

The Beck Anxiety Inventory in Older Adults With Generalized Anxiety Disorder

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Accepted April 13, 2004

The authors investigated the psychometric properties of the Beck Anxiety Inventory (BAI) in a sample of 75 older generalized anxiety disorder (GAD) patients and a comparison group of 32 older adults without significant psychopathology. Internal consistency was above .80, and the BAI showed evidence of convergent validity in both groups. Evidence for discriminant validity with respect to measures of depression was weaker. Two items, fearing the worst and nervousness, correctly distinguished 86.5% of patients with GAD and 93.8% of the normal controls. Medical comorbidity was associated with somatic but not cognitive anxiety symptoms in the normal older sample. Overall, results indicate the limitations of the BAI in assessing anxiety symptoms in older adults and suggest the need for use of an instrument focusing on cognitive aspects of anxiety.

KEY WORDS: aging; assessment; elderly; generalized anxiety; screening tests.

Generalized anxiety disorder (GAD) is one of the most prevalent disorders among older adults (Beekman et al., 1998). It is the most common anxiety disorder in primary care and is associated with increased morbidity, functional impairment, and overutilization of health care services as well as decreased quality of life (Ballenger et al., 2001; Roy-Byrne & Katon, 1997; Wetherell et al., 2004; Wittchen, 2002). Because of its high prevalence and negative consequences, development of screening instruments to detect GAD in older adults is important.

Research on the assessment of late life anxiety is still in its early phases (Beck & Stanley, 2001; Kogan, Edelstein, & McKee, 2000). Investigators have examined a number of self-report instruments for detecting anxiety in this population, including the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) and the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990).

Although the STAI is the most common self-report anxiety instrument, it has been criticized for a lack of discriminant validity with measures of depression, possibly due to the inclusion of items measuring constructs such as self-confidence and self-satisfaction (Kabacoff, Segal, Hersen, & Van Hasselt, 1997). The PSWQ is a measure of trait pathological worry that appears to have reasonably good psychometric properties in older adults with GAD (Beck, Stanley, & Zebb, 1995; Stanley, Novy, Bourland, Beck, & Averill, 2001). However, the reverse-scored items on the PSWQ may be difficult for older adults to interpret and answer appropriately (Hopko et al., 2003). Furthermore, because the PSWQ measures trait worry (sample item: "I worry all the time," rated on a Likert-type scale from 1, *not at all typical of me* to 5, *very typical of me*), it may be less sensitive to change than scales that measure symptomatology over a defined, shorter period of time (e.g., the past week), rendering it less than optimal as a measure to assess treatment effects.

Several recent studies have examined the properties of the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) as a screening instrument for anxiety symptoms in older adults (Kabacoff et al., 1997; Morin et al., 1999; Steer, Willman, Kay, & Beck, 1994; Wetherell & Areán, 1997). The BAI is a 21-item screening test that is designed to distinguish anxiety symptoms from

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depressive symptoms based on symptoms experienced during the past week, which offers certain advantages over both the STAI and the PSWQ. Moreover, given the high rates of comorbidity between GAD and other anxiety disorders, use of an instrument designed to assess a broad range of anxiety symptoms could prove useful in screening for anxiety in older adults. Investigations have found evidence for satisfactory reliability and validity of the BAI in older community, medical, and mixed psychiatric outpatient samples (Kabacoff et al., 1997; Morin et al., 1999; Steer et al., 1994; Wetherell & Areán, 1997). However, the two studies that examined the BAI in older psychiatric patients did not analyze data from those with anxiety disorders separately (Kabacoff et al., 1997; Steer et al., 1994).

Although the BAI shows promise as an assessment tool, 14 of its 21 items assess somatic symptoms of anxiety, and it has been criticized for its overlap with panic attack symptoms (Cox, Cohen, Dorenfeld, & Swinson, 1996). Because many individuals with GAD do not experience the range or severity of autonomic symptoms associated with panic attacks, the BAI may be less appropriate as a measure of anxiety symptomatology in individuals with GAD. This may be a particularly relevant limitation for its use in the assessment of anxiety in older adults, who may not experience the same degree of autonomic arousal that younger people do (Lau, Edelstein, & Larkin, 2001). It is of interest to determine whether the cognitive and somatic items of the BAI perform equally well in terms of their convergent validity with other measures of anxiety and discriminant validity with measures of medical illness as well as depression in older adults with GAD.

This study represents the first investigation of the BAI in a sample of older adults with GAD. Hypotheses include (1) the BAI will show adequate internal consistency and convergent and discriminant validity in an older GAD sample; (2) the BAI will distinguish older adults with GAD from those with no psychiatric diagnosis; and (3) somatic items from the BAI will reflect medical comorbidity rather than anxiety symptoms in older adults.

METHOD

Participants

Seventy-five older adults with a principal diagnosis of GAD according to *DSM-IV* criteria (American Psychiatric Association, 1994) were recruited to participate in a treatment outcome study of late life GAD (Wetherell, Gatz, & Craske, 2003). They were recruited through hospital-affiliated health education programs,

senior centers, and the media (Wetherell & Gatz, 2001). Exclusion criteria were age under 55, history of mania or psychosis, cognitive impairment as indicated by a score of less than 24 on the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975), current participation in psychotherapy, alcohol or other substance abuse within 6 months, commencement of psychotropic medication within 2 months, and lack of a recent medical checkup to rule out alternative causes of anxiety symptoms. Individuals stabilized on psychotropic medication for at least 2 months were eligible to participate. Individuals with comorbid depression, dysthymia, or other anxiety disorders were also eligible, as long as their principal (e.g., most severe) disorder was GAD. Individuals who met criteria for GAD secondary to another disorder such as major depression were excluded from these analyses. More than half of the sample ($n = 39$) met criteria for another disorder. Comorbid diagnoses included specific phobia ($n = 15$), depression ($n = 14$), social phobia ($n = 11$), panic disorder ($n = 6$), posttraumatic stress disorder ($n = 5$), obsessive-compulsive disorder ($n = 4$), and hypochondriasis ($n = 1$). Twenty-six of the 39 individuals with psychiatric comorbidity had one comorbid condition, 10 had two, 2 had three, and 1 had four. The other 36 GAD patients had no comorbid Axis I conditions.

A total of 498 individuals contacted the investigators and were screened by telephone over the 2-year course of recruiting for the treatment outcome study. Most of these did not meet GAD criteria, but other common reasons for exclusion were failure to return telephone calls, current participation in psychotherapy, and age younger than 55 (Wetherell & Gatz, 2001). One hundred forty-four people received an in-person diagnostic interview. Of those, 91 met criteria for the study and were invited to participate. Most of the rest did not meet criteria for GAD, but some had comorbid conditions rated more severe than GAD (typically major depression). Sixteen otherwise eligible potential participants refused, typically due to other time commitments or scheduling problems, yielding the final sample of 75 described in the present report. Individuals who did not meet criteria for the study or who refused to participate were offered referrals to community mental health agencies for alternative treatment.

Thirty-two older adults with no current psychiatric problems were recruited separately from the same sources as patients with GAD (e.g., senior centers, media advertisements) to form a normal control group (Wetherell, Le Roux, & Gatz, 2003). Exclusion criteria were the same as for the GAD group, except that they were also required to have no current experience of significant symptoms of any *DSM-IV* psychiatric disorder.

Procedures

All prospective participants underwent a telephone screening of approximately 30 min conducted by the first author, an advanced doctoral candidate in clinical psychology at the time of the study. The telephone screening was based in part on screening questions from the Structured Clinical Interview for *DSM-IV* (First et al., 1995) and the Anxiety Disorders Interview Schedule for *DSM-IV* (ADIS-IV; Di Nardo, Brown, & Barlow, 1994). Those who reported symptoms consistent with GAD were invited to undergo an in-person diagnostic interview. The full ADIS-IV was administered during the in-person diagnostic interview by the first author. This structured interview yields *DSM-IV* diagnoses and severity ratings of anxiety and mood disorders and also screens for other disorders such as schizophrenia. The Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) was also administered during the in-person diagnostic interview to detect individuals with dementia or other organic brain dysfunction, and those who scored less than 24 were excluded from participation. Those with GAD who met criteria for the treatment outcome study and who agreed to participate returned for a second assessment interview, during which measures of psychopathology were administered. Older adults without current psychiatric disorders were recruited separately. Those with no symptoms consistent with any current psychiatric disorder reported during the telephone screening were invited to undergo an in-person assessment interview during which the MMSE and measures of psychopathology were administered by either the first author or a trained research assistant.

GAD participants received gift certificates from a local grocery store in the amount of \$5 for their participation in the assessment interview as well as 12 weeks of treatment in the form of group-administered cognitive-behavioral therapy or participation in a discussion group at no cost (see Wetherell et al., 2003, for additional details about the treatment outcome study). Normal older adults received \$20 for their participation.

Measures

The BAI (Beck et al., 1988) is a 21-item self-report questionnaire designed specifically to distinguish symptoms of anxiety from those of depression over the past week. Factor analysis in an older adult psychiatric sample revealed two factors, cognitive and somatic, with 7 and 14 items, respectively (Kabacoff et al., 1997). Each item is scored on a 4-point Likert scale from *not at all*

to *severely—I could barely stand it*, yielding a total score ranging from 0 to 63.

The ADIS-IV (Di Nardo et al., 1994) is a structured interview for anxiety, depression, and related disorders according to *DSM-IV* criteria. Each disorder is rated on a 0–8 scale of severity/disablement. Scores of 0–3 represent subclinical anxiety symptoms that do not meet criteria for GAD, whereas scores of 4–8 represent syndromal GAD. A second rater experienced in ADIS-IV administration and blind to the interviewer-assigned diagnosis reviewed 25 randomly selected audiotapes of diagnostic interviews. Raw percent agreement on the GAD diagnosis was 88%, $\kappa = .75$. Interrater reliability for the GAD severity rating was .87.

The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report instrument measuring trait pathological worry. It has been validated in samples of older adults diagnosed with GAD (Beck et al., 1995; Stanley et al., 2001). Cronbach's alpha in the present sample was .95.

The Hamilton Anxiety Rating Scale (HAMA; Hamilton, 1959) is a 14-item interviewer-rated measure of anxiety primarily assessing somatic symptoms. It has been validated in samples of older GAD patients and normal community volunteers (Beck, Stanley, & Zebb, 1999; Diefenbach, Stanley, Beck, Novy, & Averill, 2001). In the present study, research assistants used a structured interview guide to increase reliability of the instrument (Bruss, Gruenberg, Goldstein, & Barber, 1994). Interrater reliability was .81, based on 37 randomly selected audiotapes reviewed by a second rater.

The Hamilton Depression Rating Scale (HAMD; Hamilton, 1960) is a widely used 17-item interviewer-rated instrument that has been validated with older GAD patients (Beck et al., 1999; Diefenbach et al., 2001). Research assistants used a structured interview guide to increase reliability (Williams, 1988). Interrater reliability based on a sample of 34 randomly selected audiotapes was .88.

The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) is a 21-item self-report scale listing common symptoms of depression that the respondent may have experienced in the past week. The scale has often been used with geriatric populations (Gallagher, 1986). Cronbach's alpha was .85 in the present sample.

Data Analysis

Chi-square tests and *t* tests corrected for unequal variance where necessary were used to perform univariate comparisons. Reliability was measured with Cronbach's

alpha, inter-item correlations, and item-total correlations. Fisher's Z transformation was used to compare the magnitude of correlation coefficients to assess convergent and discriminant validity between the BAI and its subscales and measures of anxiety, worry, and depression as well as demographic variables such as age, education, and number of medical conditions. A stepwise discriminant function analysis was used to determine the most parsimonious combination of BAI items that distinguished the GAD patients from the normal controls. Because of the large number of comparisons, only those with p values less than .01 are reported as statistically significant.

RESULTS

The GAD patients and normal older adults did not differ on any demographic variable (Table I). Older adults with GAD were more likely to report a history of psychotherapy or psychotropic medication use and were more

likely to be taking such medications currently than older adults with no psychiatric diagnosis.

The BAI showed adequate internal consistency in both samples. Cronbach's alpha was .90 for the GAD patients and .81 for the normal controls. Within the GAD sample, inter-item correlations ranged from .05 to .78, and item-total correlations ranged from .33 to .72, all significant at the $p < .01$ level. BAI scores were not significantly different by sex for either the GAD patients or the normal controls, so data from men and women were combined for these analyses.

The seven cognitive items (Item 4, not able to relax; Item 5, fear of the worst; Item 9, terrified; Item 10, nervous; Item 14, losing control; Item 16, fear of dying; and Item 17, scared) and the 14 somatic items were summed to create subscales. Correlations between the cognitive and somatic subscales were .62 for the GAD patients ($p < .01$) and .27 for the normal controls (ns).

Correlations among the total BAI score and the cognitive and somatic subscale scores and measures of

Table I. Comparisons Between Older GAD Patients and Normal Older Adults on Demographics and Treatment History

Variable	GAD ($n = 75$)	Normals ($n = 32$)	χ^2 or t	p
Age	67.1(8.2)	67.8(7.1)	-0.43	.67
Sex			0.05	.83
Women	80.0%	78.1%		
Men	20.0	21.9		
Education (years)	14.5(2.2)	14.5(2.8)	0.06	.95
Race			4.32	.36
White	77.3%	84.4%		
Latino	10.7	6.3		
African American	8.0	6.3		
Asian American	4.0	0.0		
Native American	0.0	3.1		
Marital status			0.54	.91
Married/cohabiting	38.7%	31.3%		
Divorced/separated	28.0	31.3		
Widowed	25.3	28.1		
Single	8.0	9.4		
Work status			1.99	.74
Retired	58.7%	65.6%		
Working	26.7	25.0		
Homemaker	5.3	6.3		
Disabled	5.3	0.0		
Unemployed	4.0	3.1		
Mini-Mental State Examination score	28.5(1.4)	28.6(1.5)	-0.40	.69
Number of medical conditions	6.8(4.4)	5.9(5.2)	0.87	.39
Number of primary care visits (past 6 months)	2.7(3.6)	2.4(2.2)	0.41	.68
History of counseling or psychotherapy	80.0%	43.8%	13.82	<.001
History of psychotropic medication use	69.3%	28.1%	15.54	<.001
Current psychotropic medication use	40.0%	6.3%	12.19	<.001

Note. GAD: generalized anxiety disorder.

Table II. Correlations Between Beck Anxiety Inventory Total Score and Subscales, Other Measures, and Selected Demographic Variables in Older Adults With Generalized Anxiety Disorder and Normal Older Adults

	GAD patients			Normal older adults		
	BAI	Cognitive	Somatic	BAI	Cognitive	Somatic
Beck Anxiety Inventory total score	—	.85*	.94*	—	.48*	.97*
Hamilton Anxiety Rating Scale	.57*	.42*	.58*	.73*	.32	.72*
GAD severity rating	.21	.18	.19	.58*	.46*	.51*
Penn State Worry Questionnaire	.32*	.40*	.22	.07	.40	-.02
Hamilton Depression Rating Scale	.41*	.32*	.41*	.47*	.51*	.39
Beck Depression Inventory	.61*	.54*	.57*	.57*	.34	.53*
Age	-.18	-.24	-.11	.18	-.07	.22
Education	-.13	-.07	-.15	-.34	-.37	-.28
Mini-Mental State Examination score	-.12	-.18	-.06	.14	.03	.15
Number of medical conditions	.22	.05	.29	.62*	.13	.65*
Number of primary care visits (past 6 months)	.01	-.06	.05	.65*	.14	.68*

Note. GAD: generalized anxiety disorder; BAI: Beck Anxiety Inventory.
* $p < .01$.

anxiety, depression, and selected demographic variables for both GAD patients and normal older adults are presented in Table II. Correlations between the total BAI score and the HAMA were generally higher than between the BAI and the GAD severity rating, the PSWQ, and the HAMD, although Fisher’s Z transformation revealed only two significant differences: The correlation between the total BAI and the HAMA was higher than the correlation between the total BAI and the GAD severity rating for the GAD patients, $p = .009$, and the correlation between the total BAI and the HAMA was higher than the correlation between the total BAI and the PSWQ for the normal older adults, $p = .001$. The correlations between the total BAI and the HAMA were not significantly higher than the correlations between the total BAI and either depression measure for either sample, and the differences in the magnitude of the correlation coefficients between the cognitive and somatic BAI subscales and other measures did not reach significance in either sample. Overall, these findings suggest that the BAI shows convergent validity with another measure of anxiety (the HAMA) and evidence of discriminant validity with measures of pathological worry (the GAD severity rating and the PSWQ), but no evidence of discriminant validity with measures of depression (the HAMD and the BDI).

Demographic variables such as age, education, and cognitive impairment as measured by the MMSE were not significantly correlated with either total BAI score or subscale scores in either the GAD patients or the normal older adults (Table II). For the GAD patients, differences in the magnitude of the correlation between somatic versus cognitive BAI subscale scores and either the number of medical conditions or the number of primary care visits were not statistically significant. However, among

the normal older adults, the correlation between the BAI somatic subscale score and the number of medical conditions was significantly higher than the correlation between the BAI cognitive subscale score and the number of medical conditions, $p = .01$, as was the correlation between the BAI somatic subscale score and the number of primary care visits relative to the correlation between the BAI cognitive subscale score and the number of primary care visits, $p = .009$.

GAD patients scored significantly higher on the overall BAI than the normal controls, 16.7 (9.9) versus 3.2 (4.1), $t(105) = 9.95$, $p < .001$. Most individual BAI items distinguished the GAD patients from the normal control group at the $p < .01$ level of significance, with three exceptions: Item 1, numbness, $t(70.1) = 1.70$, $p = .09$; Item 3, wobbly legs, $t(68.1) = 2.24$, $p = .03$; and Item 11, choking, $t(86.8) = 1.92$, $p = .06$. In a stepwise discriminant function analysis, two items correctly classified 86.5% of the GAD group and 93.8% of the normal group: Item 5, fearing the worst, $F(1, 99) = 87.95$, $p < .001$, and Item 10, nervous, $F(2, 98) = 52.94$, $p < .001$, $\chi^2(2) = 71.79$, $p < .001$. These two items were highly correlated, $r(106) = .78$, $p < .001$. The standardized canonical coefficients for these items were .585 and .531, respectively. A discriminant function analysis with all 21 BAI items correctly classified 85.5% of the GAD patients and 96.9% of the normal controls.

DISCUSSION

In an investigation of the psychometric properties of the BAI in older adults with GAD and normal controls,

evidence suggests that the BAI is an imperfect measure of anxiety symptomatology. Internal consistency was good, and the BAI showed evidence of convergent validity with an interviewer-rated anxiety measure in both samples. Partial evidence was found for discriminant validity between the BAI and measures of pathological worry, but no evidence was found for discriminant validity between the BAI and measures of depression. The BAI was unrelated to age, education, and performance on a cognitive screening test in either the older GAD patients or the normal older adults.

Typically, somatic BAI items were more strongly correlated with overall measures of anxiety, such as the BAI or HAMA, than were cognitive items, across both normal and psychiatric samples. Conversely, cognitive but not somatic items were correlated with the PSWQ, a measure of pathological worry. These findings suggest that cognitive features of anxiety, such as anxious apprehension or worry, are somewhat distinct from symptoms of autonomic arousal and other somatic features of anxiety. The magnitude of the differences among these correlation coefficients was not significant, however, limiting the strength of the conclusions that can be drawn from this small sample.

It is curious that neither cognitive nor somatic symptoms of anxiety as measured by the BAI correlated with the rating of GAD severity among the GAD patients. This finding suggests that GAD severity may include features such as impairment or distress that are not captured in scales measuring cognitive or somatic symptoms of anxiety. Assessment of functional impairment is typically missing from symptom scales such as the BAI. Future development of anxiety instruments may profit from more attention to this important topic. It is unlikely that the failure to find a significant relationship between BAI and GAD severity in the GAD patients can be explained by restricted range on the latter variable, because scores on that variable ranged from 4 to 8 for the GAD patients, whereas findings were significant in the normal older adults despite an even narrower range of values on GAD severity (0–3).

Failure to find evidence of discriminant validity between the BAI and measures of depression may be explained by the comorbidity between depression and anxiety, both syndromally and in terms of coexisting symptoms. The differentiation of depression and anxiety is fraught with challenges in any population, but many investigators believe that this discrimination becomes even more difficult in older adults, perhaps due to a “de-differentiation” of anxiety symptoms with aging (Krasucki, Howard, & Mann, 1998). However, this hypothesis has not yet been subjected to empirical test.

The mean BAI score among the GAD patients in this sample was somewhat lower than mean scores in a group of older psychiatric outpatients ($M = 19.2$, $SD = 11.7$, Steer et al., 1994) and in a group of older anxiety disorder patients ($M = 21.8$, $SD = 13.1$, Kabacoff et al., 1997) but higher than among older adults with other Axis I disorders ($M = 14.4$, $SD = 10.9$, Kabacoff et al., 1997). The mean score among the nonanxious older adults in this sample was slightly lower than the means in two samples of older medical patients ($M = 7.2$, $SD = 6.8$, Steer et al., 1994; $M = 9.5$, $SD = 10.0$, Wetherell & Areán, 1997) and one older community sample ($M = 6.5$, $SD = 7.2$, Morin et al., 1999).

Fearing the worst was the best discriminator between those with GAD and normal older adults in the present sample. This is consistent with the primary symptom of GAD, pathological worry, which is characterized by the tendency to overestimate the likelihood of negative outcomes and contemplate catastrophic scenarios. It is noteworthy that a subset of two cognitive anxiety symptoms distinguished the groups almost as well as the entire BAI.

For the normal controls but not for the GAD sample, the overall BAI was significantly associated with two measures of health status: the number of self-reported medical conditions and the number of primary care visits in the past 6 months. This suggests either that poor health may cause anxiety in older people, or that symptoms of medical conditions may be mistaken for anxiety symptoms in older individuals. Evidence for the latter proposition comes from the subscale analysis: Somatic but not cognitive anxiety symptoms were significantly associated with the number of self-reported medical conditions and the number of primary care visits in the normal controls. These findings suggest that, in nonclinical samples, the somatic items from the BAI may tap into symptoms of medical illness rather than anxiety, which may lead to overestimates of anxiety symptoms in medically ill samples.

Additional research may profit from a focus on the relationship between medical illness and anxiety symptoms in older adults. The findings from this investigation indicate the limitations of the BAI in assessing anxiety symptoms in older adults and suggest the need for use of an instrument focusing on cognitive aspects of anxiety to detect older adults with GAD, particularly in medical patient samples.

One limitation of this study is the relatively small sample size. However, few investigations of GAD in older individuals have been conducted to date, and several of those have included fewer participants than the present study. Second, the GAD and normal control groups were recruited at different times and thus the interviewers were

not blind to group assignment. It is possible that this lack of blindness may have led to bias, particularly on the interviewer-rated instruments, although scores on the self-report measures were also significantly different between the groups. Moreover, both the patient and normal control groups were convenience samples recruited primarily from newspaper advertisements. Studies using epidemiological samples may be more representative, particularly for older, frailer, less healthy individuals. An additional weakness was the unavailability of test–retest data, which limits conclusions about the reliability of the instrument. Future research on using the BAI to distinguish between older individuals with panic disorder and other forms of anxiety, such as GAD, may provide additional evidence for the utility of this instrument. Ideally, clinical samples that include a people with a range of ages could help determine whether the BAI is equally appropriate to use with older and younger individuals.

ACKNOWLEDGMENTS

This study was supported by NIMH grants F31 MH11972, T32 MH19934, K23 MH67643, and by the USC Clinical Psychology Kellerman Fund.

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