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Utility of the PANAS-X in Predicting Social Phobia in African American Females

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Abstract

Burgeoning literature in the field of social anxiety suggests that social phobia may diverge from the other anxiety disorders in terms of the association it shares with low positive affect. Research examining positive affect and social anxiety has contributed to the understanding of social phobia in non-Hispanic White populations, but the cross-cultural generalization of anxiety in African Americans remains unknown. The current study used receiver operating characteristic analysis to estimate the extent to which scores on the Positive and Negative Affect Scales of the Positive and Negative Affect Schedule–Expanded form (PANAS-X) predicted anxiety disorder diagnoses in a sample of 91 community-dwelling African American females. Subsequent receiver operating characteristic analyses were conducted to evaluate the utility of the Positive and Negative Affect Scales of the PANAS-X in predicting social phobia specifically. Results suggest that the PANAS-X is a clinically useful measure for predicting anxiety disorder diagnosis and, more specifically, social phobia in African American females. Additionally, optimal cutoff scores were identified, underscoring the potential use of the PANAS-X as a screening device for anxiety in African American females.

Keywords

anxiety, assessment, culture, validity

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Research examining anxiety and related constructs in members of various cultural groups remains an empirical obscurity, and the accurate assessment of these constructs continues to be an area in need of further examination. However, nascent work has suggested that the manifestation of anxiety may differ in African American populations when compared with their non-Hispanic White counterparts (Chapman, Kertz, Zurlage, & Woodruff-Borden, 2008; Chapman, Williams, Mast, & Woodruff-Borden, 2009; Last & Perrin, 1993; Nalven, 1970; Neal & Brown, 1994; Neal, Lilly, & Zakis, 1993; Neal & Turner, 1991), particularly in the realm of social fears (Chapman et al., 2008; Chapman, Vines, & Petrie, 2011; Melka, Lancaster, Adams, Howarth, & Rodriguez, 2010). The literature pertaining to collectivistic cultures and kin support networks offers an explanation for the differences that exist between African Americans and their ethnic majority counterparts (Boyd-Franklin, 2003; Caldwell & Koski, 1997; Hatchet & Jackson, 1993; McCabe, Clark, & Barnett, 1999; Murry, Bynum, Brody, Willert, & Stephens, 2001). For example, members of collectivistic cultures tend to identify themselves with the group and strive to maintain the integrity of that group (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Thus, the extended kin support networks that characterize the collectivistic nature of African American culture may result in a heavier emphasis being placed on ideal social interactions so as to avoid humiliating their kin network (Chapman et al., 2008; Chapman et al., 2011). Recent research supporting this theory suggests that individuals from collectivistic cultures endorse elevated levels of social anxiety symptoms when compared with those from individualistic cultures (Heinrichs et al., 2006).

Based on these differences, studies examining measures used to assess anxiety symptoms in exclusively African American populations have recently begun to emerge. Along these lines, the Fear of Negative Evaluation Scale (FNE) and the Social Avoidance and Distress Scale (SAD) both revealed factor structures that diverged from the original models when used in an exclusively African American sample (Melka et al., 2010). It should be noted, however, that these results appear to be more related to problems with the measure rather than specifically failing to capture social anxiety symptoms in African Americans per se. Additionally, patterns in the social fear domain derived from the Fear Survey Schedule–Second Edition (FSS-II) varied in a sample of African American college students when compared with their non-Hispanic White peers (Chapman et al., 2008). Whereas some studies have sought to examine the psychometric properties and factor structure of existing measures of anxiety symptoms in African American samples(Chapman et al., 2008; Melka et al., 2010), few to date have examined the utility of the measures in predicting the presence of *anxiety disorders* in ethnic minorities.

Given the existing paucity in the literature pertaining to the construct of anxiety in African Americans as well as the established relationship between affect and anxiety disorders (see Beck et al., 2001; Brown, Chorpita, & Barlow, 1998; Watson, 2005), an examination of an empirically supported measure of affectivity in African Americans is paramount. Recent findings regarding positive and negative affect and their relationship with social anxiety serve as a catalyst for future research examining this association.

Models of Social Anxiety

In recent decades, the empirically supported relationship between anxiety and depression has become increasingly salient. The tripartite model of affect proposed by Clark and Watson (1991) explains depression and anxiety in terms of a single nonspecific factor and two factors that are uniquely specific to anxiety and depression. Whereas symptoms of general distress and negative affect are common to both anxiety and depression, it has been suggested that low positive affect is unique to depression, and hyperarousal is unique to anxiety (Barlow, 2002; Brown et al., 1998; Clark & Watson, 1991, Watson, Clark, et al., 1995, Watson, Weber, et al., 1995, Zinbarg & Barlow, 1996). Moreover, recent research suggests that autonomic arousal may not sufficiently explain the heterogeneity that exists between the various anxiety disorders. For example, a more recent model of anxiety and depression (Mineka, Watson, & Clark, 1998) posits that the role of anxious arousal is confined to panic disorder specifically as opposed to the previously noted representation of all anxiety disorders. Additionally, each of the anxiety disorders is hypothesized to possess a specific component that is distinguishable from anxious arousal (Mineka et al., 1998).

According to the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision (*DSM-IV-TR*), social phobia is characterized by an excessive or unreasonable fear of unfamiliar people or possible scrutiny in at least one social or performance situation, which is almost invariably followed by an anxious response and results in impairing avoidance or distress (American Psychiatric Association [APA], 2000). Recent research in the field of social anxiety suggests that social phobia may diverge from the other anxiety disorders in terms of its relationship with autonomic arousal, negative affect, and positive affect (Brown et al., 1998; Watson & Clark, 1995). As previously noted, research has consistently supported the association between negative affect and both anxiety and depressive disorders. However, the strength of the association of negative affect may vary based on the specific anxiety disorder being examined (Brown et al., 1998; Clark,

Watson, & Mineka, 1994). In comparison with the majority of the anxiety disorders, the association between social phobia and both negative affect and autonomic arousal was less salient (Brown et al., 1998). Perhaps, the most striking finding from the study conducted by Brown et al. (1998) involves the relationship between low positive affect and social phobia, which was nearly indistinguishable from the relationship between low positive affect and depression. This ostensibly unique relationship between social phobia and positive affect has been noted in one other study (Watson, Clark, & Carey, 1988), but research pertaining to the role of positive affect in the development, maintenance, and manifestation of social phobia continues to remain relatively sparse. However, given the nature of social interaction and the implications that social phobia symptomology may have for positive affect, further exploration of the relationship between the two constructs is essential.

Linking past research examining positive affect to social anxiety research reveals an empirically substantiated relationship. Positive affect reflects the degree to which an individual feels excited, determined, or alert. However, individuals with social anxiety attempt to mask their socially anxious feelings, which results in a failure to take advantage of opportunities to experience and appreciate positive affect (Kashdan & Steger, 2006). Studies that specifically examined positive affect and social anxiety have certainly contributed to the understanding of social phobia in non-Hispanic White populations; however, aside from nascent work examining anxiety in African Americans specifically (Chapman et al., 2008; Chapman et al., 2009; Last & Perrin, 1993; Nalven, 1970; Neal & Brown, 1994; Neal et al., 1993; Neal & Turner, 1991), the literature pertaining to the cross-cultural and ethnic generalization of anxiety symptoms in African Americans further highlights the need for research examining the manifestation of social phobia in African Americans.

Assessment of Positive and Negative Affect

The Positive and Negative Affect Scale (PANAS) was developed by Watson, Clark, and Tellegen in 1988 to assess the distinct dimensions of positive and negative affect and is widely used by researchers interested in a dimensional approach to studying affective states (Tuccitto, Giacobbi, & Leite, 2010). The PANAS consists of two 10-item scales for positive affect and negative affect, respectively. The Positive and Negative Affect Schedule–Expanded Form (PANAS-X; Watson & Clark, 1994) contains 60 items, including the two original higher order scales (i.e., the Positive Affect and Negative Affect

Scales) in addition to 11 specific affects (Watson & Clark, 1994). The current study used the two higher order Positive Affect and Negative Affect Scales that are common to both the PANAS and the PANAS-X. Therefore, research on both forms of the measure is relevant for the following literature review. The PANAS has been used in studies covering various populations, including both clinical and nonclinical participants, such as mothers of preterm infants, job applicants, polio survivors, medical rehabilitation patients, and athletes (Burger & Caldwell, 2000; Crawford & Henry, 2004; Cuellar & Hill, 2010; Kwon, Kalpakjian, & Roller, 2010; Ostir, Smith, Smith, & Ottenbacher, 2005; Tuccitto et al., 2010). The psychometric properties of the PANAS have been relatively well-researched, and the measure has consistently been identified as a reliable and valid measure of positive and negative affect (Crawford & Henry, 2004; Watson, Clark, & Tellegen, 1988). Additionally, the PANAS has been used in multiple studies examining positive and negative affects in anxiety and related constructs. Specifically, individuals with high levels of social anxiety endorsed significantly lower levels of positive affect on the PANAS when compared with those individuals with lower levels of social anxiety (Vittengl & Holt, 1998).

Although the previous research has undoubtedly contributed to the validation of the PANAS as a measure of positive and negative affect, the literature remains sparse as it pertains to the predictive utility of the measure. Furthermore, the studies examining the psychometric properties of the PANAS failed to examine cross-cultural differences specifically. Although Crawford and Henry (2004) examined the influence of various demographic variables, including age, occupation, years of education, and gender, the cross-cultural generalization of the PANAS remains unknown.

The Current Study

Prior research has underscored the unique relationship between low positive affect and social phobia (Brown et al., 1998; Watson, Clark, & Carey, 1988), although the literature remains sparse with regard to this association. The current study examines the relative contributions of positive and negative affect to social phobia in order to provide additional support for the established relationship between positive affect and social phobia specifically. Moreover, this study seeks to extend research regarding this previously established relationship to a population in which it has not been previously examined, African American females. Recent research suggests that the manifestation of anxiety, particularly within the realm of social fears, may differ in African American populations when compared with their non-Hispanic

White counterparts (Chapman et al., 2008; Chapman et al., 2009; Chapman et al., 2011; Last & Perrin, 1993; Melka et al., 2010; Nalven, 1970; Neal & Brown, 1994; Neal et al., 1993; Neal & Turner, 1991). This research serves as the impetus for additional research examining the construct of anxiety and measures used to assess anxiety in African American populations. Although the reliability and validity of the PANAS-X is well established (Crawford & Henry, 2004; Watson, Clark, & Tellegen, 1988), the need for research examining the cross-cultural generalization of its utility is clear, given that studies specifically examining the measure in various cultural populations have not been conducted to date. Based on this rationale, the current study examines the predictive utility of the PANAS-X with two interrelated goals in mind. First, we examine whether the PANAS-X accurately predicts anxiety diagnostic status in African American females. Second, we examined whether the PANAS-X accurately predicts social phobia. Given the exploratory nature of the present study, no a priori hypotheses were made.

Method

Participants

The original sample for the current study consisted of 100 African American adults. Given the low number of male participants (n = 9) and concern regarding the generalization of findings, all males were excluded from the analyses in the current study, resulting in a sample of 91 community-dwelling African American females. Participants ranged in age from 23 to 55 years, with a mean age of 37 years (SD = 7.28). The majority of participants in the current study were single (n = 70), although 23% were married at the time the study took place. Ninety-three percent of the participants were high school graduates, although 62% of the sample earned less than $30,000 annually. Additionally, only 16% of the participants in the current study earned at least $50,000. Participant demographics are presented in Table 1.

Measures

Demographic Questionnaire. The Demographic Questionnaire used in the current study is an 11-item survey that was administered to each participant. Questions on the survey were designed in order obtain information pertaining to the participants' gender, age, education level, number of children, and annual income. Open-ended questions were used to obtain participants' age, and a closed-ended format was used to assess participant gender (i.e., male,

Table 1. Demographics

Variable	Frequency
Marital status	
Single without partner	31
Single with partner	21
Married	18
Divorced and remarried	3
Divorced and single	13
Separated	2
Never been married	3
Education	
Grades 9, 10, or 11	6
High school graduate	9
Some college or specialized training	44
College graduate	22
Graduate or professional training	10
Income level	
<$10,000	24
$10,000-$19,999	14
$20,000-$29,999	19
$30,000-$39,999	1
$40,000-$49,999	17
$50,000-$59,999	5
$60,000-$69,999	4
$70,000-$79,999	1
$80,000-$89,999	1
$90,000+	4

Note: Estimated annual income was not reported from one participant.

female). Income was assessed by asking participants to choose the most accurate estimate of their annual household income. Responses were coded as 1 = *less than $10,000*; 2 = *$10,000-$19,999*; 3 = *$20,000-$29,999*; 4 = *$30,000-$39,999*; 5 = *$40,000-$49,999*; 6 = *$50,000-$59,999*; 7 = *$60,000-$69,999*; 8 = *$70,000-$79,999*; 9 = *$80,000-$89,999*; and 10 = *$90,000+*. Annual household income was not reported from one participant. Education was assessed by asking clients to choose the option that included the last grade they completed. Responses were coded as 1 = *Grades 9, 10, or 11*; 2 = *high school graduate*; 3 = *some college or specialized training*; 4 = *college graduate*; and 5 = *graduate or professional training*. Marital status was

assessed using multiple-choice format. Responses were coded as 1 = *single without partner*; 2 = *single with partner*; 3 = *married*; 4 = *divorced and remarried*; 5 = *divorced and single*; 6 = *separated*; and 7 = *never been married*. The Demographic Questionnaire is not standardized, as it was designed by the principal investigator to acquire only the necessary information that was considered relevant to the current study.

Positive and Negative Affect Schedule–Expanded Form (PANAS-X). The PANAS-X is a 60-item self-report measure that was specifically designed to assess the distinct dimensions of positive affect (10 items) and negative affect (10 items). The measure uses a 5-point Likert-type scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*), to assess the extent to which individuals completing the measure feel or have felt a variety of adjectives over a specified time period. The PANAS-X has been used with various time frames that range anywhere from moment to year. In the current study, participants were asked to indicate the way they were feeling at the present moment. The Positive and Negative Affect Scales of the PANAS-X were then calculated by obtaining the sum of the 10 items that make up each scale. Internal consistency estimates range from good to excellent in community and psychiatric samples for both the Positive Affect Scale (α = .83-.90) and the Negative Affect Scale (α = .85-.90). The factor structure of the PANAS-X has been supported, as positive affect items were significantly correlated with the positive affect factor, and negative affect items were significantly correlated with the negative affect factor. Additionally, the two scales are minimally correlated with each other ($r = -.05$ to $-.35$), suggesting that they do indeed measure separate constructs (Watson & Clark, 1994; Watson, Clark, & Tellegen, 1988). The internal consistency in the current sample was good for the Positive Affect Scale (α = .89) and the Negative Affect Scale (α = .92). Bivariate correlations indicate that the Positive and Negative Affect Scales of the PANAS-X are negatively correlated in the current sample, $r = -.384$, $p < .001$.

The Anxiety Disorders Interview Schedule–Fourth Edition (ADIS-IV). The ADIS-IV (Brown, Di Nardo, & Barlow, 1994) is a widely used diagnostic interview that allows differential diagnoses among the anxiety and related disorders to be made as defined by the *DSM-IV-TR* (APA, 2000). Interviews were conducted by the principal investigator and advanced graduate students trained to strict reliability standards (see Brown, Di Nardo, Lehman, Campbell, 2001). Clinical severity ratings ranging from 0 to 8 were assigned to each participant with scores of 4 or greater warranting a diagnosis. Interrater reliability has been demonstrated as ranging from modest (κ = .55 for posttraumatic stress disorder [PTSD]) to excellent (κ = .86 for specific phobias)

across the anxiety disorders (Brown et al., 2001). Although no studies to date have examined the utility of the ADIS-IV in assessing diagnostic status in African American females specifically, the interrater reliability was examined in the current study, as suggested in the literature (Brown et al., 2001). As such, all interviews were videotaped, and one third of these were randomly selected for interrater reliability of primary diagnosis, which yielded an excellent kappa (.90), thus supporting the suitability of the ADIS in the current sample of African American females. Participants were provided with diagnostic feedback and any necessary treatment referrals following participation in the study.

Procedure

Participants were recruited from the community through flyers, radio advertisement, university publication, health fairs in the community, and word of mouth. The current study was part of the "Cooperative for African American Family Excellence" (CAFÉ) Project, which examined anxiety and related disorders in African American families. The CAFÉ project was advertised as a "free, culturally sensitive familial assessment" and data was collected over the course of 1 year. Informed consent was obtained from all participants prior to their participation in the study, and they were paid $50 cash as an incentive for their time. All participants completed the PANAS-X individually in the Community and Family Excellence Research Lab at the University of Louisville during a single session, ranging from 2 to 4 hours in duration. Given that data were collected during a single session, attrition was low, and only one participant was excluded from the study as a result of failure to complete all measures. As previously noted, all males ($n = 9$) were excluded from the analyses because of gender imbalance in the current study. During the completion of the self-report measure, research assistants were present and available to answer any potential questions participants may have had.

The ADIS-IV was also administered to all participants and used to specify differential diagnoses of anxiety and related disorders. Given the experimental nature of the study and utilization of the diagnostic data, participants in the current study were assigned to the anxious group if they met criteria for any anxiety disorder diagnosis derived from the ADIS-IV (*DSM-IV-TR* criteria), and participants were assigned to the nonanxious group if they failed to meet criteria for an anxiety disorder diagnosis. Similarly, the social phobia group consisted of those participants that met criteria for social phobia specifically. For purposes of the current study and the subsequent data-analytic procedure, group assignment was merely based on whether or not participants met

Table 2. Diagnoses Derived From the Anxiety Disorders Interview Schedule–Fourth Edition (ADIS-IV) in the Current Sample

Diagnosis	Frequency
Panic disorder with agoraphobia	7
Panic disorder without agoraphobia	2
Social phobia	21
Generalized anxiety disorder	18
Obsessive–compulsive disorder	5
Specific phobias	43
Posttraumatic stress disorder	4
Hypochondriasis	2
Depressive disorders	12
None	39

Note: Frequency includes primary, secondary, tertiary, and quaternary diagnoses, resulting in a higher number of diagnoses than participants.

criteria for a *DSM-IV-TR* diagnosis of any anxiety disorder, social phobia, or no diagnosis. Given that the current study assessed primary, secondary, tertiary, and quaternary diagnoses, many of the participants in the social phobia group also had other comorbid anxiety diagnoses. Table 2 displays the diagnostic information for the participants in the current study. While some measures from this sample have been presented previously (i.e., Fear Survey Schedule–II), this is the first and only study to examine the PANAS-X scores obtained from this sample in relation to anxiety diagnostic status and, more specifically, social phobia.

Data Analysis: Receiver Operating Characteristic Analysis

Receiver operating characteristic (ROC) analysis produces a curve that plots the sensitivity (*Y*-axis) against the specificity (*X*-axis) for the full range of scores on a given measure. Sensitivity is described as true positives, or the rate at which the measure accurately identifies a diagnosis when the disorder is present. Specificity represents the rate at which the measure accurately identifies the absence of a disorder. ROC analysis also calculates the area under the curve (AUC), which determines the suitability of a given measure as a screening tool, as it reflects the likelihood that a participant who meets criteria for a diagnosis selected at random will score higher on the test or measure than a randomly selected control participant (see Bredemeier et al., 2010; Rice & Harris, 1995). AUC values range from .500, which represents

50% chance of accurate classification to 1.000, which indicates accurate classification 100% of the time. The significance of AUC values is determined by comparing the AUC value indicated by the ROC analysis with the minimum AUC value of .500, which represents random prediction.

The popularity of ROC analysis as a method of assessing utility of self-report instruments in predicting diagnostic status has burgeoned in recent years because of its ability to yield robust test results in light of unequal control participants (see Bredemeier et al., 2010; Rice & Harris, 1995). Given that the current study examined whether or not the PANAS-X was useful in predicting the presence or absence of any anxiety disorder and social phobia specifically in a sample with an unequal number of participants who did and did not meet criteria for an anxiety disorder diagnosis, a ROC analysis was appropriate. Although there is no generally agreed on sample size for ROC analyses, several studies have used sample sizes similar to the current study (Bredemeier et al., 2010; Greiner, Pfeiffer, & Smith, 2000). Specifically, Bredemeier et al. (2010) used a sample of 108 participants to examine the utility of the Mood and Anxiety Symptoms Questionnaire (MASQ; Watson, Clark, et al., 1995, Watson, Weber, et al., 1995) in the prediction of depressive disorders. Similarly, Greiner et al. (2000) reviewed ROC analyses that were conducted in sample sizes ranging from 20 to 100. The ROC analyses for the current study were conducted using SPSS Version 18.0

The first ROC analysis was conducted with scores from the PANAS-X Negative and Positive Affect Scales being entered as the test variable whereas anxiety disorder diagnostic status was entered as the state variable and served as the "golden standard," indicating the presence or absence of any anxiety disorder diagnosis. Based on data obtained from the ADIS-IV, each participant was coded as either a "0," which represented *no diagnosis*, or a "1," which represented the *presence of an anxiety disorder*. When the ROC analysis was conducted, the value of the state variable (i.e., anxiety disorder diagnostic status) was defined as a "1." The second ROC analysis followed a similar procedure as the first with the PANAS-X Negative and Positive Affect Scales being used as the test variables; however, social phobia diagnosis specifically was entered as the state variable and served as the "golden standard." In the second ROC analysis, the state variable (i.e., social phobia diagnosis) was defined as a "1." The generally agreed on AUC values that are considered optimal for screening vary depending on both the characteristics of the sample as well as type of diagnoses being investigated (e.g., medical diagnoses, psychological, etc.). Given the exploratory nature of the current study, the authors used a broad range of AUC values cited in the existing literature that vary from .67 (e.g., prediction of pneumonia and confirmatory

radiological diagnosis; Lynch, Platt, Gouin, Larson, & Patenaude, 2004; .715 for diagnosing breast cancer via digital mammograms; Cole et al., 2004; .791 for dexamethosone suppression test for predicting major depressive disorder; Mossman & Somoza, 1989; .791 for harm avoidance scores predicting Generalized Anxiety Disorder; Rettew, Doyle, Kwan, Stanger, & Hudziak, 2006) to .89 (e.g., for predicting PTSD with PTSD Checklist in female veterans; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003).

Results

Of the 91 African American females who completed the ADIS-IV, 39 participants received no diagnosis whereas 52 met criteria for a primary diagnosis of an anxiety or related disorder. Co-occurring psychopathology was limited to anxiety and related disorders for the purposes of this study. Twenty-one participants met criteria for social phobia, which was the second most frequent diagnosis following specific phobia ($n = 43$).

ROC Analysis for Predicting the Presence of an Anxiety Disorder

Mean scores for the PANAS-X were 33.36 ($SD = 9.35$) for the Positive Affect Scale and 14.74 ($SD = 6.98$) for the Negative Affect Scale. The initial ROC analysis estimated the extent to which mean scores on the Positive and Negative Affect Scales of the PANAS-X predicted the presence of any anxiety disorder diagnosis. Acceptable AUCs were yielded for the positive affect (.761, 95% CI = .664-.853) and the negative affect (.698, 95% CI = .591-.806) Scales and were significantly different from the random predictor (AUC = .500, $p < .001$). Based on the sensitivity and specificity rates for each scale, displayed in Table 3, optimal cutoff scores were identified by selecting the score at which both false positives (Type I error) and false negatives (Type II error) are minimized. Additionally, when determining optimal cutoff scores, it is important to consider base rates of the disorder in question in addition to the relative costs of false positives or negatives. Given that we are examining the PANAS-X as a potential screening device for anxiety disorders and social phobia specifically, a slightly higher sensitivity rate (false positives) is warranted, given that additional assessment will later rule out negative cases. In the current sample, a score above 11 on the Negative Affect Scale of the PANAS-X indicates the need for further examination (e.g., clinical interview) to assess the presence of an anxiety disorder, with a 70% sensitivity rate and a 56% specificity rate. A score below 35 on the Positive Affect Scale of the

Table 3. Sensitivity and Specificity of PANAS-X (Positive and Negative Affect Schedule–Expanded Form) Scale Scores in Predicting Any Anxiety Disorder Diagnosis

Positive Affect Scale			Negative Affect Scale		
Score	Sensitivity (%)	Specificity (%)	Score	Sensitivity (%)	Specificity (%)
22.50	25.00	100.00	9.00	100.00	00.00
23.50	26.90	97.40	10.50	76.90	51.30
24.50	32.70	94.90	11.50	63.50	61.50
26.00	36.50	92.30	12.50	59.60	69.20
27.50	38.50	89.70	13.50	51.90	82.10
28.50	40.40	89.70	14.50	46.20	84.60
29.50	42.30	89.70	15.50	40.40	87.20
30.50	48.10	84.60	16.50	34.60	92.30
31.50	51.90	76.90	18.00	28.80	92.30
32.50	57.70	74.40	20.00	21.20	92.30
33.50	61.50	71.80	22.00	15.40	92.30
34.50	67.30	66.70	23.50	15.40	94.90
35.50	73.10	64.10	25.00	13.50	97.40
36.50	75.00	61.50	26.50	13.50	100.00
37.50	78.80	56.40	29.00	11.50	100.00
38.50	82.70	53.80	33.00	07.70	100.00
39.50	88.50	51.30	35.50	03.80	100.00
40.50	90.40	51.30	40.50	01.90	100.00
41.50	90.40	35.90	46.00	00.00	100.00
42.50	92.30	35.90			
43.50	96.20	25.60			
44.50	96.20	20.50			
45.50	96.20	15.40			
46.50	96.20	10.30			
47.50	96.20	07.70			

PANAS-X warrants further assessment for the presence of an anxiety disorder, with 70% sensitivity and 65% specificity. Figure 1 graphically shows the sensitivity and specificity rates of the Positive and Negative Affect Scales for predicting an anxiety disorder diagnosis. These results indicate that the Negative Affect and Positive Affect Scales of the PANAS-X are accurate predictors of anxiety disorder diagnostic status in this sample of African American females.

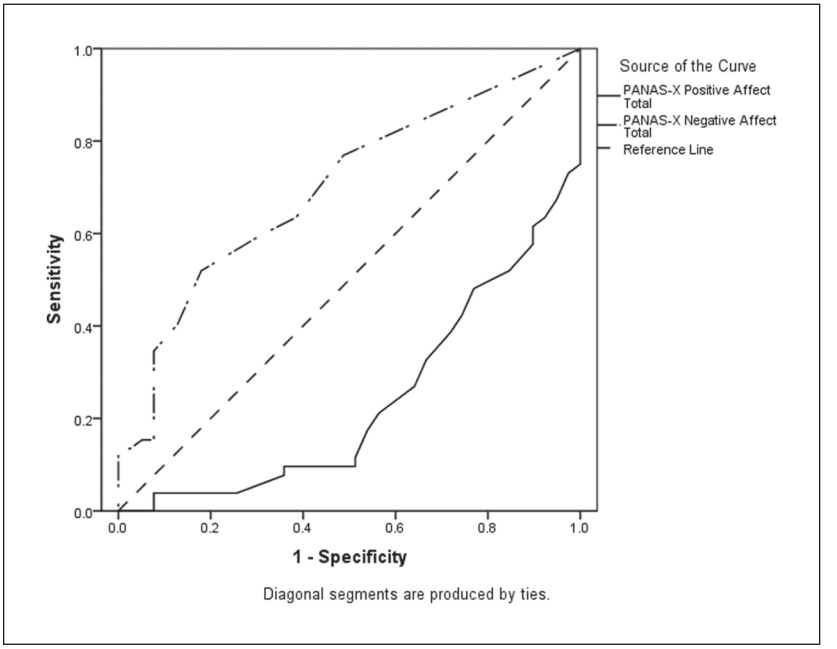

Figure 1. Receiver operating characteristic (ROC) curve for predicting the presence of an anxiety disorder

ROC Analysis for Predicting Social Phobia

Twenty-three percent ($n = 21$) of the African American females in the current sample met diagnostic criteria for social phobia. The mean scores on the PANAS-X for those participants diagnosed with social phobia were 34.12 (SD = 9.43) for the Positive Affect Scale and 14.74 (SD = 7.14) for the Negative Affect Scale. Using the same procedure described above, a subsequent ROC analysis was conducted to evaluate the predictive utility of the PANAS-X Positive and Negative Affect Scales with regard to social phobia specifically. The analysis revealed a highly acceptable AUC value of .839 (95% CI = .741-.938) for the Negative Affect Scale that was significantly different from the random predictor (AUC = .500, $p < .001$). Similarly, the analysis examining the Positive Affect Scale revealed an acceptable AUC value of .813 (95% CI = .693-.932) that was significantly different from the random predictor (AUC = .500, $p < .001$). Based on the sensitivity and specificity rates for each scale, displayed in Table 4, an optimal cutoff score

Table 4. Sensitivity and Specificity of PANAS-X (Positive and Negative Affect Schedule–Expanded Form) Scale Scores in Predicting Social Phobia Diagnosis

Positive Affect Scale			Negative Affect Scale		
Score	Sensitivity (%)	Specificity (%)	Score	Sensitivity (%)	Specificity (%)
24.50	47.60	94.90	9.00	100.00	0.00
26.00	52.40	92.30	10.50	100.00	51.30
28.50	52.40	89.70	11.50	81.00	61.50
30.50	57.10	84.60	12.50	76.20	69.20
31.50	61.90	76.90	13.50	71.40	82.10
32.50	66.70	74.40	14.50	61.90	84.60
33.50	71.40	71.80	15.50	57.10	87.20
34.50	76.20	66.70	16.50	52.40	92.30
35.50	90.50	64.10	18.00	38.10	92.30
36.50	90.50	61.50	20.00	33.30	92.30
37.50	90.50	56.40	22.00	23.80	92.30
38.50	90.50	53.80	23.50	23.80	94.90
40.00	90.50	51.30	25.00	23.80	97.40
42.00	90.50	35.90	26.50	23.80	100.00
43.50	95.20	25.60	29.00	19.00	100.00
44.50	95.20	20.50	33.00	14.30	100.00
45.50	95.20	15.40	35.50	09.50	100.00
46.50	95.20	10.30	40.50	04.80	100.00
47.50	95.20	07.70	46.00	00.00	100.00
48.50	100.00	07.70			
49.50	100.00	05.10			
51.00	100.00	00.00			

for the Negative Affect Scale of the PANAS-X was identified using the same decision-making process described above. In the current sample, a score above 13 on the Negative Affect Scale, with a 74% sensitivity rate and a 76% specificity rate represents the point at which further clinical attention may be necessary to assess the presence of social phobia specifically. An optimal cutoff score for the Positive Affect Scale of the PANAS-X was also identified. With a sensitivity rate of 74% and a specificity rate of 65%, an optimal cutoff score of 34 on the Positive Affect Scale represents the point at which further clinical assessment may be necessary to identify the presence of social phobia. Figure 2 graphically shows the sensitivity and specificity rates of the Positive and Negative Affect Scales for predicting social phobia diagnoses

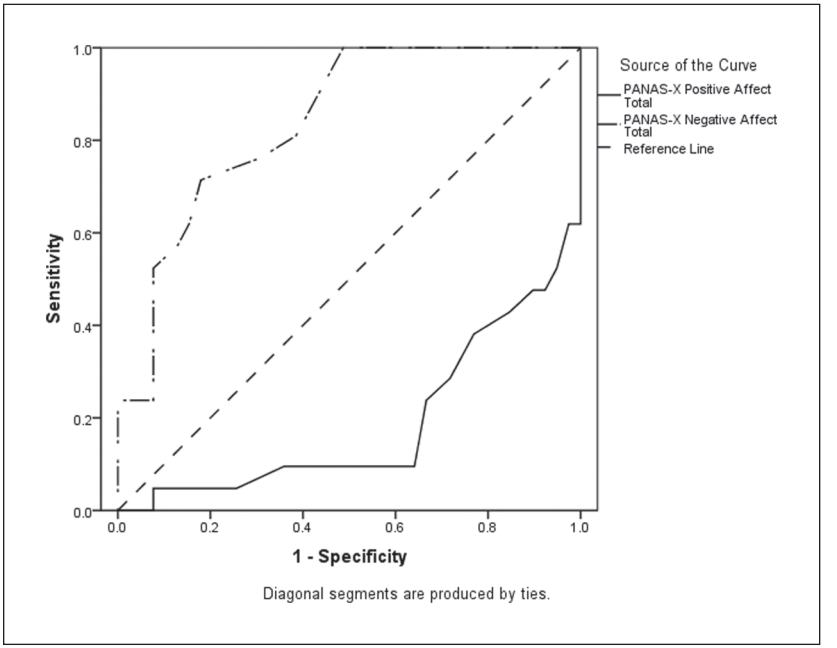

Figure 2. Receiver operating characteristic (ROC) curve for predicting the presence of social phobia

specifically. These results indicate that both negative and positive affect were accurate predictors of social phobia diagnoses in the current sample. Furthermore, both scales revealed optimal cutoff scores that could potentially be effectively used to screen for social phobia in African American females.

Discussion

The current study is the first to date to examine the relationship between positive and negative affect and anxiety disorder diagnostic status in an exclusively African American sample of females. The findings from the present study represent significant strides in the research pertaining to the utility of a frequently used assessment measure (i.e., PANAS-X) in predicting anxiety in African Americans. The current study was developed with two interrelated aims in mind; to examine the PANAS-X's ability to predict

anxiety diagnostic status in African American females as well as its specific predictive ability with regard to social phobia.

The initial ROC analysis revealed that both positive and negative affect accurately predicted anxiety diagnostic status in the exclusively African American sample with significant AUC values of .761 ($p < .001$) and .698 ($p < .001$), respectively. Additionally, optimal cutoff scores were identified for both the Positive and Negative Affect Scales of the PANAS-X. A score below 35 on the Positive Affect Scale and a score above 11 on the Negative Affect Scale indicate the need for further assessment for the presence of anxiety disorders. The mean scores for the positive affect ($M = 33.4$, $SD = 9.35$) and negative affect ($M = 14.7$, $SD = 6.98$) scales in the current sample are similar to those reported for Australian women (positive affect, $M = 33.9$, $SD = 5.1$; negative affect, $M = 15.5$, $SD = 5.3$; (Watson & Clark, 1994). However, optimal cutoff scores for the screening of anxiety disorders have not been previously identified for the PANAS-X. To date, these are among the first findings to suggest that the Positive and Negative Affect Scales of the PANAS-X may be an effective screening device for anxiety disorders in African American females specifically.

Given the unique relationship between positive affect and social phobia, a subsequent ROC analysis was conducted to examine the potential utility of the Positive Affect Scale and the Negative Affect Scale in predicting social phobia specifically. Both negative affect and positive affect revealed acceptable AUC values of .839 ($p < .001$) and .813 ($p < .001$), respectively for the prediction of social phobia. Similar to the initial ROC analyses for any anxiety disorder diagnosis, optimal cutoff scores were identified for both the Positive and Negative Affect Scales in specifically predicting social phobia. A score above 13 on the Negative Affect Scale and a score below 34 on the Positive Affect Scale indicate the potential presence of social phobia in the current sample. Although no norms for the PANAS-X have been identified for individuals with social phobia, the means for the positive affect ($M = 34.12$, $SD = 9.43$) and negative affect ($M = 14.74$, $SD = 7.14$) scales in the current sample are comparable with those identified in a mixed clinical sample (positive affect, $M = 30.2$, $SD = 6.6$; negative affect, $M = 26.3$, $SD = 9.0$) by Watson & Clark (1994). Strictly based on the cutoff scores identified in the current study, it may be difficult to differentiate between the need to assess for social phobia specifically and anxiety disorders in general, as the close proximity of the cutoff points for social phobia and other anxiety disorders result in a certain level of ambiguity. Therefore, it may be more feasible to use the PANAS-X as a specific screening device for social phobia. Prior to

the establishment of the PANAS-X as a screening device for other anxiety disorders, additional research is needed to identify specific cutoff scores for individual anxiety disorders. Given that this is the first study to date to identify optimal cutoff scores on the PANAS-X for identifying anxiety disorders and social phobia specifically, additional research is necessary to replicate the optimal cutoff scores identified in the current study. That is, future studies should use diagnostic information from exclusively African American samples containing both males and females to further examine optimal cutoff scores on the PANAS-X, so that those from the current study can be solidified and used in a clinical setting.

In addition to evidence supporting the predictive utility of the measure, the findings from the current study also shed light on the relative contributions of negative and positive affect to the prediction of anxiety disorders in African American females. Specifically, it appears that positive affect was more predictive of anxiety diagnostic status in general when compared with the predictive ability of negative affect, as evidenced by a higher AUC value of .761 (95% CI = .664-.859) compared with the AUC value of .698 (95% CI = .591-.806) for the Negative Affect Scale. Given that AUC values range from 0.500, which represents a 50% chance of accurate prediction, to 1.000, which represents correct classification every time, the larger the AUC value, the better the prediction. This suggests that positive affect may be a particularly salient factor in the manifestation of all anxiety disorders in African American females. Positive affect being significantly more predictive of anxiety diagnostic status than negative affect in the current study, as evidenced by a higher AUC, is corroborated by the ROC literature in that the comparison of two AUC values on a relative scale is frequently considered valid regardless of the data-analytic approach (Gur, Bandos, & Rockette, 2012). Furthermore, the most recent ROC literature also suggests that employing parametric and nonparametric approaches to compare AUC values often yields disparate results (Gur et al., 2012). Therefore, the previously discussed finding appears plausible based on both the empirical literature and the results from the current study. Additionally, when any anxiety disorder was narrowed to include social phobia exclusively, the predictive utility of both negative and positive affect, as measured by the PANAS-X, grew stronger, which was again indicated by larger AUC values of .839 (95% CI = .741-.938) and .813 (95% CI = .693-.932), respectively.

Interestingly, and contrary to what was expected based on prior research, the highest AUC value obtained in the current study was associated with negative affect and social phobia specifically. One finding from previous work (see Chapman, Kertz, & Woodruff-Borden, 2009) corroborates this

salience of negative affect in the manifestation of anxiety disorders in African Americans. Specifically, African American males and females who reported more psychological distress (as measured by the Beck Depression Inventory and the state scale of the State-Trait Anxiety Inventory as proxies for "negative affect") reported more worry than non-Hispanic Whites when they perceived themselves as being "less in control" (Chapman et al., 2009). Although previous findings in this area (Brown et al., 1998; Watson, Clark, & Carey, 1988) suggest that positive affect may be particularly relevant to the construct of social phobia in non-Hispanic White populations, our results suggest that negative affect, as opposed to positive affect, may be more predictive of social phobia in African American females that make up the current sample. Exploration of the relationship between positive affect and social phobia in addition to replication of the findings from the current study should be considered before any definitive conclusion can be drawn.

As previously mentioned, the two most frequently occurring diagnoses in the current sample were specific and social phobias. The elevated rate of social and specific phobias in the current sample is consistent with existing literature that suggests that African Americans may exhibit more social fears than their non-Hispanic White counterparts (Chapman et al., 2008; Chapman et al., 2011; Melka et al., 2010). Although a full discussion is beyond the scope of the findings from this study, it is worth noting that the pattern that emerged in the current sample in concert with previous research pertaining to anxiety disorders in African Americans suggests that the fear response that is characteristic of both nongeneralized social phobia and specific phobias may be an area of research that warrants further exploration. Future research endeavors of this nature may help explain the elevated rates of these disorders in the current sample of African Americans.

Limitations

Despite the strengths associated with the current study, there are several limitations worth noting. As previously noted, nine males from the original sample were excluded from the analyses in the current study because of gender imbalance. The low number of African American male participants in the current study likely reflects the general gender-ratio imbalance that exists in Black communities at large (for review see Boyd-Franklin, 2003). Specifically, in 15- to 34-year-old African Americans, there are approximately 5 million males relative to 5.7 million females (Stockard & Tucker, 2001). Given that only female participants were included in the current

study, future research might focus on including equivalent numbers of participants that are African American males to facilitate the examination of gender differences that may exist in terms of clinically relevant cutoff scores. Additionally, a sample that contains both males and females would facilitate the generalization of the current findings to the African American population in general, as opposed to only African American females. In order to obtain equal numbers of male and female participants, future studies should focus on oversampling African American males from community organizations with predominantly male constituents.

Additional research examining gender differences is absolutely necessary considering that women are typically more likely than men to be diagnosed with most anxiety disorders, including panic disorder, generalized anxiety disorder and specific phobias (*DSV-IV-TR*; APA, 2000). Future research that replicates the findings from the current study would further support the utility of the PANAS-X as a screening device in a population that is more often diagnosed with anxiety disorders. The exclusion of male participants in the current study has implications beyond just that of generalizability. It may be the case that negative affect is a uniquely salient factor in the conceptualization of social phobia in females as opposed to African Americans in general. Although gender differences have been the focus of much research, those differences are not fully understood within the context of African American populations. Future research endeavors using a gender-balanced sample would be helpful in clarifying the intersecting influences of both ethnicity and gender.

Moreover, the current study included a relatively small number of socially phobic individuals. In order to address this limitation, future studies might include samples comprising solely of African Americans who have been previously diagnosed with social phobia. Additional research is also needed to examine within-group differences (e.g., ethnic identity and acculturation collectivism) that may further explain the findings from the current study. Specifically, in order to examine cultural variables, such as collectivism, instruments that directly assess this construct should be included in future research. Last, considering that the PANAS-X is primarily used in research settings, the utility of the measure as a screener for social phobia within clinical settings should be examined.

Declaration of Conflicting Interests

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