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Cross-Ethnic Measurement Equivalence of the RCMAS in Latino and Caucasian Youth with Anxiety Disorders

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Abstract

The measurement equivalence of the Revised Children's Manifest Anxiety Scale (RCMAS) was examined in a sample of 667 Caucasian and Latino youth referred to an anxiety disorders specialty clinic. Findings supported the factorial invariance of the Physiological Anxiety, Worry/Oversensitivity, and Social Concerns/Concentration subscales as well as the construct validity equivalence of the Total Anxiety scale. These findings suggest that the RCMAS can be used with Latino youth in cross-ethnic research.

Current census estimates indicate 42.7 million people of Latino origin reside in the United States, rendering Latinos the largest minority group (United States Census, 2000) and prompting several comparative studies of mental health disparities between Latinos and Caucasians (e.g., Alegria, Canino, Stinson, & Grant, 2006; Minsky, Vega, Miskimen, Gara, & Escobar, 2003). Relevant to this study are data showing that there is a higher prevalence and/or severity of anxiety among Latino than Caucasian youth (e.g., Pina & Silverman, 2004; Varela, Vernberg, Sanchez-Sosa, Riveros, Mitchell, & Mashunkashey, 2004). For example, in a community sample of youth, Roberts, Ramsay-Roberts, and Xing (2006) found an 8.1% rate of anxiety disorders among Latinos versus 5.8% in Caucasians. It is important to highlight, however, that differences in youths' anxiety symptoms may be artifactual if the measures used to assess anxiety, including self-rating scales, yield nonequivalent information for Latino compared to Caucasian youth. According to Okazaki and Sue (1995), nonequivalent cross-ethnic information can arise from variations in respondents' values, attitudes, language, and worldviews. The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1979), for example, includes the item, "I feel nervous when things don't go the right way." If Latino youth interpret the word "nervous" as meaning the same as *nervios*, which is semantically distinct from nervous (see Baer et al., 2003; Guarnaccia, Lewis-Fernández, & Marano, 2003; Salgado de Snyder, Diaz-Perez, & Ojeda, 2000), then the RCMAS could yield nonequivalent information.

To determine whether a measure yields nonequivalent information, cross-group measurement equivalence tests are needed (Hui & Triandis, 1985; Knight & Hill, 1998; Vandenberg & Lance, 2000). In the case of the RCMAS, finding support for measurement nonequivalence would suggest under-identification or over-identification of anxiety symptoms in Latino compared to Caucasian youth. Under-identification of anxiety symptoms could lead to poor screening, poorly designed preventive interventions, and unsound research; over-identification of anxiety

symptoms could lead to erroneous conclusions about mental health disparities, unsound policies, and wasted resources. Because no study has reported on the cross-ethnic measurement equivalence of any anxiety measure for Latino and Caucasian youth, the main objective of the present study was to examine the cross-ethnic measurement equivalence of the RCMAS, the most widely used self-rating scale in youth anxiety research (Silverman & Ollendick, 2005).

To evaluate the cross-ethnic measurement equivalence of the RCMAS, this study used data from Latino and Caucasian youth. Measurement equivalence was evaluated using tests of factorial invariance (i.e., the cross-group similarity of the factor structure of a measure) and construct validity equivalence (i.e., the cross-group similarity in the construct validity relations associated with a measure) with the three scales as latent anxiety factors (Knight, Tein, Prost, & Gonzales, 2002; Millsap & Kwok, 2004). A sequence of nested confirmatory factor analysis (CFA) models were used to evaluate factorial invariance (i.e., configural invariance, metric invariance, strong invariance, and strict invariance) progressing from least restrictive to most restrictive models that evaluate the invariance of factor loadings, item intercepts, and unique error variances associated with each item across groups. In addition, a series of structural equation modeling (SEM) analyses were used to evaluate the equivalence of the slopes and intercepts of the construct validity relations of RCMAS anxiety to fear (assessed by the Fear Survey Schedule for Children – Revised: FSSC-R; Ollendick, 1983) and depression (assessed by the Children's Depression Inventory: CDI; Kovacs, 1992).

Method

Participants were 677 youth (ages 6 to 16 years; $M = 10.21$, $SD = 2.78$; 320 girls) referred to a youth anxiety disorders specialty research clinic. Forty-one percent ($n = 279$) were Caucasian and 59% Latino ($n = 398$) (196 of the Latinos were of Cuban-origin; the remaining were of other Latino backgrounds). All youth were highly proficient in English and chose to complete all measures in English. About 19% of parents reported family income of \$21,000 or less; 22.8% reported incomes ranging from \$21,001 to \$40,000; and 58.6% reported incomes over \$40,000. After parents provided informed consent (and youths provided informed assent), an assessment battery which included the RCMAS, FSSC-R and CDI was administered to the youth. The RCMAS is a 37-item self-rating scale designed to assess anxiety symptoms and youth respond either *Yes* or *No* to all items. The FSSC-R is an 80-item self-rating scale designed to assess fear levels and youth respond either: *None*, *Some*, *A Lot*. The CDI is a 27-item self-rating scale designed to assess cognitive and behavioral aspects of depression and youth respond using one of three choices. All these measures are widely used in the research literature and have been found to have sound psychometric properties with mainstream populations of youth.

Results

Table 1 shows descriptive statistics for the sample's sociodemographic and clinical characteristics. As the Table shows, there were more similarities than differences between Caucasian and Latino youth. The multi-group CFA analysis used to evaluate configural invariance by ethnicity produced a significant χ^2 fit [$\chi^2 (262, N = 662) = 379.02, p < .001$]. Because the χ^2 criterion is sensitive to trivial modifications of fit, additional practical fit indices were evaluated. These additional indices suggested the model fit the data well (i.e., CFI = .97, RMSEA = .04) and significant factor loadings in both ethnic groups were found.¹ Next, metric invariance tests produced a non-significant adjusted χ^2 difference [$\Delta\chi^2 (21, N = 662) = 22.48$,

¹CFA/SEM model fit was evaluated via the χ^2 goodness-of-fit, comparative fit index (CFI), and root mean square error of approximation (RMSEA). Acceptable CFA/SEM model fit is indicated by a non-significant χ^2 goodness-of-fit, a CFI above .95 (Hu & Bentler, 1998), and a RMSEA below .08 (Browne & Cudeck, 1993; Steiger, 1998). Because the χ^2 criteria are sensitive to trivial modifications of fit, model fit was evaluated on the basis of a majority of fit indices (Cheung & Rensvold, 2002).

ns] and the model with factor loadings constrained to be equal across ethnic groups fit well [$\chi^2 (226, N = 662) = 312.20, p < .001, CFI = .98, RMSEA = .03$]. Then, threshold invariance tests produced a non-significant adjusted χ^2 difference [$\Delta\chi^2 (22, N = 662) = 28.48, ns$] and the model with factor loadings and thresholds constrained to be equal across ethnic groups fit well [$\chi^2 (233, N = 662) = 321.21, p < .01, CFI = .98, RMSEA = .03$]. Lastly, item-uniqueness invariance tests produced a non-significant χ^2 difference [$\Delta\chi^2 (22, N = 662) = 23.55, ns$]; and the model with factor loadings, item-thresholds, and item-residuals constrained to be equal across ethnic groups fit well [$\chi^2 (233, N = 662) = 321.21, p < .001, CFI = .98, RMSEA = .03$].²

Functional and scalar equivalence were evaluated using CDI and FSSC-R scores as construct validity variables. As shown in Table 2, constraining the slope relation to the RCMAS resulted in a non-significant χ^2 difference for the CDI [$\Delta\chi^2 (1, N = 662) = 1.60, ns$] and for the FSSC-R [$\Delta\chi^2 (1, N = 662) = .00, ns$]. These findings suggest that the slope of the relations of these two construct validity variables to the RCMAS scores is similar across ethnic groups, providing some support for the functional equivalence of the RCMAS. Next, constraining the intercept and the slope of the relation to the RCMAS resulted in a non-significant χ^2 difference for the CDI [$\Delta\chi^2 (1, N = 662) = .00, ns$] and FSSC-R [$\Delta\chi^2 (1, N = 662) = .26, ns$]. These findings suggest that the slope and intercept of the relations of these two construct validity variables to the RCMAS scores is similar across ethnic groups, providing support for the scalar equivalence of the RCMAS.

Discussion

Factorial invariance of the RCMAS Physiological Anxiety, Worry/Oversensitivity, and Social Concerns/Concentration factor scales was supported via configural, metric, threshold, and item-uniqueness invariance tests. Additionally, the construct validity equivalence of the RCMAS Total Anxiety scale was supported using the CDI and FSSC-R via functional equivalence and scalar equivalence tests. Based on the present study's results, variations (and lack of) in anxiety between Latino and Caucasian youth likely reflect an ethnic difference in anxiety, at least when assessed using the RCMAS. These findings are important because they suggest that the empirical studies showing a higher prevalence and/or severity of anxiety in Latino compared to Caucasian youth (e.g., Ginsburg & Silverman, 1996; Pina & Silverman, 2004; Varela et al., 2004) reflect true differences in the anxiety that these youth experience. Without this evidence of measurement equivalence it is impossible to consider whether anxiety variations reflect an ethnic difference or represent measurement artifact. If the present study's findings replicate and are supported with broader evaluations of equivalence of construct validity relations investigators would find themselves on firmer ground for conducting studies that compare and/or combine RCMAS data corresponding to Latino and Caucasian youth and for estimating ethnic disparities in youth anxiety.

Because the present study sampled clinic referred youth with anxiety disorders as well as mostly Cuban origin youth, whether these findings replicate with other samples require further study. Future studies also need to examine whether the structure of anxiety as represented by measures tied to the DSM (e.g., March, Parker, Sullivan, Stallings, & Conners, 1997) is (non) equivalent across Latino and Caucasian youth.

²Prior to evaluating the cross-ethnic measurement equivalence of the RCMAS, analyses supported the cross-age and -sex equivalence of the RCMAS. In addition, measurement invariance across ethnicity, age, and sex was supported for the CDI and FSSC-R with the exception of item intercepts invariance across age for the FSSC-R. Details are available from the corresponding author upon request.

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Table 1
Sociodemographic and Clinical Characteristics of the Caucasian and Latino Youth Samples

Variable	Caucasian (n = 279)	Latino (n = 398)
Age Mean (SD)	10.41 (2.90)	10.07 (2.68)
Sex (female)	38.1%	44.8%
Income		
< \$21,000	10.3%	23.2%
\$21,001 to \$40,000	11.7%	29.0%
> \$40,000	77.9%	47.9%
Diagnoses		
Specific Phobia	33.30%	25.10%
Separation Anxiety Disorder	19.80%	25.90%
Social Phobia	12.50%	15.60%
Generalized Anxiety Disorder	16.85%	15.33%

Symptom Measures	M (SD)	95% C.I.	α	M (SD)	95% C.I.	α
RCMAS Anxiety	12.19 (6.55)	11.42 to 12.96	.88	12.87 (6.92)	12.19 to 13.55	.90
Physiological Anxiety	4.22 (2.43)	3.93 to 4.51	.67	4.44 (2.46)	4.20 to 4.68	.69
Social-Concerns Concentration	2.51 (1.99)	2.28 to 2.74	.72	2.66 (2.07)	2.46 to 2.86	.74
Worry/Oversensitivity	5.44 (3.22)	5.06 to 5.82	.81	5.77 (3.38)	5.44 to 6.10	.85
FSSC-R Fear	131.98 (30.10)	128.45 to 135.51	.97	139.61 (30.99)	136.57 to 142.65	.96
CDI Depression	9.27 (7.10)	8.44 to 10.10	.86	10.34 (8.11)	9.40 to 11.14	.88

RCMAS = Revised Children's Manifest Anxiety Scale, CDI = Children's Depression Inventory, FSSC-R = Fear Survey Schedule for Children – Revised. Diagnoses were derived using the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent versions (Silverman & Albano, 1996). Income: $\chi^2(2) = 34.67, p < .001$; the percentage of specific phobias was significantly higher in Caucasian compared to Latino youth ($z = 2.30, p < .05$). Skewness and kurtosis of all scales were within an acceptable range across both Latino and Caucasian groups.

Table 2
 Functional and Scalar Equivalence Estimates for of the RCMAS Total Anxiety Scale: Comparison of Slope and Intercept Differences in Construct Validity Models

Predictor	Caucasian	Latino	Constrained slope comparison	Constrained intercept comparison
<i>Outcome: 3-factor solution for the RCMAS Anxiety Scales</i>				
	Slope/Intercept	Slope/Intercept	$\Delta \chi^2$	$\Delta \chi^2$
CDI Depression	.62 ^{***} / 6.34 ^{***}	.55 ^{***} / 7.06 ^{***}	1.60 (1)	.00 (1)
FSSC-R Fear	.66 ^{***} / 12.16 ^{***}	.65 ^{***} / 11.82 ^{***}	.00 (1)	.26 (1)

RCMAS = Revised Children's Manifest Anxiety Scale, CDI = Children's Depression Inventory, FSSC-R = Fear Survey Schedule for Children - Revised

** $p < .01$

 $p < .001$