Discriminant Validity of the Wender Utah Rating Scale for Attention-Deficit/Hyperactivity Disorder in Adults

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The authors examined the factor structure and discriminant validity of the Wender Utah Rating Scale (WURS) in adults seeking evaluation for attention-deficit/hyperactivity disorder (ADHD). Three factors (Dysthymia, Oppositional/Defiant Behavior, and School Problems) accounted for 59.4% of the variance. In a stepwise discriminant function analysis, age and childhood school problems emerged as significant variables. The classification procedure correctly classified 64.5% of patients. Among those who did not have ADHD, only 57.5% were correctly classified compared with 72.1% among those with ADHD. The WURS is sensitive in detecting ADHD, but it misclassifies approximately half of those who do not have ADHD.

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Attention-deficit/hyperactivity disorder (ADHD) affects approximately 8% of children.[1] Follow-up studies of children with some form of ADHD suggest that from 30% to 60% will continue to exhibit impairment associated with ADHD symptoms into adulthood.[2] Thus it is estimated that approximately 4% of the adult population exhibits ADHD,[3] consistent with recent field surveys in the adult population.[1]

The diagnosis of ADHD in adults is challenging because symptoms of inattentiveness and/or hyperactivity and impulsivity must have been present and causing impairment before they were 7 years old.[4] Although recent studies have suggested this age cutoff may be too stringent,[5] childhood, prepubertal onset is probably still required for the diagnosis to be valid. Retrospective recall bias and elapsed time necessarily limit the accuracy of information on behavior prior to age 7.

This makes diagnosis in adults, who often were not evaluated or identified as having ADHD in childhood, quite difficult—a difficulty that is compounded by the lack of experience in childhood psychopathology of most adult clinicians who usually evaluate such patients. In this setting, the availability of rating scales to characterize and quantify relevant ADHD behaviors and symptoms is an important diagnostic aid.

Despite the explosion of interest, popular press publications, and scientific investigation in adult ADHD, lit-

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tle has been published on rating scales that might screen for or assist in diagnosing this condition in adults. The best-known scale for assessing adults with ADHD is still the Wender Utah Rating Scale, which retrospectively assesses ADHD-relevant childhood behaviors and symptoms in adults.[6,7] This scale originally consisted of 61 items reflecting signs and symptoms of ADHD and was subsequently reduced to the 25 items that distinguished patients with ADHD from a nonpatient comparison group.[6] The 25-item Wender Utah Rating Scale has been shown to distinguish ADHD patients from patients with unipolar depression; to differentiate responders from nonresponders to methylphenidate in a controlled treatment study;[6,8] and to be moderately correlated with a rating scale completed by parents.[6]

Although two subsequent studies[9,10] have replicated the adequate internal consistency of the scale, established good temporal stability with one-month test-retest reliability, and explored the scale's factor structure with respect to gender,[9] no published study has reexamined the scale's discriminant validity with respect to other psychiatric populations. Furthermore, in the original study Ward and colleagues preselected their comparison populations, so that the discriminant validity of the scale in a sample of adults presenting for ADHD evaluation is unknown.[6] Such a sample is likely to have a more heterogeneous group of psychiatric diagnoses than the homogenous comparison sample of unipolar depressed patients used by Ward et al.[6]

Use of this scale as a measure of current, as well as childhood, behavior has been shown to distinguish ADHD and non-ADHD patients in a preliminary analysis[11] and to change with medication treatment in an outpatient ADHD sample.[12] However, the internal consistency and factor structure of the scale when used in this manner are unknown.

Here we report on the factor structure, internal consistency, and discriminant validity of the 25-item Wender Utah Rating Scale, used both in its traditional retrospective way, to characterize childhood behavior and symptoms (WURS-C), and to rate adult behavior and symptoms in 141 adults seeking evaluation for ADHD in a specialty clinic (WURS-A). Unlike the previous report,[11] which divided this group three ways to include an intermediate group (patients with ADHD symptoms who either lacked a childhood history of ADHD or had current psychiatric comorbidity that complicated interpretation of current symptoms), we have dichotomized the sample so that those with absent childhood histories are classified as not having ADHD and those with complicating comorbidity but clear-cut childhood histories are classified as having ADHD.

METHODS

Participants

One-hundred forty-three adults referred to an adult ADHD specialty clinic were administered the 25-item version of the WURS-C and WURS-A as part of a comprehensive intake assessment battery. Detailed methods of the assessment are reported elsewhere.[11] Of the 143 adults evaluated in the adult ADHD specialty clinic, 46 were originally classified as definitely having ADHD; 51 showed symptoms consistent with ADHD, but complicating comorbidity or absence of childhood history made a definite DSM-IV diagnosis problematic; and 48 clearly did not have ADHD. Two patients were excluded from the present analyses because of missing data on the WURS-C and WURS-A.

Measures

Non-ADHD psychiatric diagnoses were assessed in both clinics by use of a semistructured diagnostic interview previously validated against the Structured Clinical Interview for DSM-III-R.[13–15] Patients evaluated in the clinic were also evaluated for ADHD, using DSM-IV criteria and a structured interview provided by J. Biederman, M.D.

The 25-item Wender Utah Rating Scale[6] was used to measure the presence of attention deficit disorder symptoms in childhood and adulthood. Patients were instructed to rate 25 items that completed the sentence stems "As a child I was or had . . . " and "In the last week I have been or had . . . ". Sample items include "not achieving up to potential" and "concentration problems, easily distracted." Ratings were made on a 5-point scale ranging from 0 ("not at all or very slightly") to 4 ("very much"). The range of possible scores is from 0 to 100. Items comprising the original 61-item version of the WURS[7] and the 25-item version are shown in Table 1.

Written evaluations of the 51 patients originally classified as "probable" ADHD cases were reviewed by a board-certified psychiatrist (P.R.B.) and a senior psychologist (B.S.M.), both of whom have extensive experience in making the diagnosis of ADHD in adults. The following criteria were used in the reclassification: 1) complicating comorbidity in adulthood did not rule out a diagnosis of ADHD; 2) the maximum age at onset was raised to 13 years;[16] and 3) evidence of functional impairment was required unless there was clear evidence that a spouse or business surrogate was compensating for the patient's deficits.

Statistical Analyses

We analyzed demographic differences between groups, using chi-square tests for categorical variables and *t*-tests for continuous variables.

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A principal components analysis using varimax rotation was performed on the 25 test items. The number of factors retained was determined by examination of the scree plot and use of the Kaiser-Guttman rule (i.e., eigenvalues greater than 1.0). Cronbach's alpha was calculated as a measure of internal consistency on all 25 items and on the subscales resulting from the factor analysis.

Discriminant validity was determined by a stepwise discriminant function analysis in which the subscale scores resulting from the factor analyses of the WURS-C and WURS-A were entered into the function. The resulting function was applied to each case, using a jackknifed classification.

RESULTS

Table 2 presents characteristics of patients presenting for evaluation as a function of ADHD status. Patients diagnosed with ADHD were younger than patients who did not have this diagnosis, and they completed fewer years of education. These variables were included in the discriminant function analysis.

For the WURS-C, the principal components factor analysis resulted in a three-factor solution that accounted for 59.4% of the variance (Table 3). The three factors were labeled Dysthymia, Oppositional/Defiant Behavior, and School Problems. Two items did not load at the specified 0.50 cutoff level on the WURS-C: "tendency to be immature," and "trouble seeing things from someone else's point of view." Alpha coefficients were WURS-C Total = 0.95, Dysthymia = 0.91, Oppositional/Defiant Behavior = 0.90, and School Problems = 0.87. For the WURS-A, the principal components factor analysis also resulted in a three-factor solution, which accounted for 60.1% of the variance (Table 3). Similar factors emerged, with adequate alpha reliabilities: Oppositional/Defiant Behavior ($\alpha = 0.90$), Dysthymia ($\alpha = 0.89$), and School/Work Problems ($\alpha = 0.88$). The alpha coefficient for the WURS-A total scale was 0.95. Patients diagnosed with ADHD attained higher scores than non-ADHD patients on WURS-A and WURS-C total scales and all subscales, except the Oppositional/Defiant Behavior subscale on the WURS-C (Table 4).

TABLE 1. Items comprising the 61-item Wender Utah Rating Scale (Wender Adult Questionnaire–Childhood Characteristics)

1. Active, restless, always on the go
2. Afraid of things
3. *Concentration problems, easily distracted*
4. *Anxious, worrying*
5. *Nervous, fidgety*
6. *Inattentive, daydreaming*
7. *Hot- or short-tempered, low boiling point*
8. Shy, sensitive
9. *Temper outbursts, tantrums*
10. *Trouble with stick-to-it-iveness, not following through, failing to finish things started*
11. *Stubborn, strong willed*
12. *Sad or blue, depressed, unhappy*
13. Uncautious, daredevilish, involved in pranks
14. Not getting a kick out of things, dissatisfied with life
15. *Disobedient with parents, rebellious, sassy*
16. *Low opinion of myself*
17. *Irritable*
18. Outgoing, friendly, enjoy company of people
19. Sloppy, disorganized
20. *Moody, have ups and downs*
21. *Feel angry*
22. Have friends, popular
23. Well organized, tidy, neat
24. *Acting without thinking, impulsive*
25. *Tend to be immature*
26. *Feel guilty, regretful*
27. *Lose control of myself*
28. *Tend to be or act irrational*
29. *Unpopular with other children, didn't keep friends for long, didn't get along with other children*
30. Poorly coordinated, did not participate in sports
31. Afraid of losing control of self
32. Well coordinated, picked first in games
33. [for women only] Tomboyish
34. Ran away from home
35. Got in fights
36. Teased other children
37. Leader, bossy
38. Difficulty getting awake
39. Follower, was led around too much
40. *Trouble seeing things from someone else's point of view*
41. *Trouble with authorities, trouble with school, visits to principal's office*
42. Trouble with the police, booked, convicted
43. Headaches
44. Stomach aches
45. Constipation
46. Diarrhea
47. Food allergies
48. Other allergies
49. Bedwetting
50. Overall a good student, fast learner
51. *Overall a poor student, slow learner*
52. Slow in learning to read
53. Slow reader
54. Trouble reversing letters
55. Problems with spelling
56. *Trouble with mathematics or numbers*
57. Bad handwriting
58. Though I could read pretty well, I never really enjoyed reading
59. *Did not achieve up to potential*
60. Repeated grades
61. Suspended or expelled

Note: The listed items originally appeared in Wender PH: "Wender AQCC (Adult Questionnaire-Childhood Characteristics) Scale" (*Psychopharmacology Bulletin* 1985; 21:927–928). Items in *italics* appear in the 25-item version.[6]

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In the discriminant function analysis, age, education, and all three factors from both the WURS-C and WURS-L were entered in stepwise fashion. Two variables entered into the analysis: School Problems from the WURS-C, and age ($\chi^2 = 19.2$, $P < 0.001$). The classification procedure correctly classified 64.5% of patients. Among those who did not have a diagnosis of ADHD, the correct classification rate was low, with only 57.5% correctly classified. Among those receiving a diagnosis of ADHD, the classification rate was better, with 72.1% correctly classified.

DISCUSSION

This study used a clinically referred sample of adults seeking evaluation for ADHD to study the underlying factor structure of the Wender Utah Rating Scale and to determine characteristics of the scale that distinguish those who receive a clinical diagnosis of ADHD from those who do not have ADHD. Results of this study suggest that three factors characterize the Wender Utah Rating Scale: Dysthymia, Oppositional/Defiant Behavior, and School (Work) Problems. These three factors are found in both the retrospective childhood and the adult forms of the instrument. Only one factor, School Problems in childhood, distinguished ADHD from non-ADHD patients. This factor correctly identifies 72% of patients with a clinical diagnosis of ADHD but does little better than chance in correctly identifying adults who do not have ADHD. Thus, the School Problems factor from the WURS-C has reasonable sensitivity, but poor specificity.

These findings provide only limited support for the use of the 25-item WURS as a diagnostic aid in adults who present for ADHD evaluation. In addition to its poor specificity, the underlying factor structure suggests that the WURS measures depression and conduct problems, which are not specific to the DSM-IV ADHD classification. Other studies of symptom clusters in children support two factors: inattention and hyperactivity-impulsivity.[17–19]

Another possible reason for the low specificity of the WURS may be a response bias on the part of patients

TABLE 2. Characteristics of adults seeking evaluation for ADHD by diagnosis

Characteristic	ADHD ($n = 68$)	Non-ADHD ($n = 73$)	P
Age, years (mean ± SD)	33.9 ± 9.6	38.3 ± 10.6	0.02
Gender (% male)	72.1	65.8	NS
Education, years (mean ± SD)	13.5 ± 2.9	14.7 ± 3.1	0.03
Income (% ≤$20K)	60.6	61.6	NS
Marital status (% married)	32.4	39.7	NS
Ethnicity (% white)	97.1	93.2	NS

Note: ADHD = attention-deficit/hyperactivity disorder; NS = not significant.

TABLE 3. Factor analyses of the 25-item Wender Utah Rating Scale child and adult versions (WURS-C, WURS-A)

Item Content	Factor Loading WURS-C	Factor Loading WURS-A
Factor 1: Dysthymia		
Low opinion of myself	0.77	0.79
Anxious, worrying	0.76	0.66
Sad or blue, depressed, unhappy	0.75	0.74
Guilty feelings, regretful	0.70	0.75
Nervous, fidgety	0.65	0.56
Irritable	0.65	0.61
Moody, ups and downs	0.64	0.65
Unpopular, didn't keep friends for long, didn't get along[a]	0.60	—
Losing control of myself[a]	—	0.54
Eigenvalue	11.1	2.0
Percentage of variance	44.4	7.8
Factor 2: Oppositional/Defiant Behavior		
Hot- or short-tempered, low boiling point	0.82	0.73
Temper outbursts, tantrums	0.82	0.73
Disobedient with parents, rebellious, sassy	0.73	0.72
Angry	0.63	0.63
Losing control of myself[a]	0.63	—
Tendency to be or act irrational	0.60	0.73
Stubborn, strong-willed	0.60	0.65
Acting without thinking, impulsive	0.52	0.54
Unpopular, didn't keep friends for long, didn't get along[a]	—	0.50
Eigenvalue	2.1	11.5
Percentage of variance	8.5	46.1
Factor 3: School/Work Problems		
Not achieving up to potential	0.82	0.73
Concentration problems, easily distracted	0.78	0.76
Overall a poor student, slow learner	0.73	0.73
Trouble with stick-to-it-iveness, not following through, failing to finish	0.67	0.70
Inattentive, daydreaming	0.64	0.63
Trouble with mathematics or numbers	0.60	0.69
Trouble with authorities, trouble with school, visits to the principal's office	0.53	—
Eigenvalue	1.6	1.6
Percentage of variance	6.5	6.2

[a]Separate factor analyses were performed for the child (WURS-C) and adult (WURS-A) forms of the WURS. The item "Unpopular, didn't keep friends for long, didn't get along" loaded on the Dysthymia factor on the child form but loaded on the Oppositional/Defiant factor on the adult form. Similarly, the item "Losing control of myself" loaded on the Oppositional/Defiant factor on the child form but loaded on the Dysthymia factor on the adult form.

TABLE 4. Scores (mean ± SD) on the WURS-C and WURS-A scales by ADHD diagnosis

Scale	ADHD ($n = 68$)	Non-ADHD ($n = 73$)	P
WURS-C total	54.9 ± 20.3	42.3 ± 24.3	0.001
Dysthymia	16.6 ± 8.2	12.6 ± 8.9	0.01
Oppositional/Defiant	15.0 ± 8.2	12.3 ± 8.8	0.07
School Problems	19.1 ± 6.1	14.2 ± 7.9	0.001
WURS-A total	45.4 ± 21.3	35.7 ± 22.2	0.009
Dysthymia	12.4 ± 6.5	9.9 ± 6.5	0.03
Oppositional/Defiant	15.0 ± 10.0	11.6 ± 9.6	0.04
School/Work Problems	15.2 ± 6.5	12.3 ± 6.3	0.008

Note: WURS = Wender Utah Rating Scale; child (C) and adult (A) versions; ADHD = attention-deficit/hyperactivity disorder.

evaluated in an ADHD specialty clinic; this is more probable in adult patients, who are unlikely to have parents available as informants regarding childhood behavior.[11] To the extent that patients seeking evaluation specifically for ADHD may have a preconceived notion that this diagnosis applies to them, they may be inclined to endorse items that they feel would support such a diagnosis. This tendency may represent yet another limitation of a self-report measure when used to assess for symptoms (both retrospective and current) of ADHD.

The factor structure obtained in the current study differs somewhat from the factor structure previously identified in parents of children referred for evaluation of ADHD.[9] The previous factor analysis used all of the 61 original Wender Utah Rating Scale items and analyzed the data separately for males and females. The resulting factor structures were similar, and in both genders they included conduct problems, attention problems, learning problems, poor social skills/unpopularity, and poor stress tolerance/dysphoria. Our use of the 25 items identified previously as distinguishing patients with ADHD from nonpatients[6] appeared to collapse these categories by combining learning and attentional problems (School Problems) and combining poor stress tolerance, dysthymia, and poor social skills/acceptability (Dysthymia).

Our findings are important for several reasons. First, the use of the WURS-C as a diagnostic screen in adult psychiatric patients presenting for ADHD evaluation could be misleading. For example, in a patient with equivocal evidence of ADHD by diagnostic interview, a high WURS-C score might sway a clinician in favor of the ADHD diagnosis and a low score might do the opposite. Second, the finding that inattentive symptoms are the best discriminator in adults is consistent with the evolution of ADHD over the lifespan from mixed to more predominantly inattentive. This finding also highlights that the cognitive symptom domain is perhaps the most important to consider when evaluating a general psychiatric population for presence of ADHD.

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