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Mustafa Bolghan-Abadi ^a, Daniel L. Segal ^b, Frederick L. Coolidge ^b & Juliana Gottschling ^c

^a Ferdowsi University of Mashhad, Mashhad, Iran

^b University of Colorado at Colorado Springs

^c Saarland University, Saarbruecken, Germany

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Persian version of the geriatric anxiety scale: Translation and preliminary psychometric properties among Iranian older adults

Mustafa Bolghan-Abadi^a, Daniel L. Segal^{b*}, Frederick L. Coolidge^b and Juliana Gottschling^c

^aFerdowsi University of Mashhad, Mashhad, Iran; ^bUniversity of Colorado at Colorado Springs; ^cSaarland University, Saarbruecken, Germany

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Objective: The Geriatric Anxiety Scale (GAS) is a new self-report screening measure designed for older adults. Due to the burgeoning Iranian population of older adults and the need for validated, culturally-appropriate screening measures for anxiety in Iran, the purposes of the present study were to translate the GAS into Persian and to explore its preliminary psychometric properties.

Method: Iranian older adults ($N = 295$; M age = 67.0 years) completed the GAS and the Iranian version of the Geriatric Depression Scale (GDS-15).

Results: Cronbach's alpha for the GAS total score and the GAS subscales were excellent (Total score $\alpha = .92$; Cognitive $\alpha = .81$; Somatic $\alpha = .84$; Affective $\alpha = .80$). As expected, each subscale was significantly positively correlated (all p 's < .01) with the other subscales. The subscales share common variance ranging from 42% to 56%. The GAS total score and GAS subscale scores were significantly positively correlated with the GDS-15, with medium effect sizes (GAS Total $r = .55$; Cognitive $r = .51$; Somatic $r = .50$; Affective $r = .48$). Finally, exploratory and confirmatory factor analyses were conducted to investigate the factor structure of the Persian version of the GAS. Results support a one factor solution (general anxiety) for this Iranian sample.

Conclusion: This study provides preliminary psychometric support for the Persian version of the GAS as a screening measure for anxiety in Iranian older adults, with a one-dimensional factor structure.

Keywords: anxiety; assessment; translation; validity; Iran; aging

Anxiety is a common problem among older adults in the United States and in many countries across the world. However, unlike depression, anxiety is often poorly identified and assessed among older adults (Kogan, Edelstein, & McKee, 2000; Segal, Qualls, & Smyer, 2011; Therrien & Hunsley, 2012; Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010). The Geriatric Anxiety Scale (GAS; Segal, June, Payne, Coolidge, & Yochim, 2010) is a new self-report, dimensionally-based, screening measure designed specifically for older adults. Preliminary studies in the United States provide solid evidence for the reliability of GAS scores and validity of the GAS for use as a screening measure in community-dwelling and clinical samples of older adults (Segal et al., 2010). In a related validity study with older adults, Yochim, Mueller, June, and Segal (2011) found that scores on the GAS were strongly associated with scores on other measures of anxiety and depression, but not associated with scores on measures of reading ability or processing speed, suggesting that the GAS possesses strong convergent and discriminant validity.

Like many parts of the developing world, the Iranian population of older adults is rapidly increasing. Recent statistics in Iran indicate that, in 2006, 7.3% of the population was 65 years old and older, which amounts to over 5 million older adults (Statistical Center of Iran, 2006). The availability of mental health services for older adults in Iran is still developing, and as such there exists the

need for validated, brief, culturally-appropriate screening measures for anxiety in this growing population. The purposes of the present study were to translate the GAS into Persian and to explore the preliminary psychometric properties of the Persian version of the GAS. Although several screening measures for later-life anxiety are available in English (see review by Therrien & Hunsley, 2012), we selected the GAS because of its promising psychometric properties and because it measures several components of anxiety (physical or somatic symptoms, [i.e., racing heart, sleep trouble], affective symptoms [i.e., feeling keyed up or on edge], and cognitive symptoms [i.e., worry that is difficult to manage]).

Method

GAS translation

The GAS was translated from English into Persian through an initial translation and back translation process. That is, the English version of the GAS was translated into Persian by a mental health specialist, then this translation was translated again into English language by another specialist, and finally, this English translation was translated into Persian by third specialist. Upon completion of this process, the translators compared the Persian versions of GAS to determine whether the measures had the same meaning. The results of this comparison showed

*Corresponding author. Email: dsegal@uccs.edu

acceptable concordance of the measures. This initial version of the measure was then completed by 30 older Iranians for their comments on ease of understanding of the measure. This pilot study revealed that each item of the Persian GAS was understandable and culturally appropriate except for item #4 (I felt like things were not real or like I was outside of myself). As a result, this item was modified to fit with Iranian cultural expressions of anxiety. In the next pilot study, it was determined that the revised item was understandable and this new measure was used in the larger validation study.

Participants and procedure

A sample of community-dwelling older adults (defined as 60 years old and older) in the city of Shahreza, Iran, were recruited to complete the study measures. Initially, a group of older individuals were recruited by phone from a larger random sample of older adults in the city. Upon their completion of the study, these participants were asked to provide names of older adult family members, friends, and acquaintances who also may be interested in participating (the snowball sampling method). In response to these methods, a total sample of 300 older participants began the study although five participants did not complete the measures in full. Most participants completed the measures via self-report but for illiterate older adults, a group of psychology students orally administered the measures. The final sample ($N = 295$) ranged in age from 60 to 92 years (M age = 67.0 years; $SD = 7.4$ years; 51% women). Regarding their living situation, 26 reported living alone (8.8%), 118 reported living with their partner (40%), 46 reported living with their partner and children (15.6%), 48 reported living with their children (16.3%), and 57 reported living with their children and others (19.3%). The education level of 37 participants was primary school (12.5%), 60 completed middle school (20.3%), 20 completed high school (6.8%), 25 completed diploma (8.5%), 7 completed higher education (2.4%), and 146 reported having no formal education (49.5%).

Measures

Geriatric depression scale

The GDS-15 is a short form of the GDS-30 that was developed by Yesavage et al. (1983). The GDS-15 is a self-report measure consisting of dichotomous questions that assess current depressive symptoms, with higher scores indicating higher depression. The validity for the use of the GDS as a screening measure has been confirmed in diverse cultures including China, United Kingdom, Portugal, and Malaysia (see review by Marty, Pepin, June, & Segal, 2011). Evidence for the preliminary reliability and validity of the Iranian version of the GDS-15 is good (Malakouti, Fatollahi, Mirabzadeh, Salavati, & Zandi, 2006).

Geriatric anxiety scale

The GAS is a 30-item self-report measure used to screen for anxiety symptoms among older adults (Segal et al.,

2010). The GAS total score is based on the first 25 items. The additional 5 items assess content areas of anxiety often reported to be of concern for older adults; however, these content specific items do not load on the total score of the GAS or on any subscales. Respondents answer using a 4-point Likert scale ranging from *not at all* (0) to *all the time* (3) and the time frame refers to symptoms experienced in the past week. Higher scores indicate higher levels of anxiety. The GAS includes three, theoretically-derived subscales: Cognitive symptoms, Somatic symptoms, and Affective symptoms. In the validation study (Segal et al., 2010), internal reliability of the measure (Cronbach's alpha) was excellent for the GAS total score and the 3 subscales (Total score $\alpha = .93$; Cognitive $\alpha = .90$; Somatic $\alpha = .80$; Affective $\alpha = .82$). Convergent validity was demonstrated by strong positive relationships between GAS and other measures of anxiety (Yochim et al., 2011).

Results

Descriptive analyses of the Persian GAS

Table 1 contains descriptive statistics of the 25 GAS items in the older adult Iranian sample. For each aspect of anxiety, all possible frequencies of experience have been reported by the participants. All GAS items were positively skewed and most of them showed a slightly negative kurtosis. The skewness and kurtosis of items 4 and 15 were especially high, but the values were still in an acceptable range to assume their normality (West, Finch, & Curran, 1995).

Scale reliability and item factor analysis of the Persian GAS

Reliability

Internal item consistency for the Persian version of the GAS was evaluated by Cronbach's alpha coefficient. For the GAS total score, the internal consistency was excellent ($\alpha = .92$). The reliabilities of the GAS subscale scores were as follows: Cognitive $\alpha = .81$; Somatic $\alpha = .84$; Affective $\alpha = .80$. The three subscales of the GAS were highly intercorrelated (Table 2), with r varying from .68 to .77 ($p < .001$). These data indicate that the subscales shared common variance ranging from 42% to 56%. The inter-item correlations for the GAS total score and the three GAS subscales were also substantial: GAS total score, $r_{ii} = .74$; Cognitive, $r_{ii} = .73$; Somatic, $r_{ii} = .69$; Affective, $r_{ii} = .70$. Test-retest reliability after two weeks was $r_{it} = .51$, $p < .01$, perhaps suggesting that the GAS is a state measure of anxiety that is sensitive to changes over time, as expected.

Exploratory factor analysis (EFA)

We used a principal axis factor analysis with promax rotation to investigate the structure of the Persian version of the GAS. The initial analysis revealed the presence of six components with eigenvalues exceeding 1.00, explaining 53.8% of the variance in total. However, the first factor alone explained 32.4% of the variance and the inspection of the scree plot confirmed a two factor solution. A

Table 1. Descriptive statistics and factor loadings (one factor solution) of the Persian GAS.

	Item	Subscale	N	M (SD)	Min-Max	Skew (SE)	Kurtosis (SE)	Factor loadings
My heart raced or beat strongly.	1	Somatic	291	.84 (.77)	0–3	.61 (.14)	–.19 (.29)	.509
My breath was short.	2	Somatic	290	.80 (.79)	0–3	.68 (.14)	–.12 (.29)	.538
I had an upset stomach.	3	Somatic	289	.91 (.89)	0–3	.71 (.14)	–.31 (.29)	.685
I had difficulty falling asleep.	8	Somatic	294	1.07 (.91)	0–3	.57 (.14)	–.45 (.28)	.571
I had difficulty staying asleep.	9	Somatic	294	.93 (.85)	0–3	.55 (.14)	–.48 (.28)	.574
I had a hard time sitting still.	17	Somatic	292	.66 (.91)	0–3	1.15 (.14)	.19 (.28)	.505
I felt tired.	21	Somatic	289	1.09 (.85)	0–3	.47 (.14)	–.36 (.28)	.646
My muscles were tense.	22	Somatic	285	.96 (.93)	0–3	.65 (.14)	–.50 (.29)	.587
I had back pain, neck pain, or muscle cramps.	23	Somatic	291	1.25 (1.03)	0–3	.41 (.14)	–.95 (.29)	.586
I felt like things were not real or like I was outside of myself.	4	Cognitive	273	.31 (.62)	0–3	2.22 (.15)	5.01 (.29)	.355
I felt like I was losing control.	5	Cognitive	289	.53 (.79)	0–3	1.47 (.14)	1.65 (.29)	.562
I had difficulty concentrating.	12	Cognitive	292	.83 (.80)	0–3	.64 (.14)	–.29 (.28)	.539
I felt like I was in a daze.	16	Cognitive	293	.54 (.75)	0–3	1.22 (.14)	.71 (.28)	.635
I worried too much.	18	Cognitive	294	.59 (.68)	0–3	1.07 (.14)	1.14 (.28)	.723
I could not control my worry.	19	Cognitive	293	.74 (.76)	0–3	.75 (.14)	–.02 (.28)	.598
I felt like I had no control over my life.	24	Cognitive	290	.51 (.79)	0–3	1.53 (.14)	1.67 (.29)	.530
I felt like something terrible was going to happen to me.	25	Cognitive	249	.47 (.73)	0–3	1.47 (.15)	1.41 (.31)	.580
I was afraid of being judged by others.	6	Affective	285	.59 (.75)	0–3	1.09 (.14)	.52 (.29)	.466
I was afraid of being humiliated or embarrassed.	7	Affective	291	1.02 (1.08)	0–3	.64 (.14)	–.95 (.29)	.353
I was irritable.	10	Affective	290	.93 (1.11)	0–3	.75 (.14)	–.11 (.29)	.632
I had outbursts of anger.	11	Affective	293	.85 (.88)	0–3	.73 (.14)	–.36 (.28)	.565
I was easily startled or upset.	13	Affective	290	.70 (.80)	0–3	.80 (.14)	–.36 (.29)	.552
I was less interested in doing something I typically enjoy.	14	Affective	293	.79 (.83)	0–3	1.06 (.14)	.46 (.28)	.544
I felt detached or isolated from others.	15	Affective	293	.52 (.76)	0–3	1.58 (.14)	2.25 (.28)	.453
I felt restless, keyed up, or on edge.	20	Affective	293	.83 (.86)	0–3	.92 (.14)	.25 (.28)	.607

Notes. N = 265; Factor loadings of the one factor solution of the principal axis factor analysis with promax rotation.

parallel analysis further supported the assumption of two factors. The two-component solution explained a total of 39.1% of the variance, albeit no clearly interpretable simple structure emerged. Several variables showed mediocre loadings on both components (items 3, 9, 19, 12, 16 and 23) and a clear assignment of all items of one subscale to one component was not possible. Therefore we also computed a one (general) factor solution, as the first component accounted for almost the entire variance and all of the inter-item correlations were substantial. All factor loadings in the one factor EFA were above .30 with the majority of loadings exceeding .50 (see Table 1). Additionally none of the corrected item-total correlations were

less than .30, which highlights the evidence of a single general anxiety factor in this Iranian sample.

Confirmatory factor analysis (CFA)

Confirmatory factor analysis (CFA) was used to validate both the originally postulated three factor structure of the GAS and a one general anxiety factor solution. Structural equation modeling was performed with the software package Amos 19 (Arbuckle, 2009). Prior to model fitting, the missing data patterns were analyzed. Little's MCAR test (Little & Rubin, 2002) indicated that the missing data in this study occurred at random. Missing data were therefore imputed using the full information maximum likelihood (FIML) algorithm in Amos. An item parceling procedure was used to treat the large number of indicators per latent variable and to achieve a stable model. This procedure is based on summing or averaging item scores from two or more items and using these parcel scores as indicators in CFA (Bandalos & Finney, 2001). In SEM, parceling is acceptable in presence of high alpha coefficients (Yuan, Bentler, & Kano, 1997) and when the set of items is one-dimensional (Bandalos & Finney, 2001). The 25 items were parceled into three main indicators for the Somatic subscale (i.e. each made up of three scores) and

Table 2. Inter-correlation matrix for the GDS-15 total, GAS total and GAS subscales.

	GDS-15	GAS			
		Total	Somatic	Cognitive	Affective
GDS-15 Total	–				
GAS Total	.55**	–			
GAS Somatic	.50**	.88**	–		
GAS Cognitive	.51**	.90**	.72**	–	
GAS Affective	.48**	.87**	.68**	.77**	–

Notes. ** p < .001 (two-tailed)

four main indicators for the Cognitive and Affective subscales (i.e. each made up of two scores; Brown, 2006).

The absolute degree of goodness of fit of the models was evaluated by the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Residual (SRMR). In addition, the Comparative Fit Index (CFI) and the Normed Fit Index (NFI) were used as measures of incremental fit. Values should be smaller than .06 for the RMSEA and smaller than .08 for the SRMR (Hu & Bentler, 1999). For the CFI, values larger than .95 are desirable. For the NFI, values larger than .95 indicate an excellent fit and values greater than .90 indicate an acceptable fit (Schermele-Engel, Mossbrugger, & Müller, 2003).

The three factor model was first specified. The factors were allowed to correlate, and no error covariance was specified. The latent factor correlations were very high, ranging between .84 and .98 also suggesting a one factor model to be appropriate in this Iranian sample. The model had a good fit to the data according to CFI (.95) and SRMR (.044) and a mediocre fit according to the NFI (.92) and RMSEA (.092; 90% CI [.076-.109]). Next a one factor model was specified without error covariances based on the 11 parcels. The model fit the data worse than the three factor model and achieved a mediocre total fit, CFI = .91, NFI = .89, SRMR = .050, RMSEA = .110, 90% CI [.094; .125]. To improve the model fit, the Modification Indices given by Amos were inspected and examined for whether the items included in the parcels showed overlap in content. Three pairs of item parcels were then allowed to be freely estimated (1 and 3; 2 and 3; 9 and 11). After this modification, the model demonstrated an excellent fit: SRMR = .036; CFI = .96; NFI = .94 and RMSEA = .072, 90% CI [.055-.090].

Convergent validity

Convergent validity of the Persian version of the GAS was studied by examining the associations between the GAS total, GAS subscales, and the GDS-15. As can be seen in Table 2, the GAS total score and GAS subscale scores were significantly positively correlated with the GDS-15, with medium effect sizes (GAS total $r = .55$; Cognitive, $r = .51$; Somatic, $r = .50$; Affective, $r = .48$). These data provide evidence of convergent validity of the translated GAS in this Iranian sample.

Gender differences

A series of independent samples t -tests was used to compare gender differences on the GAS total score and on the GAS subscale scores (see Table 3). These analyses were conducted to assess whether the known gender differences in later-life anxiety in the US (older women typically have higher levels of anxiety symptoms and higher rates of anxiety disorders than older men; Wolitzky-Taylor et al., 2010) would be replicated in this older Iranian sample. As can be seen in Table 3, older women scored higher than older men on the GAS somatic subscale (with a small to medium effect size, Cohen's $d = .39$) and affective subscale (with a small effect size, Cohen's $d = .17$). There

Table 3. Gender differences for the GAS total score and GAS subscale scores.

Variables	Gender	N	M	SD	t	df	p
GAS Total	Women	140	20.55	13.23	1.87	283	.063
	Men	145	17.74	12.13			
GAS Somatic	Women	140	9.50	5.81	3.31	283	.001
	Men	145	7.48	4.41			
GAS Cognitive	Women	140	4.56	3.92	0.64	283	.520
	Men	145	4.27	3.81			
GAS Affective	Women	140	6.48	4.74	1.45	283	.003
	Men	145	5.71	4.22			

were no significant gender differences on the GAS cognitive subscale.

GAS content items

As noted above, the GAS includes 5 content items (items 26–30) that do not load on any scales but rather provide clinicians and researchers with information about several types of situations that may be a source of anxiety for the respondents. A rank order of the means of these 5 content items showed that item 28 was the highest ranked item (*I was concerned about my children*, $M = 1.54$, $SD = 1.14$), followed by item 30 (*I was afraid of becoming a burden to my family or children*, $M = 1.47$, $SD = 1.18$), item 27 (*I was concerned about my health*, $M = 1.23$, $SD = 1.03$), item 29 (*I was afraid of dying*, $M = .59$, $SD = .89$), and item 26 (*I was concerned about my finances*, $M = .47$, $SD = .77$).

Discussion

In this study, the GAS was successfully translated into Persian and then the preliminary psychometric properties of the Persian version of the GAS were investigated among a large sample of community-dwelling Iranian older adults. Persian is the official language of Iran and is understandable by most Iranian citizens. The findings showed that the three reliability estimates of the new measure (Cronbach's alpha; test-retest; and inter-item correlations) were all adequate and similar to reliability data for the English version (Segal et al., 2010; Yochim et al., 2011; Yochim, Mueller, & Segal, 2013). Likewise, validity of the GAS was explored through correlations calculated between the GAS total score and GAS subscales with the GDS-15 total score. The findings revealed that the Persian GAS has adequate convergent validity as compared with the Persian GDS-15. The EFA and CFA results largely suggest a unidimensional, general anxiety factor in this Iranian sample. The findings regarding higher levels of some anxiety symptoms in older women compared to older men in this Iranian sample is interesting because it is consistent with findings from the United States, and is possibly suggestive of similar causes (e.g., comparable biological, psychological, and social factors) that predispose women to higher levels of anxiety across diverse cultures.

In their large mental health survey of Iranian adults, Noorbala, Bagheri Yazdi, Yasamy, and Mohammad

(2004) found that anxiety symptoms were common (21%) in the population, virtually identical to rates of depressive symptoms (21%) as measured by the General Health Questionnaire (GHQ-28) which was translated into Persian. However, in the Noorbala et al. study, older adults were not targeted specifically. In one of the few published studies that focused on older adults, Rahgozar and Mohammadi-Nasrabadi (2000) reported the prevalence of depression and anxiety among older Iranians to be 22% and 24%, respectively. Unfortunately, there is a paucity of literature regarding the mental health status of older adults in Iran, as the mental health infrastructure for many areas of Iran is still developing. There remains a great need for population based studies of psychopathology in Iran as well as cross-cultural studies that investigate whether Iranian people differ from those from other cultural backgrounds (e.g., United States, Europe, etc.) in terms of their psychological characteristics, including anxiety, depression, and other common forms of psychopathology.

Although the preliminary results in this study are promising, further research should explore the psychometrics of the Persian GAS in larger and more diverse samples of Iranian older adults, including psychiatrically impaired older adults and including more rural residents, perhaps using the GHQ-28 as an additional measure to assess the convergent validity of the GAS. Future studies should also investigate the extent to which self-report administration is comparable to oral administration of the GAS, since these data were not available in the present study. Another fruitful avenue of future research would be to examine criterion-related validity and discriminant validity of the Persian GAS, especially as other assessment tools for diverse forms of psychopathology are either translated into Persian or developed in Iran.

In conclusion, these preliminary data suggest that the Persian version of the GAS has promising psychometric properties. Based on this study, the GAS has sufficient preliminary psychometric support to be used in further screening and clinical studies with older residents in Iran. Clinicians and researchers can readily interpret the GAS total score as an estimate of the overall severity of anxiety, but they should be careful when interpreting subscale scores. We welcome further culturally-sensitive translations of the GAS into other languages, and subsequent validity studies of the translated measures.

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