NIH Public Access
Author Manuscript
J Abnorm Child Psychol. Author manuscript; available in PMC 2015 February 01.

Published in final edited form as:
J Abnorm Child Psychol. 2014 February ; 42(2): 311–320. doi:10.1007/s10802-013-9775-3.

Assessing Social Anxiety in African American Youth using the Social Phobia and Anxiety Inventory for Children

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Abstract

Examined measurement invariance and cut-off scores of the Social Phobia and Anxiety Inventory for Children (SPAI-C) using data corresponding to a convenience sample of 501 African American and Caucasian youth (M_{age} = 11.62 years, 249 girls; 49% with social anxiety disorder) using exploratory structural equation modeling and a weighted least squares mean variance estimator. For the cut-off scores, Receiver Operator Characteristic analyses were used along with Youden's index to evaluate the balance between sensitivity and specificity. Overall, results supported the SPAI-C's cross-race invariance but a few items emerged as non-invariant. Compared to past research, lower SPAI-C cutoff scores were found (13 to 15 range). Findings support research showing that African American youth generally have significantly lower (or similar) social anxiety levels than their White counterparts. Suggestions for using the SPAI-C with African American under non-invariant conditions youth are provided and implications of using lower cutoff scores are discussed.

Social anxiety disorder is characterized by a persistent fear of social or performance situations in one or more areas, including public speaking, dating, and/or talking to new or unfamiliar people. Typically with an age of onset in adolescence, social anxiety is accompanied by evaluation concerns, functional impairment, and is prospectively and concurrently linked to substance use, un-employment, and dependence on the welfare system (Lipsitz & Schneier, 2000; Morris, Stewart, & Ham, 2005; Tolman et al., 2009). Whereas there is ample literature about social anxiety in children and adolescents, most research has been based on White samples (Hunter, & Schmidt, 2010; Neal, & Turner, 1991). Turning to multiethnic samples, cross-ethnic comparative research based on rating scales shows that in clinical samples African American youth in particular report significantly lower (or similar) social anxiety levels than their Caucasian counterparts (e.g., Beidel, Turner, Hamlin, & Morris, 2000; Beidel, Turner, & Morris, 1999; Ferrell, Beidel, & Turner, 2004). On average, African Americans could truly be low (or same as Caucasians) on social anxiety, but it also might be the case that measures are no adequately capturing social anxiety in African American youth. As reviewed by Pina, Gonzales, Holly, Zerr, and Wynne (in press), several measures have failed to provide equivalent information across

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ethnic groups, including for African American youth. Configural invariance in a community sample of White and African American youth, for example, was not supported for the Child Behavior Checklist (internalizing/externalizing scales; Tyson, Teasley, & Ryan, 2011). Moreover, among African Americans anxiety seems to manifest itself largely in terms of physical symptoms (Neal & Turner, 1991) and measures such as the Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998) that do not include physiological anxiety items might be under-identifying socially anxious African American youth. Clearly, the implication is that lack of invariance can result in poor science, overpathologizing, and wasted resources. As such, it is important to investigate whether measures developed with White samples provide equivalent information about ethnic minority youth in general, including for African Americans.

When it comes to cross-ethnic measurement invariance, item response theory and sophisticated quantitative methods can offer rich information about a scale's performance, especially compared to simple reliability analyses. Briefly, configural invariance tests yield information on whether the same factors of a measure exist across groups (Ghorpade, Hattrup, & Lackritz, 1999; Millsap & Yun-Tein, 2004; Vandenberg & Lance, 2000), weak invariance can elucidate whether the items of a scale have the same meaning across groups (Labouvie & Ruetsch, 1995; Raykov, 2004), strong invariance tests can offer insights about the level or severity of anxiety needed for respondents to endorse a given item on a scale (Widaman & Reise, 1997), and strict invariance refers to the error or unexplained variance in the endorsement of an item (Byrne, Shavelson, & Muthén, 1989). Armed with these methods and to shed some light on the usefulness of social anxiety measures for the assessment of African American youth, we conducted secondary data analyses corresponding to a convenience sample of African American and White youth who completed the Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel, Turner, & Morris, 1995). We focused on the SPAI-C because it is the most widely used social anxiety self-rating scale and it has been found to be sensitive to change in intervention trials (e.g., Beidel et al. 2007; Masia-Warner et al. 2005) thereby making it a measure with clinical utility. In addition, the SPAI-C does contain physiological anxiety items (Beidel, Fink, & Turner, 1996; Beidel et al., 1995) making it a good initial target for investigating, in a preliminary way, the assessment of social anxiety in African American youth. As such, the main goal of this study was to explore the measurement invariance and optimal cut-off scores of the SPAI-C for African American youth. To achieve this aim, primary analyses focused on using exploratory structural equation modeling to determine factor structure and test the cross-ethnic measurement invariance of the SPAI-C (see Asparouhov & Muthén, 2009; Millsap, 2011). In addition, Receiver Operator Characteristic analyses were used to examine optimal cut-off scores for the cross-ethnic group predictive validity of the SPAI-C. Optimal cutoff scores also were ascertained based on Youden's index (Youden, 1950).

Method

Participants

Data corresponding to a convenience sample of 501 youth (8 to 16 years, M_{age} = 11.62 years, SD = 2.6, 249 girls; 120 African American, 381 Caucasian) were examined in this study. Cross-ethnic comparisons along age, sex and income revealed significant differences between African American and White youth in terms of income (lower income for African Americans, $\chi^2 = 7.53$, $p = .023$ Hollingshead Classification System; Hollingshead & Redlich, 1958) and age (African Americans were slightly older $M_{age} = 12.25$, $SD = 2.53$, but less than one year on average $t = -3.07$, $p = .002$; for White $M_{age} = 11.43$, $SD = 2.58$). About 24% of African Americans were upper class, 44% (n =24) middle class, and 32% (n =17) lower class; among Whites, 33% (n =50) were upper class, 52% (n =79) middle class, and 15% (*n* =22) lower class. The sex by race chi-square was not significant ($\chi 2$ = .40, *p* = .53).Based on the Anxiety Disorders Interview Schedule for Children (ADIS-IV: C/P; Silverman & Albano, 1996), about 49% of the sample met criteria for a primary social anxiety disorder diagnosis, 8% met criteria for other anxiety disorders as the primary diagnosis and 4% met criteria for other non-anxiety disorder diagnosis. In addition, about 40% of the sample did not meet criteria for a diagnosis and were considered "typically developing youth" also based on the ADIS: C/P. For African Americans, 49% met criteria for social anxiety disorder, 2% met criteria other disorders, and 49% were typically developing youth. For Whites, 49% met criteria for social anxiety disorder, 9% met criteria other disorders, and 37% were typically developing youth. In general, there were significantly more African American youth in the typically developing group compared to Caucasians [$\chi 2$ = 13.66, *p* = .003].

Measures

The *Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel et al, 1995)* is comprised of 26 items reflecting potentially fearful social situations. For each item, youth are given three choices from which they select the one that best describes how they feel, think, and behave in the situation. Items are scored as 0 ("never, or hardly ever"), 1 ("sometimes") or 2 ("most of the time, or always" rated) and the total scale score is used to derive clinical cutoffs. In Beidel et al. (1995), SPAI-C scores were significantly correlated with youth's self-rated trait anxiety (*r* = .50) and fear levels (*r* = .53). Moreover, a two-week retest reliability estimate of .86 and an alpha coefficient of .95 were found for the SPAI-C in Beidel et al. (1995).

The *Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions* (ADIS: C/P; Silverman & Albano, 1996) is a semi-structured diagnostic interview focusing on anxiety and related disorders. There is a child and parent version administered to children and parents, respectively. The ADIS-C/P's manual describes administration procedures and process for deriving diagnoses, including comorbid diagnoses (Albano & Silverman, 1996). The ADIS-IV: C/P yields reliable anxiety symptom counts (ICCs .78 to .95 for ADSI-C; .81 to .96 for ADIS-P), diagnoses (kappas .80 to .92), and clinical severity ratings (ADIS-CSR; rs .80 to .84) (Silverman, Saavedra, & Pina, 2001). The ADIS-IV: C/P was the primary anxiety measure used to derive diagnoses in this sample.

Procedures

Participants for this study were recruited from the community (e.g., through referrals from pediatricians, social workers, and psychologists). After parents signed consent and youth provided assent, youth completed the SPAI-C as part of a comprehensive assessment battery that included the ADIS-IV: C/P (Silverman & Albano, 1996). All study procedures were approved by the university's Institutional Review Board.

Data Analytic Plan

Exploratory structural equation modeling (ESEM) was used to determine factor structure and test measurement invariance of the SPAI-C across ethnicity/race (and also sex). Sex was tested in the preliminary analyses because girls have been found to typically report greater anxiety levels than boys (Lewinsohn, Gotlib, Lewinsohn, Seeley & Allen, 1998; Muris & Broeren, 2009; Strauss & Last, 1993), although this difference is not typically found in clinical samples. Given that our focus was on a clinic referred sample, sex was tested to render the ethnicity/race analyses more robust. We used an ESEM approach because it offers added precision in nested model invariance testing by reducing sources of model misfit in both large and small sample conditions (Asparouhov & Muthén, 2009). Further, since SPAI-C items have a 3-point response scale, a weighted least squares mean variance

(WLSMV) estimator was used, which is robust to violations of normality (Flora & Curran, 2004; Muthén & Muthén, 1998–2011). Invariance tests began with a nested multi-group "omnibus test" of the cross-group equality of the indicator covariance and mean structure matrices, which provides preliminary evidence for measurement non-invariance when significant (Millsap, 2011). Next, configural analyses examined the overall model fit and significance of hypothesized factor loadings for a multi-group model with no cross-group constraints to ensure that the same factor structure was supported across groups.[1] In accord with Muthén's recommendations, strong invariance was tested next by comparing a model with cross-group factor loadings and item thresholds equality constraints to the configural model (Muthén, & Asparouhov, 2002; Widaman & Reise, 1997). This strong invariance tested provided a simultaneous test of the equivalence of the magnitude of item factor loadings and thresholds across groups of interest; thus implying cross-group equivalence of item meaning and item severity with respect to the anxiety construct. Further, strict invariance was tested by comparing a model with constrained loadings, thresholds, and item residuals to a model with constrained loadings and thresholds but free item residuals. Strict invariance comparisons assess equivalence of cross-group item consistency. Finally, factor structure differences across groups were compared using factor variance-covariance and latent mean equality constraints in separate sets of nested model tests.

Model fit for full sample and configural models was evaluated on the basis of the chi-square measure of absolute fit and two practical fit indices: the comparative fit index (CFI), and root mean square error of approximation (RMSEA). Cutoffs of CFI ≥ .95 and RMSEA ≤ .05 suggest good fit in baseline configural models and RMSEAs between .06 and .08 suggest adequate fit (Cheung & Rensvold, 2002; Hu & Bentler, 1998). Subsequent measurement non-invariance was evaluated on the basis of a majority of indices including (1) significant change in the chi-square between successive nested models,[2] (2) change in the RMSEA of .007 or more and (3) a change in the CFI of ≤ -.002 (Meade, Johnson & Braddy, 2008; Sass, Schmitt, & Marsh, in press). Chi-square change and practical fit cutoffs were selected to optimize power and minimize Type I error for detection of measurement non-invariance using WLSMV estimation with our small samples (Elosua, 2011; Meade et al., 2008; Sass et al., in press).

Receiver Operator Characteristic (ROC) analyses were used to examine optimal cut-off scores for the predictive validity of the SPAI-C across sex and race. Cross-sex assessment of optimal cut-offs was evaluated given that sometimes girls report higher anxiety symptom levels (Muris & Broeren, 2009), and to provide a useful comparison point for interpretation of cross-race ROC analyses. ROC analyses examined SPAI-C prediction of (i) any DSM IV anxiety disorder diagnoses for diagnosed and typically developing youth and (ii) any social anxiety disorder diagnosis for social phobic and typically developing youth. From ROC analyses, area under the curve (AUC) was derived by plotting the sensitivity (SN) of SPAI-C cutoff scores against the false positive rate [1- specificity (SP)] of SPAI-C cutoff scores ranging from 1–50. Note that SN yields the proportion of diagnosed individuals detected at a given SPAI-C score while SP yields the proportion of undiagnosed individuals correctly identified at a given SPAI-C score. AUCs in the .80 to .90 range are considered "good" whereas AUCs in the .90 to 1.00 range are considered "excellent". Points on the ROC curve

[1]The ESEM configural model was identified in accord with Muthén's recommendations for ESEM multi-group models with categorical variables and theta parameterization (Muthén, & Muthén, 2006). Specifically, all item residuals were initially constrained to 1 in both groups and latent factor means were constrained to 0 in both groups. Further, to estimate the ESEM model across groups, latent factor variances were set to 1 across groups. Once factor loadings and thresholds were constrained to equality across groups for the strong invariance tests, constraints on latent factor means and variances and item residuals were released in the second non-reference group.

[2]Chi-square differences using the WLSMV estimator were ascertained from an algorithm based on Asparouhov, Muthén, and Muthén (2006).

indicating a balance between optimally high SN and low false positive rates (1-SP) represent optimal cutoff scores for disease detection. Youden's index [(SN + SP)−1] was used to evaluate the balance between SN and SP. Higher Youden's Index scores indicate better cutoffs (Youden, 1950).

Results

Preliminary Analyses

ESEM with an oblique rotation was used to evaluate the fit and factor solutions of full sample models ranging from 3 to 5 factors because prior research supports SPAI-C factor solutions of 3 and 5 factors (Beidel, 1996; Beidel, Turner, & Morris, 1995). Table 1 summarizes model fit and interpretability of the factor solutions. A 4-factor solution was selected as optimal given that it showed an overall model fit in the good range [χ^2 (107, N = 479) = 250.764, $p < .001$; CFI = .975, RMSEA = .053] and four fully interpretable factors that matched factors previously identified in published SPAI-C factor analyses (see Table 2; Beidel, 1996; Beidel et al., 1995). In contrast, RMSEA fit of a 3-factor model was just adequate [χ^2 (99, N = 479) = 350.852, $p < .001$; CFI = .956, RMSEA = .072] and the 5-factor model revealed only 4 interpretable factors. As shown in Table 2, two factors of the 4-factor solution matched corresponding Assertiveness and General Conversation and Public Performance factors identified previously with the exception that item 8 of the current Public Performance factor formerly loaded on the Assertiveness and General Conversation factor (Beidel et al., 1995). The two remaining factors also matched Avoidance and Physical and Cognitive Symptoms factors identified in a prior 5-factor solution, although item 22 of the current Physical and Cognitive Symptoms and item 7 of the current Avoidance factor were not represented in the prior 5-factor solution (Beidel, 1996). The selected 4-factor loading structure was used as a target structure in subsequent cross-group ESEM models.

Cross-Sex Measurement and Factor Invariance of the SPAI-C

Preliminary omnibus test of equality of the covariance and mean structure matrices suggested potential cross-sex measurement non-invariance. Specifically, constraining item covariances and thresholds to equality across sex resulted in a significant chi-square change and a decrement in practical fit [$\Delta\chi2$ (26, N = 479) = 44.64, $p < .05$; ΔCFI = −.004; ΔRMSEA = .05]. Next, a cross-sex configural ESEM model showed that the full sample targeted 4-factor structure was not replicated adequately. Specifically, three items (1, 7 and 23) did not show highest and adequate loadings (i.e. significant, standard loadings > .30) on target factors. Re-testing the cross-sex configural model with those items removed showed adequate fit [$\Delta\chi2$ (128, N = 479) = 248.233, $p > .001$; CFI = .976; RMSEA = .062] and a cross-sex loading pattern resembling the target factor pattern (see Table 3). All items showed their largest, significant factor loadings on corresponding target factors.

Subsequent tests supported cross-sex measurement invariance of the SPAI-C, but highlighted latent mean differences. As shown in Table 4, constraining factor loading and thresholds to equality across sex resulted in a significant chi-square change, but practical fit was not adversely affected [$\Delta\chi2$ (59, N = 479) = 89.034, $p < .01$; ΔCFI = .003; ΔRMSEA = −.007], thus supporting cross-sex strong measurement invariance. Follow-up strict invariance tests showed negligible change in model fit indices, therefore affirming cross-sex invariance of item residuals. Similarly, invariance of factor variances and covariances was affirmed when factor variances and covariances were constrained to equality across sex. Finally, cross-sex factor mean differences were revealed by significant decrements in chis-square, CFI and RMSEA fit when latent means were constrained [$\Delta\chi2$ (2, N = 479) = 24.809, $p < .001$; ΔCFI = −.004; ΔRMSEA = .023]. Specific latent mean differences were tested by regressing latent means on gender in a full sample model.[3] Compared to girls, boys showed lower Public Performance (*b* = −.37, $p < .001$), Assertiveness and General Conversation (*b* = −.44, $p < .001$) and Physical and Cognitive Symptoms (*b* = −.22, $p < .05$).

Cross-Ethnic Measurement and Factor Invariance of the SPAI-C

Primary omnibus test of the equality of the covariance and mean structure matrices supported cross-ethnic measurement invariance of the SPAI-C. Constraining item covariances and thresholds to cross-ethnic equality resulted in negligible change in chi-square and CFI tests, although the RMSEA worsened [$\Delta\chi 2$ (23, *N* = 479) = 26.94, $p > .05$; ΔCFI = .001; ΔRMSEA = .027]. A subsequent cross-race 4-factor configural model using all items revealed that 3 items (1, 9 and 14) did not show adequate loadings on target factors across race. As shown in Table 4, with items 1, 9 and 14 removed from the configural model, the resulting model fit was good [χ^2 (118, *N* = 479) = 193.958, $p < .001$; CFI = .984, RMSEA = .051]. All factor loadings reflected the target structure (see Table 5). Cross-ethnic measurement invariance of the SPAI-C was affirmed by measurement and factor invariance tests (see Table 4). Constraints on loadings and thresholds and then item residuals had negligible effects on chi-square and practical fit. Similarly, constraining latent factor variances/covariances and latent means did not affect chi-square or practical fit.

Sensitivity, Specificity, and Clinical Meaningfulness of the SPAI-C

We next examined sensitivity, specificity, and clinical meaningfulness analyses across sex and race. Table 6 shows results from Receiver Operator Characteristic (ROC) analyses, including AUC, sensitivity, and specificity for models predicting (i) a social anxiety disorder diagnosis in a sub-sample of social phobic and typically developing youth and (ii) any DSM IV anxiety disorder diagnosis in a sub-sample sample of diagnosed (86% had social anxiety disorder based on the ADIS-C/P) and typically developing youth. Figures 1A–1D depict corresponding ROC curves for both African-American and Caucasian groups. In the prediction of any anxiety disorder, Youden's index suggested a cutoff of 14 as the criterion with the best combination of SN and SP for girls and White youth (range .79 to .86). For African American youth, however, Youden's index suggested a cutoff of 17 was best (SN/SP =.74 /.90), although SN was below .80. Focusing on optimizing SN, however, a cut-off of 15 provides high SN and minimal loss in SP for African-American youth (SN/SP = .81/.83). Similarly, although Youden's index indicated an optimal cut-off of 14 for boys, an alternative cut-off of 13 shows higher SN (.78) and acceptable SP (.79) for boys. In the prediction of a social anxiety disorder diagnosis specifically, Youden's index suggested 14 as an optimal cutoff for boys, girls, and White youth. For African-American youth, a cutoff of 17 was suggested by Youden's index, which yielded a SN of .75 and a SP of .90. Focusing on optimal SN/SP, however, a cut-off of 15 provides higher SN and minimal loss in SP for African-American youth (SN/SP = .82/.83).

Discussion

Findings from the present study suggest that social anxiety levels among African American youth based on the SPAI-C appear to be "true" and not a function of measurement bias. In addition, since measurement invariance for the SPAI-C was largely ascertained in this study, findings support past research showing that African American youth generally have significantly lower (or similar) social anxiety levels than their White counterparts (e.g., Beidel, et al., 2000; Beidel et al., 1999; Ferrell et al., 2004).

In the present study, cross-ethnic non-invariance for a handful of SPAI-C items was found. Even if these findings replicate, non-invariance for a few items is not necessarily a cause for

[3]Partial invariance tests of latent factor means is not possible in.

concern (Widamen & Reise, 1997). Knowledge about the invariant items: "scared when joining a large group", "scared in the school cafeteria", and "scared when I talk to someone" can help refine the cultural sensitivity of the SPAI-C. In particular, it has been suggested that socially anxious African American youth show more anxiety in situations with same-race youth compared to situations with Whites (Neal & Ward-Brown, 1994). Neal-Barnett and Smith (1997) explain that African Americans sometimes fear being accused of "Acting White" when meeting same race-individuals. In addition, we believe it is possible for African American youth to interpret these items (e.g., *scared when joining a large group*) in the context of predominantly 'White situations' which might activate for some youth racial socialization survival skills rather than anxiety. As such, exploring the various meanings African American youth might be assigning to non-invariant items can inform any SPAI-C content revision and its cultural sensitivity in the assessment of African American youth.

Turning to cutoff scores, our results showed that the previously suggested SPAI-C cutoff of 18 might be under-identifying anxious youth. Instead, lower SPAI-C cutoff scores (in the 13 to 15 range) appear to be more adequate. These lower cutoffs have implications for screening youth into prevention efforts, identifying more cases in need of diagnostic "work-ups" and treatment services, and for better estimating program effects (Aune & Stiles, 2009; Beidel et al., 2007; Masia-Warner et al., 2005). Lower cutoffs can help address health disparities among African American youth because they have been found to be less likely to use specialty care without identification or encouragement (Alegría et al., 2012). As such, these revised scores can facilitate casting a wider net to serve more African American youth and families.

The present study findings have clinical practice implications, including for working in the contexts of cultural diversity. Clinicians using the SPAI-C in their practice should specifically question African American youth who endorse any of the identified non-invariant items. This questioning should include asking the child to generate examples that pertain to the specific item. In terms of clinical cutoffs, we suggest cautiously using the scores suggested herein (less than the traditional 18) with the caveat that revised scores are not likely to distinguish youth with social anxiety disorder from youth with other anxiety disorders. This lack of disorder specificity within the anxieties is commonly linked to symptom overlap (Silverman & Ollendick, 2005). It also is important to note that our cross-sex invariance analyses yielded non-invariant items and very similar revised cut-offs for boys versus girls. We feel it is difficult to untangle whether sex differences are (un)related to ethnicity since our sample size prohibited use of 4-way multiple group analyses (smallest group would have been less than 70). As such, asking African American youth about endorsed invariant items should not be culturally-guided, but open to the possibility that gender may play a role.

Several limitations and directions for future research are noteworthy. First, data used for the present study was drawn from a convenience sample of families who sought services for the child's anxiety. In the case of African American families, youth were likely identified as anxious and parents encouraged to seek help (Alegría et al., 2012). For these reason, findings might not be completely representative of African American youth and any nuanced ways they experience anxiety (Kingery, Ginsburg, & Alfano, 2007). Second, as noted earlier, our sample size prohibited use of 4-way multiple group analyses to untangle any possible sex-by-race/ethnicity effects. This is an important future step given our findings that boys endorsed less public performance, assertiveness and general conversation symptoms while a few of the non-invariant items identified for African Americans resided in those same factor scales. Third, whereas our focus on African American youth was sample driven, other cultural groups with diverse views and interpretations of mental illness should be a focus of these types of investigations as well (Knight, Roosa, & Umaña-Taylor, 2009) since cultural socialization relevant to symptom interpretation and expression can bias clinical assessment results when using measures developed for another cultural group (see Pina et al., in press). As data accumulate to identify evidence-based assessments that are culturally robust, greater progress can be made to improve the mental health of ethnic minority youth and families.

Acknowledgments

This study was supported in part by Award Numbers K01MH086687 and L60MD001839 from the National Institute of Mental Health and the National Center on Minority Health and Health Disparities. The content of this article is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies. We would like to thank Roger Millsap, Department of Psychology, Arizona State University, Daniel Sass, Department of Educational Psychology, University of Texas San Antonio and Augustine Osman, Department of Psychology, University of Texas San Antonio for their methodological consultation.

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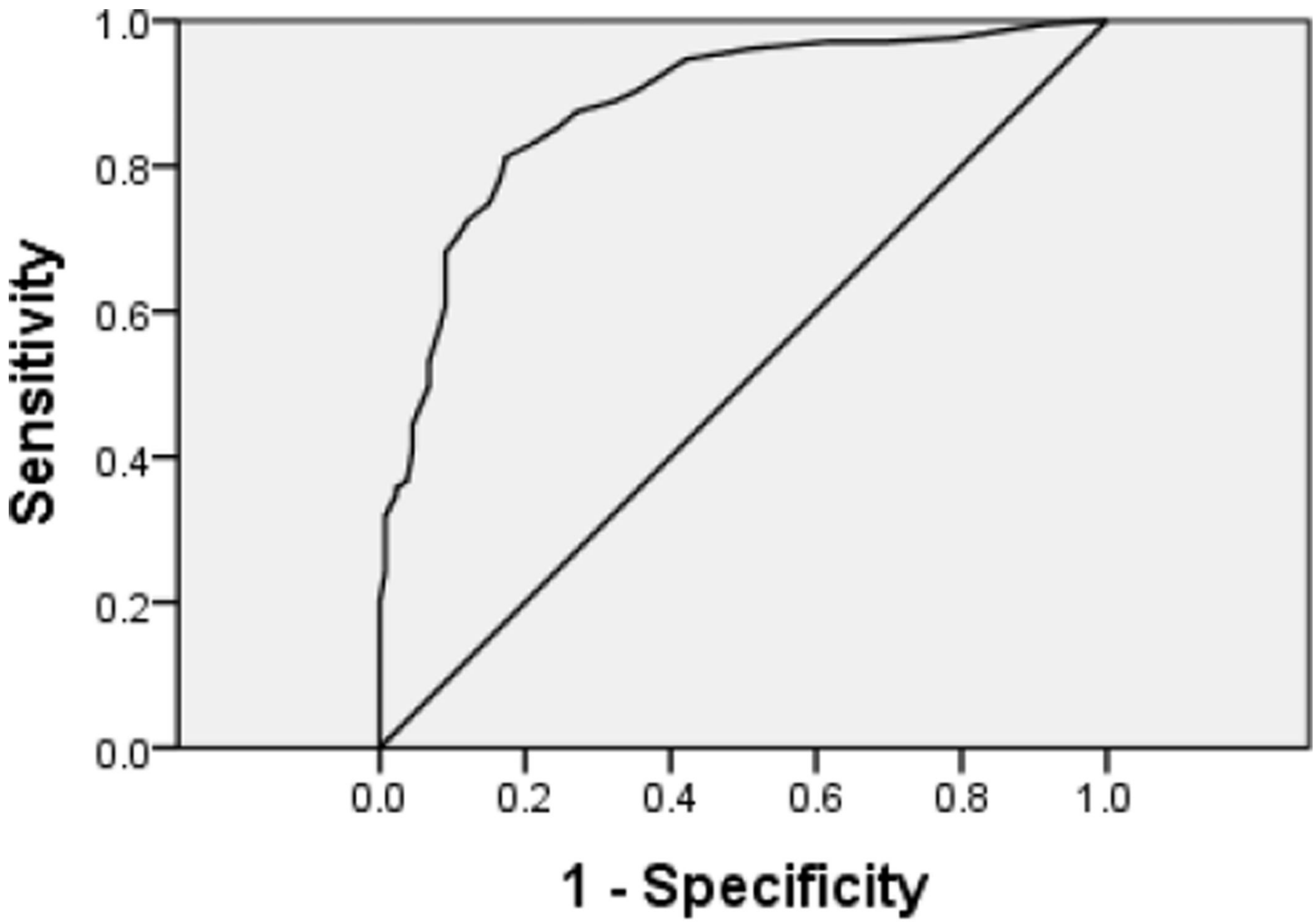

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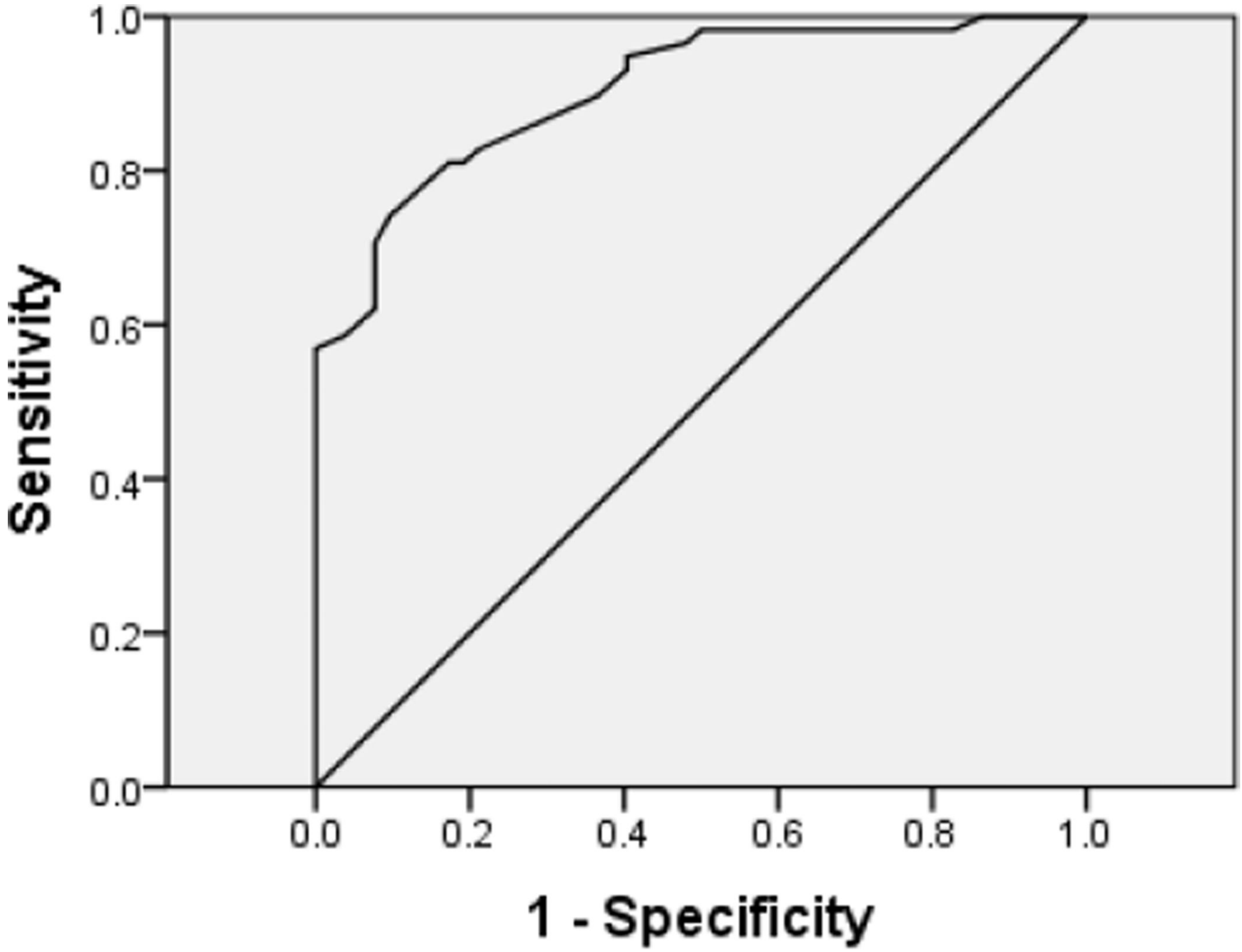

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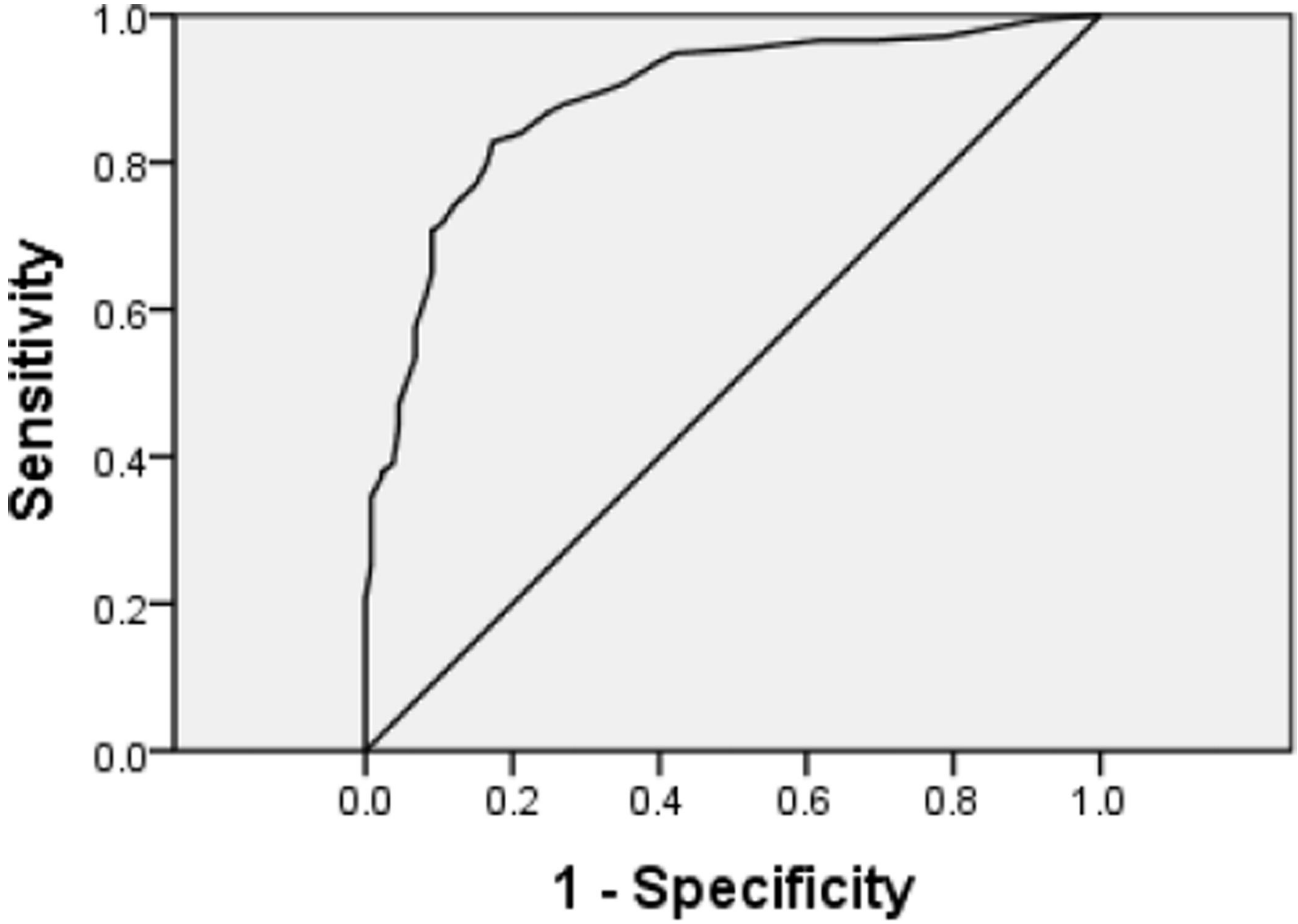

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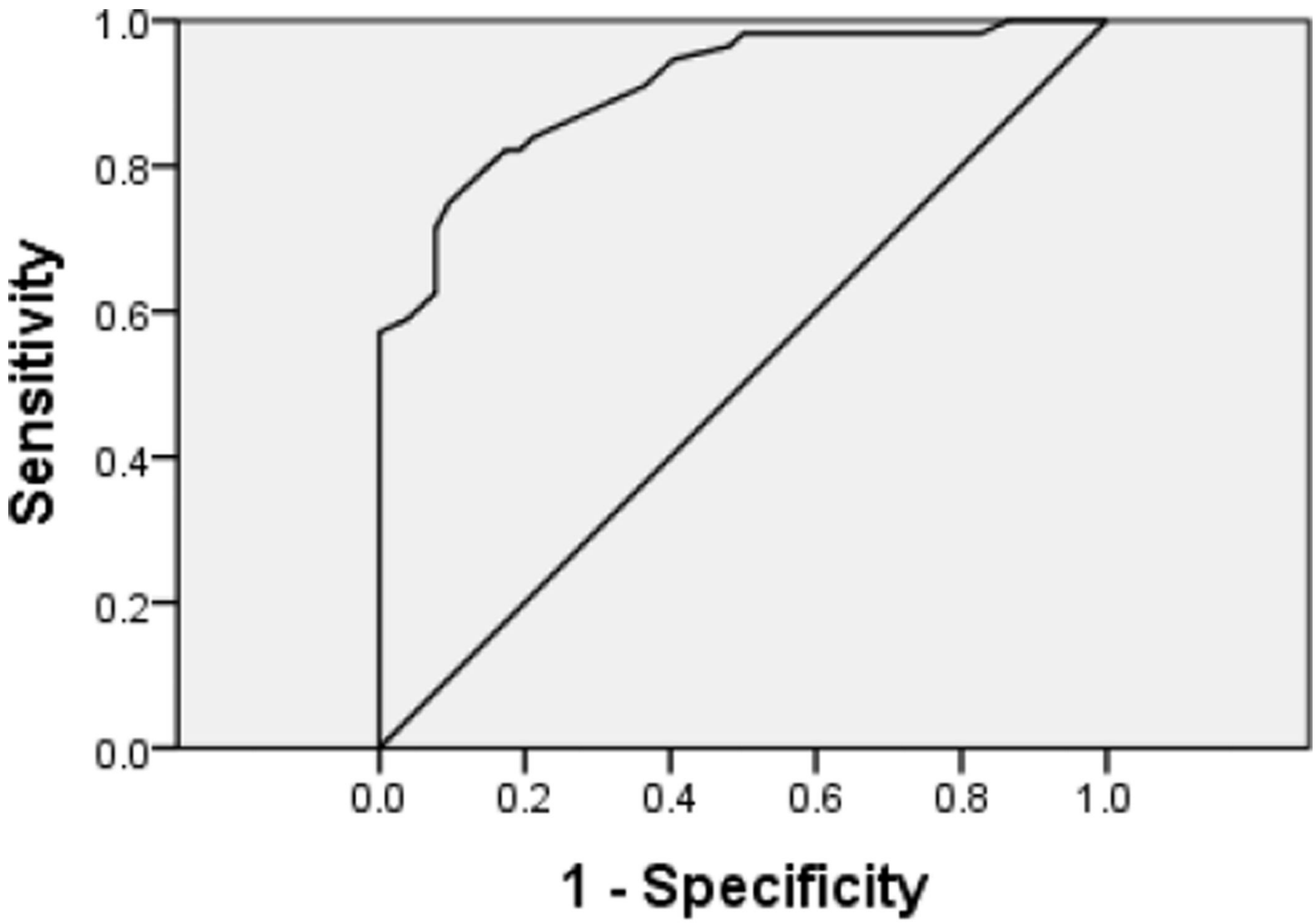

d.

Figure 1.

a. Receiver Operator Characteristic (ROC) Curve of SPAI-C Prediction of Any Anxiety Disorder among Caucasians

b. Receiver Operator Characteristic (ROC) Curve of SPAI-C Prediction of Any Anxiety Disorder among African-Americans

c. Receiver Operator Characteristic (ROC) Curve of SPAI-C Prediction of Social Anxiety Disorder among Caucasians

d. Receiver Operator Characteristic (ROC) Curve of SPAI-C Prediction of Social Anxiety Disorder among African-Americans

Table 1

Overall ESEM Model Fit and Interpretability of 3–5 Factor Solutions of the SPAI-C

	3-factor	**4-factor**	**5-factor**
χ2 Fit (*df*)	350.852*** (99)	250.764*** (107)	202.616*** (102)
CFI	.956	.975	.982
RMSEA	.072	.053	.045
Factor Interpretability	3 factors interpretable	4 factors interpretable	4 factors interpretable

*** $p < .001$

Table 2

Standardized Factor Loadings of the 4-Factor ESEM SPAI-C Model

No. Item	Public Performance	Assertiveness General Conversation	Avoidance	Physical Cognitive Symptoms
Public Performance				
1 scared when joining a large group	**0.428**		0.335	
2 scared when becoming the center of attention	**0.404**			
3 scared when I have to do something while others watch me	**0.687**			
4 scared when speaking or reading in front of a group	**0.88**			
5 scared when answering questions in class or at group meetings	**0.677**			
8 too scared to ask questions in class	**0.577**			
16 scared when speaking in front of the class	**0.843**			
17 scared when in a school play, choir, music, or dance recital	**0.697**			
Assertiveness & General Conversation				
9 scared in the school cafeteria		**0.375**		
10 scared if someone starts arguing		**0.665**		
11 scared if someone asks me to do something that I don't want to do		**0.65**		
12 scared in an embarrassing situation		**0.561**		0.327
13 scared if someone says something that is wrong or bad		**0.697**		
14 scared when I start to talk to someone	0.319	**0.544**	0.32	
15 scared if I have to talk for longer than a few minutes	0.304	**0.454**		
18 scared when ignored or made fun of by others		**0.572**		
Avoidance				
6 scared at parties, dances, school, and go home early			**0.557**	
7 scared to meet new kids			**0.392**	
19 I avoid social situations (parties, school, playing with others)			**0.702**	
20 I leave social situations			**0.746**	
23 I don't speak until spoken to			**0.388**	
Physical & Cognitive Symptoms				
21 before going to a party, I think about what might go wrong				**0.615**
22 I am unable to speak or sound funny when talking to others				**0.563**
24 when I am with other people, I think "scary" thoughts				**0.593**
25 before going someplace, I feel (somatic symptoms)				**0.906**
26 when I am in a social situation, I feel (somatic symptoms)				**0.898**

Note. All represented factor loadings are significant at $p < .05$. Bolded factor loadings represent primary factor loadings for particular factors. Factor loadings that are not bolded are non-zero cross-loadings above .30. Item 8 formerly factored on the Assertiveness/General Conversation Factor (Beidel et al, 1995). Items 7 and 22 did not load on any factors in prior research (Beidel, 1996; Beidel et al., 1995).

Table 3

Cross-Sex Standard Factor Loadings of the 4-Factor Configural SPAI-C Model

Item #	Public Performance		Assertiveness & General Conversation		Avoidance		Physical & Cognitive Symptoms	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
2	**0.329**	**0.594**						
3	**0.786**	**0.742**						
4	**0.973**	**0.825**						
5	**0.882**	**0.591**						
8	**0.662**	**0.481**						
16	**0.764**	**0.900**						
17	**0.561**	**0.867**						
9			**0.391**	**0.642**				
10			**0.709**	**0.873**				
11			**0.772**	**0.850**				
12			**0.699**	**0.709**				
13			**0.850**	**0.872**				
14			**0.627**	**0.867**				
15			**0.481**	**0.801**				
18			**0.667**	**0.692**				
6					**0.357**	**0.604**		
19					**0.436**	**0.811**		
20					**0.740**	**0.865**		
21							**0.706**	**0.548**
22							**0.572**	**0.628**
24							**0.728**	**0.502**
25							**0.952**	**0.813**
26							**0.908**	**0.839**

Note. All re presente d loadings are significant at $p < .05$.

Table 4

Summary of Model Fit Statistics for Measurement and Factor Structure Invariance Tests

	$\chi 2$(df)	CFI	RMSEA	$\Delta\chi 2$(df)	ΔCFI	ΔRMSEA
Cross-Sex						
Configural Invariance	248.233^{***} (128)	.976	.062			
Strong Invariance				89.034^{**} (59)	.003	-.007
Strict Invariance				25.505 (18)	.006	-.002
Factor Variance/				1.267 (3)	.014	-.015
Covariances Invariance						
Latent Means Invariance				24.809^{***}(2)	−.004	.023
Cross-Race						
Configural Invariance	193.958^{***} (118)	.984	.051			
Strong Invariance				55.242 (52)	.006	-.010
Strict Invariance				26.784 (17)	.000	.002
Factor Variance/				4.150 (3)	.008	-.004
Covariances Invariance						
Latent Means Invariance				2.063 (2)	.000	-.001

** $p < .01$,

*** $p < .001$

Note. Factor loadings and thresholds are constrained for strong invariance tests. Item residuals, loadings and thresholds are constrained for strict invariance tests.

Table 5

Cross-Race Standard Factor Loadings of the 4-Factor Configural SPAI-C Model

Item #	Public Performance		Assertiveness & General Conversation		Avoidance		Physical & Cognitive Symptoms	
	White	African American	White	African American	White	African American	White	African American
2	**0.354**	**0.557**						
3	**0.716**	**0.633**						
4	**0.896**	**0.877**						
5	**0.684**	**0.590**						
8	**0.584**	**0.555**						
17	**0.650**	**0.837**						
10			**0.691**	**0.792**				
11			**0.654**	**0.815**				
12			**0.635**	**0.586**				
13			**0.733**	**0.927**				
15			**0.418**	**0.463**				
18			**0.523**	**0.883**				
6					**0.537**	**0.757**		
7					**0.421**	**0.516**		
19					**0.671**	**0.920**		
20					**0.732**	**0.789**		
23					**0.357**	**0.371**		
21							**0.634**	**0.643**
22							**0.606**	**0.694**
24							**0.622**	**0.508**
25							**0.968**	**0.847**
26							**0.970**	**0.791**

Note. All represented loadings are significant at $p < .05$.

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Table 6

Receiver Operator Characteristics Curve (ROC) Analyses of the SPAI: Differences by Gender, Ethnicity, and Optimal Cutoff

	AUC	Confidence Interval		Cutoff of 18		Cutoff of 15		Cutoff of 14		Cutoff of 13	
		LC	UC	SN	SP	SN	SP	SN	SP	SN	SP
Model 1 Any Anxiety Disorder vs. Typically Developing Youth											
Full Sample	0.887	0.857	0.917	0.70	0.90	0.79	0.83	0.81	0.82	0.83	0.79
Afr.Am	0.905	0.851	0.958	0.71	0.92	0.81	0.83	0.81	0.81	0.83	0.79
Caucasian	0.882	0.845	0.918	0.70	0.89	0.78	0.83	0.81	0.83	0.83	0.79
Female	0.889	0.847	0.931	0.76	0.87	0.85	0.80	0.86	0.79	0.87	0.77
Male	0.881	0.838	0.923	0.64	0.92	0.72	0.86	0.75	0.85	0.78	0.79
Model 2 Social Anxiety Disorders vs. Typically Developing Youth											
Full Sample	0.891	0.860	0.922	0.72	0.90	0.80	0.83	0.83	0.82	0.87	0.74
Afr.Am	0.909	0.856	0.963	0.71	0.92	0.82	0.83	0.82	0.81	0.84	0.79
Caucasian	0.885	0.848	0.923	0.72	0.89	0.80	0.83	0.83	0.83	0.84	0.79
Female	0.899	0.856	0.942	0.78	0.87	0.87	0.80	0.88	0.79	0.88	0.77
Male	0.886	0.842	0.930	0.65	0.93	0.74	0.86	0.77	0.85	0.79	0.81

Note. AUC = Area under the Curve, SN = sensitivity, SP = specificity. Afr.Am= African American/Black, All AUCs are significant at the $p < .01$ level