Published in final edited form as:
Cogn Behav Ther. 2010 December ; 39(4): 251–261. doi:10.1080/16506073.2010.486841.

Psychometric Properties of the Generalized Anxiety Disorder Questionnaire for DSM-IV Among Four Racial Groups

Christina M. Robinson, M.A., **Suzanne C. Klenck, M.A.**, and **Peter J. Norton, Ph.D.**
University of Houston, 126 Heyne Bldg, Houston, TX 77204-5022, Ph: 713-743-8600, Fax: 713-743-8633

Abstract

The Generalized Anxiety Disorder Questionnaire-IV (GAD-Q-IV) is a self-report diagnostic measure of generalized anxiety disorder. Previous studies have established the psychometric properties of the GAD-Q-IV revealing excellent diagnostic specificity and sensitivity as well as good test-retest reliability and convergent and discriminant validity (Newman et al., 2002). Recent analyses with other measures of anxiety symptoms have revealed differences across racial or national groups. Given that the GAD-Q-IV was tested primarily on Caucasian (78%) participants, the purpose of this study was to demonstrate the psychometric properties of the GAD-Q-IV across four racial groups: African American, Caucasian, Hispanic/Latino, and Asian. A student sample of 585 undergraduate psychology students completed the GAD-Q-IV as well as other measures of anxiety symptoms. A clinical replication sample was obtained from 188 clinical participants who completed the GAD-Q-IV as part of a larger psychotherapy study. Results indicated excellent and very similar factor structures in the student sample, and similar psychometric properties across both samples across the racial groups. Implications for the use of the GAD-Q-IV across racial groups are discussed.

Keywords

Anxiety; Assessment; Generalized Anxiety Disorder; Psychometric Analyses; GAD-Q-IV

Introduction

Awareness of cross-cultural variations in psychopathology is a growing concern in psychology. Evidence suggests that while anxiety disorders have been found to exist across cultures (Good & Kleinman, 1985), there is considerable variation in the cross-cultural presentation of symptoms (Barlow, 2002; Craske, 1999). Even within the United States, it is premature to assume that all racial or ethnic groups experience equivalent symptoms with regards to frequency or severity, with several researchers underscoring the need to examine racial background and ethnic identity as a potential moderator of symptom presentation (Carter, Sbrocco, Miller, Suchday, Lewis, & Freedman, 2005).

Generalized anxiety disorder (GAD) is one of the most common anxiety disorders (Kessler et al., 1994), marked by excessive and uncontrollable worry as well as associated physical symptoms such as fatigue and muscle tension (American Psychological Association, 2000). Only a handful of studies have investigated the phenomenology of GAD across racial groups within the United States. Grant et al. (2005) examined the prevalence and correlates of GAD

Reprint requests and correspondence concerning this article should be addressed to Dr. Peter J. Norton, Department of Psychology, University of Houston, 126 Heyne Bldg., Houston, TX, 77204-5022. pnorton@uh.edu Fax: (713) 743-8633.

using the National Epidemiologic Survey on Alcohol and Related Conditions and found that the odds of meeting criteria for GAD were lower among Asian, Hispanic, and African Americans than Caucasians. In a primarily African American sample, Brantley, Mehan, Ames, and Jones (1999) found that individuals who met criteria for GAD reported more minor stressors than a non-anxious control group. However, these authors were unable to compare this finding across racial groups. In a community sample matching census quotas of the time, Gillis, Haaga, and Ford (1995) found no racial differences between African American, Caucasian and Hispanic groups on the severity of pathological worry as measured by the Penn State Worry Questionnaire (PSWQ). Scott, Eng, and Heimberg (2002) examined the degree of pathological worry, the topics of worry, and the rate at which individuals met criteria for GAD in a non-clinical sample of Asian, African American, and Caucasian undergraduate students. Their results revealed that while the groups had no differences on the rate of pathological worry or the frequency with which they met criteria for generalized anxiety disorder, they did differ on the number of domains and intensity of worry across specific domains (Scott et al., 2002). Specifically, African Americans tended to endorse fewer worry domains and reported lower scores on the Relationships, Lack of Confidence, and Work Incompetence domains than Caucasians and Asian Americans. However, they reported the greatest worry in the Financial domain. Research has also indicated that African American and Caucasian groups may also differ when it comes to how constructs predictive of anxiety disorders influence the experience of worry. In a non-clinical sample, both psychological distress and perceived control were found to predict worry in both groups; however, psychological distress was found to be a more significant predictor of worry in the African American group while low perceived control was a better predictor in the European American group (Chapman, Kertz, & Woodruff-Borden, 2009). These findings hold intriguing implications as to the whether the difference in psychological constructs placing individuals at risk for pathological worry also necessitate different conceptualizations of anxiety disorders and treatment strategies across groups (Chapman, et al., 2009).

A critical prerequisite to the examination of potential differences in clinical presentation is ensuring that assessment instruments have demonstrated metric equivalence, meaning the scores on assessments can offer similar interpretations across cultural or racial groups (Ozaki & Sue, 1995). Many widely used assessment instruments have been initially validated on primarily Caucasian student samples which may limit the extent to which these measures can be considered valid with different racial or cultural groups. It has been suggested (Malgady, 1996) that it may be more prudent to assume cross cultural differences exist on assessment instruments and avoid problems of misdiagnosis or incorrect interpretation, rather than the more common approach of assuming the null until rejected.

Within the assessment of anxiety disorders, recent studies have found that some measures may function differently across different groups. For example, the Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1992) is one measure which has received numerous evaluations across racial groups (Carter, Miller, Sbrocco, Suchday, & Lewis, 1999; Norton, DeCoteau, Hope, & Anderson, 2004; Zvolensky, McNeil, Porter, & Stewart, 2001) and nationalities (Zvolensky et al., 2003) with some studies finding group differences while others suggest equivalence across groups. Of the many measures that have been developed to assess generalized anxiety three have been examined across ethnic groups: the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990), the Worry Domains Questionnaire (WDQ; Tallis, Eysenck, & Mathews, 1992), and the Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman, Zuellig, Kachin, Constantino, Przeworski, Erickson et al., 2002). Within the investigation of these three measures for generalized anxiety and worry, the evidence has been mixed as to whether the currently developed instruments function equivalently across groups. For example, no group

differences were found on the overall scores or coefficient alphas on the PSWQ in both a community (Gillis et al., 1995) and student sample (Scott et al., 2002), both of which included African American, and Caucasian groups. However, Carter et al. (2005) found that African Americans scored significantly lower on the PSWQ than Caucasians. In addition, these authors also found differences in factor structure on the PSWQ, with a two factor (general worry and worry absence) solution found for Caucasians and a three-factor (general worry, worry absence, and worry dismissal) solution found for African Americans.

Scott et al. (2002) found that African Americans scored lower than Caucasians and Asian Americans on the Worry Domains Questionnaire (WDQ; Tallis, et al., 1992) and also exhibited different patterns of worry on the specific worry domains. The authors have suggested that perhaps the WDQ is not adequately measuring the content of worries for African Americans and that a more culturally relevant scale is needed. These authors also found that the three ethnic groups studied did not differ on the rate at which they met criteria for GAD on the Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman et al., 2002), although they did not report on how the particular psychometric properties of this measure performed across groups.

The Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman et al., 2002) is the only self-report measure in English which assesses the full diagnostic criteria of generalized anxiety disorder (Rodebaugh, Holaway, & Heimberg, 2008), making it a valuable tool as both a screening measure as well as indicator of disorder severity. To date only one study (Scott et al., 2002) has examined the GAD-Q-IV across ethnic groups; however, this study did not include details on the specific psychometric properties of this measure across ethnicities. The GAD-Q-IV is comprised of 9 items which assess the presence, frequency, and controllability of excessive worry, the number of endorsed worry themes and physical symptoms, and the interference and distressed caused by worry and its symptoms. During the original validation study (Newman et al., 2002), the GAD-Q-IV demonstrated sensitivity (83%) and specificity (89%), adequate test-rest reliability ($\kappa = .67$) as well as both convergent and discriminant validity. Additional research has also demonstrated a one-factor structure to the GAD-Q-IV (Rodebaugh, et al., 2008). Despite the promising psychometric properties of the GAD-Q-IV, the measure was validated on two primarily Caucasian (78%; 89%) samples, indicating there is little knowledge about the specific psychometric properties across racial or cultural groups.

There is sufficient need to ensure measurement equivalence of the GAD-Q-IV given the above evidence that groups may differ in the presentation of worry and GAD as well as some evidence for differential functioning of the PSWQ and WDQ. In addition, the GAD-Q-IV was originally validated on a primarily Caucasian sample and there has been little information provided in the literature as to how this measure functions across ethnic groups. Therefore the purpose of this study was to investigate the psychometric properties of the GAD-Q-IV across racial groups. Although it was anticipated that the GAD-Q-IV would not display differential functioning across racial groups due to the similarity found in a previous study (Scott et al., 2002), logical issues arise when predicting the null. Therefore we sought to determine the convergent and divergent validity as well as the factor structure of the GAD-Q-IV across racial groups.

Method

Participants and Procedures

Student Sample—Five-hundred and eighty-five undergraduate students from the University of Houston participated in the study for extra academic credit. Participants completed the GAD-Q-IV as part of a battery of other self-report measures using an online

data collection system. Participants were administered informed consent consistent with the IRB guidelines at the University of Houston. Individuals were asked to self-identify their ethnicity, but were not asked any information regarding their place of birth or first language spoken; However, the University of Houston requires that all international students obtain a minimum score on the Test of English as Foreign Language (TOEFL)for admittance to the University, therefore it was assumed that participants could understand English at a sufficient level to answer the questionnaires. The sample was comprised of African American (n = 114, 17.5%), Caucasian (n= 184, 28.3%), Hispanic/Latino (n = 131, 20.2%), and Asian (n = 156, 24%) participants. Only participants from these four racial groups were included in the analyses as there were insufficient numbers (n = 59) of participants from any other racial or multiracial group to ensure adequate statistical power. The sample was primarily female (70%) with roughly similar compositions across ethnic groups, Asian (n = 105, 67.3%), African American (n = 91, 81.3%), Caucasian (n = 212, 65.8%), and Hispanic (n = 95, 72.5%). The mean age was 21.4 and ranged from 18 to 50 years. No other demographic information, such as martial or socio-economic status was gathered. Using the cut-off score of 5.7 suggested by Newman et al. (2002), 221 (37.7%) of the student sample met criteria for generalized anxiety disorder.

Clinical Sample—A clinical replication sample was obtained from 188 clinical participants presenting to the University of Houston Anxiety Disorder Clinic for services as part of a larger psychotherapy research study. All individuals provided informed consent prior to completing the questionnaires. The sample consisted of African American (n = 20, 10.6%), Caucasian (n= 116, 61.7%), Hispanic/Latino (n = 38, 20.2%), and Asian (n = 14, 7.4%) participants. Again, there were an insufficient number of participants self-identifying as of other or mixed racial or ethnic descent for analysis. The sample was primarily female (60 %) with slightly more women comprising the African American than the other groups, Asian (n = 7, 50.0%), African American (n = 14, 72.4%), Caucasian (n = 70, 59.5%), and Hispanic (n = 22, 58.2%). The mean age was 33.04 and ranged from 18 to 63. Clients were administered the GAD-Q-IV as part of a pre-treatment assessment which included a diagnostic interview using the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; Brown, DiNardo, & Barlow, 1994). The sample was diagnostically mixed, with 68 (36.2%) showing primary social anxiety disorder, 58(30.9%) panic spectrum disorders, 25 (13.3%) generalized anxiety disorder, 7 (3.7%) specific phobia, 4 (2.1%) major depressive disorder, 6 (3.2%) obsessive-compulsive disorder, 5 (2.7%) anxiety disorder NOS, 3 (1.6%) post-traumatic stress disorder, 3 (1.6%) bipolar disorder, 1 (0.5%) adjustment disorder, and 1 (0.5%) dysthymic disorder. Over half of the sample (61.2%) had one or more comorbid Axis I diagnoses. In addition, 44 (25.0%) had a comorbid diagnosis of GAD for a total 67 (38.1%) of the entire sample who met criteria for generalized anxiety disorder. Additional comorbid diagnoses of individuals with primary GAD included 4 (16%) with major depression, 6 (24 %) with panic disorder with or without agoraphobia, 7 (28%) with social phobia, 1 (.04%) with specific phobia, 1 (.04%) with obsessive-compulsive disorder , and 1 (.04%) with trichotillomania. A diagnostically mixed sample was used throughout the analyses to ensure sufficient power to the analyses given the relatively lower number of individuals with primary GAD.

Measures

Generalized Anxiety Disorder Questionnaire for DSM-IV—(GAD-Q-IV; Newman et al., 2002). The GAD-Q-IV is a 9-item self-report measure assessing DSM-IV criteria for generalized anxiety disorder including the presence, and interference of worry and associated physical symptoms. The GAD-Q-IV has demonstrated good psychometric characteristics and has shown good sensitivity and specificity in distinguishing individuals with GAD from those with other anxiety diagnoses (Newman et al., 2002). A recent factor

analytic study has supported a one-factor model of the GAD-Q-IV (Rodebaugh, et al., 2008). Psychometric properties within the current samples will be detailed below.

Penn State Worry Questionnaire—(PSWQ; Meyer et al., 1990). The Penn State Worry Questionnaire was designed to measure an individual's tendency to worry excessively without reference to the specific content of the worries. The PSWQ does not assess for the presence of physical symptoms of generalized anxiety disorder. The scale consists of 16 self-report items on a 5-point Likert scale with higher scores indicating increased levels of worry. The PSWQ has demonstrated good psychometric properties and has been shown to distinguish patients with GAD from those with other anxiety disorders and healthy controls (Brown, Antony, & Barlow, 1992). The PSWQ has demonstrated rough metric equivalence between Caucasian and African American students, although there may be differences in the factor structure between these two groups (Carter et al., 2005). In addition, no group differences on the PSWQ were found between Caucasian, Hispanic, and Asian groups in a community sample (Gillis et al., 1995). In the student sample this scale had a $M = 47.82$, $SD = 12.38$, and $\alpha = .756$. In the clinical sample this scale had a $M = 59.33$, $SD = 12.92$, and $\alpha = .740$.

Beck Anxiety Inventory—(BAI; Beck, Epstein, Brown, & Steer, 1988).The BAI is a 21-item measure which respondents self-report on a 4-point Likert scale their current level of various anxiety symptoms. Higher scores on this measure indicate a greater severity of anxiety symptoms. The BAI has demonstrated excellent reliability and validity in clinical as well as college samples (Creamer, Foran, & Bell, 1995). The BAI has previously exhibited no differences between Caucasian, African-American, and Hispanic groups in a community sample (Gillis et al., 1995). In the student sample this scale had a $M = 9.44$, $SD = 8.75$, and $\alpha = .912$. In the clinical sample this scale had a $M = 25.86$, $SD = 13.63$, and $\alpha = .931$.

Intolerance of Uncertainty Scale—(IUS; Buhr & Dugas, 2002; Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994). The IUS is a 27-item scale which respondents self-report on a 5-point Likert scale their reactions to ambiguous or uncertain situations. The IUS has demonstrated excellent psychometric properties and is considered to measure a trait-like vulnerability to anxiety(Norton, Sexton, Walker, & Norton, 2003). The IUS has displayed convergence across Asian, African American, Caucasian and Hispanic groups (Norton, 2005). In the student sample this scale had a $M = 55.50$, $SD = 19.30$, and $\alpha = .949$. In the clinical sample this scale had a $M = 78.03$, $SD = 24.66$, and $\alpha = .957$.

Beck Depression Inventory-II—(BDI-II: Beck, Steer, & Brown, 1996). The BDI-II is a 21-item questionnaire asking participants to rate from 0 to 3 their experience with common depressive symptoms within the past two weeks. The BDI has demonstrated acceptable psychometric properties including internal consistency and validity (Beck, Steer, & Brown, 1996). Furthermore, the BDI-II displayed similar psychometric properties in a diverse group of college students (Asian, African American, Caucasian, Hispanic, and Native American), although groups were found to differ in the frequency of particular symptoms (Carmody, 2005). In the student sample this scale had a $M = 12.41$, $SD = 10.04$, and $\alpha = .926$. In the clinical sample this scale had a $M = 21.05$, $SD = 11.54$, and $\alpha = .911$.

Panic Disorder Severity Scale—(PDSS; Shear et al., 1997). The PDSS is a 7-item measure rated by interviewers (Shear et al., 1997) or respondents (see Houck, Speigel, Shear, & Rucci, 2002) on 5-point (0 to 4) scales. The Self-Report version, the PDSS-SR, has shown comparable reliability, validity, and clinical sensitivity in comparison to the original clinician-rated PDSS (Houck et al., 2002). Test-retest reliability of the PDSS-SR was high ($r = .83$) over consecutive days (Houck et al., 2002). Items assess panic frequency, distress,

social and occupational interference, anticipatory anxiety, and avoidance of agoraphobic situations and interoceptive cues. Scores on the PDSS-SR can range from 0 to 28. No normative data was found for the PDSS regarding race. In the student sample this scale had a $M = 2.75$, $SD = 4.15$, and $\alpha = .897$. In the clinical sample this scale had a $M = 11.79$, $SD = 7.10$, and $\alpha = .899$.

Results

Scale Summary

Student Sample—Scores on the GAD-Q-IV ranged from 0 to 12 with a mean of 5.01 (S.D. = 3.46). No significant differences on mean GAD-Q-IV emerged across races ($F_{3, 489} = 1.46$, $p = .224$, $\alpha = .05$) in African American ($\mu = 4.48$, S.D. = 3.36), Caucasian ($\mu = 5.12$, *S.D.* = 3.55), Hispanic/Latino ($\mu = 4.73$, S.D. = 3.39), and Asian ($\mu = 5.35$, S.D. = 3.23) groups. Differences in mean scores were observed across genders (men: $\mu = 3.87$, *S.D.*= 3.07; women : $\mu = 5.46$, *S.D.*= 3.50), $F\ (_{1, 536}) = 20.659$, $p < .001$, $\alpha = .05$) which is consistent with prevalence rates of generalized anxiety disorder. Consistent with the original study, estimates of internal consistency were not examined as the scale was constructed with an option to discontinue if the first three items are answered negatively. Any estimates of internal consistency would therefore be inflated due to raised item-total correlations between skipped items (Newman et al., 2002).

Clinical Sample—In the clinical replication sample, scores on the GAD-Q-IV ranged from 0 to 13 with a mean of 8.74 (S.D. = 3.59). No significant differences on mean GAD-Q-IV scores emerged across races ($F = 1.71$, $p = .168$, $\alpha = .05$) in African American ($\mu = 8.13$, S.D. = 4.80), Caucasian (μ =8.95, *S.D.* = 3.47), Hispanic/Latino ($\mu = 8.38$, S.D. = 3.20), and Asian ($\mu = 6.77$, S.D. = 4.09) groups. Differences in mean scores were not observed across gender (men: $\mu = 8.07$, *S.D.*= 4.09; women : $\mu = 8.89$, *S.D.*= 3.32), $F\ (_{1,185}) = 2.27$, $p = .134$, $\alpha = .05$).

Factor structure

Student Sample—Although factor analysis was not completed as part of the original validation study, recent evidence suggested that a one-factor solution was defensible (Rodebaugh et al., 2008). In order to examine the replicability of this finding across racial groups, a Principal Components factor analysis and a Promax rotation was performed for each racial group. The number of factors retained was determined by visual examination of scree plots, factor structure interpretability, and the eigenvalues greater than 1. The results revealed the existence of one-factor that emerged across all racial groups (Table 1). Eigenvalues for the single factor along with the amount of variance explained by that factor were similar across the four racial groups: African American (5.017, 55.74% variance explained), Asian (4.657, 51.74% of variance explained), Caucasian (5.483, 60.92% of variance explained) and Hispanic (4.821, 53.57% variance explained).

Convergent validity

Student Sample—Correlations between the GAD-Q-IV and the Penn State Worry Questionnaire (PSWQ), Beck Anxiety Inventory (BAI), and Intolerance of Uncertainty Scale (IUS) were examined across racial groups to demonstrate convergent validity (Table 2). The magnitudes of the correlations were compared across groups using Fisher's test of Z transformed independent sample correlations. Due to the multiple number of comparisons performed, a Bonferroni correction was used to reduce the probability of alpha inflation and a Type 1 error. The standard $\alpha = .05$ was divided by the 18 comparisons resulting in $\alpha = .002$. Using the Bonferroni correction, no significant differences emerged between the GAD-Q-IV and the IUS, PSWQ, or BAI across all four racial groups (all *p*s > .05).

Clinical Sample—Correlations between the GAD-Q-IV and the Penn State Worry Questionnaire (PSWQ), Beck Anxiety Inventory (BAI), and Intolerance of Uncertainty Scale (IUS) were examined across racial groups to demonstrate convergent validity (Table 2). The magnitudes of the correlations were compared across groups using Fisher's test of Z transformed independent sample correlations and the same Bonferroni correction as used in the student sample. No significant differences were found between the correlations between the GAD-Q-IV and the PSWQ, BAI, and IUS across Caucasian, African American, Hispanic, and Asian participants (all *p*s > .05).

In addition, participants in the clinical sample were coded as to whether they met criteria for a primary or comorbid diagnosis of GAD (1 = GAD, 0 = No GAD) based on the ADIS-IV. This variable and participant race/ethnicity were included as between subject factors in an ANOVA to examine if those diagnoses with GAD scored significantly higher on the GAD-Q-IV, and if such differences varied by race/ethnicity. As expected, those diagnosed with a diagnosis of GAD scored significantly higher on the GAD-Q-IV (M = 10.53, SD = 1.86) than did those not diagnosed with GAD (M = 7.55, SD = 3.98), F = 18.55, p < .001. This effect was not moderated by a race/ethnicity by diagnosis interaction, F = 0.33, p = .801, indicating that the difference in GAD-Q-IV scores between those with or without a GAD diagnosis did not vary by race/ethnicity.

Incremental Validity

Student Sample—The incremental validity of the GAD-Q-IV was tested through a hierarchical multiple regression to determine if the GAD-Q-IV could account for any variance of the PSWQ beyond that accounted for by general measures of anxiety and depression. For each racial group a hierarchical multiple regression analysis was conducted with the PSWQ as the criterion and the BAI and BDI entered in the first step. The GAD-Q-IV was then entered into the second step. As shown in Table 3, the GAD-Q-IV significantly predicted PSWQ scores (p < .001, α = .05) beyond what was predicted by the BAI and BDI. Furthermore, there were no differences in this significance across the four racial groups.

Clinical Sample

The incremental validity of the GAD-Q-IV was also tested in the clinical sample through a hierarchical multiple regression to determine if the GAD-Q-IV could account for any variance of the PSWQ beyond that accounted for by general measures of anxiety and depression. For each racial group a hierarchical multiple regression analysis was conducted with the PSWQ as the criterion and the BAI and BDI entered in the first step. The GAD-Q-IV was then entered into the second step. As shown in Table 4, the GAD-Q-IV significantly predicted PSWQ scores (p < .001, α = .05) beyond what was predicted by the BAI and BDI for each group, with the exception that the unique incremental addition of the GAD-Q-IV among African American participants only approached significance.

Divergent Validity

Student sample—Finally, the divergent validity of the GAD-Q-IV was evaluated across groups through a hierarchical multiple regression to determine if the GAD-Q-IV accounted for a significant proportion of the variance of an unrelated measure, the PDSS, beyond that accounted for by general measures of anxiety and depression. For each racial group a hierarchical multiple regression analysis was conducted with the PDSS as the criterion and the BAI and BDI entered in the first step. The GAD-Q-IV was then entered into the second step. Supporting the divergent validity of the GAD-Q-IV across groups, no significant unique relationship between the GAD-Q-IV and PDSS was observed for participants of African American, β = .178, p = .159, α = .05, Caucasian, β = .006, p = .941, α = .05,

Hispanic, β = .137, *p* = .238, α = .05, or Asian descent, β = .066, *p* = .436, α = .05, beyond what was predicted by the BAI and BDI.

Clinical sample—The divergent validity of the GAD-Q-IV was similarly evaluated across groups in the clinical sample. As in the student sample, no significant unique relationship between the GAD-Q-IV and PDSS was observed for participants of African American, β = .025, *p* = .911, α = .05, Caucasian, β = .036, *p* = .683, α = .05, Hispanic, β = .101, *p* = .590, α = .05, or Asian descent, β = .075, *p* = .817, α = .05, beyond what was predicted by the BAI and BDI.

Discussion

The demonstration of metric equivalence of diagnostic measures across racial groups is a necessary step in order to accurately measure and examine possible differences in psychopathology between groups. To further these efforts, the current study examined the psychometric equivalence of the GAD-Q-IV, a diagnostic measure of generalized anxiety disorder primarily studied in Caucasian samples. Overall the results indicated that the GAD-Q-IV held similar psychometric properties across racial groups in both clinical and student samples. No significant differences on mean scores emerged between African American, Caucasian, Hispanic/Latino, and Asian groups in either sample; however, gender differences in symptomatology was only found in the student sample. It is possible that gender differences were not found in the clinical sample due to a ceiling effect. In addition, the clinical sample did not have a sufficient number of participants, so a factor analysis was only able to be conducted within the student sample. The results of the factor analysis in the student sample revealed the emergence of a single factor across all racial groups and were consistent with previous factor analysis conducted in a primarily Caucasian sample (Rodebaugh et al., 2008). These results suggest that the questionnaire is measuring the diagnostic construct of generalized anxiety disorder uniformly across groups and also provides evidence that there are no differences in convergent validity between the groups studied.

Finally, analyses of incremental validity found that the GAD-Q-IV was able to predict additional variance in the PSWQ beyond general measures of anxiety and depression across all four racial groups, with the possible exception of African American participants in the clinical sample for whom the effect only approached significance. This finding was somewhat unexpected, especially given previous studies which revealed that the PSWQ demonstrates general metric equivalence between African American and Caucasian groups (Carter et al., 2005). It may be possible that the lack of significant incremental validity is related to previous findings of different factor structures for the PSWQ in African American and Caucasian groups, with African American group's responses best captured by a three factor solution (Carter et al., 2005). However, it is important to note that no racial differences were found on analyses of divergent validity in both the clinical and student samples. Future research examining specific patterns of symptom endorsement across ethnic/racial groups may help to shed more light on this finding. Another unexpected finding was the lower correlation between the GAD-Q-IV and the IUS for African American, Asian, and Hispanic relative to Caucasian individuals, although these differences were not statistically significant (see Table 2). Previous research has found cross racial uniformity with the IUS (Norton, 2005), suggesting this finding is not related to psychometric biases. Intolerance of uncertainty has been suggested as a risk factor for the development of GAD and the differences in correlations across groups may be indicative of differential risk factors for GAD between White and non-White racial groups. Chapmen et al. (2009) found differences in risk factors for worry between African American and Caucasian students and it is plausible that these differences extend to other non-white racial groups.

Overall, these results taken together provide evidence for cross-racial uniformity with the GAD-Q-IV. As the GAD-Q-IV was designed to extrapolate a diagnosis, these results also imply that generalized anxiety disorder can be conceived as the same diagnostic construct across racial groups. This implication requires more rigorous investigation as a recent study found differences in the phenomenology of worry between African American and Caucasian college students (Scott, et al., 2002). The results demonstrate excellent psychometric equivalence of the GAD-Q-IV across the racial groups inspected and indicate that the measure can be administered and interpreted similarly across these ethnicities with implications for both researchers as well as the practicing clinician. This study does have a few limitations which should be noted. First, there was no measure of acculturation or ethnic identity limiting the extent to which participant's level of affiliation with their racial/ethnic group can be determined. This issue is an important one to be considered by the field of clinical psychology since the stress from acculturation (navigating the line between the majority and minority cultures) has been found to be factors in the development of psychopathology and may contribute to difficulty in treatment (Sue & Sue, 2008; Cardemil & Battle, 2003). Conversely, previous research has also indicated that pride and affiliation with one's ethnic group may act as a buffer against anxiety. For example, Carter et al. (2005) found higher levels of ethnic identification in African Americans are associated with lower levels of state and trait anxiety, but are unrelated to measures of depression and worry. Although no psychometric differences were found on the GAD-Q-IV across racial categories, the lack of acculturation and/or ethnic identity measures in the current study make it unclear if the GAD-Q-IV would perform similarly across diverse individuals with different levels of acculturation/affiliation. Another notable limitation is the small number of participants in each racial group within the clinical sample; however, it was felt that there were a sufficient number in order to fulfill the purposes of this study. Additionally, there was a small number (38.1%) of participants that met criteria for generalized anxiety disorder in the clinical sample, as participants were seeking treatment at an anxiety disorder specialty clinic where a wide variety of anxiety disorders are treated. Finally, the clinical and student samples were comprised mainly of women and it could be possible that differences may emerge between racial groups if more men were included in the sample. Despite these limitations, this study provided preliminary evidence for the metric equivalence of the GAD-Q-IV with implications that the diagnostic construct of generalized anxiety can also be considered unitary. These findings may prove useful when examining if empirically supported treatment strategies for generalized anxiety will be equally efficacious across racial groups.

References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed.. Washington, DC: Author; 2000. text rev.

Barlow, DH. Anxiety and its disorders. 2nd ed.. New York: Guilford; 2002.

Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety. Journal of Consulting and Clinical Psychology 1988;56:893–897. [PubMed: 3204199]

Beck, AT.; Steer, RA.; Brown, GK. Beck Depression Inventory manual. 2nd Ed.. San Antonio, TX: Psychological Corp; 1996.

Brantley PJ, Mehan DJ, Ames SC, Jones GN. Minor stressors and generalized anxiety disorder among low-income patients attending primary care clinics. The Journal of Nervous and Mental Disease 1999;187:435–440. [PubMed: 10426464]

Brown TA, Antony MM, Barlow DH. Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorders sample. Behaviour Research and Therapy 1992;30:33–37. [PubMed: 1540110]

Brown, TA.; Di Nardo, PA.; Barlow, DH. Anxiety disorders interview schedule for DSM-IV (Adult Version). Albany, NY: Graywind; 1994.

Buhr K, Dugas MJ. The Intolerance of Uncertainty Scale: Psychometric properties of the English version. Behaviour Research and Therapy 2002;40:931–945. [PubMed: 12186356]

Carmody DO. Psychometric characteristics of the Beck Depression Inventory-II with college students of diverse ethnicity. International Journal of Psychiatry in Clinical Practice 2005;9:22–28.

Carter MM, Miller O, Sbrocco T, Suchday S, Lewis EL. Factor structure of the Anxiety Sensitivity Index among African American college students. Psychological Assessment 1999;11:525–533.

Carter MM, Sbrocco T, Miller O, Suchday S, Lewis EL, Freedman REK. Factor structure, reliability, and validity of the Penn State Worry Questiionnaire: Differences between African-American and White-American college students. Journal of Anxiety Disorders 2005;19:827–843. [PubMed: 16243633]

Chapman LK, Kertz SJ, Woodruff-Borden J. A structural equation model analysis of perceived control and psychological distress on worry among African American and European American young adults. Journal of Anxiety Disorders 2009;23:69–76. [PubMed: 18487036]

Craske, MG. Anxiety disorders: Psychological approaches to theory and treatment. Boulder, CO: Westview; 1999.

Creamer M, Foran J, Bell R. The Beck Anxiety Inventory in a non-clinical sample. Behaviour Research and Therapy 1995;33:477–485. [PubMed: 7755538]

Freeston MH, Rheaume J, Letarte h, Dugas MJ, Ladouceur R. Why do people worry? Personality and Individual Differences 1994;17:791–802.

Good, BJ.; Kleinman, AM. Culture and anxiety: Cross-cultural evidence for the patterning of anxiety disorders. In: Tuma, AH.; Maser, JD., editors. Anxiety and Anxiety Disorders. Hillsdale, NJ: Erlbaum; 1985. p. 297-323.

Gillis MM, Haaga DAF, Ford GT. Normative values for the Beck Anxiety Inventory, Fear Questionnaire, Penn State Worry Questionnaire, and Social Phobia and Anxiety Inventory. Psychological Assessment 1995;7:450–455.

Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Huang B. Co-occurrence of 12-month mood and anxiety disorders and personality disorders in the US: Results from the national epidemiologic survey on alcohol and related conditions. Journal of Psychiatric Research 2005;39:1–9. [PubMed: 15504418]

Houck PR, Speigel DA, Shear KM, Rucci P. Reliability of the self-report version of the Panic Disorder Severity Scale. Depression and Anxiety 2002;15:183–185. [PubMed: 12112724]

Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshkeman S, Wittchen HU, Kendler KS. Lifetime and 12 month prevalence of DSM-III-R psychiatric disorders in the United States: Results from the National Comorbidity Study. Archives of General Psychiatry 1994;51:8–19. [PubMed: 8279933]

Malgady RG. The question of cultural bias in assessment and diagnosis of ethnic minority clients: Let's reject the null hypothesis. Professional Psychology: Research and Practice 1996;27:73–77.

Meyer T, Miller M, Metzger R, Borkovec T. Development and validation of the Penn State Worry Questionnaire. Behaviour Research and Therapy 1990;28:487–495. [PubMed: 2076086]

Newman MG, Zuellig AR, Kachin KE, Constantino MJ, Przeworski A, Erickson T, Cashman-McGratch L. Preliminary reliability and validity of the Generalized Anxiety Disorder Questionnaire-IV: A revised self report diagnostic measure of generalized anxiety disorder. Behavior Therapy 2002;33:215–233.

Norton PJ. A psychometric analysis of Intolerance of Uncertainty Scale among four racial groups. Journal of Anxiety Disorders 2005;19:699–707. [PubMed: 15927782]

Norton PJ, Sexton KA, Walker JR, Norton GR. Hierarchical model of vulnerabilities for anxiety: Replication and extension with a clinical sample. Cognitive Behaviour Therapy 2003;34:49–63.

Norton PJ, DeCoteau TJ, Hope DA, Anderson JA. The factor structure of the Anxiety Sensitivity Index among Northern Plains Native Americans. Behaviour Research and Therapy 2004;42:241–247. [PubMed: 14975784]

Okazaki S, Sue S. Methodological issues in assessment research with ethnic minorities. Psychological Assessment 1995;7:367–375.

Peterson, RA.; Reiss, S. Anxiety Sensitivity Index revised test manual. Worthington, OH: International Diagnostic Services; 1992.

Rodebaugh TL, Holaway RM, Heimberg RG. The factor structure and dimensional scoring of the Generalized Anxiety Disorder Questionnaire for DSM-IV. Assessment 2008;15:343–350. [PubMed: 18202302]

Scott EL, Eng W, Heimberg RG. Ethnic differences in worry in a nonclinical population. Depression and Anxiety 2002;15:79–82. [PubMed: 11891998]

Shear MK, Brown TA, Barlow DH, Money R, Sholomskas DE, Woods SW, et al. Multicenter Collaborative Panic Disorder Severity Scale. American Journal of Psychiatry 1997;154:1571–1575. [PubMed: 9356566]

Tallis F, Eysenck M, Mathews A. A questionnaire for the measurement of nonpathological worry. Personality and Individual Differences 1992;13:161–168.

Zvolensky MJ, Arrindell WA, Taylor s, Bouvard M, Cox BJ, Stewart SH, et al. Anxiety sensitivity in six countries. Behaviour Research and Therapy 2003;41:841–859. [PubMed: 12781249]

Zvolensky MJ, McNeil DW, Porter CA, Stewart SH. Assessment of anxiety sensitivity in young American Indians and Alaska Natives. Behaviour Research and Therapy 2001;39:477–493. [PubMed: 11280345]

Table 1

Student sample factor loadings for 1 factor solution across 4 racial groups.

Item	African American	Asian	Caucasian	Hispanic/Latino
1	.828	.820	.839	.777
2	.768	.785	.851	.690
3	.758	.702	.785	.742
4	.731	.553	.720	.708
5	.625	.592	.620	.745
6	.683	.754	.785	.644
7	.716	.562	.708	.727
8	.761	.808	.820	.739
9	.826	.826	.864	.803

Eigen				
1	5.017	4.657	5.483	4.821
2	.940	.934	.752	.931
3	.885	.802	.622	.792
4	.577	.646	.555	.639
5	.518	.615	.505	.569
6	.361	.494	.407	.418
7	.357	.425	.349	.339
8	.238	.247	.179	.297
9	.107	.181	.149	.196

Note: No item loaded on more than a single factor for each of the racial groups.

Table 2

Pearson correlations between GAD-Q-IV and measures of worry and anxiety

	$r_{\text{GAD-Q-IV.PSWQ}}$		$r_{\text{GAD-Q-IV.BAI}}$		$r_{\text{GAD-Q-IV.IUS}}$	
	Student	**Clinical**	**Student**	**Clinical**	**Student**	**Clinical**
African American	.771	.682	.616	.481	.587	.355
Caucasian	.792	.736	.635	.544	.684	.625
Hispanic/Latino	.786	.654	.679	.506	.695	.366
Asian	.758	.908	.619	.664	.546	.322

All correlation coefficients significant ($p < .001$).

Table 3

Step 2 of hierarchical regressions predicting the PSWQ in the student sample

Racial Group	Variable	*B*	S.E. *B*	β	*p*	Model Adj R^2	R^2 Change
Caucasian	BAI	−.285	.102	−.186	.006	.641	.410, p< .001
	BDI	.014	.086	.011	.869		
	GAD-Q-IV	3.249	.236	.903	<.001		
African American	BAI	.257	.142	.176	.074	.596	.286, p< .001
	BDI	−.127	.119	−.107	.289		
	GAD-Q-IV	2.741	.332	.732	−.001		
Hispanic/ Latino	BAI	.005	.118	.004	.968	.610	.324, p < .001
	BDI	−.096	.114	−.073	.403		
	GAD-Q-IV	3.182	.341	.831	<.001		
Asian	BAI	−.034	.107	−.026	.753	.571	.279, p < .001
	BDI	.124	.088	.112	.162		
	GAD-Q-IV	2.434	.273	.709	<.001		

PSWQ: Penn State Worry Questionnaire; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; IUS: Intolerance of Uncertainty Scale.

Table 4

Step 2 of hierarchical regressions predicting the PSWQ in the clinical sample

Racial Group	Variable	*B*	S.E. *B*	β	*p*	Model Adj R^2	R^2 Change
Caucasian	BAI	.043	.071	.046	.545	.570	.313, p< .001
	BDI	.010	.085	.009	.910		
	GAD-Q-IV	2.632	.297	.732	<.001		
African American	BAI	.212	.166	.221	.220	.704	.066, p=.057
	BDI	.557	.227	.461	.026		
	GAD-Q-IV	0.967	.471	.322	.057		
Hispanic/ Latino	BAI	−.117	.156	−.109	.461	.548	.392, p < .001
	BDI	.197	.166	.169	.247		
	GAD-Q-IV	3.102	.598	.732	<.001		
Asian	BAI	−.337	.208	−.206	.139	.886	.417, p < .001
	BDI	.088	.172	.068	.621		
	GAD-Q-IV	3.627	.547	1.028	<.001		

PSWQ: Penn State Worry Questionnaire; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; IUS: Intolerance of Uncertainty Scale.

Cogn Behav Ther. Author manuscript; available in PMC 2011 December 1.