Journal of Anxiety Disorders 28 (2014) 804–811

Contents lists available at ScienceDirect

Journal of Anxiety Disorders

Measuring anxiety in late life: A psychometric examination of the Geriatric Anxiety Inventory and Geriatric Anxiety Scale

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ARTICLE INFO

Article history:
Received 9 January 2014
Received in revised form 14 August 2014
Accepted 20 August 2014
Available online 6 September 2014

Keywords:
Worry
Measurement
Aging
Reliability
Validity

ABSTRACT

We examined the psychometric properties, internal scale reliability and validity, of two geriatric anxiety measures: the Geriatric Anxiety Inventory (GAI) and Geriatric Anxiety Scale (GAS). We also determined the extent to which memory ability influenced the psychometric properties of these measures. Older adult participants ($N = 110$; M age = 75 years) completed self-report, clinician-rated and diagnostic psychiatric measures and a neuropsychiatric battery. GAI and GAS scores had good internal consistency, adequate reliability, and strong convergent validity. GAI scores had better discriminant validity than GAS scores relative to a health rating. Both measures had strong associations with depression scores. Psychometric properties were decreased in participants with average delayed memory recall compared with those with superior recall. Both measures had good psychometric support, particularly in those with strong memory abilities. Psychometric performance characteristics indicate that the GAI and GAS may be good alternatives to anxiety measures not designed specifically for older adults.

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1. Introduction

Anxiety disorders represent the most common late-life mental health illnesses (Gum, King-Kallimanis, & Kohn, 2009). Anxiety symptoms are also pervasive, afflicting 15–56% of older adults in clinical settings (Bryant, Jackson, & Ames, 2008). Assessing anxiety with psychometrically sound geriatric anxiety measures is critical given the harmful health consequences of anxiety including increased risk of mortality (Van Hout et al., 2004), high comorbidity with depression (King-Kallimanis, Gum, & Kohn, 2009), and greater disability (Porensky et al., 2009). Moreover, identifying subthreshold anxiety symptoms is crucial given they are related to lower cognitive performance (Beaudreau & O'Hara, 2008, 2009), disability and diminished quality of life (de Beurs et al., 1999), presence of more medical illnesses, and poor sleep (Mehta et al., 2003).

Many anxiety measures validated on younger samples have limitations for use with older adults. For instance, the Beck Anxiety Inventory (BAI; Beck & Steer, 1993) has good internal consistency in older samples (e.g., Wetherell & Gatz, 2005), but relies heavily on self-reported somatic symptoms, making the BAI a poor choice for use with medically ill older adults receiving home-care (Diefenbach, Tolin, Meunier, & Gilliam, 2009) or those seen in primary care settings (Gould, Beaudreau, & Huh, 2013). Reverse-scored items also pose a challenge because they can be confusing to some older adults. In the case of the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), reverse-scored items load on a separate factor (Hopko et al., 2003), resulting in diminished reliability and validity.

Two recently developed, elder-specific measures, the Geriatric Anxiety Inventory (Pachana et al., 2007) and the Geriatric Anxiety Scale (Segal, June, Payne, Coolidge, & Yochim, 2010), assess a broad array of anxiety symptoms and show promise for use in varied clinical and research settings. Modeled after the Geriatric Depression Scale, the 20-item Geriatric Anxiety Inventory (GAI) uses a simple response scale of 'agree' or 'disagree'. The 30-item Geriatric Anxiety Scale (GAS) measures somatic, cognitive, and affective anxiety symptoms rated on a dimensional, four-point

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http://dx.doi.org/10.1016/j.janxdis.2014.08.001
0887-6185/Published by Elsevier Ltd.

scale of anxiety severity. Psychometric studies support excellent internal consistency and strong convergent validity with measures of anxiety and worry for the GAI (Byrne et al., 2010; Diefenbach et al., 2009; Pachana et al., 2007) and for the GAS (Segal et al., 2010; Yochim, Mueller, June, & Segal, 2010). Discriminant validity has been demonstrated through small correlations ($r > .40$) with demographic characteristics and cognition for GAI scores (Byrne et al., 2010; Pachana et al., 2007; Yochim et al., 2010) and GAS scores (Segal et al., 2010; Yochim et al., 2010); however, more evidence of discriminant validity from depression and health-related variables is needed for both measures. An area in which the development of the GAI exceeds that of the GAS is the use of the GAI to identify the presence of anxiety disorders. Studies have identified a clinical cut score of >8 to detect the presence of any anxiety disorder in geropsychiatric patients (Pachana et al., 2007) and homebound older adults (Diefenbach et al., 2009).

With regards to cognition, the GAI has been used to detect anxiety in older patients with a range of memory abilities including those from a memory clinic (Byrne, Pachana, Arnold, Chalk, & Appadurai, 2008) and those in long-term care settings (Gerolimatos, Gregg, & Edelstein, 2013). Yochim and colleagues (2010) established that GAS scores in community-residing older adults were not strongly associated with reading ability or processing speed, but the extent to which cognition affects the reliability and validity of the GAS is unknown. The factor structure of the GAI was examined in individuals with dementia, cognitive impairment no dementia, and no impairment (Diefenbach, Bragdon, & Blank, 2013), but no studies have determined whether cognitive abilities affect the GAI's reliability or validity in a largely non-impaired sample.

The GAI and GAS show promise as geriatric anxiety measures. Previous validation studies have primarily examined validity of the GAI and GAS with self-report measures of anxiety, worry, or depression; and none with measures of posttraumatic stress symptoms. Previous studies also have not determined whether cognitive abilities are related to psychometric properties of the GAI or GAS or whether psychometric properties differ for the GAI and GAS depending on participants' memory ability. The first and primary aim of the present study was to examine the psychometric properties, specifically internal consistency, item-total reliability, convergent validity, and discriminant validity of the GAI and GAS in a sample of community-dwelling older adults. The present study builds on Yochim et al. (2010) findings of their direct comparison of GAI and GAS scores with self-report measures of anxiety, depression, and health and a memory assessment. We replicated and extended the evaluation of GAI and GAS scores to include comparisons with a clinician-rated measure of anxiety severity, self-report measures of post-traumatic stress and worry, and a structured diagnostic interview. The second aim was to examine the extent to which memory functioning influenced the psychometric properties of the GAI and the GAS. The third aim was to identify clinical cut scores for the GAI and GAS compared with a structured diagnostic interview.

2. Methods

2.1. Participants

Participants were 121 community-dwelling older adults (M age = 75.2 years, SD = 7.0 years) who participated in a two-year study on the impact of anxiety and depressive symptoms on cognition (NIRG-09-133592; P.I. Beaudreau). Participants responded to advertisements for the study at a Veterans Administration hospital, senior centers, and Craigslist. Additional recruitment strategies included word-of-mouth, referrals from other studies, and advertisements in a research newsletter. Eligible participants were 65 years or older when enrolled, free of psychotic symptoms, and scored within normal limits on a phone-administered brief cognitive assessment (Blessed, Romlinson, & Roth, 1968). Here, we focus on geriatric self-report measures collected at year two from 110 participants. Eleven of the original 121 participants dropped out ($n = 3$), relocated ($n = 3$), died ($n = 2$) or were lost to follow-up ($n = 3$). Participant characteristics are described in Table 1.

Table 1
Participant characteristics ($N = 110$).

Characteristic	M (SD) or n (%)
Age	75.22 (7.0)
Gender (women)	63 (57.3%)
White, non-Hispanic	100 (90.9%)
Marital status	
Single	13 (11.8%)
Married/live-in partner	58 (52.7%)
Separated/divorced	23 (20.9%)
Widowed	16 (14.5%)
Veterans	22 (20.0%)
Retired	83 (75.5%)
Years education	17.26 (3.02)
Health status rating	2.04 (0.68)
Current SCID diagnoses	
Threshold anxiety disorder	10 (8.3%)
Threshold PTSD	0 (0%)
Lifetime SCID diagnosis	
Threshold anxiety disorder	14 (12.7%)
Threshold PTSD	1 (0.1%)
Subthreshold anxiety	17 (15.5%)
Subthreshold PTSD	5 (4.5%)

Note: SCID = Structured clinical interview for DSM-IV. PTSD = Posttraumatic stress disorder.

2.2. Measures

2.2.1. Geriatric anxiety

2.2.1.1. Geriatric Anxiety Inventory (GAI). The GAI (Pachana et al., 2007) has excellent test-retest reliability ($r = .93$ and .91; Diefenbach et al., 2009; Pachana et al., 2007) and excellent internal consistency with Kuder–Richardson 20 (KR-20) coefficients ranging from .91 to .93 (Byrne et al., 2008; Diefenbach et al., 2009; Pachana et al., 2007). Convergent validity of GAI scores was demonstrated through strong associations with anxiety (Pachana et al., 2007; Yochim et al., 2010) and worry measures (Diefenbach et al., 2009; Pachana et al., 2007). Discriminant validity with measures of depression varied between studies ($r = .38$ and .74; Byrne et al., 2010; Yochim et al., 2010). Yochim et al. (2010) did not find a significant correlation between the GAI and medical burden, whereas Byrne et al. (2010) found that worse general health was associated with higher GAI scores.

2.2.1.2. Geriatric Anxiety Scale (GAS). The GAS (Segal et al., 2010) has excellent internal consistency for the GAS total scores (α's = .90) among community-dwelling older adults and a clinical sample of older adults (Segal et al., 2010; Yochim et al., 2010). Internal consistency for the subscale scores ranged from good to excellent: $\alpha = .90$ for cognitive, $\alpha = .80$ for somatic, and $\alpha = .82$ for affective subscales (Segal et al., 2010). Evidence for convergent validity was demonstrated through strong correlations with measures of anxiety and worry (Segal et al., 2010; Yochim et al., 2010). Discriminant validity of the GAS is limited based on large associations ($r = .73$–$.78$) with depression measures (Segal et al., 2010; Yochim et al., 2010); however, the correlation coefficients for the GAS subscale scores and depression scores vary considerably from $r = .53$ (somatic) to .82 (cognitive), indicating better discriminant validity for the GAS somatic subscale relative to the affective and cognitive subscales.

Of the 30 GAS items, the first 25 items are scored and remaining five items provide information about specific content areas of anxiety among respondents.

2.2.2. Anxiety and worry

2.2.2.1. Beck Anxiety Inventory (BAI). The BAI (Beck & Steer, 1993) is an 18-item self-report measure of anxiety assessing somatic arousal and some cognitive symptoms. Reliability and validity among older adult samples have been established (e.g., Wetherell & Areán, 1997; Yochim et al., 2010), although the BAI was limited in the ability to discriminate Major Depressive Disorder from Generalized Anxiety Disorder (GAD; Wetherell & Gatz, 2005).

2.2.2.2. Hamilton Anxiety Scale (HAM-A). The HAM-A (Hamilton, 1959; Riskind, Beck, Brown, & Steer, 1987), a 14-item clinician-administered rating scale, assesses the severity of anxiety using a five-point scale. HAM-A scores have adequate internal consistency and high inter-rater reliability (Beck, Stanley, & Zebb, 1999; Diefenbach et al., 2001; Lenze et al., 2009; Stanley et al., 2009). HAM-A scores demonstrated convergent validity with anxiety as evidenced by a moderate correlation ($r = .47$) between HAM-A scores and the BAI (Morin et al., 1999). The Structured Interview Guide for Hamilton Anxiety Scale (Shear et al., 2001) was used in this study to increase reliability of HAM-A scoring with its descriptive anchors that guide clinician ratings of frequency and severity.

2.2.2.3. Penn State Worry Questionnaire (PSWQ). The PSWQ (Meyer et al., 1990), a 16-item self-report measure, assesses the excessiveness and uncontrollability of worry. Items are rated from 1 (not at all typical) to 5 (very typical). The PSWQ is a valid measure of worry among older adults (e.g., Beck, Steer, & Brown, 1996; Beck, Stanley, & Zebb, 1996), but test-retest reliability was poor among older adults with GAD (Stanley, Novy, Bourland, Beck, & Averill, 2001). Some older adults have difficulty with the reverse-scored items on the measure (Hopko et al., 2003).

2.2.3. Other psychological measures

Psychological symptoms of depression and posttraumatic stress were assessed respectively with the Beck Depression Inventory-II (BDI-II; Beck, Steer, et al., 1996; Beck, Stanley, et al., 1996) and the Posttraumatic Stress Disorder Checklist-Civilian version (PCL-C; Weathers, Litz, Huska, & Keane, 1994). The BDI-II scores demonstrated good internal consistency and convergent and discriminant validity in a community dwelling sample of older adults (Segal, Coolidge, Cahill, & O'Riley, 2008). Cook, Elhai, and Areán (2005) found that the PCL scores have adequate internal consistency and convergent validity with measures of depression among older adult primary care patients. The Structured Clinical Interview for DSM-IV (SCID; First, Gibbon, Spitzer, & Williams, 2002) was administered to all patients by trained interviewers as part of the psychiatric assessment.

2.2.4. Health and cognition

Participants rated their global, self-reported health in comparison to a state of perfect health as "excellent" (1), "good" (2), "fair" (3), or "poor" (4). Measures of memory included delayed recall for 15 words (Rey Auditory Verbal Learning Test (RAVLT); Rey, 1958), and delayed recall for complex geometric figures (Visual Reproduction subtest (VR), Wechsler Memory Scale – Fourth edition; Wechsler, 2008).

2.3. Procedure

Eligible participants completed a 2.5-h psychiatric assessment and a 1.5-h neuropsychological battery with a psychologist (SB, CG) or a graduate student research assistant trained in the administration of the measures. Participants had the option to complete all testing in the same visit or to complete the psychiatric and neuropsychological assessments in two separate visits within two weeks of each other. The psychiatric assessment began with completion of a demographic and health questionnaire followed by administration of the SCID, HAM-A, and self-report questionnaires. Self-report measures in the order completed were the BAI, PSWQ, BDI-II, PCL-C, and two geriatric self-report anxiety measures (GAI and GAS). One hundred ten participants completed the GAS, but one participant was excluded due to missing items 18 through 30, yielding an N of 109 for this measure. One participant did not complete the PSWQ, yielding an N of 109 for the PSWQ. Seventy-four participants completed the GAI, which was added to the assessment procedures part way through the study during the second year of assessment. Two memory measures from the neuropsychological assessment were included in the present study (RAVLT, VR).

2.4. Statistical analyses

Analyses were completed with IBM SPSS Statistics 21.0 (SPSS, Chicago, IL); alpha level was set at $p < .05$. Means and standard deviations on the measures are presented for the total samples and for two subgroups based on the presence or absence of a current SCID diagnosis of any DSM-IV-TR anxiety disorder (GAD, Panic Disorder, Social Anxiety Disorder, Specific Phobia, Agoraphobia, Anxiety Disorder NOS). If a participant met diagnostic criteria for an anxiety disorder at the time of the SCID interview, the participant was deemed to have an anxiety disorder currently. Reliability and validity of the GAI and GAS scores were examined in the total sample. Convergent and discriminant validity were examined using Spearman rank correlation coefficients, a non-parametric correlation coefficient, due to a positive skew found for the self-report measures including the GAI, Skewness = 3.11 (SE = .29), and GAS, Skewness = 2.23 (SE = .23). Convergent validity was expected to be demonstrated if GAI and GAS scores were significantly and positively correlated with measures of anxiety (BAI, HAM-A) and worry (PSWQ). Correlations between the GAI and GAS with measures of depression (BDI-II) and posttraumatic stress symptoms (PCL-C) were expected to be significant and positively correlated, but to a lesser magnitude than correlation coefficients between geriatric anxiety measures and anxiety or worry measures. Discriminant validity was expected to be demonstrated if the GAI and GAS had small magnitude correlations ($r_s < .3$) with measures of delayed verbal memory (RAVLT), age and health (health rating). Internal scale reliability was examined using Cronbach's alpha as a measure of internal consistency and inter-item correlations for the GAS and Kuder-Richardson 20 for the GAI. Post hoc analyses were conducted to determine if participants' memory abilities influenced the psychometric properties of the GAI and the GAS. Specifically, we compared the psychometric properties of the two measures between participants on delayed verbal memory and visual memory using median splits based on delayed memory scores for the RAVLT and the VR. We used the median split approach with memory scores because only a few participants scored in an impaired range on either memory test and the sample size was not sufficient to split participants into more than two groups based on percentiles.

Receiver Operating Characteristics (ROC) analyses were completed with Signal Detection Software (2007) ROC Software (Version 4.19; Stanford University School of Medicine and the Sierra Pacific MIRECC, Stanford and Palo Alto, CA). The ROC software uses a conservative alpha level of $p < .01$ to identify significant cut scores in the decision tree. The dependent variable was the presence or absence of a current anxiety disorder diagnosis on the SCID. ROC analyses were conducted to identify clinical cut scores

Table 2
Descriptive statistics for measures of anxiety and depression.

	Nonclinical anxiety (n = 100)	Current anxiety disorders (n = 10)	Total (N = 110)		
	M (SD)	M (SD)	M (SD)	Range	α
BAI	3.07 (3.54)	8.40 (9.62)	3.55 (4.62)	0–31	.83
BDI-II	4.22 (4.38)	11.00 (13.87)	4.84 (6.10)	0–45	.89
GAI[a]	1.19 (2.42)	4.57 (6.16)	1.51 (3.07)	0–16	.89
GAS[b]	6.51 (5.43)	15.90 (14.21)	7.37 (7.14)	0–41	.90
PCL-C	20.82 (4.77)	29.90 (14.60)	21.65 (6.72)	16–58	.88
PSWQ[b]	35.59 (11.19)	44.80 (18.68)	36.43 (12.24)	17–76	.92
HAM-A	7.52 (5.72)	13.40 (12.46)	8.05 (6.74)	0–36	.83

Note: BAI = Beck Anxiety Inventory, BDI-II = Beck Depression Inventory, GAI = Geriatric Anxiety Inventory, GAS = Geriatric Anxiety Scale, PCL-C = Posttraumatic Stress Disorder Checklist-Civilian version, PSQW = Penn State Worry Questionnaire, HAM-A = Hamilton Anxiety Scale.
[a] N = 74, n = 67 for nonclinical anxiety, n = 7 for current anxiety.
[b] N = 109, n = 99 for nonclinical anxiety, n = 10 for clinically significant anxiety.

that optimize sensitivity and specificity on the GAS, GAI, and HAM-A in the total sample. A decision tree was not produced for the GAI or HAM-A because no cut scores were significant at $p < .01$.

3. Results

Participant demographic characteristics are presented in Table 1. Ten individuals (8.3%) met criteria for a current anxiety disorder (agoraphobia = 1, specific phobia = 3, GAD = 2, Anxiety Disorder NOS = 4). Table 2 displays mean scores on the self-report measures of anxiety, geriatric anxiety, mood, PTSD, and worry. The current anxiety disorders group (M = 4.57, SD = 6.16) obtained significantly higher GAI scores compared with the non-clinical group (M = 1.19, SD = 2.42), $F(1, 73), = 8.48$, $p = .005$, with a medium effect size (Cohen's d = 0.72). Similarly, the current anxiety disorders group (M = 15.90, SD = 14.21) had higher GAS total scores than the nonclinical group (M = 6.51, SD = 5.43), $F(1, 108), = 18.23$, $p < .001$, with a large effect size (Cohen's d = 0.87). Participants with current anxiety disorders also obtained higher scores on the remaining anxiety, PTSD, and depression measures.

3.1. Psychometric properties of the GAI

3.1.1. Internal scale reliability

GAI scores had good internal consistency with Kuder–Richardson 20 coefficients (KR-20) of .89 and .80 as seen in Table 2. Corrected item-total correlations for the GAI ranged from r = .00–.81 as seen in Table 3. In our sample, item 15 was not endorsed by any participants and consequently had no variance. Four other items (2, 7, 14, 18) had corrected item-total correlations below .30.

3.1.2. Convergent and discriminant validity

Convergent validity coefficients for the GAI ranged from r_s = .28 with the BAI to r_s = .71 with the PSWQ as displayed in Table 5. The GAI had medium to large correlation coefficients with measures of depression (r_s = .49, $p < .001$) and PTSD (r_s = .56, $p < .001$). The GAI was not related to the health rating (r_s = .04, p = .75). The GAI was significantly associated with performance on the delayed recall on the RAVLT, although the correlation was of a small magnitude (r_s = –.27, p = .02). GAI scores were not significantly related to delayed recall performance on the VR (r_s = –.17, p = .16).

3.2. Psychometric properties of the GAS

3.2.1. Internal scale reliability

The GAS total score had excellent internal consistency as evidenced by a Cronbach's α of .90. Internal consistency for the subscales scores was marginal for the somatic subscale (α = .68) and good for the cognitive (α = .84) and affective subscales (α = .80). Corrected item-total correlations displayed in Table 4 ranged from r = .26 to .77. Two items (3, 9) had corrected item-total correlation coefficients below .30. A separate analysis of the item-subscale correlations yielded low associations for three items. On the somatic subscale, rs ranged from .24 to .47. Items 17 and 23 fell below .30. Item-subscale correlations were acceptable (r > .30) for all items on the cognitive subscale with rs ranging from .37 to .72. On the affective subscale, item-subscale correlations ranged from r = .27 to .70. Item 14 was the only item to have low reliability (r < .30) on the affective subscale.

Table 3
Corrected item-total correlations for geriatric anxiety inventory (GAI).

Item #		GAI corrected item-total correlation
1	I worry a lot of the time	.48
2	I find it difficult to make a decision	.23
3	I often feel jumpy	.44
4	I find it hard to relax	.42
5	I often cannot enjoy things because of my worries	.69
6	Little things bother me a lot	.60
7	I often feel like I have butterflies in my stomach	.03
8	I think of myself as a worrier	.65
9	I cannot help worrying about even trivial things	.58
10	I often feel nervous	.71
11	My own thoughts often make me anxious	.71
12	I get an upset stomach due to my worrying	.64
13	I think of myself as a nervous person	.72
14	I always anticipate the worst will happen	.12
15	I often feel shaky inside	.00
16	I think that my worries interfere with my life	.71
17	My worries often overwhelm me	.64
18	I sometimes feel a great knot in my stomach	–.02
19	I miss out on things because I worry too much	.80
20	I often feel upset	.68

Note: N = 73 rather than 74 due to one missing item.

3.2.2. Convergent and discriminant validity

Convergent validity coefficients of the GAS ranged from r = .57 with the PSWQ to .60 with the GAI, BAI, HAM-A, and PCL-C (see Table 5). The GAS has good discriminant validity from unrelated measures based on the very small association with delayed recall on the RAVLT (r_s = –.07, p = .49), small association with visual memory (r_s = –.23, p = .02), and small association with the health rating (r_s = .29, p = .003). Like the GAI, the GAS has a large association with a depression measure (r_s = .59, $p < .001$). The magnitude of the association between the GAI and depression (r_s = .49) and the GAS and depression did not differ based on a comparison using Steiger's Z_h = 1.17, p = .24. An examination of the association between the GAS subscale scores and the depression measure

Table 4
Corrected item-total correlations for Geriatric Anxiety Scale (GAS) total and subscales ($N = 109$).

Item #		Corrected item-total correlation	Corrected item-subscale correlations		
			Somatic subscale	Cognitive subscale	Affective subscale
1	My heart raced or beat strongly	.39	.31		
2	My breath was short	.46	.42		
3	I had an upset stomach	.28	.34		
4	I felt like things were not real or like I was outside of myself	.41		.37	
5	I felt like I was losing control	.55		.53	
6	I was afraid of being judged by others	.45			.56
7	I was afraid of being humiliated or embarrassed	.43			.48
8	I had difficulty falling asleep	.43	.37		
9	I had difficulty staying asleep	.26	.36		
10	I was irritable	.40			.43
11	I had outbursts of anger	.38			.47
12	I had difficulty concentrating	.72		.69	
13	I was easily startled or upset	.77			.65
14	I was less interested in doing something I typically enjoy	.43			.27
15	I felt detached or isolated from others	.70			.55
16	I felt like I was in a daze	.66		.71	
17	I had a hard time sitting still	.38	.24		
18	I worried too much	.57		.63	
19	I could not control my worry	.66		.72	
20	I felt restless, keyed up, or on edge	.70			.70
21	I felt tired	.46	.47		
22	My muscles were tense	.54	.47		
23	I had back pain, neck pain, or muscle cramps	.36	.29		
24	I felt like I had no control over my life	.61		.60	
25	I felt like something terrible was going to happen to me	.51		.61	

(BDI-II) demonstrated that the cognitive subscale had the strongest association with depression ($r_s = .81$, $p < .001$) followed by the affective subscale ($r_s = .65$, $p < .001$), and the somatic subscale ($r_s = .65$, $p < .001$).

3.3. Psychometric properties by delayed memory performance

Participants were separated based on a median split into two delayed memory performance groups for verbal (median raw score = 10) and visual memory (median raw score = 27). The verbal memory group scoring ≤10 ($n = 57$) on the RAVLT Delayed Recall recalled a mean of 7.33 words (SD = 2.57) and the group scoring >10 ($n = 52$) on the RAVLT recalled a mean of 12.69 (SD = 13.62) words. The mean VR Delayed Recall scores for the visual memory group scoring ≤27 ($n = 64$) on the VR is 18.84 (SD = 6.07) and the mean for those scoring >27 ($n = 45$) on the VR was 32.90 (SD = 4.50). Both lower memory performance groups obtained mean recall scores in the average range (63rd percentile), and both higher performance groups were in the superior range (98th percentile for RAVLT and 95th for VR) and are therefore referred to as "average" and "superior" in the sections that follow.

3.3.1. Delayed memory and the GAI

Internal consistencies were reduced but in the good range on the GAI in the average memory groups (RAVLT and VR: KR-20s = .87 and .88) compared with the superior memory groups (RAVLT and VR: KR-20s = .95 and .93). Several items had a variance of zero (i.e., were not endorsed) among participants with average delayed memory performance on the RAVLT or VR (items 15 and 18) or superior memory performance on the RAVLT or VR (items 3, 7, and 5). Corrected item-total scores were below .30 for two GAI items (2, 7) in participants with average performance in either verbal or visual delayed memory. Corrected item-total correlations for item 14 were <.30 in both the average and superior verbal and visual memory groups. Convergent and discriminant validity of the GAI in the average and superior memory groups fit the overall pattern observed in the total sample.

Table 5
Spearman inter-correlations for measures.

Measure	GAI	GAS	BAI	HAM-A	PSWQ	PCL-C	BDI-II	Health rating	RAVLT	VR
GAI	1.00									
GAS	.60**	1.00								
BAI	.28*	.60**	1.00							
HAM-A	.47**	.60**	.48**	1.00						
PSWQ	.71**	.57**	.34**	.38**	1.00					
PCL-C	.56**	.60**	.44**	.52**	.43**	1.00				
BDI-II	.49**	.59**	.51**	.53**	.43**	.58**	1.00			
Health rating	.04	.29**	.45**	.32**	.23*	.40**	.45**	1.00		
RAVLT	−.27*	−.07	−.01	−.01	−.03	−.07	−.07	−.002	1.00	
VR	−.17	−.23*	−.20*	−.07	−.23*	−.08	−.25*	−.15	.36**	1.00

Note: Sample size for correlation analyses ranged from 110 to 74. BAI = Beck Anxiety Inventory, BDI-II = Beck Depression Inventory, GAI = Geriatric Anxiety Inventory, GAS = Geriatric Anxiety Scale, PCL-C = Posttraumatic Stress Disorder Checklist-Civilian version, PSWQ = Penn State Worry Questionnaire, RAVLT = Rey Auditory Verbal Learning Test, HAM-A = Hamilton Anxiety Scale, VR = Visual Reproduction subtest of Wechsler Memory Scale-Fourth edition.

** Indicates correlation is significant at $p < .01$ level.

* Indicates correlation is significant at $p < .05$ level.

Table 6
Results from receiver operating characteristic curve (ROC) analysis for GAS.

Cut score	Sensitivity	Specificity	PPV	NPV	Efficiency	*p*
>9	.60	.75	.19	.95	.73	<.05
>10	.50	.82	.22	.94	.79	<.05
>12	.50	.83	.23	.94	.80	<.05
>13	.50	.84	.24	.94	.81	<.01
>14	.50	.88	.29	.95	.84	<.01
>15	.50	.89	.31	.95	.85	<.001
>16	.40	.94	.40	.94	.89	<.001

Note: No cut score for 11 was generated because no participants obtained this score. GAS = Geriatric Anxiety Scale, PPV = positive predictive value, NPV = negative predictive value.

3.3.2. Delayed memory and the GAS

Similarly, internal consistencies were reduced but still good on the GAS for average (RAVLT and VR: αs = .88 and .83) compared with superior memory performers (RAVLT and VR: α's = .93 and .94). Item total correlations were below .30 for four GAS items in the average verbal memory group (1, 3, 9, and 22), eight GAS items in the average visual memory group (1, 3, 4, 5, 9, 21, 22, and 23), and one item in the superior verbal memory group (9). Convergent validity of the GAS in the average and superior memory groups fit the patterns observed in the total sample.

Discriminant validity of the GAS with health was decreased (as evidenced by higher correlations) in the average versus superior verbal memory groups (r_s = 41, p < .05 versus r_s = .22, p = .08) and, unexpectedly, in the direction of decreased discriminant validity in the superior versus average visual memory groups (r_s = .45, p < .01 versus r_s = .11, p > .05).

3.4. Receiver operating characteristic (ROC) analyses for the GAS

All cut scores that are significant at p < .05 are displayed in Table 6. A cut score of >16 was identified as optimal at the p < .01 level based on an efficiency of 89% (i.e., the percentage of times a given cut score correctly classified participants in our sample). However, a less stringent cut score of >9 maximized the balance of sensitivity and specificity (.60 and .75) while obtaining adequate efficiency (73%). A cut score of >9 also identified two of four participants with anxiety disorder NOS, whereas a cut score of >16 identified one of four participants with anxiety disorder NOS. Both cut scores identified the two participants with GAD, one of the three with specific phobia, and zero of one with agoraphobia. Notably, five participants who were not identified by either cut score reported low severity of mental health symptoms despite meeting diagnostic criteria for an anxiety disorder.

4. Discussion

Overall findings support the use of the GAI and GAS with older individuals with acceptable to excellent psychometric properties for the GAI and GAS on internal consistency, item-total correlations, convergent validity with similar measures (i.e., anxiety, worry), and discriminant validity with dissimilar measures (i.e., perceived health, verbal memory, and visual memory). This lends further support to previous validation studies of the GAS (Segal et al., 2010; Yochim et al., 2010) and extends that research by examining the convergent validity of the GAI and GAS with a clinician rated interview (i.e., the HAM-A). A novel aspect of this study was the comparison of average versus superior performing participants on delayed memory. Though we document reduced psychometrics for the average memory compared with the superior memory participants, both the GAI and GAS still generally performed well in both memory groups. The ability of the GAI and GAS to discriminate anxiety from depression was limited, but this issue is not unique to the geriatric measures as standard anxiety and depression measures often correlate highly in adult samples (e.g., Beck, Steer, et al., 1996; Beck, Stanley, et al., 1996; Stanley et al., 2001; Yochim et al., 2010).

Despite these good psychometrics, the item-total correlations for four items on the GAI and two on the GAS fell below the minimum accepted cut-off of r_s < .30 in the total sample suggesting that removal of select items from these measures could improve their internal consistency if validated in future studies. These low item-total correlations arose potentially due to participants endorsing items for reasons unrelated to anxiety. For example, problems with decision-making was one such item on the GAI, which could have been endorsed due to cognitive problems with executive functioning unrelated to worry. In addition, items that use the word "always," as with one of the GAI items with a low item-total correlation, could have diminished reliability because older adults are less likely to endorse statements that use absolute terms on mental health measures (Karlsson et al., 2009; Mohlman et al., 2012). Other low performing items on the GAI and GAS have a physical or sleep focus. Difficulty differentiating anxiety from medical disorders and the overall ubiquity of sleep difficulties (e.g., Foley, Ancoli-Israel, Britz, & Walsh, 2004) in late life may have led to the poor reliability of these items.

Slight differences in the psychometrics between the two measures emerged in our sample. For example, GAS scores had a higher magnitude correlation with two anxiety measures (BAI and HAM-A) than GAI scores. In contrast, compared with the GAS, GAI scores had a higher magnitude correlation with worry (PSWQ). Though both the GAI and GAS successfully discriminated between anxiety and self-reported general health, the GAI had a lower and non-significant association with single-item health rating whereas the GAS scores had a small but significant association with health. In addition, despite good albeit reduced psychometric properties for both the GAI and GAS in our sample of community dwelling older adults with average versus superior memory recall, eight items on the GAS did not meet the minimal accepted level of association in the item-total correlations in participants with average visual memory recall compared with zero items in those with superior recall. This association may be due to the multiple choice response format of the GAS rather than the simple binary response format of the GAI. We postulate that the reduced internal consistencies of both the GAI and GAS and reduced discriminant validity for GAS with lower (but average) memory performance would be more pronounced in older adults with memory impairment, which is consistent with elevated levels of anxiety symptoms among patients with cognitive impairment and dementia compared with those with normal cognition (Diefenbach et al., 2013). Taken together, these minor differences in convergent validity with like measures, divergence with a health rating, and psychometrics by cognitive abilities offer some insight as to when the GAS may be preferred over the GAI and vice versa.

Findings do not clearly implicate one cut score over another on the measures used to identify older adults who may have a diagnosable anxiety disorder. No optimal cut score emerged in our ROC analyses for the GAI based on p < .01, although past studies have identified cut scores for the identification of any anxiety disorder in older adults when using the GAI (e.g., Diefenbach et al., 2009; Pachana et al., 2007). A cut score of >16 was identified for the GAS using ROC analysis, but could not be reconciled based on the balance of sensitivity and specificity which was optimized with >9. The identification of a clinical cut score for the GAS will help this measure be used in clinical and research settings, but may need to be clarified in future studies with larger clinical samples.

Several limitations to the present study should be noted. First, only ten participants (8.3%) were diagnosed with a current anxiety disorder. Although this approximates the reported prevalence of

these disorders in epidemiological samples (e.g., 7.0% in Gum et al., 2009), there is a need to examine the psychometric properties of the GAI and GAS in larger, clinical samples with more racial and ethnic diversity. A second limitation is our assessment of health status with a single item rather than a multi-dimensional measure, though psychometric evidence supports the use of this one-item health scale as a predictor of outcomes such as mortality (e.g., Idler & Benyamini, 1997). Post hoc analyses suggest diminished internal scale reliability and validity when using the GAI and GAS with participants with lower but average memory performance. However, these post hoc analyses are preliminary and are based on small samples of older adults. Some of the poor-performing items may have been influenced by low variability for the items in either the average or superior memory groups.

Despite these limitations, the study improves upon prior studies including the use of a structured clinical interview to diagnose present and past anxiety disorders in a large sample of community-dwelling older adults. It provides support for both measures in older adults with varying degrees of memory ability. Exploratory and confirmatory factor analyses of the GAI and GAS in future investigations are needed to clarify findings from previous studies of a four factor structure of the GAI (Diefenbach et al., 2013) and a single factor structure of the GAS in Iranian older adults (Bolghan-Abadi, Segal, Coolidge, & Gottschling, 2013). Future studies should measure treatment change using the GAI and GAS to determine whether these measures are sensitive to effects of interventions on late-life anxiety. Additionally, the 5-item GAI short form (GAI-SF; Byrne & Pachana, 2011) could be administered and evaluated in future research compared with abbreviated forms of other measures, such as the abbreviated PSWQ (Hopko et al., 2003).

Funding

This work was supported by an Alzheimer's Association Grant (NIRG-09-133592) to the corresponding author (S.B.).

Acknowledgments

The first author is supported by the Special Fellowship Program in Advanced Geriatrics, with funds from the VA Office of Academic Affairs, Department of Veterans Affairs. Views expressed in this article are those of the authors and not necessarily those of the Department of Veterans Affairs.

References

Beaudreau, S. A., & O'Hara, R. (2008). Late-life anxiety and cognitive impairment: a review. *American Journal of Geriatric Psychiatry*, *16*, 790–803. http://dx.doi.org/10.1097/JGP.0b013e31817945c3

Beaudreau, S. A., & O'Hara, R. (2009). The association of anxiety and depressive symptoms with cognitive performance in community-dwelling older adults. *Psychology and Aging*, *24*, 507–512. http://dx.doi.org/10.1037/a0016035

Beck, A. T., & Steer, R. (1993). *Beck anxiety inventory manual* (2nd ed.). San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck depression inventory-II*. San Antonio, TX: Psychological Corporation.

Beck, J. G., Stanley, M. A., & Zebb, B. J. (1996). Characteristics of generalized anxiety disorder in older adults: a descriptive study. *Behaviour Research and Therapy*, *34*, 225–234. http://dx.doi.org/10.1016/0005-7967(95)00064-X

Beck, J. G., Stanley, M. A., & Zebb, B. J. (1999). Effectiveness of the Hamilton Anxiety Rating Scale with older generalized anxiety disorder patients. *Journal of Clinical Geropsychology*, *5*, 281–290. http://dx.doi.org/10.1023/A:1022962907930

Blessed, G., Tomlinson, B. E., & Roth, M. (1968). The association between quantitative measures of dementia and of senile change in the cerebral grey matter of elderly subjects. *The British Journal of Psychiatry*, *110*, 205–242. http://dx.doi.org/10.1192/bjp.114.512.797

Bolghan-Abadi, M., Segal, D. L., Coolidge, F. L., & Gottschling, J. (2013). Persian version of the Geriatric Anxiety Scale: translation and preliminary psychometric properties among Iranian older adults. *Aging & Mental Health*, *17*, 896–900. http://dx.doi.org/10.1080/13607863.2013.788999

Byrne, G. J., & Pachana, N. A. (2011). Development and validation of a short form of the Geriatric Anxiety Inventory – the GAI-SF. *International Psychogeriatrics*, *23*, 125–131. http://dx.doi.org/10.1017/S1041610210001237

Byrne, G. J., Pachana, N. A., Arnold, L., Chalk, J. B., & Appadurai, K. (2008). Performance characteristics of the Geriatric Anxiety Inventory in memory clinic attendees. *Alzheimer's & Dementia*, *4*, 441–442. http://dx.doi.org/10.1016/j.jalz.2008.05.1314

Byrne, G. J., Pachana, N. A., Goncalves, D. C., Arnold, E., King, R., & Keat Khoo, S. (2010). Psychometric properties and health correlates of the Geriatric Anxiety Inventory in Australian community-residing older women. *Aging & Mental Health*, *14*, 247–254. http://dx.doi.org/10.1080/13607861003587628

Bryant, C., Jackson, H., & Ames, D. (2008). The prevalence of anxiety in older adults: methodological issues and a review of the literature. *Journal of Affective Disorders*, *109*, 233–250. http://dx.doi.org/10.1016/j.jad.2007.11.008

Cook, J. M., Elhai, J. D., & Areán, P. A. (2005). Psychometric properties of the PTSD checklist with older primary care patients. *Journal of Traumatic Stress*, *18*, 371–376. http://dx.doi.org/10.1002/jts.20038

de Beurs, E., Beekman, A. T. F., Van Balkom, A. J. L. M., Deeg, D. J. H., van Dyck, R., & van Tilburg, W. (1999). Consequences of anxiety in older persons: its effect on disability, well-being and use of health services. *Psychological Medicine*, *29*(3), 583–593.

Diefenbach, G. J., Bragdon, L. B., & Blank, K. (2013). Geriatric Anxiety Inventory: factor structure and associations with cognitive status. *American Journal of Geriatric Psychiatry*, http://dx.doi.org/10.1016/j.jagp.2013.04.014 (Advance online publication)

Diefenbach, G. J., Stanley, M. A., Beck, J. G., Novy, D. M., Averill, P. M., & Swann, A. C. (2001). Examination of the Hamilton Scales in assessment of anxious older adults: a replication and extension. *Journal of Psychopathology and Behavioral Assessment*, *23*, 117–124. http://dx.doi.org/10.1023/A:1010967725849

Diefenbach, G. J., Tolin, D. F., Meunier, S. A., & Gilliam, C. M. (2009). Assessment of anxiety in older home care recipients. *The Gerontologist*, *49*, 141–153. http://dx.doi.org/10.1093/geront/gnp019

First, M., Spitzer, R., Gibbon, M., & Williams, J. (2002). *Structured clinical interview for DSM-IV-TR Axis I Disorders, Research Version*. New York, NY: New York State Psychiatric Institute (Revision: October, 2008).

Foley, D., Ancoli-Israel, S., Britz, P., & Walsh, J. (2004). Sleep disturbances and chronic disease in older adults: results of the 2003 National Sleep Foundation Sleep in America Survey. *Journal of Psychosomatic Research*, *56*, 497–502. http://dx.doi.org/10.1016/j.jpsychores.2004.02.010

Gerolimatos, L. A., Gregg, J. J., & Edelstein, B. A. (2013). Assessment of anxiety in long-term care: examination of the Geriatric Anxiety Inventory (GAI) and its short form. *International Psychogeriatrics*, *25*, 1533–1542. http://dx.doi.org/10.1017/S1041610213000847

Gould, C. E., Beaudreau, S. A., & Huh, J. W. T. (2013). A Veterans health administration imperative: recommendations for detecting anxiety in older adults. *Federal Practitioner*, *30*(8), 35–42.

Gum, A. M., King-Kallimanis, B., & Kohn, R. (2009). Prevalence of mood, anxiety, and substance-abuse disorders for older Americans in the national comorbidity survey-replication. *American Journal of Geriatric Psychiatry*, *17*, 769–781. http://dx.doi.org/10.1097/JGP.0b013e3181ad4f5a

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, *32*, 50–55. http://dx.doi.org/10.1111/j. 2044-8341.1959.tb00467.x

Hopko, D. R., Reas, D. L., Beck, J. G., Stanley, M. A., Wetherell, J. L., Novy, D. M., & Averill, P. M. (2003). Assessing worry in older adults: confirmatory factor analysis of the Penn State Worry Questionnaire and psychometric properties of an abbreviated model. *Psychological Assessment*, *15*, 173–183. http://dx.doi.org/10.1037/1040-3590.15.2.173

Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behavior*, *38*(1), 21–37.

Karlsson, B., Klenfeldt, I. F., Sigström, R., Waern, M., Östling, S., Gustafson, D., & Skoog, I. (2009). Prevalence of social phobia in non-demented elderly from a Swedish population study. *American Journal of Geriatric Psychiatry*, *17*, 127–135. http://dx.doi.org/10.1097/JGP.0b013e3181860051

King-Kallimanis, B., Gum, A. M., & Kohn, R. (2009). Comorbidity of depressive and anxiety disorders for older Americans in the National Comorbidity Survey-Replication. *American Journal of Geriatric Psychiatry*, *17*, 782–792. http://dx.doi.org/10.1097/JGP.0b013e3182ad4d17

Lenze, E. J., Rollman, B. L., Shear, M. K., Dew, M. A., Pollock, B. G., Ciliberti, C., & Reynolds, C. F., III. (2009). Escitalopram for older adults with generalized anxiety disorder. *The Journal of the American Medical Association*, *301*, 295–303. http://dx.doi.org/10.1001/jama.2008.977

Mehta, K. M., Simonsick, E. M., Penninx, B. W., Schulz, R., Rubin, S. M., Satterfield, S., & Yaffe, K. (2003). Prevalence and correlates of anxiety symptoms in well-functioning older adults: findings from the health aging and body composition study. *Journal of the American Geriatrics Society*, *51*, 499–504. http://dx.doi.org/10.1046/j. 1532-5415.2003.51158.x

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State worry questionnaire. *Behaviour Research and Therapy*, *28*, 487–495. http://dx.doi.org/10.1016/0005-7967(90)90135-6

Mohlman, J., Bryant, C., Lenze, E. J., Stanley, M. A., Gum, A., Flint, A., & Craske, M. G. (2012). Improving recognition of late life anxiety disorders in diagnostic and statistical manual of mental disorders: observations and recommendations of the Advisory Committee to the Lifespan Disorders Work Group. *International Journal of Geriatric Psychiatry*, *27*, 549–556. http://dx.doi.org/10.1002/gps.2752

Morin, C. M., Landreville, P., Colecchi, C., McDonald, K., Stone, J., & Ling, W. (1999). The Beck Anxiety Inventory: psychometric properties with older adults. *Journal of Clinical Geropsychology*, *5*(1), 19–29. http://dx.doi.org/10.1023/A:1022986728576

Pachana, N. A., Byrne, G. J., Siddle, H., Koloski, N., Harley, E., & Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. *International Psychogeriatrics*, *19*, 103–114. http://dx.doi.org/10.1017/S1041610206003504

Porensky, E. K., Dew, M. A., Karp, J. F., Skidmore, E., Rollman, B. L., Shear, M. K., & Lenze, E. J. (2009). The burden of late-life generalized anxiety disorder: effects on disability, health-related quality of life, and healthcare utilization. *American Journal of Geriatric Psychiatry*, *17*, 473–482. http://dx.doi.org/10.1097/JGP.0b013e31819b87b2

Rey, A. (1958). *L'examen clinique en psychologie*. Paris: Presse Universitaire de France.

Riskind, J. H., Beck, A. T., Brown, G., & Steer, R. A. (1987). Taking the measure of anxiety and depression: validity of the reconstructed Hamilton scales. *Journal of Nervous and Mental Disease*, *175*, 474–479. http://dx.doi.org/10.1097/00005053-198708000-00005

Segal, D. L., Coolidge, F. L., Cahill, B. S., & O'Riley, A. A. (2008). Psychometric properties of the Beck Depression Inventory – II (BDI-II) among community-dwelling older adults. *Behavior Modification*, *32*, 3–20. http://dx.doi.org/10.1177/0145445507303833

Segal, D. L., June, A., Payne, M., Coolidge, F. L., & Yochim, B. (2010). Development and initial validation of a self-report assessment tool for anxiety among older adults: the Geriatric Anxiety Scale. *Journal of Anxiety Disorders*, *24*, 709–714. http://dx.doi.org/10.1016/j.janxdis.2010.05.002

Shear, M. K., Vander Bilt, J., Rucci, P., Endicott, J., Lydiard, B., Otto, M. W., & Frank, D. M. (2001). Reliability and validity of a structured interview guide for the Hamilton Anxiety Rating Scale (SIGH-A). *Depression and Anxiety*, *13*, 166–178. http://dx.doi.org/10.1002/da.1033

Signal Detection Software. (2007). *ROC Software (Version 4.22)*. Stanford and Palo Alto, CA: Stanford University School of Medicine and the Sierra Pacific Mental Illness Research Education and Clinical Centers (MIRECC). http://www.stanford.edu/~yesavage/ROC.html (accessed on 01.02.13)

Stanley, M. A., Novy, D. M., Bourland, S. L., Beck, J. G., & Averill, P. M. (2001). Assessing older adults with generalized anxiety: a replication and extension. *Behaviour Research and Therapy*, *39*, 221–235. http://dx.doi.org/10.1016/S0005-7967(00)00030-9

Stanley, M. A., Wilson, N. L., Novy, D. M., Rhoades, H. M., Wagener, P. D., Greisinger, A. J., & Kunik, M. E. (2009). Cognitive behavior therapy for generalized anxiety disorder among older adults in primary care. *The Journal of the American Medical Association*, *301*, 1460–1467. http://dx.doi.org/10.1001/jama.2009.458

Van Hout, H. P., Beekman, A. T., de Beurs, E., Comijs, H., Van Marwijk, H., De Haan, M., & Deeg, D. J. (2004). Anxiety and the risk of death in older men and women. *The British Journal of Psychiatry*, *185*, 399–404. http://dx.doi.org/10.1192/bjp.185.5.399

Weathers, F. W., Litz, B. T., Huska, J., & Keane, T. (1994). *PTSD checklist–civilian version (PCL-C)*. Boston: National Center for PTSD, Behavioral Science Division.

Wechsler, D. (2008). *Wechsler Memory Scale* (4th ed.). San Antonio, TX: Psychological Corporation.

Wetherell, J. L., & Areán, P. A. (1997). Psychometric evaluation of the Beck Anxiety Inventory with older medical patients. *Psychological Assessment*, *9*, 136–144. http://dx.doi.org/10.1037/1040-3590.9.2.136

Wetherell, J. L., & Gatz, M. (2005). The Beck Anxiety Inventory in older adults with generalized anxiety disorder. *Journal of Psychopathology and Behavioral Assessment*, *27*, 17–24. http://dx.doi.org/10.1007/s10862-005-3261-3

Yochim, B. P., Mueller, A. E., June, A., & Segal, D. L. (2010). Psychometric properties of the Geriatric Anxiety Scale: comparison to the Beck Anxiety Inventory and Geriatric Anxiety Inventory. *Clinical Gerontologist*, *34*, 21–33. http://dx.doi.org/10.1080/07317115.2011.524600