARS WURS, BAAS or ARS	Only one test admin to each group

Leark	Sim w/in	H-M	PSY	18	22.4	44%	-	n/a	-	Y	(4)	Coached. TOVA only.	n/a
		M-H	PSY	18	(2.4)				-	Y			
Quinn	Sim	HON	PSY	19	-	-	-	n/a	-		(2)	IVA-CPT, Barkley-Murphy ADHD Symptom Checklist	Random-ized
		MAL	PSY	23	-	-	-	n/a	-	N			
		ADH D	Univ DO	16	-	-	-	n/a	-				

Note. See Table 1-2 for a summary of applicable results. Where demographic cells are combined, this is merely how data were presented in the study and does not imply that there was no group difference. cc = course credit, comp/inc = compensation or incentive, DP = differential prevalence or correlational design (correlate test failure with performance on other measures), H-M = honest condition first then malingering condition, m=measure, M-H=malingering condition first then honest condition, n/a=not applicable, PSY = Introductory Psychology course, Univ AC = university assessment center, Univ DO = university Students with Disabilities Office, scenario=feigning scenario (listed below), warn = admonition to feign believably, w/in = within subjects design.

6

Feigning Scenarios:

- (1) "Imagine that you have significant problems with inattention, impulsivity, and/or hyperactivity that are interfering with your academic performance. You believe that if you are diagnosed with ADHD you may be given some academic accommodations, such as extended time for tests, or medication, such as Ritalin, that will improve your grades. Your job in this experiment is to successfully convince the experimenter that you have ADHD, so you want to perform on these tests as if you actually have ADHD. Some of the tests you will take contain validity measures of effort and honesty that indicate whether you are putting forth good effort. You want to fool the experimenter, that is, you want it to look as if you have ADHD, without arousing any suspicion. You should appear to be putting forth a good effort. Participants that successfully simulate ADHD and have acceptable validity scores will be entered in a drawing at the end of the semester for a \$50 gift certificate to a local restaurant."
- (2) "Imagine yourself having trouble in school. Things aren't working out as you planned but your counselor's only advice is to work harder. You want to get some help. You hear about adult ADHD on a television show. When talking to a friend about it, your friend tells you that you could get special accommodations from the university, like untimed tests and rescheduling of exams if two are given on the same day. Your friend ADHDs that the stimulant medications that are generally prescribed have minimal side effects and that you can take the medicine only when you need it, just for school. You decide to read a book on ADHD. You find out that some ADHD adults even collect social security benefits. You conclude that you have enough of the symptoms. You convince yourself that you have ADHD. You go to the doctor and you really want to get help. In order to get these benefits, you need to convincingly act like a person who has ADHD."
- (3) "We would like you to complete these tests as if you were pretending to have an attention deficit disorder (ADHD). Imagine that you have heard about academic accommodations and other "perks" that are offered to people with this disability, and that you are trying to pretend that

you have this condition. You have heard that people who have this diagnosis get extra time for tests and exams, and can access money to purchase computers and other equipment. When you research ADHD on the internet, you find the following diagnostic criteria (see below)." (DSM-IV criteria provided). "Please complete the following tests as if those characteristics apply to you. It is important, however, that you *not be caught* in your efforts to exaggerate, so make sure your performance is believable."

(4) "I want you to take this test in such a way as to show me that you have ADHD when indeed you may not have ADHD. That is, try to make yourself appear as if you have a problem with attention and impulse control, even though you do not. In other words, fake bad on the test, but try not to be too obvious about your faking.

^a Only contained feigning participants, each group administered a different measure (N reflects group size).

As a whole, the methodologies of the identified feigning studies do not begin to compare in rigor to the research on feigned cognitive impairment (see Sollman & Berry, under review, for a comparison). Methodological weaknesses include the fact that only two studies reported providing simulators with incentive beyond course credit (Booksh, 2005; Fisher, 2007). Rogers (1997) cautions researchers that adequate incentives are necessary in the assessment of simulated malingering in order to approximate real-world conditions and to assure participants' motivation to feign. Additionally, only one study utilized a number and variety of diagnostic tests that would approximate a real-world evaluation, including standard neuropsychological measures (Booksh, 2005). Only one study reported group IQ estimates, which are helpful for understanding the success of feigning group and for comparing results between studies.

The most notable weakness in the evaluations is that only one study (Booksh, 2005) included a standard neurocognitive feigning measure. These are commonly employed in evaluations of suspected or feigned neurocognitive impairment, which is often associated with impulsivity and attentional difficulties that may mimic ADHD. Theoretically, therefore, neurocognitive feigning measures may be helpful in the detection of feigned ADHD. The Booksh study (2005) employed the Word Memory Test (Green, 2000), and found that it separated feigning and honest groups well (mean d -metric = 1.6) *and* demonstrated superb specificity to rule out feigning in honest individuals (1.0). However, the measure demonstrated only moderate sensitivity (.58). No studies evaluated included psychiatric feigning indices which are frequently employed in correctional and inpatient psychiatric settings.

Summary of Previous Studies' Results

Having examined the methodologies of studies to date, a summary of the studies' results ensues. These are provided for computerized measures of impulsivity and attention (continuous performance tests [CPTs]), and symptom report tests in general. Due to the number of measures examined and the differences in types of scores provided, a quantitative summary of results across studies is generally not possible. However, selected data are provided in Table 1-2.

CPTs. The Conners' CPT and the Integrated Visual and Auditory CPT (IVA-CPT) were evaluated separately within two of the five above-mentioned ADHD feigning

Table 1-2

Results of Previous Simulation Studies Pertinent to the Present Dissertation's Proposed Measures

	Results (M [SD])			Effect Size (g)			Test Parameters	
	HON	MAL	CLIN	Hon-Clin	Mal-Clin	Hon-Mal	Sn	Sp
<u>BOOKSH DISSERTATION (2005)</u>								
<i>Connors' CPT</i>								
Commission Errors	51.4 (11.2)	66.1 (13.5)	66.4 (14.7)	1.1	0.1	1.2	n/a	n/a
Omission Errors	-	-	-	-	-	-	n/a	n/a
Hit Rate	54.5 (10.7)	52.3 (15.1)	52.2 (10.4)	-0.2	0.0	0.2	n/a	n/a
Hit Rate Standard Error	59.2 (13.5)	81.7 (25.1)	67.2 (14.7)	0.6	0.7	1.1	n/a	n/a
Hit Rate Variability of Standard Error	52.8 (10.3)	72.1 (16.9)	62.4 (11.6)	0.9	0.7	1.4	n/a	n/a
<u>FISHER DISSERTATION (2007)</u>								
<i>Barkley-Murphy ARS</i>								
Current Symptoms								
Inattentive Total	n/a	77% faked	n/a	n/a	n/a	n/a	-	n/a
Hyperactive Total	n/a	5.8 (2.4)	n/a	n/a	n/a	n/a	-	n/a
Inattentive Symptoms	n/a	5.1(2.6)	n/a	n/a	n/a	n/a	-	n/a
Inattentive Total	n/a	11.0 (2.8)	n/a	n/a	n/a	n/a	-	n/a
<u>HARRISON (2007)</u>								
CAARS (see note below)								
Inattention/Memory Problems	-	-	-	1.2	0.4	-	-	-
Hyperactivity/Restlessness	-	-	-	1.4	0.8	-	-	-
Impulsivity/Emotional Labiality	-	-	-	0.8	0.8	-	-	-
Problems with Self-Concept	-	-	-	0.7	0.3	-	-	-
DSM-IV Inattentive Symptoms	-	-	-	1.5	0.7	-	-	-
DSM-IV Hyperactive/Impulsive Sympt	-	-	-	1.1	1.3	-	-	-
DSM-IV ADHD Symptoms Total	-	-	-	1.4	1.1	-	-	-

ADHD Index	-	-	-	1.0	0.9	-	-	-
<u>JACHIMOWICZ & GEISELMAN (2004)</u>								
<i>Barkley-Murphy ARS</i>	n/a	75% faked	n/a	n/a	n/a	n/a	0.3	n/a
<i>CAARS—S:L</i>	n/a	90% faked	n/a	n/a	n/a	n/a	0.1	n/a
<u>QUINN (2003)</u>								
<i>Barkley-Murphy ARS</i>								
Retrospective Symptoms								
Inattentive Total	6.9 (5.2)	18.7 (5.6)	19.8 (4.4)	2.7	-.2	2.1	-	-
Hyperactive Total	6.7 (5.1)	18.8 (6.1)	18.0 (5.3)	2.1	.1	2.1	-	-
Inattentive Symptoms	1.8 (2.5)	6.8 (2.5)	7.2 (1.7)	2.4	-.2	2.0	-	-
Hyperactive Symptoms	1.9 (2.1)	6.5 (2.4)	6.6 (2.2)	2.1	-.0	2.0	-	-
Current Symptoms								
Inattentive Total	4.9 (3.6)	17.9 (5.5)	14.7 (4.7)	2.3	.6	2.7	.7 ^a	.4 ^a
Hyperactive Total	5.3 (3.4)	15.5 (5.6)	14.4 (5.3)	2.0	.2	2.1	.7	.4
Inattentive Symptoms	0.7 (1.2)	6.4 (2.6)	4.9 (2.4)	2.2	.6	2.7	n/a	n/a
Hyperactive Symptoms	0.8 (1.1)	5.4 (2.5)	4.8 (2.2)	2.2	.3	2.3	n/a	n/a

Note. In Harrison study, the MAL group obtained \bar{T} - scores higher than the CLIN group on the CAARS. Raising the cut score to $70\bar{T}$ created more of a disparity between the three groups, and increased Specificity for the Hon group. Also, in the Harrison study, students were not instructed to think of themselves "off of medications" when reporting on the CAARS. In the Quinn study, the ADHD group did not score in the ADHD range on the Barkley Murphy ADHD Rating Scale's Current symptoms scale. Also, there was no significant difference between the clinical and malingering group on Childhood symptoms scale; thus, malingerers were not discriminated. CLIN = clinical group, HON = honest group, n/a = not applicable, MAL = feigning group, - = missing, Sn = sensitivity to actual ADHD, Sp = specificity.

^a Combined Subtype parameters: Using the criteria of >6 Inattentive items ranked 2 or 3, and > 6 Hyperactive items ranked 2 or 3. ^b Inattentive Subtype parameters: Using the criteria of > 6 Inattentive items ranked 2 or 3. ^c Hyperactive Subtype parameters: Using the criteria of >5 Hyperactive symptoms ranked 2 or 3.

studies. Both tests separated normal honest and ADHD groups on at least one index (IVA-CPT Full Attention Quotient d -metric = 1.1 [Quinn, 2003], C-CPT Commission Errors d -metric = 1.2 [Booksh, 2005]). The clinical group was accurately identified 86% of the time in the Quinn study, using three different scoring algorithms. However, it must be noted that this does not point to the measures' true sensitivity to ADHD, as other diagnostic conditions were not ruled out in either study.

The separation of the feigning and ADHD groups across CPTs was less successful. Only the IVA-CPT, as evaluated by Quinn (2003) appeared to be somewhat resilient to feigning. The Full Attention Quotient of the IVA-CPT yielded a d -metric of 1.9, whereas the best C-CPT T -score mean yielded a d -metric of 0.7. The IVA-CPT was not successfully faked on 81% of its scales according to the author. A mean sensitivity to feigning of .86 was found for the IVA-CPT across three scoring algorithms.

Self-Report Symptom Questionnaires. Examining results across studies, symptom report tests generally discriminated normal honest groups from both feigning and ADHD groups. However, these measures demonstrated inadequacy in separating feigned ADHD from diagnosed ADHD.

The Booksh (2005) study employed two symptom-report measures, the Wender Utah Rating Scale (WURS) to assess historical (childhood) symptomatology, and the Attention-Deficit Scale for Adults (ADSA) to assess current symptomatology. These discriminated feigned and diagnosed ADHD profiles with variable success in this study (WURS d -metric = .5, ADSA d -metric = 1.1). Test parameters could not be calculated due to a lack of information. The Quinn (2003) study employed the Retrospective (childhood) and Current Symptom indices of the Murphy and Barkley ADHD Rating Scales. Neither of these robustly separated feigned from diagnosed ADHD profiles, with d -metrics ranging from 0 to .6. Harrison (2007) examined the Conners Adult ADHD Rating Scale (CAARS) and demonstrated slightly more promising results, effect size estimates ranging from 0.3 to 1.2. Both the ADHD Total Symptoms Index (d -metric = 1.1) and the ADHD Hyperactive/Inattentive Symptoms Index (d -metric = 1.2) separated simulated and diagnosed ADHD profiles somewhat adequately, in that study. Neither Quinn (2003) nor Harrison (2007) provided data allowing for the calculation of test parameters.

Lastly, in the Jachimowicz and Geiselman (2004) study, students produced profiles "consistent with ADHD" on the Brown ADHD Rating Scale in 95% of cases, on the Conners ARS in 90% of cases, on the Barkley-Murphy ADHD rating scale in 75% of cases, and on the Wender Utah in 65% of cases, after reading DSM-IV criteria. These results, although consistent with literature examining the measures' abilities to separate ADHD from other clinical profiles, are alarming. They highlight how little preparation may be necessary in order to provide evidence of ADHD impairment. In light of this "internet age," where vast amounts of information are available to read and "to go" at the click of a button, these data are even more concerning.

Summary and Statement of the Problem

There is no question that significant incentives exist for college students to seek ADHD diagnoses regardless of whether or not they believe they genuinely have the disorder. The recently-growing base rates of ADHD diagnostic evaluations and treatment prescriptions, discussed above, suggest that this is an area requiring attention. Unfortunately, it is also apparent that existing diagnostic procedures are weak at distinguishing ADHD from other clinical disorders, and very little information is available regarding their robustness to feigning.

Before researchers can make accurate claims about measures' abilities to separate ADHD from other clinical conditions, it is necessary to understand how successful such tests are at ruling out feigned inattention. Thus, significantly more evaluations of the symptom self-report, computerized impulsivity / inattention measures, objective feigning measures, and even standard neuropsychological tests need to be undertaken. In order to generalize results of such research to a college population, it is necessary to conduct such work within relevant samples.

It is not enough to simply conduct analog evaluations of the various tests with a clinical comparison group, however. In order to develop sound predictions of how well results will hold up in the real world, it is necessary to conduct research that is as ecologically valid as possible. Educated individuals intent on receiving a diagnosis of ADHD will likely not just arrive for an evaluation unprepared, in hopes of "getting lucky." Minimally, they will probably educate themselves about the disorder. This can be done with very little effort today, thanks to the Internet. Unfortunately, the ecological

validity of the existing studies described above has been an obvious weakness.

Goals of the Present Study

The present study investigates whether various well-validated ADHD-related, standard neuropsychological, and symptom validity measures previously studied in other populations may be extended to an undergraduate ADHD-diagnostic setting where feigning may occur. The measures' abilities to separate actual and feigned ADHD groups, and to accurately classify individuals as clinical or not, will be evaluated. In order to produce the most ecologically valid results, the methodological focus will be on adequately motivating and preparing feigners for their role. Preparation will involve providing information obtained directly from the internet to students, and allowing them time to process this information and develop a "plan of action." Motivation will come in the form of financial incentive for "successful" feigning. In order to provide results that are practical for clinicians, measures will be selected based upon their popularity and economic appeal (for cost and time) in clinical practice, in addition to their previously identified psychometric strengths in either ADHD or other neuropsychological domains.

Chapter Two: Method

Participants

Participants were eighty undergraduates at the University of Kentucky. Two groups were sought: students without ADHD (“Presumed Normals”) and students with a previous, verifiable diagnosis of ADHD. Presumed Normals were screened to rule out any comorbid disorder that presents similarly to attention/concentration difficulty, including learning disabilities, diagnosed or self-perceived psychiatric conditions, neurological disorders, and a history of head injury. A diagnostically “clean” ADHD group was also sought, and those with comorbid neuropsychological, neurological, and psychiatric conditions were excluded. ADHD referrals were additionally asked what types of procedures they underwent for diagnosis (neuropsychological testing, symptom self-report, parent interview, classroom observation, teacher rating, et cetera) to maximize diagnostic integrity. Students reportedly diagnosed in a brief office visit or using only symptom report were excluded.

Both Presumed Normal and ADHD participants were recruited via the University of Kentucky Introductory Psychology class Mass Screening Session. This is a non-required class period where students interested in fulfilling a research exposure requirement by participating in research studies, rather than reviewing journal articles, anonymously fill out multiple pre-screening questionnaires. The questionnaire used in this study is provided in Appendix A, and examines the above-mentioned diagnostic characteristics. This questionnaire served to identify both prospective Presumed Normals and some ADHD participants.

ADHD participants were identified in several ways. As noted, some were initially selected using results from the mass screening. Additional ADHD participants responded to a flier (Appendix B) either posted in the University Disability Office (UDO) or emailed to ADHD-diagnosed students registered there. All ADHD-diagnosed students were asked if they were registered with the UDO as having ADHD, or could provide proof of their diagnosis at the time of participation, before being selected as a participant.

Procedure

Either a senior research assistant (identifying herself by first name and affiliation), or the primary investigator contacted eligible Presumed Normals identified from the

subject pool to screen them further (Appendices C-D). Those who continued to meet the previously described criteria were scheduled for participation. The primary investigator of this study contacted all eligible ADHD participants for full screening, in order to maximize confidentiality. ADHD participants were told that they would be contacted at a later date if they met inclusion criteria, which additionally included willingness to skip their medication for a twelve-hour wash-out period prior to testing. This was done so as not to give away inclusion criteria. Those qualifying were subsequently phoned by the same individual, told of the medication requirement, and asked again if they would like to participate. Scheduling was arranged to be at the safest and most convenient time for that student, in light of this. Subjects were called twenty-four hours before participation with a reminder of the appointment and medication requirement. Because of this methodology, and reimbursement requirements, the primary investigator was not blind to participants' clinical status.

As compensation and incentive for participation, Presumed Normals were told they would receive two research credits (of their required six) at testing completion. (In reality, some participants received greater incentive, as described later). ADHD participants were offered a choice of two research credits and \$15 (for medication-related inconveniences), or \$45 and no research credits. So, ADHD participants not enrolled in Introductory Psychology always got \$45, as research credits were not useful for them.

Presumed Normal participants were tested using two examiners, where one (RA1) provided pretesting and preparation protocol, and another, blind examiner completed the testing battery (RA2). RA1 obtained informed consent and administered a demographic and diagnostic questionnaire (Appendix E) as well as a "word reading test" for IQ estimation (Wechsler Test of Adult Reading [WTAR; Wechsler, 2001]). RA1 then provided information about the study and the procedures to come. To maintain confidentiality and give students a chance to recall any diagnoses they neglected to tell the phone screener, the demographic questionnaire was completed in privacy and sealed in an envelope by the evaluatee.

After being informed about the nature of this study, Presumed Normal students were randomly assigned to an Honest (HON) or Feigning (FGN) condition by selecting from two envelopes with enclosed role-specific information. RA1 instructed participants

not to disclose their role to RA2, who would be testing them.

Students in the HON condition received an explanation of the purpose and importance of a normal control group, and were asked to take the tests to the best of their ability. They were then asked to remain in the testing room for a few minutes, until RA2 was ready. FGN-condition students were congratulated with excitement in order to increase their attention, involvement and motivation; they were then told that if they were “successful” in that assignment, they would receive \$45 in addition to the two research credits already offered. They were then provided with a feigning scenario (see below), followed by information about ADHD. This information was obtained from the first few listed Google “hits” for ADHD and ADHD diagnosis (Appendix F) at the time of study inception, Fall 2006. FGN-role individuals were then given instruction to take five minutes to read through the scenario and internet information (presented in a pseudo web-page format), and to take notes. Prior to reading, they were encouraged to think about how this information would relate to their presentation in a testing evaluation.

Feigning Scenario:

Your roommate has been diagnosed with ADHD. S/he had trouble with classes, but then was given some medication for ADHD, and now does well. S/he even got a couple of A's recently, and has more time to socialize because studying is not as hard! During your midterms, you decided to try your roommate's medication, and ended up surprising yourself with how much easier things went. You may think that you have undiagnosed ADHD, so you "Google" the disorder to learn more about it. On the following pages are some of the things that you find.

When you are done reviewing these materials, please use the colored paper to jot down symptoms that will help you remember how to fake on the tests you will be given. Tell the examiner when you are done.

After their five-minute preparation, FGN students were asked to describe symptoms of ADHD and to share how this disorder may affect testing results. They were then told to remember that they are “presenting” as a university student, so must do at least as well as someone who would be admitted to the University of Kentucky. They were cautioned not to reveal their role or to feign too blatantly lest they lose the \$45 incentive. (In reality, however, all FGN students received the \$45 incentive due to Internal Review

Board guidelines.) Students who appeared inadequately prepared were asked leading questions about symptoms, such as, “How would someone with ADHD pay attention to a lecture?” They were not ‘coached to the tests’ through information that symptom validity measures were imbedded or through instruction about what symptoms to fake on certain types of tasks. FGN-role participants were then given the post-preparation instructions below, by RA1, reminding them of cautions and incentives.

Post-Preparation Instructions:

You will now be introduced to the person who will complete testing with you.

Please take the following tests as if you are trying to convince someone that you have ADHD. It is not necessary for you to try to act like you have ADHD; you only need to respond to the test items as if you do. The examiner who tests you will not know your role, so please do not give it away!

Remember, if you are successful at deceiving the tests and following instructions throughout, you can win \$45!

If you have any questions, please take time to ask me right now.

Students in the ADHD condition (ADHD) were all tested by the primary investigator. All participants were debriefed (Appendix G) and provided a manipulation check (Appendix H) to determine if they understood what they were asked to do and complied with their instructions. Students were then compensated for their participation.

Materials

Pretesting Measures

Pretesting measures included the demographic questionnaire (Appendix E) and the WTAR (described below).

Wechsler Test of Adult Reading (WTAR; Wechsler, 2001)

The WTAR is a word-reading test for individuals aged 16-89 that utilizes atypically-pronounced (i.e., nonphonetic) words. It is used to estimate intelligence level, or premorbid intelligence level when damage-related decline is suspected, because reading recognition is relatively stable in the presence of brain insult (though not immune to effects of notable intellectual impairment [see Spreen & Strauss, 1998; Putnam, Ricker, Ross, & Kurtz, 1999 for reviews, as provided in test manual]). For this purpose,

it was selected for inclusion in order to evaluate HON, FGN, and ADHD groups' intellectual equivalence.

The WTAR's US Standardization sample was a nationally-representative, stratified sample of 1,134 adolescents and adults aged 16-89. Target values for stratification closely matched 1995 US Census data for age, gender, race/ethnicity, education, and geographic region. However, standard normative data are provided by gender, age (16-17, 18-19, 20-24, 25-29, etc.), and ethnicity.

The WTAR displayed excellent internal consistency ($\alpha = .90$ to $.92$ for ages 18—34). Standard errors of measurement were relatively adequate (± 8.1 to 9.5 points at 95% Confidence Interval for ages 16—34), and excellent test-retest reliability for a mean inter-test interval of 35 days (corrected $r = .92$ for adults aged 18—29). It also demonstrated very good convergence with the AMNART, as evidenced by a mean correlation of $.90$. Moderate correlations between the WTAR and the WAIS-III Verbal IQ were demonstrated by the standardization sample, ranging from $.74$ (age 18-19) to $.79$ (age 20-24) for college-aged adults. Similar correlations were found with the Full Scale IQ ($.70$ for age 18-19 and $.74$ for age 20-24), though the WTAR tends to predict the VIQ slightly better than the FSIQ in all age groups. Thus, the WTAR appears to be a fairly good source of Verbal IQ estimation. Further, data presented in the manual suggest it is a good indicator of IQ for ADHD evaluatees as well.

Materials for Remainder of Protocol

Tests administered by RA2 after the pretest and preparation period included ADHD-related measures, symptom validity tests, and neuropsychological measures. These were given in a counter-balanced fashion, with one of the symptom validity tests always administered first.

ADHD-Related Measures. Two ADHD symptom report measures (the Murphy & Barkley ADHD Rating Scale [ARS], Current Symptoms and Childhood Symptoms subscales; the Conners' Adult ADHD Rating Scale—Self Report, Long Version [CAARS—S:L]), and a computerized continuous performance task (the Conners' Continuous Performance Test [CPT]) were administered. The ADHD group participants were asked to complete the symptom-report measures with regard to how they currently felt when unmedicated, so that results would provide their clinical profile.

ADHD Rating Scale (ARS): Current & Childhood Symptom Checklists (ARS)

These indices, first published by Kevin Murphy and Russell Barkley in 1996, are commonly used in the assessment of ADHD for individuals over the age of 12. The ARS Current and Childhood Symptoms scales were constructed using the 18-item DSM-IV symptom list. Evaluatees are asked to rate the extent to which they have been experiencing various symptoms within the past 6 months (Current Symptoms Checklist), and from age 5-12 (Childhood Symptoms Checklist), using a Likert scale that ranges from 0 ("Never or rarely") to 3 ("Very often"). Nine Inattention items are alternated with nine Hyperactivity items on each index. The forms are hand scored, and each completed index produces three "Symptom Count" scores on both the Childhood and Current Symptoms indices. The Inattentive and Hyperactive symptom counts are the sum of their relevant items rated "2" or "3." A Total ADHD Scale for Childhood and Hyperactive symptoms is the summation of the two counts. Murphy and Barkley (1996) provide norms for the population of interest; these are also recommended in Barkley, Murphy, & Fisher (2008). The authors recommend that both Current and Childhood criteria are met to fulfill DSM-IV criteria. In the developmental sample, consisting of individuals applying for or renewing Massachusetts driver's licenses, no gender effects were demonstrated for Current symptoms. Childhood ratings produced greater symptom endorsements by males.

As discussed in the introduction, susceptibility of the ARS to feigning has been investigated in three studies, only one of which was a simulation design, however (see Tables 1-1 and 1-2). In Quinn's (2003) simulation study, and Jachimowicz & Geiselman's (2004) and Fisher's (2007) quasi-experimental evaluations, the measure was successfully faked. Quinn (2003) reported small effect sizes (g) for both Current ($M = 0.4$) and Childhood ($M = 0.0$) symptoms in comparing feigned and ADHD student profiles; Jachimowicz and Geiselman (2004) stated that ADHD profiles were obtained by 75% of feigners; and Fisher (2007) reported successful faking by 77% of undergraduate feigners. Though these rates seem alarming, the latter two studies provided evidence that the ARS was significantly less susceptible to feigning than other tests examined, which were falsified by up to 95% of feigners.

Thus, the ARS was selected for inclusion for its potentially greater resilience, as well as due to its common use and economics—usage is free and unlimited to examiners

who purchase the book. As with the CAARS—S:L (described below), the ARS was derived directly from DSM-IV diagnostic criteria. Thus, it has the potential to have either strong convergence, or redundancy (a weakness), with the CAARS—S:L. However, the ARS adds information about childhood symptoms, which is required by the DSM-IV for diagnosis. Moreover, because symptom scales are indicated only for the support of diagnostic decisions, and because two current symptom indices are not likely given within the same evaluation, the impact of such redundancy is limited.

Conners' Adult ADHD Rating Scale, Self-Rating Form, Long (CAARS-S:L)

This measure (Conners, Erhardt, & Sparrow, 1999) is commonly used in the assessment of ADHD with individuals 18 and older. The CAARS—S:L has adult evaluatees rate the extent to which they have "recently" been experiencing various symptoms of ADHD on a 4-point Likert scale ranging from 0 ("Not at all, Never") to 3 ("Very much, very frequently"). Responses are hand-scored on the carbon-write form as indicated by specific instructions, and presented as age and gender-stratified T-scores arranged on 8 subscales and an Inconsistency Index. T-scores greater than 65 correspond to a "clinical elevation."

The eight subscales of the CAARS—S:L include four DSM-IV-derived "diagnostic" indices, four factor-derived subscales, and an Inconsistency Index. The latter index, generally examined first, estimates whether the pattern of responses is consistent across items, and is calculated by finding the sum of absolute differences between eight highly correlated item pairs. Cutoff scores indicative of inconsistency were derived by comparing profiles of 100 respondents from 100 computer-generated (random) profiles, which resulted in 96% sensitivity and 96% specificity. This Index increases the clinical appeal of the CAARS—S:L.

After examining the Inconsistency Index, clinicians are urged to consider the diagnostic indices, with T-scores above 65 being clinically significant. The diagnostic indices first include the ADHD Index ("Scale 8"), which is a summary score reflecting whether the evaluatee has clinically significant levels of ADHD symptoms compared to other adults. Scale 8 is said to differentiate clinical from non-clinical levels of ADHD symptomatology, and to be the best screen for identifying "at risk" individuals (see test manual). Next, the DSM-IV Inattentive Symptoms subscale ("Scale 5") provides an

indication of whether the rater has clinically significant levels of inattention, corresponding to the current diagnostic criteria. It contains nine items and is based directly upon the nine inattentive symptoms provided in the Diagnostic manual. The DSM-IV Hyperactive-Impulsive subscale (“Scale 6”) provides the same information for the alternative diagnostic subtype, also including nine items corresponding directly to those in the DSM-IV. Finally, the DSM-IV Total ADHD Symptoms subscale (“Scale 7”) indicates whether the individual meets criteria for ADHD according to the DSM-IV; it is based upon the sum of the two preceding subscales.

After considering the diagnostic indices, the clinician may turn to the factor-derived subscales for more information regarding the evaluatee's specific areas of difficulty. These include the Inattention/Memory Problems scale (with high scores corresponding to slower learning, organizational difficulty, and trouble completing tasks and concentrating), the Hyperactivity/ Restlessness scale (with high scores reflecting difficulty working on one task for prolonged periods as well as greater feelings of restlessness than others), the Impulsivity/Emotional Liability (reflecting impulsive behavior, sudden mood changes, and quicker anger and irritation than others), and lastly the Problems with Self-Concept (which reflects poor social relationships, low self-esteem, and low self-confidence).

Although the diagnostic subscales are generally examined first, CAARS—S:L scores are generally interpreted in light of the number of clinically-elevated subscales (at $T > 65$). If only one elevation is present, the pattern of symptoms is said to be "marginal."

The CAARS—S:L was developed from an original item pool of 93 statements, administered to 839 nonclinical adults. Factor analysis revealed 66 items on four factors, accounting for 46.8% of the total variance. The normative sample consisted of 1,026 adults. A satisfactory mean inter-item correlation was demonstrated for each scale (excluding the Inconsistency Index). Moderately high mean test-retest reliability was found (.91), suggesting that the measure is only mildly susceptible to temporal variability. Good validity characteristics were also demonstrated. As with the ARS, the CAARS:S—L does not appear to have been cross-validated with other ADHD current symptom scales. An evaluation of its convergence with the Wender Utah Rating Scale,

an assessment of childhood symptoms, demonstrated only moderate correlations (.37—.67; see Macey, 2003). Discriminant validity was demonstrated using DSM-IV diagnosed adults (Erhardt et al., 1999). The ADHD Index in particular demonstrated a sensitivity of .71 and a specificity of .75 in a cross-validation involving 192 adults.

Susceptibility of the CAARS to falsification has only been evaluated by Jachimowicz and Geiselman (2004), as described above, where 90% of college students asked to read DSM-IV criteria were able to create ADHD-like profiles. Additional weaknesses of this index include marginal correlations between Self and Observer (Long) ratings for both males and females (Range = .42 to .61 for men, .45 to .61 for women), administration length, and the absence of a childhood symptom evaluation, as stated above. The measure's psychometrics for use with ethnic or racial minority evaluatees have been poorly examined, and the test manual does not provide the normative composition of such groups (Macey, 2003).

Despite flaws, the CAARS—S:L was selected for inclusion in this study for several reasons beyond the appeal of its Inconsistency Index. The CAARS was developed by one of the foremost researchers of ADHD, and been relatively well-validated. Self-report measures of ADHD symptomatology should be of great interest in ADHD feigning research, as they are very commonly used in ADHD diagnostic evaluations. Such measures provide a great deal of information while requiring very little clinician time. Research shows that many health care providers, particularly primary care providers, use these to arrive at a diagnosis (Elliott, 2002, as cited in McCann & Roy-Byrne, 2004). For these reasons, obtaining an indication of the measure's vulnerability to exaggerated or feigned responses should be of great interest.

Conners' Continuous Performance Test (CPT)—II for Windows

The Conners' CPT (C-CPT hereafter; Conners, 2000) is one of several computerized tests commonly used to screen for problems that may be associated with ADHD, including impulsivity and inattention. It measures sustained visual attention, response inhibition, and response rate.

In the C-CPT, evaluatees are asked to hit the spacebar every time they see a letter other than "X" on the screen. Letters are flashed in one location, one at a time at variable intervals for 15 minutes. The C-CPT is scored in terms of errors of omission (missing

targets) and commission (responding to non-targets), hit reaction time, hit reaction time standard error, and variability of standard error, among other factors. Failure to respond to target stimuli is considered an indication of inattention, while responding to non-target stimuli is considered a reflection of impulsivity or motoric disinhibition. Both are traditional indicators of ADHD, although the extent to which they are manifested is thought to vary with diagnostic subtype (Homack & Reynolds, 2006). With regard to the utility of hit reaction time, evidence has been conflicting. The construct has typically been labeled an indication of "processing efficiency." However, several factors, including motivation, may affect response time, and more recent literature has suggested that ADHD evaluatees have "normal" reaction times, on average (see Hervey, Epstein, and Curry, 2004). Instead, the standard error for response time may be considered as an indication of the variability of "attentiveness."

CPTs are generally similar in that evaluatees are asked to respond to some stimuli while ignoring others for a prolonged period of time, with variable target presentation frequency. Conners' version differs from others in that it has a large number of target stimuli embedded in a small number of non-target stimuli, rather than the reverse. Thus, it should theoretically tap disinhibition for non-target stimuli (i.e., commission errors) better than the other measures. Literature has shown that the measures with a low number of target stimuli discriminate omission errors better than the C-CPT (see a meta-analytic review by Hervey et al., 2004). In addition to omission and commission error scores, the C-CPT provides a hit reaction time, standard error, and a standard error variability score. A T-score of 60 or greater on any C-CPT index is said to be a high probability marker of attentional problems (Conners, 2000).

Conners' CPT was developed and normed using more than 2000 individuals. Of those aged 18-34, however, only 237 were non-clinical and only 48 had a diagnosis of ADHD. No age effects were found in the adult samples. Adult gender effects may be observed for commission errors. Overall, a high split-half reliability was found for hit reaction time (.95), omissions (.94), standard error (.87), and commissions (.83), with variability (.66) lagging. Moderate test-retest reliability was noted across these indices, ranging from .84 for omissions to .60 for variability. Results of validity assessments suggest that the above indices generally discriminated the clinical (ADHD and

neurological) and non-clinical adult normative groups, despite the relatively small sample sizes. Likewise, a multi-site study of 107 ADHD cases, 223 neurologically impaired, and 437 non-clinical cases provided in the manual resulted in a high sensitivity for ADHD (88%) and neurological patients (85%); with a moderate specificity for non-ADHD (87%) and non-neurological (92%) patients. Looking specifically at the ADHD versus normal control normative data, ADHD individuals performed statistically significantly worse on all indicators. However, these data were derived from "pure" contrasts of ADHD patients vs. normals, or neurological patients vs. the same normals, so the diagnostic accuracy of an ADHD vs. neurological group is unknown. Also, this finding is challenged by another study suggesting that the C-CPT was unable to discriminate ADHD and normal control adolescents (Homack & Riccio, 2005).

Although the above data are somewhat encouraging, further evaluation is needed, particularly with mixed clinical groups. Other studies have demonstrated that the C-CPT is insensitive to differences between ADHD and PTSD (Schmitt, 2000) in addition to other anxiety disorders, depression, and Cluster A personality traits (see Homack & Reynolds, 2006). An evaluation of the measure's convergence with ADHD rating scales in adults diagnosed only with ADHD demonstrated a lack of correlation between results, though restriction of range may have been an issue (Epstein, Conners, Sitarenios, & Erhardt, 1998). Performance has also been shown to be affected by anxiety (see test manual; Schweiger et al., 2007). The general consensus is that CPTs only provide information about the presence of symptoms of disorders involving attention problems and impulsivity, rather than information about the presence of a specific disorder (Homack & Reynolds, 2006). Not surprisingly then, the C-CPT is indicated only for use as a screen for the presence of attention-related problems.

Despite weaknesses and limitations, the C-CPT was chosen for inclusion in this study because its susceptibility to feigned dysfunction requires further evaluation. Booksh (2005) demonstrated a lack of separation between simulated and diagnosed ADHD groups on C-CPT indices, using a college sample (g range = 0 to 0.7). However, the same study also obtained high g 's of 1.4 (for Hit Rate Variability of Standard Error) and 1.1 (for Commission Errors) in the separation of normal honest and ADHD-diagnosed students, as well as a high g of 1.1 (for Commission Errors) in the separation

of the normal honest and feigning groups, pointing to its potential. These results contrast with an undergraduate simulation study of the IVA-CPT (which includes auditory and visual stimuli); this study found that the IVA was "not fakable" on more than 80% of its scales (Quinn, 2003). Across three different impairment indices, a mean sensitivity to feigning of .85 and a mean specificity of .85 were found. Looking specifically at the full scale indices using the Response Control and Attention Quotient published cutoffs, sensitivity was .81 and specificity was .91. This contrast from C-CPT results provides interest in replicating the Booksh evaluation.

Standard Neuropsychological Measures

Several neuropsychological tests were included to increase the ecological and face validity of the test protocol as a neuropsychological battery. Unlike the symptoms reports and C-CPT, these measures do not assess ADHD in such a transparent way. Also, they detract attention from the malingering tests described below.

Stroop Color-Word Test

Several version of the Stroop measure exist, but the variant selected for this study, the Charles Golden version (Golden, 1978; Golden & Freshwater, 1999) was one commonly used in neuropsychological practices. In this version, evaluatees first read aloud a list of color names as quickly as possible, for 45 seconds ("Word" subtest). Then, the ink color that "XXXX" is printed in is stated for 45 seconds ("Color" subtest). Lastly, the ink color used to print various incongruous color names is named for 45 seconds ("Color-Word" subtest). In each trial, errors are identified and the evaluatee must correct them before going on. The total number of correct items and the total number of errors are indicated in the score of each trial. The test manual recommends that subtest raw scores first be converted to an age and education-corrected T-score using equations provided in the manual. These corrections were derived from the prediction of "normal" performance using an updated normative sample. Following calculation of T-scores, the "Interference Score" is calculated using the raw Color and Word scores. This score is said to represent the ability of an individual to inhibit word naming when reading ink color in the Color-Word subtest, and was originally based upon the amount of time to read one Word item followed by one Color item ($45/\text{total Word} + 45/\text{total Color}$), which would translate to $CW = (W * C) / (W + C)$ when considering the number of items that

should be completed on the Color-Word subtest. Although all scores are corrected for age and education only, several studies have demonstrated gender effects for reading the Color page, although not the Color-Word page in college students (Jensen, 1965; Stroop, 1935; Brown, 1915), as well as younger individuals. This needs to be considered when examining results of the present study. Additional considerations are provided below.

Hervey, Epstein, and Curry (2004) conducted a meta-analytic review of 33 published studies contrasting performance of ADHD and "normal" adults on various neuropsychological measures. Seven studies evaluated the Color-Word difference score in the Golden version, and found a mean g of .47, suggesting that this index is moderately effective at discriminating ADHD and non-ADHD adults. For the Golden-derived interference score, however, the g was just .19, suggesting that this does not effectively discriminate these groups. The review had several major limitations, though, most notably uncertain criterion status due to inconsistent diagnostic criteria and assessment procedures. Several authors have suggested that the difference score and Golden method of quantifying interference are ineffective for various reasons (see Chafetz and Matthews, 2004; Lansberger, Kenemans, & van Engeland, 2007 also provide a review of this issue). In turn, Lansberger et al. (2007) conducted a meta-analytic review of 19 studies employing *any* Stroop color-word version in a comparison of DSM-IV-diagnosed ADHD individuals and "normal" controls. These authors employed a ratio score of Color to Color Word time per item, and found that interference control was consistently compromised in ADHD individuals regardless of age. The mean effect size for tests scored in time-per-item was $g = 1.11$. Using the items in 45" scoring, however, there was great variability between studies. Unfortunately, the resulting effect size was not presented. In addition to these results, the authors demonstrated that ADHD individuals were consistently slower in base word reading (for 13 studies that provided these data, $t(12) = 5.19, p < .001$). Thus, when scoring and analyzing data from the present study, it may be appropriate to examine the base word reading T -score as well as the time per item. The Stroop task was selected for inclusion in the present study for its utility in ADHD evaluations, as well as to increase the ecological validity of the battery as that of a diagnostic evaluation.

Nelson-Denny Word Reading Test: Reading Speed Component

In this measure, a short non-fiction work is provided to participants, and they are instructed to read it at their normal reading rate so that they may comprehend and "absorb" the material, as "questions may be asked after." Individuals are instructed to mark where they were after one minute of reading, by circling the corresponding number at the right-hand side of the line they were on when told to stop reading in the present study. No questions were asked; only the reading speed score was used.

The Reading Speed Component of the Nelson-Denny Reading Comprehension Test ("N-D Comp") was chosen for inclusion in the present study as some literature has suggested that ADHD individuals perform significantly worse than their non-ADHD peers (see Brock, 1996; Seidman, Biederman, Faraone, & Milberger, 1995). Moreover, laypeople often associate slow reading with attentional problems. The research on this is mixed, however, with greater evidence implicating reduced comprehension than inattention *per se* (Brock & Knapp, 1996; Cordon, Kahl, & Wahl, 2006). This, however, cannot be assessed in a timed test without evaluation of reading comprehension. In the very least, this measure will serve to increase the ecological validity of the assessment and to deter students from developing suspicion about the nature of the measures administered, and may provide a gross indication of the difference between simulated and diagnosed ADHD reading speed performance.

Wechsler Memory Scale—Third Edition, Word Lists Subtest

Word Lists ("WMS-III WL") is an optional subtest from the WMS-III. It involves memorization of 12 common, but neither semantically nor phonemically related words (List A). This distinguishes it from other full reminding procedures, such as the California Verbal Learning Test (CVLT; Delis, Kramer, Kaplan, & Ober, 1987), which provide words that can be grouped into several semantic categories. In the WMS-III WL, the examiner reads this list four times, each time after which the evaluatee freely recalls all words remembered in any order. Then, without instructing individuals to remember the original list, a second 12-item list is provided for memorization and free recall one time (List B). Finally, incidental memory of the first list is assessed with free-recall of those items (Short-Delay Free Recall). Intrusions are recorded, and for this study, repetitions were also recorded. A long-delay recall and recognition trial are also available, but these

were not included in the present study.

Five raw scores are calculated from evaluatee responses. The "First Recall Total Score" is the sum of items recalled in List A Trial 1 and List B. The "Recall Total Score" is the sum of all items recalled from List A and List B. The "Learning Slope" describes rate of acquisition and is the mean number of items added per trials 2-4. "Contrast 1" score describes the difference between the number of items recalled on Trial 1 List A and List B. Lastly, the "Contrast 2" score describes the difference between number of items recalled in Trials 4 and Trial 1. Each of these raw scores is converted to a T-score based upon age group (18-19 or 20-24, 25-29, etc.).

The WMS-III standardization sample consisted of a demographically representative group of 1,250 individuals aged 16-89. Reliability and validity data are not presented for the WL itself as it is a supplemental subtest not scored on any scale, but internal consistency is said to be greater than .70 for all subtests (see test manual). Test-retest reliability for adults up to age 54 after a one-month period was found to be .61, suggesting that performance on this subscale is susceptible to some temporal variability.

Notably, several feigning indices were developed or adapted for the WL scale in a 2005 dissertation (Larson, 2005). However, only one of these does not involve the long-term delayed recall portion of the WL. Responses from the immediate-recall trials listed above can be used to calculate a Recall Consistency Index. This index was based upon the Recall Consistency Index (Demakis, 1999) created for the CVLT. Larson's Recall Consistency Index is a measure of consistency across only the learning trials of List A. Each time a correct word is recalled in two successive trials, it is counted. (As such, each word could potentially be counted three times). The score is the sum of these counts divided by the total number of words recalled in Trials 1—3. Score interpretations are found in Appendix I of the WMS-III manual.

Larson (2005) evaluated this index using a within-subjects simulation design that included a clinical control group. Twenty community volunteers and twenty non-litigating TBI patients with no current or past psychiatric diagnoses were asked to complete measures to the best of their ability, and then, following a 10-minute break, to simulate memory impairment. An effect size of $d = 1.35$ was found for the community volunteer group, suggesting that it was a very good discriminator in a presumably

unimpaired group; for the TBI group, the index was a mere $d = .23$. This suggests that the index may only be useful for individuals without memory impairment. However, classification accuracy was not calculated in that study, and these results do not preclude the possibility that high true positive and true negative rates may be obtained using the Inconsistency Index with non-impaired individuals, such as college students.

The WMS-III WL was included as a measure of immediate memory, and to investigate the utility of the Inconsistency Index for feigned cognitive impairment. Additionally, as with the other "true" neuropsychological measures, it served the purpose of preventing participants from realizing that multiple feigning detection tools were being administered. Other questions may be addressed through inclusion of this measure. For example, at this time, very little research exists on list learning abilities of ADHD-diagnosed young adults. Intuitively, distractibility may be associated with poorer initial list acquisition. A narrative review of neuropsychological testing results in ADHD versus normal controls conducted by Woods, Lovejoy, and Ball (2002) demonstrated a trend towards poorer performance on measures such as the California Verbal Learning Test. However, examination of list learning in younger students has shown that they can perform in the Average range (see Mahone, Koth, Cutting, Singer, and Denckla, 2001). Additionally, no comparisons of feigning and ADHD college students exist for List Learning Tasks.

It was hoped that performance patterns might be assessed in order to understand both differences between honest and feigning ADHD "evaluatees" and the performance of individuals diagnosed with the disorder. Errors of commission and repetitions, which may reflect impulsivity; or errors of omission, which may reflect distractibility (among other neuropsychological functions) may be noted from the ADHD group. Mahone et al. (2001) found a greater number of intrusion errors by ADHD-participants than by normal controls. Of course, performance of children may not generalize to adults.

Neurocognitive Feigning Measures

36-Item Short Form, Hiscock-Hiscock Digit Memory Test Card Version

The Digit Memory Test (DMT) is considered by many to be the "gold standard" of neurocognitive feigning tools (Vagnini et al., 2006; Vickery, Berry, Inman, Harris, & Orey; 2001). This measure involves presenting a 5-digit stimulus, then a delay, and then a

two-alternative forced-choice recognition trial. The first "block" of items has a 2.5-second delay; this is increased to 5 and then 10 seconds in attempt to make the test appear as if it is becoming more difficult. Two score thresholds are useful in evaluating results of the DMT: less than 90% correct, and statistically significantly below chance. The former was derived from normative studies of non-compensation seeking individuals with neurological damage instructed to perform to the best of their ability, and thus represents the point at which probable feigning may be suspected. It was derived by maximizing specificity. The latter is said to detect deliberate attempts to feign, derived from the binomial theory.

Two meta-analytic reviews of primarily neurological patient groups have demonstrated the procedure (Vickery et al., 2001) and a computerized variation (Sollman & Berry, Under Review)—the Victoria Symptom Validity Test (Slick, 1999)—to have the strongest sensitivity of all measures reviewed, as well as very high specificity. In addition, very large effect sizes in the separation of purportedly honest and feigning individuals has been demonstrated in the same reviews for those test variations ($d = 1.95$, $g = 2.71$, respectively). The DMT was selected for this study due to these characteristics.

Letter Memory Test (Card Version)

The Letter Memory Test (LMT; Inman et al., 1996) was developed as an alternative to the DMT under the assumption that increased public knowledge over time may reduce utility of a measure. As with the DMT, the LMT was created to increase evaluatees' belief that it assesses memory and becomes more difficult over time. However, it manipulates the number of characters (letters) presented, as well as the number of alternative choices in the recall trial, rather than the delay length. For this measure, the specificity-maximizing cutting score for probable feigning is 93%.

A meta-analytic review of known-groups and clinically-enhanced simulation design studies is presented in Sollman & Berry (Under Review). This study provides evidence that the LMT has a strong ability to separate groups of known or probable feigning and honest individuals ($g = 1.79$). Although this effect size is significantly lower than that of the DMT's computerized counterpart, it still exceeds Cohen's recommendations for a large effect size, when translated into Cohen's d . In the same review, the LMT demonstrated mean sensitivity (76%) and specificity (98%) values that

were statistically equivalent to those of the computerized DMT variant.

Test of Memory Malingering

The Test of Memory Malingering (TOMM; Tombaugh, 1996) is another two-alternative forced-choice measure, but it uses line-drawn "pictures of common objects" rather than alpha-numeric characters as with the first two measures reviewed. Fifty such pictures are presented in two learning trials, each of which is followed by a 50-item forced-choice recognition trial. After a 20-minute delay, a final two-alternative recognition trial is administered. The TOMM uses the below-chance criterion described above as well as a standard cutoff of less than 90% correct on *either* Trial 2 or the Retention Trial. In the Sollman and Berry meta-analytic review above, the TOMM was demonstrated to have a high g (Trial 2 $g = 1.31$; Retention $g = 1.47$), which was not statistically significantly different from that of the LMT. The Trial 2 effect size was included in a cross-test comparison and was found to be equivalent to that of the LMT, although significantly lower than the computerized DMT variant. As with the LMT, near-perfect to perfect specificities were demonstrated (Trial 2 = 98%, Retention = 100%). Sensitivities were statistically equivalent to those of the LMT and computerized DMT variant (Trial 2 = 65%, Retention = 68%), although this may be due to the small number of contributing studies and the large variation between; a considerable difference exists between the sensitivity values of the TOMM and VSVT (81%).

Green's Nonverbal-Medical Symptom Validity Test

This measure (NV-MSVT; Green, 2004) is the computerized "non-verbal" component of Green's Medical Symptom Validity Test, which is a shortened adaptation of Green's Word Memory Test. It is said to be usable in any sample regardless of language spoken or reading level, though empirical data were not available. The NV-MSVT was designed to detect when individuals are providing sub-optimal effort on a perceived test of visual memory. Evaluatees are presented with a list of 10 pictures, each containing a pair of items, and are asked to name the components of each picture out loud. The list is presented twice. Then they are shown two single-component pictures side-by-side, asked to name each out loud, and then select the one that was in the ten-picture list (IR subscale). Feedback regarding accuracy is given by the computer. A ten-minute delay then occurs, and the evaluatee is not informed that long-term retention will be

assessed later. During this delay, the evaluatee is asked to memorize a set of 20 pictures presented on a two-sided sheet, in one minute. The test manual instructs the examiner to fill the remaining nine minutes with tasks not involving visual memory. Finally, evaluatees are presented with two pictures side-by-side and asked to select the one they saw on the computer previously. This delayed recognition portion actually consists of three intermixed subscales: the DR, where a new foil is paired with a learned target; the DRA, where the two items presented include an easy-to-remember foil from IR with a distinctively new foil; and the DRV, where an original target is presented with a similar, slightly altered target. The examiner is asked to leave during this portion of the test, as those evaluatees intent on exaggerating impairment may be more likely to deliberately select the incorrect response when left alone. Again, the computer provides feedback regarding response accuracy. Next, individuals are provided with a single-component picture from the original list of 10 two-component pictures. They are asked to verbally indicate what the missing component is, and the examiner clicks either a green check mark (to indicate correct response) or a red "X" (to indicate incorrect response) (PA subscale). Lastly, the computer screen is turned away from the evaluatee, who is asked to freely recall the items presented in the original list of 10 pictures (FR subscale). The evaluatee may recall items singly or in pairs. At the close of the test, the evaluatee is asked, "Did you try your hardest on this test?" and their response is recorded on the computer. In sum, this measure includes two two-alternative forced choice subtests, and two free-recall tests.

Feigning determination is made according to either of two algorithms. If the mean of all subtest scores falls at or below 90%, or if the mean of DR, CNS, DRA, and DRV falls below 88%, the individual is said to be feigning. The latter is said to be the best combination for predicting TOMM or WMT failure according to ROC analysis. A sensitivity of .70 and a specificity of .95 were found for predicting WMT failure at that measure's cutting score of <88%. The cutting scores used for the NV-MSVT appear to have been derived from the normal simulation comparison, based upon a graphic illustration provided by the author, of these groups' mean (non-overlapping) scores.

To date, there is no test manual and little data on the psychometrics of the NV-MSVT. However, the author of this measure provided some data by personal

communication. First, results of an unpublished non-clinically enhanced simulation study illustrate that individuals asked to feign early dementia (N = 39) obtain significantly lower scores on all subscales than normal controls (N = 36), with *g* effect sizes all greater than 1.9 (range 1.9—3.5). Of note, simulators obtained a significantly lower DRV subscale relative to the DRA and PA subscales than normal controls. Examining these simulation data in comparison to an early dementia group (N = 8, only) demonstrates *g* effect sizes ranging from 0.9 to 1.8. Here, simulators appeared to overestimate the ability of mildly demented individuals on the PA subscale; the author deems this the "Pinocchio Effect" due to the pointed appearance of the aggregated simulators' profile. This has reportedly been replicated in an evaluation of NV-MSVT evaluatees failing the TOMM and WMT.

Despite current shortcomings and lack of validation, the NV-MSVT was selected for inclusion in the present study for a number of reasons. First, it is the shortest computerized measure known to the primary investigator, requiring only 6 minutes of administration time (not including the 9 minute delay). It is believed that clinicians would find computerized measures significantly more appealing than those involving time-consuming administration. In addition, it may be that those individuals intent on feigning may do so more readily when they do not have to provide their response to a clinician. Thus, this test has potential to separate honest and feigning evaluatees. This measure was also very appealing because it seems to be particularly susceptible to errors associated with poor self-monitoring (i.e., impulsivity or perseveration). Impulsive responses may occur when an evaluatee is in the habit of responding using quick mouse clicks, and selects the wrong response by (a) clicking the mouse twice concurrently before even "seeing" the next presentation (motor impulsivity), (b) selecting the option on the same side as the previous correct response after noting the correct response, but without moving the mouse over that response (general impulsivity), or (c) clicking the option on the same side as the previous correct response after having multiple correct selections on that side of the screen in a row, but before processing which is correct (perseveration).

Psychiatric Feigning Measure

Because feigning strategies of students seeking a diagnosis of ADHD are not

well-understood, it is unknown if false psychiatric symptoms are commonly presented. Thus, the present study included one such measure.

The M-FAST

The M-Fast (Miller, 1999) is a 25-item structured interview that was developed to aid clinicians in quickly identifying malingered mental illness. Administration takes about five minutes, and scores are provided on seven scales: Unusual Hallucinations, Reported Versus Observed Symptoms (assessing symptom reports that do not correspond with actual behavior), Extreme Symptomatology (assessing endorsement of a greater number or severity of symptoms than actual psychiatric patients), Rare Combinations (assessing symptoms that rarely or never coexist), Negative Image (assessing self-portrayal in an unusually negative light), Unusual Symptom Course (assessing responses not reflecting the actual gradual onset of true mental illness), and Suggestibility.

The M-FAST was chosen for inclusion over other psychiatric feigning measures because some of the above scales appeared to correspond to ADHD symptoms. Additionally, it seemed that various items on this measure could be applicable to ADHD, or could be construed as assessing its symptomatology (e.g., "I often have a hard time sitting still;" "Whenever I sit in a chair I have to breathe deep breaths in order not to get sick;" "Sometimes I hear a radio playing when there is not one on near me"—the latter corresponding to media reports that some peoples' mental ADHD experience is like a TV changing channels). Unfortunately, there are no known studies of the M-FAST's utility in ADHD evaluations; instead, research to date has been limited to general psychiatric and forensic samples. This is summarized in Table 1-3 below.

M-FAST development and validation were completed using 546 forensic psychiatric inpatients and undergraduates. It was found to have good convergence with the gold standards of the time: the MMPI-2 fake bad indices and the Structured Interview of Reported Symptoms (SIRS; Rogers, Gillis, Dickens, & Bagby, 1991). Using the MMPI-2 defensiveness and "good impression" indicators, discriminant validity was also demonstrated. Lastly, the M-FAST was found to have strong reliability ($\alpha = .94$, test-retest reliability = $.91$, $p < .001$). A brief review of the available known groups and clinically enhanced simulation studies is provided in Table 2-1 below. All studies utilized forensic or psychiatric patients, which limits generalizability to the present

Table 2-1

Summary of Known-Groups and Clinically Enhanced M-FAST Evaluations

Reference	Des	Group	N	Sample	MAL- HON g	cut score	Sn	Sp																																																																																																																							
Miller, 1999 ^a	KG	MAL	14	FP	-	≥ 9	.86	.83																																																																																																																							
		HON	36	FP					Guy & Miller, 2004 ^a	KG ^b	MAL	21	FP	1.9	≥ 6	.86	.83	HON	29	FP	Miller, 2004 ^a	KG ^b	MAL	-	FP	-	≥ 6	.93	.83	HON	-	FP	Jackson, Rogers, & Sewell, 2005	KG ^b	MAL	8	FP	2.8	≥ 6	.76 ^c	.90 ^c	HON	41	FP	ES	MAL	43	FP	1.9	HON	96	FP	Veazey, 2005	KG ^d	MAL	5	IP	-	≥ 6	.80	.85	HON	39	IP	Guy, Kwartner & Miller, 2006	ES ^e	MAL	48	Students	2.7	≥ 6	.88	.82	HON	48	Scz	ES ^e	MAL	41	Students	1.4	≥ 6	.84	.79	HON	20	BP	ES ^e	MAL	51	Students	1.7	≥ 6	.62	.79	HON	25	MDD	ES ^e	MAL	50	Students	1.2	≥ 6	.63	.85	HON	47	PTSD	Alwes, Clark, Berry, & Granacher, 2007	KG	MAL	75	CF, P	1.0	≥ 6	.83	.91	HON	178	CF, P	2007	KG	MAL	23	CF, N	3.0
Guy & Miller, 2004 ^a	KG ^b	MAL	21	FP	1.9	≥ 6	.86	.83																																																																																																																							
		HON	29	FP					Miller, 2004 ^a	KG ^b	MAL	-	FP	-	≥ 6	.93	.83	HON	-	FP	Jackson, Rogers, & Sewell, 2005	KG ^b	MAL	8	FP	2.8	≥ 6	.76 ^c	.90 ^c	HON	41	FP			ES	MAL	43					FP	1.9	HON	96	FP	Veazey, 2005	KG ^d	MAL	5	IP	-	≥ 6	.80	.85	HON	39	IP	Guy, Kwartner & Miller, 2006	ES ^e	MAL	48	Students	2.7		≥ 6	.88	.82	HON	48	Scz	ES ^e	MAL	41	Students	1.4	≥ 6	.84	.79	HON	20	BP	ES ^e	MAL	51	Students	1.7	≥ 6	.62	.79	HON	25	MDD	ES ^e	MAL	50	Students	1.2	≥ 6	.63	.85	HON	47	PTSD	Alwes, Clark, Berry, & Granacher, 2007	KG	MAL	75	CF, P	1.0	≥ 6	.83	.91	HON	178	CF, P	2007	KG	MAL	23	CF, N	3.0	≥ 6	.43	.88	HON	172
Miller, 2004 ^a	KG ^b	MAL	-	FP	-	≥ 6	.93	.83																																																																																																																							
		HON	-	FP					Jackson, Rogers, & Sewell, 2005	KG ^b	MAL	8	FP	2.8	≥ 6	.76 ^c	.90 ^c	HON	41	FP			ES	MAL	43					FP	1.9	HON	96	FP	Veazey, 2005	KG ^d	MAL	5	IP	-	≥ 6	.80	.85	HON	39	IP	Guy, Kwartner & Miller, 2006	ES ^e	MAL	48	Students	2.7	≥ 6	.88	.82	HON	48	Scz		ES ^e	MAL	41	Students	1.4		≥ 6	.84	.79	HON	20	BP	ES ^e	MAL	51	Students	1.7	≥ 6	.62	.79	HON	25	MDD	ES ^e	MAL	50	Students	1.2	≥ 6	.63	.85	HON	47	PTSD	Alwes, Clark, Berry, & Granacher, 2007	KG	MAL	75	CF, P	1.0	≥ 6	.83	.91	HON	178	CF, P	2007	KG	MAL	23	CF, N	3.0	≥ 6	.43	.88	HON	172	CF, N										
Jackson, Rogers, & Sewell, 2005	KG ^b	MAL	8	FP	2.8	≥ 6	.76 ^c	.90 ^c																																																																																																																							
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HON	96	FP																																																																																																																													
Veazey, 2005	KG ^d	MAL	5	IP	-	≥ 6	.80	.85																																																																																																																							
		HON	39	IP					Guy, Kwartner & Miller, 2006	ES ^e	MAL	48	Students	2.7	≥ 6	.88	.82	HON	48	Scz	ES ^e	MAL	41	Students	1.4	≥ 6	.84	.79	HON	20	BP	ES ^e	MAL	51	Students	1.7	≥ 6	.62	.79	HON	25	MDD	ES ^e	MAL	50	Students	1.2	≥ 6	.63	.85	HON	47	PTSD	Alwes, Clark, Berry, & Granacher, 2007	KG	MAL	75	CF, P	1.0	≥ 6	.83	.91	HON	178	CF, P	2007	KG	MAL	23	CF, N	3.0	≥ 6	.43	.88	HON	172	CF, N																																																		
Guy, Kwartner & Miller, 2006	ES ^e	MAL	48	Students	2.7	≥ 6	.88	.82																																																																																																																							
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2007	KG	MAL	23	CF, N	3.0	≥ 6	.43	.88																																																																																																																							
		HON	172	CF, N																																																																																																																											

Note. g = Hedges' g effect size. Effects calculated using means and standard deviations, except for Guy & Miller (2004), using t -score results. No study reported feigning incentive. Only Jackson, Rogers & Sewell (2005) provided a warning to feigners and a compliance check. - = missing or unable to determine; BP = bipolar disorder patients, CF = civil forensic (outpatient), Des = design, ES = clinically-enhanced simulation design; FP = forensic (imprisoned) psychiatric, IP = inpatient psychiatric, KG = known-groups design; N = neurological claim, n/a = not applicable, P = psychiatric claim, Scz = schizophrenic patients, Sn = sensitivity, Sp = specificity.

^a It is unclear if there was participant overlap in these three studies, which used the same classification criteria but reported a slightly different demographic makeup. Most likely, Miller (2004) provides data from Miller (1999). ^b SIRS used for classification. ^c Values derived from combination of the two studies. ^d PAI Malingering Index used for classification. ^e Each clinical group had a corresponding feigning group, so no two effect sizes or test parameters were drawn from the same individual.

student and ADHD sample. However, a very large mean g was demonstrated after correcting for sample size ($g = 1.7$). Using a cutting score of ≥ 6 , sensitivity across studies was moderately high at .77, and specificity was moderate at .84.

Scoring and Data Entry

All measures were scored according to standardized instructions. The Stroop was additionally scored with the literature-recommended time per item score. Scoring and data entry were independently cross-checked for accuracy by two individuals at the conclusion of data collection. Review of twenty percent of files resulted in an inter-rater reliability greater than 99% (due to seven errors), so no additional files were checked.

Manipulation Checks

Two manipulation checks were employed. In the first, individuals' post-test questionnaires were examined to determine if they accurately summarized instructions (e.g., "to fake ADHD" or "to take these tests honestly and with my best effort") and reported providing adequate effort according to a Likert rating of at least three out of five points. The second manipulation check involved assessing group accuracy. HON and ADHD results were examined to determine if they diverged; that is, to support the clinical nature of that experimental group. These results are provided in the next section.

Chapter Three: Results

Sample Description

A total of eighty undergraduates from the University of Kentucky participated in the study. Of these, seven were excluded for various reasons: two Honest-role subjects were non-native English speakers and struggled with the protocol, one Feigning-role participant did not pass the post-test by rating effort at least three out of five, and four ADHD participants did not provide evidence for a valid diagnosis of the disorder (by clinically elevating at least one ADHD-diagnostic measure). No HON student elevated any measure or subscale believed to be “diagnostic” of inattention. Thirty FGN, twenty-nine ADHD, and fourteen HON participants remained. (The HON control group served simply as a manipulation check, described later, so few participants were needed). Demographics are provided by group in Table 3-1. As can be seen, the groups were equivalent in terms of gender, age, number of months of college, ethnicity, handedness, and WTAR-estimated FSIQ. Overall, this university sample represents a younger undergraduate group with an Average-range mean WTAR predicted FSIQ of 105.4 ($SD = 8.1$).

Because not all ADHD students were completely sure of their current diagnostic subtype, this was estimated by scoring the ARS and CAARS:S—L symptom checklists according to manualized instructions. Based on these results, the ADHD group is best described as predominantly Combined subtype (about 75%), with a substantial group being Inattentive (>20%), and a minority being Hyperactive-Impulsive (<5%), according to symptom reports. There were two modal ranges of age at diagnosis: 8-12 and 16-18, representing 31.0% and 34.4% of the sample, respectively, though the overall range of age at diagnosis spanned from four to twenty-one. The majority of ADHD students (41%) were diagnosed using a brief neuropsychological assessment (including psychological, IQ, and learning disability testing), while 31% received a full neuropsychological evaluation and 21% received a comprehensive psychological evaluation including corroborative interviews of parents and teachers. A minority were diagnosed using methods not meeting the above classification (e.g., psychological evaluation and IQ testing only). With regard to treatment, almost one-fifth of the students (17.9%) reported using behavioral techniques rather than medication due to side effects. For those who provided a description of their medication ($N = 21$), the majority received a form of

Table 3-1

Demographic Characteristics of Participants Included in Final Analyses

Variable		Group			<i>F</i> or χ^2	<i>p</i>
		HON N = 14	FGN N = 30	ADHD N = 29		
Male	%	50.0	46.7	55.2	0.430	.807
Age	<u>M</u>	18.9	19.1	19.4	1.209	.304
	<u>SD</u>	1.03	1.28	1.21		
Months of College	<u>M</u>	12.3	13.2	16.3	0.787	.459
	<u>SD</u>	10.25	10.56	12.89		
Race/Ethnicity Overall					8.599	.197
Caucasian	%	100	83.3	86.2	-	-
Black	%	0	6.7	6.9	-	-
Asian	%	0	10.0	0	-	-
Multiracial	%	0	0	6.9	-	-
Right-handed	%	85.7	90.0	93.1	0.605	.739
WTAR est. FSIQ	<u>M</u>	105.8	105.8	105.6	0.036	.965
	<u>SD</u>	8.15	8.15	8.54		

Note. HON = Honest, FGN = Feigning, WTAR est. FSIQ = Wechsler Test of Adult Reading estimated Wechsler Adult Intelligence Scale—III Full Scale IQ.

Adderall (57.8%), and about half (48.3%) were treated with an extended release medication. The accuracy of these reports was not verified by checking medical records.

Comparison of results from the HON and ADHD groups, as illustrated throughout the Results section below, indicated that ADHD participants' results diverged from those of the normal HON group. This reflects global symptom report and performance differences between the presumably clinical participants and the undiagnosed, presumably normal students, and loosely supports both the validity of the ADHD group makeup and the validity of measures used to distinguish these groups.

Results from Core Battery

Data Presentation and Analytic Strategy

In order to facilitate clarity in data presentation and analyses, the following structure will be broadly followed: First, for each instrument, between group analyses of major indices will be undertaken using ANOVA or Mann-Whitney U as appropriate. Next, in order to evaluate whether feigning actually occurred, results from the HON and FGN groups will be contrasted. Following this, to assess feigning success, the ADHD and FGN groups will be compared. Then, in order to evaluate individual classification rates, slightly different analyses will be undertaken for the ADHD-diagnostic vs. malingering measures. For the ADHD-diagnostic indicators, Sensitivity and Specificity rates for the contrasts of HON vs. ADHD will index diagnostic properties, whereas the same parameters for the ADHD vs. FGN comparison will illustrate potential error rates in settings that have a mixture of feigning normals and genuine ADHD evaluatees. For the malingering indicators, the diagnostic parameters will be presented only for the ADHD vs. FGN contrast, as these are the operating characteristics of most interest in the present study. Finally, in a later section, logistic regression will be employed to determine the optimal combination of indicators for identification of ADHD vs FGN status.

Attention-Related Measures

CAARS—S:L: Results are provided in Table 3-2. One-way ANOVAs indicated a significant main effect for group on every measure from this instrument. Follow-up pairwise comparisons using Tukey's HSD at $p < .05$ identified a consistent pattern across all scales, such that the FGN group was statistically significantly higher than the HON group and the FGN group was comparable to the ADHD group. The former results

Table 3-2

CAARS—S:L Scale T-scores (M [SD])

Variable	HON N = 14	FGN N = 30	ADHD N = 29	Overall		FGN-ADD		
				<u>F</u>	<u>p</u>	<u>U</u>	<u>p</u>	<u>g</u>
Scale 1	49.9 (7.11) a	71.0 (10.43) b	66.9 (12.23) b	19.140	.000	354.5	.222	0.36
Scale 2	44.9 (8.73) a	66.7 (8.80) b	63.9 (9.38) b	29.853	.000	360.0	.255	0.31
Scale 3	42.7 (6.84) a	64.1 (12.19) b	59.7 (12.34) b	17.042	.000	358.5	.246	0.36
Scale 4	43.7 (7.25) a	55.2 (10.20) b	53.3 (10.53) b	6.761	.002	396.0	.554	0.18
Scale 5	51.9 (10.06) a	79.4 (9.43) b	79.6 (11.20) b	40.705	.000	432.5	.970	-0.02
Scale 6	42.1 (8.43) a	72.0 (11.00) b	69.9 (12.48) b	38.014	.000	381.5	.417	0.18
Scale 7	47.1 (9.65) a	80.2 (9.49) b	78.5 (10.11) b	61.818	.000	395.0	.543	0.18
Scale 8*	45.4 (9.47) a	67.0 (11.54) b	63.6 (9.90) b	20.952	.000	356.0	.320	0.31
Overall Mean	46.0 (0.45) a	69.5 (8.84) b	66.9 (8.27) b	40.671	.000	386.0	.453	0.30
Number of Scales > 65 <u>T</u>	0.1 (0.27) a	5.1 (2.33) b	4.6 (2.23) b	31.088	.000	363.5	.278	0.21

Note. Within each row, columns with different letters are statistically different ($p < .05$) from one another according to Tukey post-hoc testing.

FGN-ADHD = comparisons involving those groups only; g = Hedges' g effect size; Overall = comparisons involving all three groups.

suggests that analog feigners endorsed symptoms at a significantly higher rate than control participants; the mean elevations here are mostly in the clinically significant range according to the manual for the test (i.e., $> 65T$). The non-significantly different scores for the FGN and ADHD contrasts suggest that feigners approximated the symptom reports of students diagnosed with ADHD. This lack of difference is also illustrated by the rank distribution of scores for the FGN and ADHD groups according to the Mann-Whitney U Test, which reflects a comparable number and degree of elevated scores for those groups. Further, the median FGN-ADHD contrast g was .18, which barely approximates a small effect size. These results suggest that normal students could easily feign ADHD symptoms on the CAARS-S:L to a comparable extent to those with the diagnosis.

Table 3-3 presents Sensitivity and Specificity values of the CAARS—S:L for distinguishing HON and ADHD as well as FGN vs. ADHD contrasts. Results indicate perfect Specificity for the HON vs. ADHD contrast, but only modest Sensitivity (median = .586). Findings were considerably worse for the FGN vs. ADHD contrast. Here Specificity calculated using FGN results was very poor (median = .650), although Sensitivity remained moderate (median = .350) as it was calculated using the same ADHD group as in the previous contrast. Overall, these results suggest that the CAARS-S:L is modestly effective at discriminating honestly responding students with ADHD versus honestly responding normals. However, the instrument is essentially unable to distinguish normals feigning ADHD from those with the condition who responded honestly. In this regard, it should be noted that the CAARS—S:L has not been previously validated for discrimination of feigned vs genuine ADHD.

CAARS—S:L additional considerations: In clinical evaluations of the CAARS—S:L, the authors suggest that two factors be considered when determining if a profile is clinical or not: performance on Scale 8, and the number of scales elevated. As with the other scales, a T -score greater than 65 is considered clinically noteworthy on Scale 8. In the present sample, the ADHD mean score's 95% confidence interval did not fall entirely within the range of clinical elevation, though the average and score distribution were not statistically different from that of the FGN group, which was clinically elevated. As such, Scale 8 may not be the most robust index of clinical status for undergraduates. A sensitivity value of .448 furthers this contention.

Table 3-3

Clinical Elevation on CAARS—S:L Scales (> 65T), By Group

Variable	HON N = 14	FGN N = 30	ADHD N = 29	Sn to ADHD	Sp for HON	Sp for FGN
Scale 1	0	22	19	.655	1.000	.267
Scale 2	0	16	15	.517	1.000	.467
Scale 3	0	14	11	.379	1.000	.533
Scale 4	0	6	4	.138	1.000	.800
Scale 5	0	28	27	.931	1.000	.067
Scale 6	0	22	20	.690	1.000	.267
Scale 7	0	28	25	.862	1.000	.067
Scale 8*	0	17	13	.448	1.000	.433
<u>Ruling Out ADHD:</u>						
0—1 Scales Elevated	0	1	3	NR	1.000	.967
Up to 3 Scales Elevated	0	11	7	NR	1.000	.633
<u>Ruling In ADHD:</u>						
6—8 Scales Elevated	0	15	12	.414	1.000	.533
4—8 Scales Elevated	0	19	22	.759	1.000	.367

Note. The condition of interest (for sensitivity) is ADHD. HON-ADHD = analyses involving those conditions; NR = not relevant; Sp = Specificity; Sn = Sensitivity; *The test manual recommends that Scale 8, and the number of scales with clinical elevations (>65T), be examined when making a diagnostic decision.

Turning to the number of scales elevated above T_{65} , the test manual does not provide a guideline regarding the number of scales that should be elevated for a clinical determination. In this study, the FGN and ADHD groups produced equivalent numbers (ADHD $M = 4.6$ [SD = 2.23], FGN $M = 5.1$ [SD = 2.31]) and distributions ($U = 363.5$, $p = .278$) of elevated scales (see Table 3-2). This suggests that it does not discriminate feigned from diagnosed ADHD. However, because a clinically significant profile was required on at least one of the ADHD-diagnostic measures for ADHD participants to remain included in the study (as stated earlier), this may be biased. As depicted in Table 3-3, though more than four elevations pointed to attention dysfunction in this sample (Sensitivity = .759, Specificity for HON = 1.000), it did not distinguish feigned from actual attention problems (Specificity = .367).

ARS: This measure is scored differently from the Conners' scales, as raw scores are interpreted in light of gender-based cut scores. As such, it was necessary to analyze data for males and females separately. Univariate ANOVA was used for this task to examine for main effects of gender and role, as well as an interaction of the two. ARS endorsements for the Childhood and Current Symptoms scales are provided in Table 3-4, collapsed across gender for simplicity.

Overall, results closely matched those of the CAARS-S:L. There was a significant main effect for group on every index, which according to follow-up contrasts using Tukey HSD at $p < .05$ indicates that the FGN group endorsed significantly more items in a "clinical" manner (by rating them 2 or 3) than the HON group. Also, the FGN group endorsements were similar to the ADHD group's for every subscale. Analog feigners' endorsements were generally consistent with clinical elevation, for both males and females. Collapsed by gender, effect sizes for the Inattentive and Hyperactive subscales were small for all scales (median $g = .31$), but were larger on those subscales where gender effects were noted due to the tendency of female feigners to rate more symptoms 2 or 3. These included both Childhood subscales, as indicated with footnotes in Table 3-4 below.

Table 3-5 presents sensitivity and specificity values of the ARS for distinguishing HON and ADHD as well as FGN vs. ADHD contrasts. Just as with the CAARS:S—L, results indicate perfect specificity for the HON condition when contrasted with ADHD. Sensitivity to ADHD was somewhat higher (mean = .785) for this measure. Specificity

Table 3-4

Barkley-Murphy ARS Test Results Collapsed Across Gender: Number of Clinically Relevant Endorsements (M [SD])

Variable (Cut Score)	HON N = 14	FGN N = 30	ADHD N = 29	Overall <i>p</i>	FGN- ADHD <i>g</i>
<u>Current Scale</u>					
Inattentive (≥ 4)	.5 (1.16) a	6.4 (2.66) b	5.5 (2.60) b	.000	.31
Hyperactive (≥ 5)	.3 (0.61) a	5.7 (2.48) b	5.3 (2.25) b	.000	.18 ²
Total (NA)	.8 (1.48) a	12.1 (4.88) b	10.8 (4.19) b	.000	.15
<u>Childhood Scale</u>					
Inattentive (M \geq 7, F \geq 6)	1.2 (1.53) a	7.3 (2.26) b	7.0 (2.06) b	.000	.49 ³
Hyperactive (M \geq 7, F \geq 6)	1.0 (1.71) a	7.4 (2.14) b	6.6 (2.18) b	.000	.44 ⁴
Total (NA)	2.2 (3.02) a	14.7 (4.10) b	13.6 (3.60) b	.000	.36 ⁵
Est. Age Onset (NA)	-	7.0 (2.25)	7.5 (4.03)	.768	-.20 ⁶

Note. Data were analyzed using Univariate ANOVA due to lack of gender norms. Means and effect sizes collapsed by gender for this table, though analyses produced separate results. Means represent the number of items endorsed two or three on a Likert spanning from zero to three. Statistics provided for FGN-ADD contrast. Within each row, columns with different subscripts are significantly different, $p < .05$, according to post hoc testing. Gend = gender; Grp = group; Intxn = interaction; mean *g* = average Hedge's *g* effect size indicator (combined for males and females); M = male; F = female.

¹ Gender effect reflects that males' scores were lower than females' scores. ² Male *g* = -.04, Female *g* = .39. ³ Male *g* = -.31, Female *g* = .66. ⁴ Male *g* = .00, Female *g* = .87. ⁵ Male *g* = -.16, Female *g* = .87. ⁶ Male *g* = -.46, Female *g* = .07.

Table 3-5

Frequency of Clinical Classification on ARS Indices, Using Age and Gender-Based Norms (Murphy & Barkley, 1996)

	HON (N = 14)	FGN (N = 30)	ADHD (N = 29)	Sn to ADHD	Sp for HON	Sp for FGN
<u>Current Symptoms Scale</u>						
Inattentive Endorsements	0	24	24	.828	1.000	.200
Hyperactive Endorsements	0	18	19	.655	1.000	.400
Current Symptom Clinical Classification *	(0)	(24)	(25)	.862	1.000	.200
Inattentive	0	6	6	-	-	-
Hyperactive	0	0	1	-	-	-
Combined	0	18	18	-	-	-
<u>Childhood Symptoms Scale</u>						
Inattentive Endorsements	0	25	22	.759	1.000	.167
Hyperactive Endorsements	0	20	26	.897	1.000	.333
Childhood Symptom Clinical Classification *	(0)	(28)	(26)	.897	1.000	.067
Inattentive	0	2	6	-	-	-
Hyperactive	0	3	4	-	-	-
Combined	0	23	16	-	-	-

Note. Endorsements refer to items rated 2 or 3 on the 0—4 Likert. *Values in parentheses represent total of individuals meeting classification criteria for Inattentive, Hyperactive, or Combined subtype.

in the FGN-ADHD contrast was poor for this measure (mean = .275), indicating that it essentially does not discriminate between normals feigning ADHD and ADHD patients responding honestly. However, as with the CAARS—S:L, the ARS has not been previously validated for discrimination of feigned vs genuine ADHD.

Additional ARS Considerations: On the ARS, individuals are additionally asked to estimate the age of onset of the rated problems. Participants in the FGN and ADHD groups reported comparable symptom onset ages (overall $M = 7.0$ [$SD = 2.25$]), with no main effects or interactions for gender and role. It should be noted that coaching material provided the DSM-IV criterion that symptoms must be present before age seven. ARS-identified subtypes are explored later under the heading of Feigning Strategies.

Continuous Performance Test: C-CPT results are provided in Table 3-6, and diverge somewhat from the results of the Symptom Report measures described above. Although there were significant main effects of group for several indices, neither the number of perseverations, Hit Rate, Beta, nor any variable examining changes across response block or stimulus item showed an effect. (Note that Hit Rate and Beta were examined as two-tailed indices due to clinical scores being $<35T$ and $>65T$). This calls into question the validity of these variables for distinguishing clinical versus normal individuals, so they will not be discussed further. Of further concern, of those seven variables with a significant main effect of group, follow-up pairwise contrasts revealed no significant difference between HON and ADHD for five; and, for three (Omissions, Hit Rate SE, Variability), the FGN group was significantly higher than the ADHD group. In fact, the ADHD group did not have a mean above the clinical cut score ($65T$) on any index.

Table 3-7 presents sensitivity and specificity values of the CAARS—S:L for distinguishing HON and ADHD as well as FGN vs. ADHD contrasts. For the selected indices that showed a main effect of group in the previous analyses, these results indicate near-perfect specificity for HON vs. ADHD (median $Sp = .714$), and low to moderate Specificity for FGN vs. ADHD (median = .621). Not surprisingly, though, Sensitivity to ADHD was very poor (median = .241). Overall, these results suggest that the C-CPT is ineffective in identifying undergraduates with ADHD, relatively good at ruling out symptoms in normals presumed to be performing to the best of their ability, but poor at

Table 3-6

Conners' CPT T-scores for Indices Where T > 65 is Indicative of Clinical Profile

Variable	HON N = 14	FGN N = 30	ADHD N = 29	Overall		FGN-ADD			
				<u>F</u>	<u>p</u>	<u>U</u>	<u>p</u>	<u>g</u>	
<u>Index T-scores</u>									
Omissions	46.4 (4.24) a	85.4 (46.01) b	61.2 (24.15) a	7.596	.001	301.0	.042	0.65	
Commissions	48.2 (14.67) a	63.5 (10.02) b	59.5 (9.93) b	9.319	.000	351.0	.203	0.40	
Hit Rate SE	50.5 (9.56) a	70.4 (17.48) b	60.0 (15.81) a	8.419	.000	283.5	.022	0.62	
Variability	49.8 (8.62) a	67.5 (13.09) b	58.2 (13.77) a	10.099	.000	257.0	.007	0.70	
Detectibility	50.6 (8.63) a	59.4 (5.43) b	57.4 (6.90) b	8.280	.000	351.0	.203	0.31	
Perseverations	48.3 (5.51)	81.7 (91.50)	61.3 (26.03)	1.641	.201	347.5	.181	0.30	
Hit Rate Block Change	48.3 (7.56)	52.2 (12.95)	47.4 (12.15)	1.332	.270	367.5	.306	0.38	
Hit Rate SE Block Change	55.8 (7.94)	53.5 (13.09)	52.2 (10.17)	.480	.621	420.5	.826	0.11	
Hit Rate ISI change	58.8 (12.40)	67.7 (19.89)	61.6 (17.32)	1.603	.209	355.0	.225	0.33	
Hit Rate ISI SE change	53.3 (9.40)	62.6 (15.44)	58.2 (11.97)	2.488	.090	375.0	.363	0.31	
<u>Number Scales >65T</u>	1.1 (1.56) a	3.9 (2.98) b	2.3 (2.44)	6.362	.003	296.0	.033	0.58	
<u>"% Clinical Agreement"</u>	42.4 (17.76) a	71.4 (26.40) b	60.3 (24.04)	7.005	.002	327.5	.090	0.44	

Note. Within each row, columns with different letters are statistically different ($p < .05$) from one another according to Tukey post-hoc testing. "Hit Rate" and "Beta" not provided because distributions are binomial due to clinical scores being $<35T$ and $>65T$; using Univariate ANOVA no main effect of group observed. FGN-ADHD = comparing those groups only; g = Hedges' g effect size; Overall = comparing all three groups.

Table 3-7

Frequency of Clinical Elevation on C-CPT subscales, for Those with Group Differences

	HON (N = 14)	FGN (N = 30)	ADHD (N = 29)	Sn to ADHD	Sp for HON	Sp for FGN
<u>Mean Index Score >65T</u>	0	14	7	.241	1.000	.533
<u>Index</u>						
Omissions	0	14	7	.241	1.000	.533
Commissions	2	12	9	.310	.857	.621
Hit Rate *	4	9	7	.241	.714	.724
Hit Rate SE	0	18	7	.241	1.000	.400
Variability	1	16	7	.241	.929	.483
Detectibility	1	4	5	.172	.929	.897
Beta *	0	0	0	.000	1.000	1.000

Note. *Clinical elevation at >65T, except Beta and Hit Rate, where clinical at <35T and >65T. Subscales indicative of inattention include Omissions, Hit Rate Block Change, and Hit Standard Error Block Change. Subscales indicative of hyperactivity/impulsivity include Commissions, Perseverations, and Hit Rate (using values <35T for the latter). NA = not applicable because bi-directional test not possible; ns = not significant; Sn = sensitivity to ADHD, Sp = specificity.

avoiding false positive diagnoses for FGN. Overall, individuals in this sample with clinical elevations are likely to be FGN-role.

Additional C-CPT Considerations: The variable “Percent Clinical Agreement” (presented in Table 3-6) indicates the percent correspondence between an individual’s profile and the standardization sample’s mean clinical profile. It is the first information provided in a C-CPT report, suggesting it is believed to be a good overall indicator of attention dysfunction status. On this variable, the FGN group obtained a mean clinical profile agreement of 71.4% ($SD = 26.40$). According to post-hoc analyses, this value was significantly different from that of the HON group, which obtained a high mean clinical profile agreement of 42.4% ($SD = 17.76$). The mean ADHD group Percent Clinical Agreement was not different from either FGN or HON, and fell at chance (50%).

Summary of ADHD-Diagnostic Results: In summary, both symptom checklists administered (the CAARS:S—L and the ARS) were highly unlikely to classify normals responding honestly as ADHD and were relatively sensitive to ADHD, but were very easily faked. At published cutting scores, the C-CPT indices were insensitive to the attention dysfunction of the ADHD group.

Results of Standard Neuropsychological Testing

Three neuropsychological tests were administered: the Nelson-Denny Comprehension subtest Reading Speed component (N-D Comp), the Stroop Color-Word Test (Charles Golden Version, 2002), and the WMS- III Word Lists Immediate subscales (WMS-III WL). Because no cut scores are available for these measures, sensitivity and specificity are not explored.

N-D Comp Results: Students were administered the N-D Comp with instructions to read at their usual rate, “for comprehension.” There was no between-group difference in either reading rate (Overall, $F(2) = 1.360$, $p = .393$) or in the distribution of reading times, after removing three outliers that were each more than three standard deviations above the mean. Thus, all three groups read comparable numbers of words. On average, the HON group read 188 words per minute ($SD = 40.8$), feigners read 182 ($SD = 42.1$), and ADHD read 167 ($SD = 46.1$). Thus, this component of the test has little diagnostic utility in ADHD undergraduates.

Stroop Task Results: For each Stroop subscale (Word, Color, and Color-Word),

three types of scores were calculated: \underline{T} -scores according to instructions within the manual, words read per second, and errors per subscale. \underline{T} -scores account for errors via increased reading time. These results are presented in Table 3-8 and discussed separately.

Regarding the Subscale \underline{T} -scores, lower scores are more indicative of pathology. Here, significant main effects of group are seen for all indices except the controversial Interference score discussed earlier. For those with group differences, follow-up pairwise comparisons indicate that the FGN group read significantly slower than the HON group for all. The FGN mean was significantly lower than ADHD group mean only on the Word subtest, where significantly more feigners scored in the impaired direction. This is supported by a large FGN-ADHD effect size ($g = -1.06$). The HON and ADHD groups had equivalent mean \underline{T} -scores on all subtests, indicating that these indices were insensitive to difficulties associated with ADHD.

Examining the mean number of words read per second, previously suggested to be a more accurate indication of reading speed, the resulting patterns and effects were identical to the above. This suggests that the scoring methods are comparable in these samples. In combination with results from the Nelson-Denny Reading Test, it additionally suggests that ADHD undergraduates do not read significantly slower than presumed normal students.

Turning to the raw number of errors, main effects of group were observed for the Word and Color subtests. Follow-up tests reveal different patterns of results, however. On the Word subscale, feigners provided more errors than presumed normals. However, there were statistically equivalent numbers and distributions of errors for the FGN and ADHD groups. This is supported by the only moderate effect size, .48. Of note, the ADHD group did not achieve significantly more errors than the HON group. On the Color subscale, the FGN group again produced more errors than the HON group; but the FGN group also more errors than the ADHD group, resulting in a slightly larger effect size for this contrast ($g = .63$). Again, the ADHD and HON groups were statistically equivalent.

WMS-III WL Results: The WMS-III WL was scored according to manualized instructions, to produce various index Scaled Scores (as well as feigning indices described later). These results are presented in Table 3-9, and show a main effect for

Table 3-8

Stroop Test Results (Mean [SD])

Variable	HON N = 14	FGN N = 30	ADHD N = 29	Overall		FGN-ADD		
				<u>F</u>	<u>p</u>	<u>U</u>	<u>p</u>	<u>g</u>
<u>Subscale T-score</u>								
Word	48.3 (13.96) a	30.9 (12.18) b	43.0 (10.65) a	12.752	.000	198.5	.000	-1.06
Color	47.1 (10.23) a	37.5 (11.51) b	43.2 (9.92)	4.419	.016	309.0	.056	-0.53
Color-Word	52.8 (9.52) a	43.2 (12.16) b	47.7 (8.49)	4.427	.018	313.0	.064	-0.43
Interference	55.4 (5.88)	54.0 (8.67)	53.2 (7.14)	.391	.678	412.0	.727	0.10
<u>Mean Words / Second</u>								
Word	2.3 (.46) a	1.7 (.40) b	2.1 (.36) a	12.133	.000	194.0	.000	-1.05
Color	1.7 (.28) a	1.4 (.31) b	1.6 (.26)	4.388	.016	308.5	.055	-0.70
Color-Word	1.1 (.23) a	0.9 (.27) b	1.0 (.19)	4.348	.017	307.0	.052	-0.43
<u>Raw Number Errors</u>								
Word Errors	0.0 (.00) a	1.0 (1.89) b	0.3 (.55)	3.586	.033	378.0	.303	0.48
Color Errors	0.1 (.27) a	1.0 (1.54) b	0.2 (.51) a	5.005	.009	338.5	.058	0.63
Color-Word Errors	0.4 (.65)	1.0 (1.40)	0.6 (.91)	1.065	.350	417.0	.755	0.26

Note. Within each row, columns with different letters are statistically different ($p < .05$) from one another according to Tukey post-hoc testing.

FGN-ADD = statistics involving only those participant groups; Overall = statistics involving all three participant groups.

Table 3-9

WSM-III Word Lists Results

Variable	HON	FGN	ADHD	Overall		FGN-ADD		
				<u>F</u>	<u>p</u>	<u>U</u>	<u>p</u>	<u>g</u>
Subscale Scaled Score:	N = 14	N = 30	N = 29					
1 st Recall	11.1 (3.08)	9.4 (2.16)	9.4 (3.03)	2.130	.126	416.5	.775	0.00
Recall Total	11.4 (2.47) a	7.8 (2.86) b	9.0 (2.73) b	8.073	.001	320.0	.079	-0.43
Learning Slope	9.5 (2.65)	8.2 (2.16) a	10.1 (3.74) b	2.896	.062	300.0	.038	-0.60
Contrast 1	9.6 (2.13)	9.7 (2.13)	10.4 (2.81)	.680	.510	351.5	.199	-0.29
Contrast 2	10.1 (3.23) a	7.7 (3.49) b	10.5 (2.36) a	6.738	.002	232.0	.002	-0.92
<u>Pilot Variables:</u>								
Number of Intrusions*	N = 14	N = 30	N = 29					
	0.1 (.27)	1.0 (1.81)	1.0 (1.20)	2.426	.096	388.5	.439	-0.02
Number of Repetitions*	N = 5	N = 11	N = 24					
	2.0 (2.55)	1.2 (1.40)	2.9 (2.89)	1.719	.193	230.5	.000	0.67

Note. Within each row, columns with different letters are statistically different ($p < .05$) from one another according to Tukey post-hoc testing. FGN-ADD = statistics involving only those participant groups; Overall = statistics involving all three participant groups.

group on only two of the five variables: Recall Total (sum of words recalled in Trials 1 through 4) and Contrast 2 (difference in number of words recalled in Trial 4 and the Short Delay). For Recall Total, pairwise post-hoc tests indicate that the FGN group recalled significantly fewer words than the HON group and an equivalent number to the ADHD group. This is supported by a relatively small effect size in the FGN-ADHD contrast ($g = -.43$) and a lack of difference in the distribution of FGN and ADHD scores. The ADHD group was equivalent in performance to the HON group, suggesting this is not an area of difficulty for this clinical sample. For the Contrast 2 variable, feigners achieved significantly lower scores due to recalling fewer words at the Delay than both HON and ADHD groups, whose recalls were statistically equivalent (Tukey HSD $p = .002$; Mann Whitney $p = .002$). These results suggest that Contrast 2 is likely the most effective at discriminating feigned from honest performance, according to the large FGN-ADHD g of $-.92$. However, the WMS-III WL subtests are broadly ineffective at separating performance of ADHD from normal students responding honestly.

For this study, the total number of intrusions provided across all learning and recall trials was recorded to determine if this variable discriminate feigned or genuine ADHD from presumed normal honest performance. There were no between-group differences, precluding this notion. There was likewise no effect in the FGN-ADHD contrast ($g = -.02$). In addition to the number of intrusions, the number of repetitions was recorded for a minority of participants. Power to detect a difference is minimal, and no main effect of group was noted. However, score distributions indicate that significantly more ADHD than FGN participants provided repetitions ($U = 230.5$, $p = .000$), and a moderately high effect size of $-.67$ was observed for this contrast. Thus, examining repetitions may prove helpful in identifying genuine ADHD.

Neuropsychological Test Result Summary: Overall, ADHD participants were not likely to obtain reduced neuropsychological test scores relative to presumed normals. FGN-group performance on neuropsychological testing resembles that of the research on feigned head injury (described earlier) in that malingerers' performance was generally suppressed. However, the size of FGN-ADHD group separation in this study, as evidenced by effect sizes, was less than is commonly seen in known-groups assessment of neurological insult groups. Though the nature of this study's design does not make it

directly comparable to the real-world counterpart (known-groups), the observation suggests that undergraduates were successful at making themselves not look too impaired, an issue for which they were coached. This further hints that using neuropsychological testing results is unlikely to be as helpful with similar samples. This issue is discussed further in the Classification Accuracy section.

Feigning Test Results

Symptom Validity Tests, broadly speaking, were developed to distinguish malingerers from those with genuine pathology. Results for the Test of Memory Malinger (TOMM), Digit Memory Test (DMT), Letter Memory Test (LMT), Nonverbal Medical Symptom Validity Test (NV-MSVT), WMS-III WL Inconsistency Index, Miller Forensic Assessment of Symptoms Test (M-FAST), and CAARS—S:L Inconsistency Index are provided in Table 3-10, which shows the mean test score for each measure and index.

Cognitive Malinger Measures: Very consistent main effects for group were demonstrated across all of the cognitive malinger measures (this category excludes the M-FAST and CAARS—S:L index), except the WMS-II WL Inconsistency Index for which there was no main effect of group. For those variables with significant main effects, post-hoc testing indicated that the FGN group consistently scored significantly lower than the HON group, as well as the ADHD group, which was statistically equivalent with the HON group. This suggests that the various measures are insensitive to problems associated with ADHD in undergraduate samples, but are attuned to performance differences associated with feigning. Indeed, very large effect sizes in the ADHD-FGN contrast were noted: Excluding the Inconsistency Index, the mean cognitive feigning measure effect size was $g = 1.12$. Additionally, the distribution of FGN and ADHD individual scores was characterized by significantly more FGN than ADHD individuals producing low scores in each case (see Mann-Whitney p -values). Of note, examination of the nature of group means shows that for the TOMM and LMT in particular, more feigners scored in the lower range of effort.

The sensitivity to feigning and specificity for the Honest and ADHD conditions in contrast to feigning are provided for the cognitive feigning measures in Table 3-11. Near perfect specificity in the HON vs. FGN contrast was noted across the board at each measure's published cut score (examining the best index per measure, $M = .982$, $Med =$

Table 3-10

Feigning Test Results (Mean [SD])

Index (Cut Score)	HON N = 14	FGN N = 30*	ADHD N = 29	Overall		FGN-ADD		
				<u>F</u>	<u>p</u>	<u>U</u>	<u>p</u>	<u>g</u>
<u>TOMM Subscales (< 90)</u>								
Trial 1 % Correct	98.6 (2.98) a	76.7 (13.58) b	93.7 (6.30) a	33.722	.000	109.0	.000	-1.60
Trial 2 % Correct	100.0 (0.00) a	84.5 (17.07) b	99.2 (2.65) a	16.077	.000	147.5	.000	-1.19
Retention % Correct	99.9 (0.54) a	84.9 (16.08) b	99.2 (2.65) a	16.816	.000	120.5	.000	-1.23
<u>DMT % Correct (< 90)</u>								
DMT % Correct (< 90)	100.0 (0.00) a	90.2 (11.83) b	99.5 (1.30) a	13.634	.000	190.0	.000	-1.10
<u>LMT % Correct (< 93)</u>								
LMT % Correct (< 93)	100.0 (0.00) a	85.5 (15.97) b	97.7 (3.35) a	13.667	.000	204.5	.001	-1.06
<u>NV-MSVT</u>								
Scale A (\leq 90)	97.5 (3.25) a	90.5 (9.21) b	97.2 (3.54) a	9.772	.000	215.0	.001	-0.96
Scale B (< 88)	96.3 (4.66) a	87.0 (12.31) b	96.1 (4.73) a	9.855	.000	216.5	.001	-0.97
<u>WMS-LL Inconsistency</u>								
WMS-LL Inconsistency	0.89 (.067)	0.82 (0.108)	0.87 (.091)	2.863	.064	315.5	.070	-0.46
<u>M-FAST Subscales</u>								
RO	.07 (2.67) a	.63 (0.49) b	.34 (0.48) a	7.811	.001	309.5	.028	0.60
ES	.14 (0.36)	.63 (0.96) a	.14 (0.35) b	4.694	.012	313.0	.017	0.68
RC	.00 (0.00)	.53 (1.22)	.21 (0.56)	2.107	.129	390.5	.320	0.33

UH	.00 (0.00)	.40 (0.68)	.21 (0.49)	2.811	.067	376.5	.232	0.32
USC	.00 (0.00)	.27 (0.45)	.14 (0.35)	2.667	.076	379.0	.223	0.32
NI	.00 (0.00)	.10 (0.31)	.03 (0.19)	1.101	.338	406.5	.321	0.28
S	.00 (0.00)	.07 (0.25)	.00 (0.00)	1.473	.236	406.0	.161	0.39
TOTAL	.21 (0.58) a	2.63 (3.03) b	1.07 (1.22) a	7.745	.001	292.0	.025	0.67
<u>CAARS Inconsistency</u>	4.0 (2.04)	5.2 (2.25)	5.2 (2.43)	1.436	.245	431.0	.951	-0.22

Note. Within each row, columns with different subscripts are significantly different according to Tukey post-hoc testing, $p < .05$. *
N = 29 for LMT due to student not finishing protocol before leaving.

Table 3-11

Frequency of Probable Feigning on Symptom Validity Tests

Index (Published Cut Score)	HON N = 14	FGN N = 30*	ADHD N = 29	Sn to FGN	Sp for HON	Sp for ADHD
<u>TOMM Subscales</u>						
Trial 1 (used < 90%)	0	26	5	.867	1.000	.828
Trial 2 (< 90%)	0	14	1	.467	1.000	.966
Retention (< 90%)	0	14	1	.467	1.000	.966
<u>DMT % Correct (< 90%)</u>	0	13	0	.433	1.000	1.000
<u>LMT % Correct (< 93%)</u>	0	15	2	.500	1.000	.931
<u>NV-MSVT</u>						
Scale A (\leq 90%)	1	14	2	.467	.929	.931
Scale B (< 88%)	2	13	2	.433	.857	.931
<u>M-FAST Total (\geq 6)</u>	0	3	0	.100	1.000	1.000
<u>CAARS Inconsistency (\geq 8)</u>	1	5	5	.167	.929	.828

Note. WMS-III WL not included because no cut score has been suggested or become apparent yet. n/a = not applicable due to lack of published cut score; ns = not significant, * = for LMT, FGN N = 29 due to one student having to leave before protocol complete.

1.000). Thus, the cognitive feigning measures are highly unlikely to misclassify a normal honest undergraduate performing to the best of his/her ability as feigning. Very high specificity was also noted for the ADHD vs FGN contrast (examining the best index per measure, $M = .946$, $Med = .926$). This suggests that none of these measures is likely to misclassify ADHD individuals as feigners. The DMT demonstrated the highest Sp (1.0), followed by TOMM Trial 2 and Retention (both Sp = .966).

While these measures were not developed to identify feigned ADHD or normed on ADHD samples to develop optimal cut scores, modest sensitivity was noted across the board ($M = .567$, $Mdn = .484$). When a cut score of less than 90% was applied to the TOMM Trial 1, it far outperformed the other indices with high sensitivity (.867), though with an accompanying lower specificity (.828). Because of the near-perfect specificity described above, high accuracy can be expected when an individual is said to be feigning by any measures except the TOMM T1.

M-FAST: The psychiatric feigning measure performance was characterized by a very low item endorsement rate for all groups. However, looking at the Total Score mean (Table 3-10), there was a main effect of role due to feigners endorsing more items than both HON and ADHD participants (per Tukey HSD results). There was likewise a tendency for feigners to provide a greater number of higher-ranked responses than ADHD participants (Mann-Whitney results). A moderately high effect size of $g = .67$ was noted.

As indicated in Table 3-11, the M-FAST demonstrated perfect specificity for both the HON and ADHD individuals in this sample, indicating that it did not classify any non-feigners as feigning using the standard cut score of six or more endorsements. However, it had very low sensitivity—just .100. Despite the high specificity, the M-FAST is unlikely to be helpful because of very low sensitivity to feigned ADHD.

CAARS:S—L Inconsistency Index: Because it is embedded in the CAARS:S-L, the results of this measure were examined. An Inconsistent profile typically results from responses that do not consider item content, such as random responses. Due to the academic nature of the sample, this index was not expected to discriminate FGN and ADHD groups, so a lack of main effect of group, a low FGN-ADHD effect size ($g = -0.22$, Table 3-10), and very low sensitivity to feigning (.121) are not surprising.

However, HON and ADHD groups' individual performance on this measure was of interest. The mean Inconsistency score for these groups ranged from about four to five items, suggesting that at a cutoff of >8 endorsements, very few if any individuals would be classified as inconsistent. This is reflected in the high specificity for HON, .929 (Table 3-11) as well as for ADHD, .828, and provides some support for the index's construct validity.

Implications and Direction for Symptom Validity Testing Alone: These results suggest that at the published cutting scores, no one symptom validity measure alone would be useful for both ruling out feigning in truly honest normal or ADHD evaluatees and correctly identifying malingering in other individuals. Should only symptom validity tests be used to maximize classification accuracy, the use of two measures may increase classification accuracy. Here, a measure with maximal specificity could be used first to ensure Honest individuals are not wrongfully determined to be feigning, followed by a measure with high sensitivity to feigning, yet still adequate Sp. Using multiple measures may also lead to incremental increases in sensitivity. Based on the above results, use of the DMT followed by the TOMM T1 index might be optimal at these cut scores. This is evaluated in more detail subsequently.

Final Considerations

Classification Accuracy at the Individual Level

Of those individuals said to have a condition of interest by a measure at a given cut score, the proportion that actually do is represented by the test's positive predictive power (PPP). Negative predictive power, conversely, refers to those accurately said to not have the condition by that test. For attention-related tests, PPP would relate to the diagnosis of ADHD; for feigning tests, it would relate to malingering. Predictive values calculated in a study are unique to the base rates of the condition(s) of interest (in this case, both ADHD and FGN), and require adjustment for other base rates. Predictive powers from this study can be applied only in the determination of ADHD versus faking, and therefore should only be used when a clinical profile is noted.

Attention Tests: Because the C-CPT did not demonstrate adequate construct validity through the consistent and overall clinical elevation of scales by ADHD participants, its predictive power is irrelevant in that determination, and should not be

considered. For the symptom-report measures, because no guidelines have been published to date regarding the detection of ADHD in undergraduate populations where feigning may be a factor, the sample-specific sensitivities may likewise have reduced construct validity. It is therefore not recommended that they be used on an individual basis in that determination, at this time. Further research and/or adjustment of cut scores is necessary.

Symptom Validity Tests: Due to the high specificity of these measures, high Positive Predictive Power can be expected such that individuals said to be feigning are highly likely to have been accurately classified. Indeed, the mean PPP was .904, and was perfect for the DMT (1.0) and lowest for the TOMM T1 (.863). Because of lower sensitivities, however, only moderate negative predictive values can be expected. Not surprisingly, at published cutting scores of feigning measures, a mean NPP of .483 was observed for the cognitive feigning indices alone. This was highest for the TOMM T1 (.866) and lowest for the NV-MSVT Scale A (.636). As the proportion of malingerers falls from the approximately 50% base rate in this sample, NPP will increase and PPP will decrease.

Identifying an Optimal Combination of Predictors

Binary logistic regression can be used to identify, in an exploratory manner, the optimal combination of tests for predicting feigning versus ADHD status. As previously stated, it would be ideal to have a series of measures that first identify ADHD individuals with high sensitivity to the disorder, then rule out feigning with high specificity, and then identify feigners with high sensitivity to that behavior. The lack of ADHD-sensitive measures in this population precludes that. Instead, we can only examine the feigning measures for the best “predictors.”

Two logistic regression models were undertaken. In the first, the predictor variables examined were the classification status of “probably feigning” or “probably honest,” assigned at the published cut score of each feigning measure. The second model examined instead the continuous, raw test data for those measures examined in Model 1. Both models tested the accuracy of classifying individuals as ADHD or FGN-role. Model 2 was examined as it is unclear how optimal the published cut scores are for this sample of educated, high-functioning individuals. Because little to no research exists on

the use of this study's measures in the distinction of ADHD vs. feigning for undergraduates, the forward conditional method of data entry was used. Here, all variables are made available for entry and the statistical software identifies the single best predictor, and then it identifies subsequent predictors that add significant incremental predictive power above the first. When measures such as the TOMM had multiple indices, the best predictor of FGN vs. ADHD status was selected according to AUC values obtained in ROC analyses. These included the TOMM T1 (using a 90% cut score for Model 1), the DMT, LMT, MSVT Scale A, and M-FAST. The WMS-III Inconsistency Index, as it does not have a published cut score, could only be evaluated in Model 2.

Model 1: Results (depicted in Table 3-12) indicate an overall significant model for the dichotomous variables ($\chi^2(5, N=58) = 31.698, p = .000$), in which 86.2% of individuals were accurately classified (Nagelkerke R -square = .660). In Step 1, the TOMM T1 was entered as a single best predictor ($\beta = 3.401, SE = .729, p = .000$), correctly classifying 84.5% of individuals. The final Step 2 entered the DMT, which added incremental predictive power (change $p = .010$) when applied after the TOMM, raising the classification accuracy to its final 86.2%. However, it must be noted that both the LMT and MSVT Scale A were quite comparable to the DMT (change $p = .013$ and $.026$, respectively), so it is not safe to say that this model would hold up when retested on another sample. In other words, the LMT or MSVT Scale A may be appropriate secondary measures at their published scores.

Model 2: Results (depicted in Table 3-13) likewise indicate an overall significant model for the raw data ($\chi^2(6, N=58) = 24.318, p = .000$), also correctly classifying precisely 86.2% of FGN and ADHD participants (Nagelkerke R -square = .703). Here, however, while Step 1 similarly entered the TOMM T1 ($\beta = -.174, SE = .045, p = .000$), and Step 2 the DMT ($\beta = -.404, SE = .190, p = .034$), a third step was included to add incremental predictive accuracy via the M-FAST (change $p = .034$).

Understanding Feigning Strategies

The feigners in this study, simply coached on symptoms, asked not to be too obvious, and reminded to do at least as "well" or "similar" as someone who would gain admission to a university, reported only mediocre confidence in their performance ($M = 3.3, SD = .80$ on a five-point Likert with five being "completely successful"), despite

Table 3-12

Binary Logistic Regression Analysis for Predicting FGN vs. ADHD Status from Cognitive and Psychiatric Feigning Tests' Classification as Probably Feigning or Probably Honest

	β (SE)	95% CI for exp \underline{b}			Classification Rate
		Lower	exp \underline{b}	Upper	
<u>Step 1</u>					
TOMM T1 class	3.401 (.729)***	7.186	30.000	125.250	84.5%
<u>Step 2</u>					
TOMM T1 class	3.109 (.804)***	4.633	22.400	108.298	
DMT class	21.076 (10921.517)	.000	.000	-	86.2%

Note. Forward Stepwise Conditional Logistic Regression was used due to the pilot nature of these data. Step One entered the observed classification for the following symptom validity measure to predict FGN or ADHD role: TOMM T1, DMT, LMT, NV-MSVT A, M-FAST. The overall model was significant, $\chi^2(5, N=58) = 31.698, p = .000$. The DMT and LMT were very similar, $p = .010$ and $.013$, respectively. ***= $p < .001$; Class = probably honest or probably feigning classification according to published cut score; SE = Standard Error; CI = confidence Interval. $\underline{R}^2 = .660$ (Nagelkerke), $.495$ (Cox & Snell). Model Chi-square(5) = 31.698, $p < .001$.

Table 3-13

Binary Logistic Regression Analysis for Predicting FGN vs. ADHD Status from Cognitive and Psychiatric Feigning Test Scores

	β (SE)	95% CI for exp b			Classification Rate
		Lower	exp b	Upper	
<u>Step 1</u>					
TOMM T1 pr	-.174 (.045)***	.769	.840	.918	79.3%
<u>Step 2</u>					
TOMM T1 pr	-.175 (.055)***	.754	.840	.934	
DMT pr	-.404 (.190)*	.460	.668	.970	84.5%
<u>Step 3</u>					
TOMM T1 pr	-.168 (.056)**	.758	.846	.944	
DMT pr	-.491 (.218)*	.400	.612	.938	
M-FAST tot	.447 (.267)	.926	1.563	2.639	86.2%

Note. Forward Stepwise Conditional Logistic Regression was used due to the pilot nature of these data. Step One entered the raw score for the following symptom validity measure to predict FGN or ADHD role: TOMM T1, DMT, LMT, NV-MSVT A, M-FAST, and WMS-III Inconsistency Index. M-FAST significance of the change = .034. The overall model was significant, $\chi^2(6, N=58) = 24.318, p = .000$. *** = $p < .001$, ** = $p < .01$, * = $p < .05$; pr = percent correct; tot = total score; SE = Standard Error; CI = confidence Interval. $\underline{R}^2 = .703$ (Nagelkerke), .527 (Cox & Snell).

their success as a group. Knowledge of how the undergraduate students in this sample feigned the disorder when fiscally motivated might be helpful for refining existing and creating new detection strategies.

Self-Reported Feigning Strategies: Table 3-14 presents the self-reported strategies provided by malingering-role students. Because this was the last question in the protocol, few responded with notable detail or took time to thoughtfully respond. These are provided for descriptive purposes only as some students listed several strategies within multiple categories and others, just a few. As illustrated in the table, students were about equally likely to list strategies involving physical behavior (despite being told this was unnecessary), learning style, and response style. Examples of physical strategies including fidgeting, looking around, and responding slowly. Students endorsing altering their learning style most often stated that they tried not to concentrate or pay attention, such as when learning items to memorize. With regard to response style, a number of students reported deliberately choosing the wrong answer; though surprisingly, only a few mentioned endorsing ADHD-like symptoms on the symptom report measures.

Assessment of Feigning Strategy on ADHD-“Diagnostic” Testing: Feigning strategy for these measures is described by the number of symptoms endorsed and the specific ADHD subtypes obtained. The FGN group was exceptionally successful in faking the ARS Current and Childhood Symptoms scales. Figure 1 shows that Current specific ADHD subtypes obtained. The FGN group was exceptionally successful in Symptom endorsements resulted in frequencies of Combined, Inattentive, and Hyperactive-Impulsive subtype specifications that were virtually identical to those of the ADHD group. These results suggest that a sizable proportion of university students avoided the “blanket endorsement” strategy for Current Symptoms (though this was more common for Childhood Symptoms, Figure 2), and that students were more likely to view the disorder as characterized by inattention than hyperactivity at this age.

On the CAARS—S:L, FGN participants tended to clinically elevate either 2-3 or 6-8 subscales, while ADHD participants demonstrated a parabolic incline in the number of subscales clinically elevated (0-1, 2-3, 4-5, or 6-8). This may illustrate two different

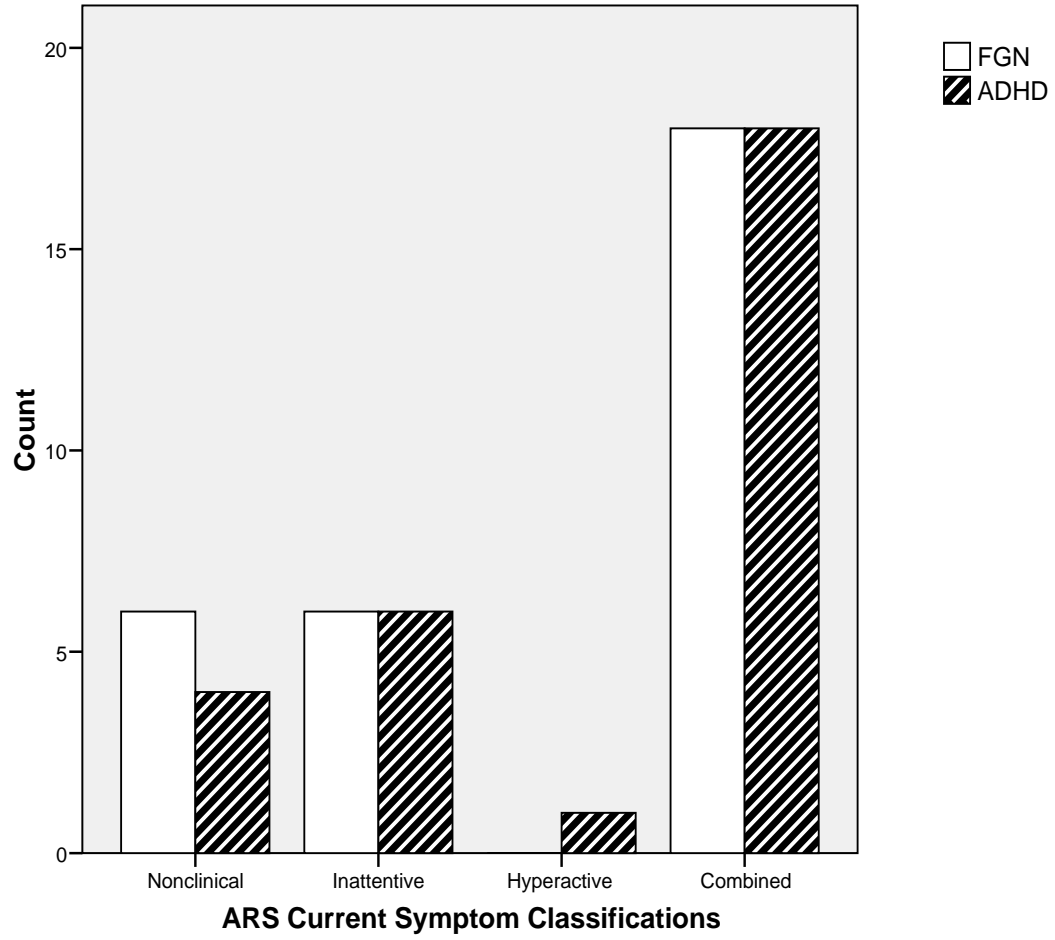
Table 3-14

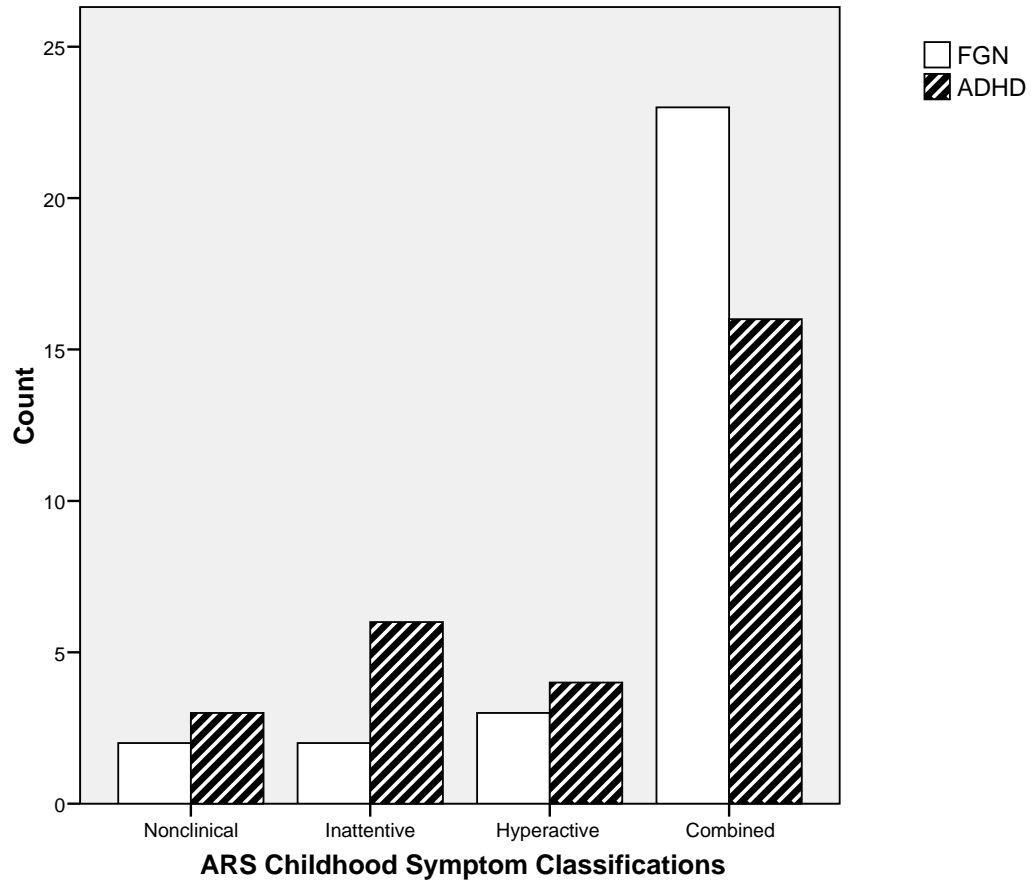
Reported Feigning Strategies

Strategy / Examples	Frequency (N = 26)
Reference to physical behavior strategy*	14
General reference (e.g., “physical mannerisms”)	4
Fidget	3
Look away / look around, not look at items to memorize	3
Be dazed / “daydreamy” / less alert	3
Respond [at a] slow [rate]	2
Act frustrated /look uncomfortable with easy items	2
Make no eye contact	1
Reference to learning strategy	15
Not concentrate / pay attention / focus	12
Try not to memorize / remember / learn	3
Not look at [stimulus items]	3
Not pay attention to instructions, specifically	2
Ignore details	1
Reference to response strategy	17
Indicated deliberate errors	12
→ Made reference to placement or spread of errors	(3)
→ Reference to controlling or reducing number of errors	(3)
→ Only pick wrong answer when it was close	(1)
Respond with regard to ADHD symptoms / be dishonest about symptoms	2
Respond [at a] slow [rate]	2
Guess [between available answers, rather than thinking]	1

Note. Some students provided responses in multiple categories, or multiple responses within one category. Values in bold Values in parentheses represent components of the above category.

* = Students were told that they did not need to physically act as if they had ADHD.





feigning strategies. Because the CAARS—S:L does not lend to subtype identification, FGN-ADHD patterns were not examined.

Omissions (misses), commissions (false positives), perseverations, and hit rate (response speed) were examined as potential faking strategies for the C-CPT. Feigners were successful in their use of perseveration and response rate only: Results reflect that a relatively similar proportion of feigners and ADHD participants obtained clinically notable levels of perseverations (43.3% for FGN versus 31.0% for ADHD). Also, the proportion of FGN participants achieving altered response rates was equivalent to that of the ADHD group (76.7% versus 75.9%). Of note, those feigners who altered their hit rate responded faster than normal in 65.2% of cases; this was true for 68.2% of ADHD participants. FGN-role participants only marginally matched ADHD participants in their use of false positive errors (with 73.3%, versus 55.2%, respectively having noteworthy numbers of these). Feigners were least successful with their use of misses (60.0% versus 31.0% clinically noteworthy).

Chapter Four: Discussion

A number of motivators exist at the university level for students to seek diagnosis of ADHD, regardless of whether or not they truly believe they have the disorder. While research shows that symptoms of ADHD may remit with age (Shaw, 2002; Farone, Biederman, & Mick, 2006; Biederman et al., 1996), and that impaired students may have difficulty advancing to higher education (see Barkley & Murphy, 2006) evidence explored earlier also suggests that there has been a disproportionate increase in ADHD-based claims in higher education in recent years. Unfortunately, little research exists on how to separate genuine from feigned ADHD symptoms presented by an educated young adult population. Results from studies on malingering in neurocognitive impairment groups cannot automatically be expected to generalize to these individuals.

This study evaluated the efficacy of various attention-related, neuropsychological, and symptom validity measures in the detection of feigned ADHD in an undergraduate sample. Performance was compared between a group of presumed normal students (HON), a group of diagnostically “clean” ADHD students asked to respond to the best of their ability (ADHD), and a group of motivated, coached feigners (FGN). Feigners were educated about symptoms and characteristics of ADHD, provided with a scenario to help them relate to the plight of a student who might seek diagnosis, asked not to fake too obviously (by performing at least as well as a college student would), and provided with a significant monetary incentive for “successful feigning” (\$45). They were not forewarned about the specific types of tests they would take, nor alerted to the presence of malingering detection instruments.

This study provides novel results, as little research exists on the susceptibility of attention-related, neuropsychological, and symptom validity measures to feigned ADHD in undergraduate samples. Because of the higher cognitive ability of college students and the poorly understood difficulties posed by ADHD undergraduates, it could not be assumed that all of these measures would be appropriate. Not surprisingly, results illustrated that the ADHD symptom-report measures, though sensitive to ADHD, were quite susceptible to faking. The ARS was successfully faked in 80% of cases (according to the 1996 norms) and the CAARS—S:L in 67% of cases (when using a stringent cut score of 4 or more clinical scale elevations). Students did not take a blanket feigning

strategy by endorsing all symptoms on the measures; instead, the proportion of individuals achieving Combined subtype, Inattentive Subtype, and Hyperactive Subtypes closely matched that of the ADHD group. The Conners CPT, in contrast to those measures, had both limited sensitivity to ADHD and specificity for FGN in this sample. Only about 24% of ADHD students were consistently identified by published cut scores, and slightly less than 50% of FGN-role participants obtained clinically elevated results.

A selection of neuropsychological tools validated to assess attention, concentration, memory, and reading speed, including the Stroop task (Golden & Freshwater, 1999), Nelson-Denney Comprehension Test Reading Speed component, and the WMS-III Word Lists subscale, likewise had limited utility in separating ADHD from HON groups. Evidence from these measures suggests that the admonished feigners obtained only slightly depressed scores, but enough so that their performance as a group was worse than that of the HON group. Only the Stroop Word subscale had FGN-ADHD differences, and the measures generally did not have HON-ADHD differences due to comparable reading speeds and list learning abilities. Thus, the chosen battery of neuropsychological measures may have limited utility in the identification of genuine ADHD symptoms and feigned presentations.

At their published cutting scores, several neurocognitive feigning measures demonstrated strong specificity, with large AUCs illustrating good classification at the range of cutting scores. ADHD participants were very unlikely to be misclassified as feigners by these measures, so when applied to clinical evaluations of like samples, reasonable accuracy might be expected for those who were identified as feigners. The TOMM Trial 1 demonstrated the highest sensitivity, and was the only measure with adequate sensitivity to detect feigning at cutting scores employed. However, its corresponding specificity was below 90%. Moreover, this index has only infrequently been recommended for use in screening for feigning (see Sarmra, 2004; Bauer, O'Bryant, Lynch, McCaffrey, & Fisher, 2007; O'Bryant, Engel, Kleiner, Vasterling, & Black, 2007; Gavett, O'Bryant, Fisher, & McCaffrey, 2005). In the present study, binary logistic regression using various feigning test results (Honest or Probable Feigning) identified the TOMM T1 followed by the DMT as strong predictors in combination. The LMT and M-FAST demonstrated incremental predictive ability closely matching the DMT in the

present sample.

It was hoped that a three-step classification procedure, where ADHD is identified with a highly sensitive test (or series of measures) in the first step, feigning is ruled out with a highly specific symptom validity tool in the second step, and probable feigning is identified with more sensitive malingering tests in the third step, would be identified. However, such did not emerge from these data. At this time, it is necessary to be reliant on clinicians' use of sound diagnostic procedures to arrive at a confident "pre-diagnosis" of ADHD. These include a detailed clinical interview, corroborating interview (for historical information and evidence of dysfunction), neuropsychological and psychological testing (to rule out all alternate cognitive and psychiatric conditions), and an evaluation of possible incentives for feigning. Fortunately, the present data indicate that there exist at least two strong, easily administered measures—the TOMM and the DMT—against which the classification accuracy of a pre-diagnosis of ADHD can be assessed relative to feigning.

Two major limitations exist in this study: the first lies in the nature of the research design, the second, in the nature of the clinical group. As both a pilot study and a simulation design, generalizability of the data is limited, and cross-validation in multiple university or college settings and geographical regions is necessary. Because no "gold standard" exists to identify either genuine ADHD or feigned ADHD in this population, researchers must rely on the analog methodology at this time.

Regarding the clinical sample used, a few points must be noted. First, diagnostic accuracy of the ADHD group could not feasibly be perfect. Clinicians undoubtedly vary in their approach to diagnosing the disorder, as well as the base rate at which they apply it. To assess the likelihood that each student's diagnosis was accurate, ADHD participants were phoned 3-15 months after their participation. Each was told that "some psychologists or psychiatrists may diagnose the disorder when they are not 100% certain the individual has it, as many conditions share symptoms with ADHD," and then asked to rate the confidence they had that the diagnosis pertained to them on a scale of 1 to 10, with 10 being absolutely confident. Nineteen students were reached, but one provided a rating of "five, chance" because he believed that "ADHD is a made-up condition." This student's results were excluded. The remaining had a mean rating of 9.2 ($SD = 1.00$),

reflecting high certainty that they had ADHD, and not another condition with similar symptoms. Anecdotally, the data of two students who provided responses of complete certainty had been excluded from analysis for failure to produce clinical profiles on the ADHD-specific tests.

Another concern regarding the clinical group is that performance was obtained from ADHD students without known comorbid diagnoses. Though this may have increased diagnostic certainty to some extent, application of these results to students with greater pathology should not be assumed until more data are available. In addition, substance use of the ADHD group was not evaluated to rule out the influence of this on symptoms reported. Second, and related, without independent evaluation of the ADHD condition for each participant before inclusion, the clinical standing of each participant cannot be verified. Accuracy was maximized by ruling out participants with comorbid diagnoses and omitting those students who failed to present current symptoms of ADHD (N = 4).

Additional research is needed in this field in order to identify measures or to recalibrate scoring methods in order to accurately identify ADHD as disordered university undergraduates experience it. Evidence suggests that adults seeking first diagnosis, and adults who were diagnosed during childhood, experience ADHD differently than children do (see Barkley, Murphy, & Fischer, 2008). Moreover, further research is necessary to identify procedures that rule out suboptimal effort and altered self-presentation, within the young adult population. Evaluations should not be limited to the measures explored in this study. With more research, adjustment of cutting scores in existing measures may prove useful. A focus on maximizing specificity for “honesty” before then identifying measures sensitive to feigning, is recommended. Comparing the forced-choice methods employed in this study, it appears that both face validity and actual difficulty may have played a role in the accuracy of these measures, particularly the LMT and DMT. It will be necessary to obtain further information on the performance of the most successful index in this population—TOMM Trial 1—as well as to develop additional measures to maintain the advantage over bright, motivated students.

Appendix A. *Mass Screening Form.*

Student ID: _ _ _ _ _

Some research opportunities are available for individuals who have been diagnosed with, or without, certain disorders.

Do you presently have a diagnosis of:

ADD or ADHD	Yes / No
An anxiety disorder	Yes / No
A depressive disorder	Yes / No
A thought disorder	Yes / No
A learning disability	Yes / No

<i>Have you ever been knocked unconscious?</i>	Yes / No
--	----------

Attention UK Undergraduates:

Do you have Attention Deficit Disorder? (ADD or ADHD)

If so, you can make \$45
by participating in a research study.

We would like to see how effective
various tests are at diagnosing ADHD
in college students.

please call for more information:

Myriam
(859) XXX-XXXX

Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx	Paid Research Study 333-xxxx
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Appendix D cont.

9. Do you have access to a diagnostic report or evaluation? Yes
No

10. Are you taking medication for this right now? Yes
No
(If yes): _____

11. About how often do you skip a dose, either accidentally or on purpose? _____

12. We have different opportunities for people in this study. One involves not taking medication for about 12 hours before your participation, so that we can know how people with ADHD do without treatment. Would you be interested in doing this? I would work around your school schedule, and can test on a Saturday if you prefer.
Yes No

13. Another opportunity is for people who have been diagnosed with other disorders. Do you currently have a diagnosis of a learning disability?
Yes No

14. How about any mood, anxiety, or thought disorder? Yes
No

14. How about any other psychiatric, psychological, or neurological disorder? Yes
No

SAY: *Thank you for answering these questions. Now let me tell you more about the study. This study involves you taking a number of different tests that are used to diagnose ADHD. Some of them, you may have taken before. These are all pencil / paper, or computerized tests. If you qualify and participate, it will take about two hours of your time and you will be compensated \$45. The study is conducted at Kastle Hall on UK's campus.*

If you qualify for enrollment, would you like to participate?

If Yes:

If No: Stop (circle no)

14. First name _____

Phone _____

15. Gender: M F

Thank you. I will have to determine if you meet criteria. If you do, I will call you to schedule your appointment within the next month.

Appendix E. *Demographic Questionnaire*

INSTRUCTIONS: *Please respond to the following as best you can. You do not need to share your responses with the examiner. Your responses will NOT be associated with your name. Please put this in the envelope and seal it when done.*

Gender: M F

Age: _____

Handedness: R L

Ethnic background:

African American

Hispanic/Latino

Native American

Asian/Pacific Islander

Caucasian

Other _____

Education: Freshman Sophomore Junior Senior Other _____

Please check which apply to you. If you respond "Yes," please answer the Additional questions below:

1. Color Blindness N Y

2. Repeated a Grade N Y

3. Knocked Unconscious N Y

(respond for most severe occurrence)

Length of Time: Unconscious _____

Hospitalized _____

Age of occurrence: _____

Do you remember this happening? _____

4. Attention Deficit Disorder N Y

Type: _____

Age diagnosed: _____

What medication do you take for this? _____

Have you taken medication for this in the past 12 hours? Y / N

5. Learning Disability N Y

Type: _____ Age diagnosed: _____

6. Current Mood, Anxiety,
or Thought Disorder N Y

(list separately)

Type: _____

Age diagnosed: _____

Are you currently being treated? Y / N

Type: _____

Age diagnosed: _____

Are you currently being treated? Y / N

Type: _____

Age diagnosed: _____

Are you currently being treated? Y / N

7. Neurological or Neuro-
degenerative Disorder N Y

(list separately)

Type: _____

Age diagnosed: _____

Are you currently being treated? Y / N

Type: _____

Age diagnosed: _____

Are you currently being treated? Y / N

Thank you! Please seal this in the envelope provided.

Appendix F. Packet Given to Faking Group

Faking ADHD

While faking ADHD, it may help you to pretend that this scenario applies to you:

Your roommate has been diagnosed with ADHD. S/he had trouble with classes, but then was given some medication for ADHD, and now does well. S/he even got a couple of A's recently, and has more time to socialize because studying is not as hard! During your midterms, you decided to try your roommate's medication, and ended up surprising yourself with how much easier things went. You may think that you have undiagnosed ADHD, so you "Google" the disorder to learn more about it. On the following pages are some of the things that you find.

Feel free to underline or write notes on these pages. At the end of the internet information, you will be asked to jot down a few symptoms or characteristics of people with ADHD to help you fake.

Website 1

Address	http://www.daytrana.com/?SOURCE=GOOG&KEYWORD=p
<p>WHAT ARE THE SYMPTOMS OF ADHD?</p> <ul style="list-style-type: none">• The most common behaviors exhibited by those who have ADHD are inattention, hyperactivity, and impulsivity. People with ADHD often have difficulty focusing, are easily distracted, have trouble staying still, and frequently are unable to control their impulsive behavior.• Because everyone shows signs of these behaviors at times, the DSM-IV-TR specifies that the behaviors must appear early in life (before age 7) and continue for at least six months.• In children, these behaviors must be more frequent or severe than in other children the same age. In addition, the behaviors must interfere with at least two areas of a person's life, such as paying attention in school, completing homework, or making friends.• ADHD in adults looks much as it does in children, except that much less hyperactivity is present. Still, inattention and impulsivity can have a major effect on functioning at work and in social relationships. People often have difficulty focusing, are easily distracted, have trouble staying still, and frequently are unable to control their impulsive behavior.	

Appendix F cont.

Website 2

Address	http://www.adultADHD.com/2_2_recognizing/2_2_recognizing.jsp
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Recognizing Adult ADHD

Fidgeting, interrupting conversations, losing things, forgetting the reason for a trip to the grocery store – everyone acts this way once in a while. But a long and persistent history of restless, impulsive, or inattentive behavior may be a sign of Adult ADHD. This is especially true if these behaviors have existed since childhood and result in problems at work, home, and/or in social situations.

If you think you may have Adult ADHD, here are several questions you may want to ask yourself. These are some of the questions that can help doctors and healthcare professionals screen for Adult ADHD.

Ask yourself these questions and think about how long you have experienced these symptoms and how often they occur. If these symptoms are interfering with your success at home, at work or with friends, you may want to talk with your doctor or healthcare professional about a clinical evaluation.

- Do you have difficulty concentrating or focusing your attention on one thing?
- Do you often start multiple projects at the same time, but rarely finish them?
- Do you have trouble with organization?
- Do you procrastinate on projects that take a lot of attention to detail?
- Do you have problems remembering appointments or obligations?
- Do you have trouble staying seated during meetings or other activities?
- Are you restless or fidgety?
- Do you often lose or misplace things?

Appendix F cont.

Research Participant: On the next two pages are diagnostic screening tests you find. Please read through the questions. You do not need to complete the tests.

Website 3

Address	http://www.adultADHD.com/2_2_recognizing/2_2_recognizing.jsp
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Screeener Test

Many adults have been living with Adult Attention-Deficit Disorder (Adult ADHD) and don't recognize it. Why? Because its symptoms are often mistaken for a stressful life. If you've felt this type of frustration most of your life, you may have Adult ADHD; a condition your doctor can help diagnose and treat.

Adult Self-Report Scale (ASRS – V1.1) Screener
from WHO Composite International Diagnostic Interview
© World Health Organization

		Never	Rarely	Sometimes	Often	Very Often
How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How often do you have difficulty getting things in order when you have to do a task that requires organization?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How often do you have problems remembering appointments or obligations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When you have a task that requires a lot of thought, how often do you avoid or delay getting started?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How often do you fidget or squirm with your hands or your feet when you have to sit down for a long time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How often do you feel overly active and compelled to do things, like you were driven by a motor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix F cont

Website 4

Address	http://psychcentral.com/ADHDquiz.htm
<p>Adult ADD/ADHD Test</p> <p><i>Jasper/Goldberg Adult ADHD Screening Quiz</i> <i>by Larry Jasper & Ivan Goldberg</i></p> <p><i>Instructions:</i> The 24 items below refer to how you have behaved and felt DURING MOST OF YOUR ADULT LIFE. If you have usually been one way and recently have changed, your responses should reflect HOW YOU HAVE USUALLY BEEN. For each item, indicate the extent to which it is true by checking the appropriate box next to the item.</p> <ol style="list-style-type: none">1. At home, work, or school, I find my mind wandering from tasks that are uninteresting or difficult.2. I find it difficult to read written material unless it is very interesting or very easy.3. Especially in groups, I find it hard to stay focused on what is being said in conversations.4. I have a quick temper... a short fuse.5. I am irritable, and get upset by minor annoyances.6. I say things without thinking, and later regret having said them.7. I make quick decisions without thinking enough about their possible bad results.8. My relationships with people are made difficult by my tendency to talk first and think later.9. My moods have highs and lows.10. I have trouble planning in what order to do a series of tasks or activities.11. I easily become upset.12. I seem to be thin skinned and many things upset me.13. I almost always am on the go.14. I am more comfortable when moving than when sitting still.15. In conversations, I start to answer questions before the questions have been fully asked.16. I usually work on more than one project at a time, and fail to finish many of them.17. There is a lot of "static" or "chatter" in my head.18. Even when sitting quietly, I am usually moving my hands or feet.19. In group activities it is hard for me to wait my turn.20. My mind gets so cluttered that it is hard for it to function.21. My thoughts bounce around as if my mind is a pinball machine.22. My brain feels as if it is a television set with all the channels going at once.23. I am unable to stop daydreaming.24. I am distressed by the disorganized way my brain works.	

Research participant: When you are done reviewing these materials, please use the colored paper to jot down symptoms that will help you remember how to fake on the tests you will be given. Tell the examiner when you are done.

Appendix G. *Debriefing Form*

Debriefing Form: Faking Group

Thank you for participating in our study! As we told you in the beginning, the purpose of this study is to determine how effectively some tests discriminate between individuals with true ADHD and individuals asked to fake ADHD.

In order to motivate you to fulfill your role as well as you could, we offered that you would receive a "bonus incentive" if you followed instructions and were successful in your role. In reality, everyone is given this incentive.

We ask that you do not discuss this with anyone. If others know how the study is run, then we will not get the effort and motivation from participants necessary for us to determine if these tests really work! This is an important study that can bring the University of Kentucky much recognition if it is run properly, so please do not discuss what you did with anyone!

If you do not wish to have your data included, please tell the examiner now.

Thank you again for your participation!

I MAINTAIN CONSENT / WITHDRAW CONSENT to have my data used in this study.
(circle one)

Print Name Date

Witness Date

Sign Name

Appendix H. *Manipulation Check (Post-Testing Questionnaire)*

Post-Testing Questionnaire

Please write the instructions (role) you were given at the very beginning of this study:

How well did you understand these instructions given at the very beginning?

1	2	3	4	5
Not at All				Perfectly Well

How hard did you try to follow the instructions or role given at the very beginning?

1	2	3	4	5
Not at All				Your Hardest

How successful do you think you were at following those instructions or playing the role given at the very beginning?

1	2	3	4	5
Not at All		Somewhat Successful		Extremely Successful

What was your strategy for this?

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