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RESEARCH ARTICLE

Cross-validation of PAI scales for the detection of suspected ADHD in adults

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This research is based on the master's thesis of the first author.

Abstract

The purpose of this study was to cross-validate scales and subscales of the Personality Assessment Inventory (PAI) identified in previously published research against criterion variables for the identification of Attention Deficit/Hyperactivity Disorder (ADHD) in adults. Performance-based indicators of attention deficits from the Wechsler Adult Intelligence Scale—Fourth Edition were used as criterion variables. In a hierarchical logistic regression analysis, the addition of the PAI scales to the criterion variables did significantly improve the fit of the model, with an overall classification accuracy of 75%. Limitations of this study and implications for future research are discussed.

KEYWORDS

ADHD, adult, assessment, PAI, validate

1 | INTRODUCTION

Individuals often seek help for mental health difficulties while also presenting with symptoms of Attention Deficit/Hyperactivity Disorder (ADHD). Although several measures exist that were designed to assist with the detection of ADHD in adults (e.g., ADHD rating scales, intelligence tests, tests of specific abilities, and continuous performance tests), many clinicians do not administer these tests if ADHD is not initially suspected. This can be problematic for clients, as adults with undiagnosed and untreated ADHD may suffer from significant functional deficits across multiple life domains. ADHD usually manifests during childhood, however it persists into adolescence and adulthood in an estimated 35%–70% of cases (Adler & Cohen, 2004; Barkley, Fischer, Smallish, & Fletcher, 2002; Kessler et al., 2005) and affects approximately 2.5% of adults worldwide (American Psychiatric Association, 2013). The prevalence of adult ADHD is estimated to be between 4% and 5% in the United States, amounting to approximately 9.4 million adults (Faraone, Spencer, Montano, & Biederman, 2004).

Personality and psychopathology measures such as the Personality Assessment Inventory (PAI; Morey, 2007) are often administered to clients seeking a broad range of services, and it would be beneficial for such a measure to alert clinicians to the possibility of ADHD. The PAI, a self-report inventory used to identify personality traits, clinical constructs, and problematic behaviors, has become one of the most widely used measures to assess psychopathology in adults (Piotrowski, 2000). It has been rigorously studied and found to have strong reliability and validity (Boyle &

Lennon, 1994; Morey, 2007). The PAI is commonly used by mental health professionals to assist with diagnosis and treatment planning (Piotrowski, 2000).

Researchers have studied the PAI for use in the detection of symptoms of ADHD using varying approaches. Some have compared PAI profiles of adults diagnosed with ADHD and those not diagnosed with the disorder. For example, Walker (2013) found significant differences on the Mania (MAN), Drug Problems (DRG), and Warmth (WRM) scales, and on the Depression-Cognitive (DEP-C), Mania-Activity Level (MAN-A), Mania-Irritability (MAN-I), Schizophrenia-Thought Disorder (SCZ-T), and Borderline Features-Self-Harm (BOR-S) subscales of the PAI. There was some overlap in scales that differentiated between adults with and without ADHD in another study using similar methodology (SCZ-T, BOR-S, and MAN-A; DeLong, 2008). In this latter study, the Antisocial Features-Stimulus-Seeking (ANT-S) subscale also differentiated between groups. However, both authors reported limitations in both their sample characteristics (exclusively college students) and that the use of archival data could limit the generalizability of the findings.

An alternate approach has been to look for convergence in construct or symptom coverage by examining correlations between the PAI and measures of ADHD symptomology. For example, Stewart and Liljequist (2012) found significant correlations between the Conners' Adult ADHD Rating Scale – Self-Report: Long Version (CAARS-S:L; Conners, Erhardt, & Sparrow, 1999) and the Anxiety (ANX) and Depression (DEP) scales of the PAI. Such convergence may be expected given the frequent comorbidity between anxiety and mood disorders in adults with ADHD (Biederman et al., 1993). There were even larger correlations between the CAARS-S:L and the Borderline Features (BOR), Schizophrenia (SCZ), and MAN scales of the PAI; however, this was an outpatient sample of adults seeking services for a variety of clinical concerns.

Given the frequent correspondence between several PAI scales and subscales, researchers set out to develop an index to detect ADHD-like symptomology (Watson & Liljequist, 2015). Using two different approaches that mirror those outlined above, they first used regression analysis, with the CAARS-S:L ADHD Index as the criterion variable and the correlated scales and subscales of the PAI as predictors. The final set of predictors, including Positive Impression Management (PIM), Treatment Rejection (RXR), Somatic Complaints-Somatization (SOM-S), Anxiety-Related Disorders-Traumatic Stress (ARD-T), MAN-A, and SCZ-T, accounted for 39% of variance in the CAARS-S:L ADHD Index. Next, they examined differences in the PAI scales and subscales between participants diagnosed with ADHD and those not diagnosed with ADHD, similar to several of the previous studies cited. Participants diagnosed with ADHD and those not diagnosed with ADHD differed on the ANT-S, SCZ-T, MAN-A, BOR-S, Anxiety-Cognitive (ANX-C), and Mania-Grandiosity (MAN-G) subscales of the PAI, such that those with ADHD scored higher than those without the disorder on these six scales. The authors noted that although both approaches yielded significant results, further research would be needed to cross-validate the two sets of scales.

Despite the many instruments available to screen for ADHD, many individuals do not present requesting an ADHD assessment due to the overlap of symptoms among ADHD and other disorders. Rather than administering multiple measures, it would be beneficial if there were an assessment measure that is routinely administered to adult clients seeking clinical services that can alert clinicians to the possibility of ADHD, such as the PAI. This commonly used measure to assess psychopathology in adults has several scales and subscales that may capture a wide range of symptoms and behaviors experienced by adults with ADHD. The PAI has the potential to alert clinicians to the possibility that their client may have ADHD, which would improve identification of ADHD in adults and result in more appropriate conceptualization and treatment planning.

Previous research has suggested a subset of scales and subscales on the PAI that may aid in identifying adults in need of further assessment of ADHD (Watson & Liljequist, 2015). Much of the previous research has relied solely on self-report as the means of detecting ADHD or ADHD-like symptoms. The PAI is also a self-report measure, leading to a problem of shared method variance, which can contribute to inflated correlations. Therefore, the primary focus of the present study was to attempt to cross-validate the previously identified PAI scales and subscales for differentiating adults who may have ADHD from those without ADHD using a performance-based indicator of inattention or ADHD-like symptoms.

2 | METHOD

2.1 | Participants

Approval for this study was obtained from the institutional review board. Participant data were drawn from records of clients maintained at an outpatient center on a university campus serving both college students and community members. Participant data from a 5-year period were collected from records of clients who requested an ADHD or learning disorder (LD) assessment, and signed a release allowing their information to be used for research purposes. All adult clients who present to this outpatient center are asked to complete the PAI as a part of the information-gathering process before receiving services. Additional test data, demographic data, presenting problem(s), and discharge diagnoses were retrieved from the client files.

Of the initial 182 client records, 16 participants (eight of whom had an ADHD diagnosis) were excluded from the study. Ten participants were excluded due to an incomplete or invalid PAI. A PAI profile was considered invalid if T-scores on any of the four validity scales met exclusion criteria from the PAI manual (inconsistency > 73, infrequency > 75, negative impression > 92, or positive impression > 68). Three PAI profiles were invalid due to inconsistency, three due to infrequency, and two due to negative impression. Six participants were excluded due to an incomplete or invalid intelligence test. A WAIS-IV was considered invalid if a core subtest was "spoiled" and a supplemental subtest was not administered. One WAIS-IV was invalid due to a "spoiled" Digit Span (DS) subtest. Remaining were 166 usable records with 102 females (61.45%) and 64 males (38.55%), whose ages ranged from 18 to 63 ($M = 24.39$, $SD = 8.32$). The sample was largely Caucasian (83.13%), followed by African American (11.45%).

Of the participants requesting an ADHD assessment, 55 (33.13%) were ultimately diagnosed with ADHD. Twenty-seven (49.09%) of the participants were diagnosed with combined presentation, 26 (47.27%) were diagnosed with predominantly inattentive presentation, and two (3.64%) were diagnosed with other specified; no participants were diagnosed with predominantly hyperactive/impulsive presentation. These results are similar to other studies regarding the prevalence of subtypes in adult ADHD in which the combined presentation is the most prevalent subtype of ADHD followed by the inattentive presentation (Wilens et al., 2009). Due to the lack of a predominantly hyperactive/impulsive group, no analyses were performed to examine the relationships between subtypes. Eleven of the 55 participants with ADHD also received a comorbid diagnosis: four with an anxiety disorder, three with a depressive disorder, one with a substance-related disorder, one with a trauma-related disorder, and two with a LD.

ADHD diagnoses were made based on semistructured interviews, as well as the Conners' Adult ADHD Rating Scales—Self Report, and when applicable the Conners' Adult ADHD Rating Scales—Observer Report.[1] Clinicians did have access to clients' WAIS-IV scores and PAI profiles in determining diagnoses. WAIS-IV scores and PAI profiles were not used in determining ADHD diagnosis, but rather to either help rule out or pursue information regarding possible comorbid conditions. Strict adherence to the DSM diagnostic criteria during the time of assessment was maintained in all diagnoses.

2.2 | Materials

Personality Assessment Inventory (PAI; Morey, 2007*)*: The PAI is a self-administered, multidimensional inventory intended to identify characteristics of personality and psychopathology in adults ages 18 years and older. It was designed to be easy to administer to a wide range of clients and in a relatively short amount of time, as it only requires a 4th grade reading level and takes approximately 50 min to complete (Morey, 2007). The PAI is composed of 344 items, each scored on a four-point scale. It contains 22 nonoverlapping scales: four validity scales, 11 clinical scales, five treatment scales, and two interpersonal scales. Internal consistency coefficients for the PAI scales and subscales range from .70 to .80 and test–retest reliability coefficients range from .70 to .80 (Morey, 2007).

Wechsler Adult Intelligence Scale—Fourth Edition (WAIS-IV; *Wechsler*, *2008a*): The WAIS-IV assesses IQ in individuals ages 16–90 years old. The WAIS-IV is composed of 10 core subtests that comprise the Full Scale IQ (FSIQ) as well as assess four specific domains of intelligence: verbal comprehension (VCI), perceptual reasoning (PRI), working memory

TABLE 1 Means and standard deviations of predictors

	ADHD group ($N = 55$)		Non-ADHD group ($N = 111$)	
	M	*SD*	*M*	*SD*
VCI-WMI discrepancy	5.95	14.44	6.48	11.02
PRI-PSI discrepancy	5.44	13.20	1.95	13.09
DS-Forward (raw)	9.73	2.09	9.52	1.89
DS-Backward (raw)	9.12	1.61	8.31	2.14
DS-Sequencing (raw)	9.62	1.97	8.91	1.95
PIM	44.40	9.82	45.17	11.86
RXR	47.27	9.61	49.04	10.96
SOM-S	54.55	10.88	53.00	10.41
ANX-C	60.93	12.93	61.94	13.84
ARD-T	53.45	13.84	55.86	13.95
MAN-A	61.82	11.70	53.71	12.31
MAN-G	53.07	12.02	49.35	11.95
SCZ-T	76.76	12.27	64.93	16.31
BOR-S	56.02	10.52	51.40	11.74
ANT-S	60.15	14.49	51.28	10.49

Note. $N = 166$.

(WMI), and processing speed (PSI) (Wechsler, 2008b). Internal consistency coefficients for the WAIS-IV range from .97 to .98 for FSIQ and from .87 to .98 for the four indexes (VCI, PRI, WMI, and PSI). Test–retest reliability coefficients range from .94 to .96 for FSIQ, from .94 to .95 for VCI, from .80 to .88 for PRI, from .82 to .90 for WMI, and from .76 to .89 for PSI (Wechsler, 2008a).

The WAIS-IV has demonstrated strong correlations with the WAIS-III and other measures of intelligence and achievement (Sattler & Ryan, 2009). On the WAIS-IV, adults diagnosed with ADHD had WMI and PSI scores significantly lower than their VCI and PRI scores. On several previous versions of the Wechsler Adult Intelligence Scale, researchers have found that adults with ADHD score significantly lower on processing speed subtests (Hervey, Epstein, & Curry, 2004; Walker, Shores, Troller, Lee, & Sachdev, 2000). Further, a meta-analysis based on six studies found that working memory, as measured by the Digit Span (DS) subtest of the WAIS-R, was impaired in adults with ADHD (Hervey et al., 2004).

2.3 | Procedure

Information was transferred from archival records including demographic data, scores from PAI scales and subscales that were identified in previous research, and scores from the VCI, PRI, WMI, PSI, and DS subtest of the WAIS-IV. Discrepancy scores were calculated by subtracting WMI from VCI and by subtracting PSI from PRI. Participant data were divided into two groups based on discharge diagnoses: a non-ADHD group and an ADHD group.

3 | RESULTS

Means and standard deviations of the criterion variables and the PAI scales are presented in Table 1. Correlations between the WAIS variables (VCI-WMI discrepancy scores, PRI-PSI discrepancy scores, and the DS subscales) and the PAI scales and subscales were conducted to examine if there were any significant relationships. As can be seen in Table 2, the analysis revealed no significant correlations between the WAIS variables and the PAI scales and subscales.

TABLE 2 Correlations between WAIS variables and PAI scales

	VCI-WMI	PRI-PSI	DS-Forward	DS-Backward	DS-Sequencing
PIM	−0.03	−0.12	−0.02	−0.08	−0.05
RXR	−0.14*	−0.05	−0.06	−0.12	−0.09
SOM-S	−0.11	0.13	0.05	0.11	0.14*
ANX-C	0.01	0.13*	−0.00	0.04	−0.00
ARD-T	−0.07	0.10	0.06	0.06	0.02
MAN-A	−0.02	0.08	−0.04	0.02	0.10
MAN-G	0.04	0.03	0.03	−0.04	0.00
SCZ-T	−0.01	0.08	0.02	0.11	0.11
BOR-S	0.05	0.05	−0.05	0.07	0.04
ANT-S	0.05	0.07	0.02	−0.07	0.06

Note. $N = 166$.
*$p < .10$.

A hierarchical logistic regression was conducted with discharge diagnosis as the dependent variable and the WAIS criterion variables were predictors of ADHD. To assess the contribution of the PAI scales, the WAIS predictors were entered first then the PAI scales. The new model was compared with the previous model to determine the contribution of the PAI scales. Initial diagnostics indicated that the assumption of linearity in the logit was met and no outliers or influential observations were detected.

Prediction was first assessed based on the criterion variables: WAIS DS scores (DS-Forward, DS-Backward, and DS-Sequencing), and WAIS index discrepancies (VCI-WMI and PRI-PSI). The PIM, RXR, SOM-S, ANX-C, ARD-T, MAN-A, MAN-G, SCZ-T, BOR-S, and ANT-S scales were included in the second step of the model. ADHD diagnosis was not reliably predicted by the criterion variables alone, $\chi^2(5, N = 166) = 10.84$, $p = .055$, Negelkerke's $R^2 = .09$. The addition of the PAI scales in Step 2 significantly improved the fit, $\chi^2(10) = 56.89$, $p = < .001$. For the full model at Step 2, the likelihood ratio was $\chi^2(15) = 67.73$, $p = < .001$, Negelkerke's $R^2 = .47$. Table 3 shows the variables entered at each step with the likelihood ratio chi-square for the model at each step, along with the coefficients, Wald statistics, and odds ratios for the variables in the model. According to the Wald criterion, the ARD-T, MAN-A, SCZ-T, and ANT-S subscales were reliable predictors of an ADHD diagnosis. Classification based on a prior probability of .50 was 55% for the ADHD group and 86% for the non-ADHD group, with an overall classification accuracy of 75%. The rate of false positives was 35% and the rate of false negatives was 21%.

4 | DISCUSSION

The purpose of the present study was to evaluate the utility of the PAI in detecting ADHD symptoms in adults by cross-validating the PAI scales identified by Watson and Liljequist (2015) using archival data from adults who requested an ADHD or LD assessment. From this sample, a hierarchical logistic regression analysis was performed to determine if the PIM, RXR, SOM-S, ANX-C, ARD-T, MAN-A, MAN-G, SCZ-T, BOR-S, and ANT-S scales accounted for more variance above and beyond that of other predictors of ADHD. The full model had an overall classification rate of 75%. This is an improvement over chance alone meaning that an individual diagnosed with ADHD would be identified as a member of that group while at the same time members of the non-ADHD group would be identified as being members of the other group. However, the magnitude of the hit rate was not as high as would be preferred, since approximately 21% of individuals with ADHD would still go unrecognized.

TABLE 3 Hierarchical logistic regression of ADHD diagnosis (standard errors in parentheses)

	B (SE B)	Wald Chi-square	Odds ratio	95% CI for odds ratio	χ^2
Step 1					10.84
VCI-WMI	0.01 (0.02)	0.73	1.01	0.98–1.05	
PRI-PSI	0.02 (0.01)	1.41	1.01	0.99–1.04	
DS-Forward	−0.03 (0.10)	0.10	0.97	0.80–1.18	
DS-Backward	0.19 (0.10)	3.56	1.21	0.99–1.48	
DS-Sequencing	0.15 (0.10)	2.56	1.17	0.97–1.41	
Step 2					67.73***
VCI-WMI	0.01 (0.02)	0.41	1.01	0.98–1.05	
PRI-PSI	0.03 (0.02)	2.23	1.03	0.99–1.06	
DS-Forward	−0.01 (0.12)	0.01	0.99	0.78–1.25	
DS-Backward	0.32 (0.14)	5.45	1.37	1.05–1.79	
DS-Sequencing	0.03 (0.12)	0.05	1.03	0.81–1.31	
PIM	0.05 (0.03)	3.05	1.05	0.99–1.11	
RXR	0.00 (0.03)	0.01	1.00	0.95–1.06	
SOM-S	0.03 (0.03)	1.29	1.03	0.98–1.09	
ANX-C	−0.03 (0.02)	1.85	0.97	0.92–1.02	
ARD-T	−0.07 (0.02)	10.04**	0.94	0.90–0.98	
MAN-A	0.05 (0.03)	4.43*	1.06	1.00–1.11	
MAN-G	0.00 (0.02)	0.04	1.00	0.97–1.04	
SCZ-T	0.08 (0.02)	11.32***	1.08	1.03–1.13	
BOR-S	−0.02 (0.03)	0.58	0.98	0.93–1.03	
ANT-S	0.05 (0.02)	4.98*	1.05	1.01–1.10	

Note. $N = 166$. Diagnosis was coded as 0 = ADHD, 1 = Non-ADHD. CI = confidence interval; χ^2 = likelihood-ratio statistic. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

When examining each scale individually, the ability of the MAN-A, SCZ-T, and ANT-S subscales to differentiate between groups is consistent with prior research (DeLong, 2008; Stewart & Liljequist, 2012; Walker, 2013; Watson & Liljequist, 2015) as these scales are identified across multiple studies using different samples and methodologies. Further, represented within these constructs of the PAI, as defined by Morey (2007), are features that could also be perceived by individuals responding to the items as consistent with the experience of ADHD in adults. For example, the MAN-A subscale contains items that address thinking and talking too fast, taking on too many commitments, thinking friends cannot keep up with them regarding social activities, feeling a need to stay active, and buying things on impulse. Hyperactivity, rapid thinking, and losing one's train of thought are consistent with the hyperactive/impulsive presentation of ADHD. Further, the SCZ-T subscale has items that ask about thoughts becoming confused or scrambled, shifting from thing to thing, trouble keeping one's thoughts straight, and trouble concentrating. Difficulty with focusing attention and concentration are consistent with the inattentive presentation of ADHD. Finally, the ANT-S subscale contains items that identify thrill-seeking, risk-taking, and driving too fast. A willingness to take risks and impulsive decision making are consistent with the hyperactive/impulsive presentation of ADHD.

It is not recommended that these subscales be used to make an ADHD diagnosis, but rather alert clinicians to the possibility of ADHD who could then follow up with additional interview and testing, as a battery approach should improve the accurate diagnosis of ADHD in adults. In fact, the rather surprising lack of significant correlations between

the performance-based indicators of inattention and these PAI scales further emphasize the need for a multimodal approach to assessment of ADHD in adults. That the WAIS variables did not correlate with the PAI variables in the present study suggests that the correspondence between the PAI and other self-report indicators of ADHD may be due, in part, to shared method variance. Self-report captures the subjective experience of the client and relies on their ability to accurately relay that experience, whether verbally through interview data or on paper through responses to questionnaire items. Although the PAI is standardized and norm-referenced, it is still limited by the client's ability to accurately evaluate their own experience, and interpret and respond to the items. Standardized and norm-referenced performance-based measures offer a different assessment approach in that they are less reliant on the client's perception of his or her symptoms. It is likely that accurate diagnosis lies at the convergence of these various types of assessment methods.

Another important issue that concerns the accuracy of self-report measures is distortion, in which clients feign their responses in an attempt to deceive the clinician. Previous research has listed several reasons clients may feign ADHD symptoms, such as to receive testing accommodations (e.g., extra time on exams) or stimulant medications (Booksh, Pella, Singh, & Gouvier, 2010; Sollman, Ranseen, & Berry, 2010). Thus self-report measures, such as the PAI, may be susceptible to efforts to feign ADHD (Musso, Hill, Barker, Pella, & Gouvier, 2016). These previous studies have found that the symptoms of ADHD can be easily feigned, especially when symptoms are assessed with self-report measures (Booksh et al., 2010; Musso et al., 2016; Sollman et al., 2010). Although some of the items on the PAI may appear to have high face validity for ADHD symptoms, this is comparable to the high face validity associated with ADHD self-report measures. Symptom measures rarely contain "validity scales," which highlights the importance of a battery approach that incorporates measures that assess for dissimulating response styles, such as the PAI.

The fact that the WAIS criterion variables did not correlate with the PAI variables, nor predict discharge diagnosis, is a limitation of the present study. Clients who presented requesting an ADHD evaluation believed that they had difficulties with inattention, which may have influenced their response to all self-report measures, inflating the correspondence between these types of methods, and limiting the relationship to the performance-based indicators. Further, although diagnosis was based on strict adherence to the DSM diagnostic criteria, all of the assessment data used in the present research were available to clinicians and may have colored or biased the impressions of some clinicians in favor of or against a diagnosis. The clinicians did have access to clients' WAIS-IV and PAI scores in determining diagnoses, raising concern about the possibility of criterion contamination in the present findings. As diagnoses were made based on DSM criteria rather than test data, it is expected that the impact of criterion contamination was low, however. Nevertheless, this is a significant limitation of these findings and replication with independence in clinical diagnoses is strongly encouraged.

Despite these limitations, the present results lend additional support to findings of previous studies in identifying several PAI scales that may alert clinicians to the possibility of ADHD-like symptoms in adults. According to Morey (2007) the full interpretation of PAI scores resides in the "configural profile," a configuration of multiple scales. It is possible that three PAI subscales, repeatedly mentioned in this and similar research, the MAN-A, SCZ-T, and ANT-S, are the foundation of such a profile. In order for these PAI subscales to be useful clinically, future research will need to focus on developing specific cut-off scores or ranges that maximize hit rates and minimize false positives and false negatives. Until then, clinicians may wish to note elevations on these subscales as indicating a need for further assessment of attention and impulse-control related problems.

NOTE

[1] Although not available for the entire sample, as not all clients presenting for assessment complained of inattention, there were significant correlations between many of the CAARS subscales and PAI scales and subscales. The highest correlations were between the CAARS subscales and the PAI subscales: MAN-A, SCZ-T, BOR-S, and ANT-S, with significant correlations ranging from .33 to .62 ($N = 115$).

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REFERENCES

Adler, L., & Cohen, J. (2004). Diagnosis and evaluation of adults with attention-deficit/hyperactivity disorder. *Psychiatric Clinics of North America*, *27*, 187–201.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

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

Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Norman, D., Lapey, K. A., … Doyle, A. (1993). Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with attention deficit hyperactivity disorder. *American Journal of Psychiatry*, *150*, 1792–1798.

Booksh, R. L., Pella, R. D., Singh, A. N., & Gouvier, W. D. (2010). Ability of college students to simulate ADHD on objective measures of attention. *Journal of Attention Disorders*, *13*, 325–338.

Boyle, G. J., & Lennon, T. J. (1994). Examination of the reliability and validity of the Personality Assessment Inventory. *Journal of Psychopathology and Behavioral Assessment*, *16*, 173–187.

Conners, C. K., Erhardt, D., & Sparrow, E. P. (1999). *Conners' adult ADHD rating scales (CAARS) technical manual*. North Tonawanda, NY: Multi-Health Systems Inc.

DeLong, D. M. (2008). The utility of the personality assessment inventory as a screening tool for adult attention deficit/hyperactivity disorder (Doctoral dissertation). Available from ProQuest Dissertations and Thesis database. (UMI No. 3342311)

Faraone, S. V., Spencer, T. J., Montano, C. B., & Biederman, J. (2004). Attention deficit/hyperactivity disorder in adults: A survey of current practice in psychiatry and primary care. *Archives of Internal Medicine*, *164*, 1221–1226.

Hervey, A. S., Epstein, J. N., & Curry, J. F. (2004). Neuropsychology of adults with attention-deficit/hyperactivity disorder: A meta-analytic review. *Neuropsychology*, *18*, 485–503.

Kessler, R. C., Adler, L., Barkley, R., Biederman, J., Conners, C. K., Faraone, S. V., … Zaslavsky, A. M. (2005). Patterns and predictors of attention-deficit/hyperactivity disorder persistence into adulthood: Results from the National Comorbidity Survey replication. *American Biological Psychiatry*, *57*, 1442–1451.

Morey, L. C. (2007). *Personality assessment inventory (PAI): Professional manual* (2nd ed.). Lutz, FL: Psychological Assessment Resources.

Musso, M. W., Hill, B. D., Barker, A. A., Pella, R. D., & Gouvier, W. D. (2016). Utility of the Personality Assessment Inventory for detecting malingered ADHD in college students. *Journal of Attention Disorders*, *20*, 763–774.

Piotrowski, C. (2000). How popular is the personality assessment inventory in practice and training? *Psychological Reports*, *86*, 65–66.

Sattler, J. M., & Ryan, J. J. (2009). *Assessment with the WAIS-IV*. San Diego, CA: Jerome M. Sattler.

Sollman, M. J., Ranseen, J. D., & Berry, D. T. R. (2010). Detection of feigned ADHD in college students. *Psychological Assessment*, *22*, 325–335.

Stewart, A. M., & Liljequist, L. (2012). Specificity of the CAARS in discriminating ADHD symptoms in adults from other axis I symptoms. *Journal of Attention Disorders*, *19*, 1007–1012.

Walker, A, J., Shores, E. A., Troller, J. N., Lee, T., & Sachdev, P. S. (2000). Neuropschological functioning of adults with attention deficit hyperactivity disorder. *Journal of Clinical and Experimental Neuropsychology*, *22*, 115–124.

Walker, G. J. (2013). Personality assessment inventory (PAI): Can the PAI distinguish adult attention-deficit/hyperactivity disorder (ADHD) from other disorders? (Doctoral dissertation). Available from ProQuest Dissertations and Thesis database. (UMI No. 3564562)

Watson, J., & Liljequist, L. (2015). Using the personality assessment inventory to identify ADHD-like symptoms. *Journal of Attention Disorders*, Advance online publication. https://doi.org/10.1177/1087054714567133.

Wechsler, D. (2008a). *Wechsler Adult Intelligence Scale—Fourth Edition*. San Antonio, TX: Pearson.

Wechsler, D. (2008b). *Wechsler Adult Intelligence Scale—Fourth Edition: Technical and interpretive manual*. San Antonio, TX: Pearson.

Wilens, T. E., Biederman, J., Faraone, S. V., Martelon, M., Westerberg, D., & Spencer, T. J. (2009). Presenting ADHD symptoms, subtypes, and comorbid disorders in clinically referred adults with ADHD. *Journal of Clinical Psychiatry*, *70*, 1557–1562.

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