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To: HCHS/SOL Steering Committee, Publications Committee, and Statistical Committee

From: Psychosocial/Sociocultural Committee (Linda Gallo & Frank Penedo, Chairs); Measurement/Psychometrics Working Group (William Arguelles, John Elder, Patricia Gonzalez, Carmen Isasi, Maria Llabre, Vanessa Malcarne, Krista Perreira, Scott Roesch, Daniela Sotres-Alvarez)

Re: Results of psychometric analyses, and recommendations for use of the machismo scale administered in the HCHS/SOL Sociocultural Ancillary Study. Note: Analyses performed by Patricia Gonzalez and Alicia Nunez

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Male gender role socialization in Hispanic/Latino cultures is referred to as machismo. The construct of *machismo* encompasses positive and negative aspects of masculinity including bravery, honor, dominance, aggression, sexism, sexual prowess, reserved emotions, among others (Mirandé, 1977; Niemann, 2004). The HCHS/SOL Sociocultural Ancillary Study included the 10 items measuring male gender roles from the MAN for Health Survey (Ayala et al., 2008), which is comprised of items from the Multiphasic Assessment of Cultural Constructs-Machismo Subscale (Cuellar et al., 1996), and the Neff and colleagues Male Honor and Machismo Subscales (Neff, Prohida, & Hoppe, 1991), as well as an added item about men's jobs. Sample items included statements such as, "Wives should respect a man's position" and "It is important for a man to stick to his beliefs."

Psychometric analyses were performed to evaluate the internal consistency and the factor structure of the 10-item Male Gender Roles Scale *(Machismo)* administered in the HCHS/SOL Sociocultural Ancillary Study. In addition, a multiple group confirmatory factor analysis (CFA) was conducted to examine the configural invariance (or equivalence) of this measure across English and Spanish speakers.

The psychometric properties were problematic when machismo was operationalized as a one-factor construct with the 10-item measure used in the HCHS/SOL Sociocultural Ancillary Study. The full scale score did not achieve adequate internal consistency (α = .598). Results suggested that the reliability could be improved if the reverse-coded item GNEA6 ("It is better for a man to ask for help with a difficult task") was dropped. After removing item GNEA6 from the scale, the internal consistency for the total score with 9-items improved to α =.670.

Following the test of internal consistency, an exploratory factor analysis of the 9-item machismo scale was conducted. Results suggested that the *machismo* scale consists of two factors, with four items loading on the first factor (i.e., GNEA2, GNEA7-GNEA9) and five items loading on the second factor (i.e., GNEA1, GNEA3-GNEA5, and GNEA10). Specifically, the two factors identified were ***traditional machismo*** (i.e., Factor 1) and ***caballerismo*** (i.e., Factor 2). Tests of internal reliability for traditional *machismo* and *caballerismo* were conducted. For *caballerismo*, results showed that deletion of item GNEA2 ("It is important for a man to be strong") could

improve this subscale's reliability to α =.721; thus, item GNEA2 was removed to improve both reliability and factor interpretability. Results then suggested that the internal consistency for the *caballerismo* subscale was adequate ($\alpha_{\text{full sample}}$ = .72; α_{Eng} = .69; α_{Span} = .73). Although the cronbach's alpha for the *traditional machismo* subscale was not optimal ($\alpha_{\text{ull sample}}$ =.61; α_{Eng} = .59; α_{Span} = .59), it was within the .5 to .6 range reliability estimate that may be considered acceptable for subscales consisting of 6 items or fewer.

A two-factor CFA model (with 8 items) fit the data well descriptively (CFI = .903, RMSEA = .065, SRMR = .052). This two-factor model was then tested to determine the language configural invariance (i.e., measurement equivalence). Results showed that the two-factor model met the fit criteria for the descriptive fit indices of RMSEA = .070 and SRMR = .059, thus suggesting that the two-factor model was acceptable (invariant) across both language groups.

Note: CFA analyses revealed that the one-factor solution did not fit well (e.g., $\text{RMSEA}_{\text{Eng}}$ =.104; $\text{RMSEA}_{\text{Span}}$ =.109).

Recommendations: For investigators who wish to pursue research questions regarding *machismo*, we recommend the use of the two subscales (i.e., traditional machismo and *caballerismo*). Please note that two items (i.e., GNEA 2 and GNEA6) were excluded to improve psychometric properties. Due to psychometric and construct interpretability issues, we do not recommend the use of the *machismo* total score. Therefore, we recommend that this scale be re-scored in the master database to include the two new subscale scores, and that total scale score representing machismo as a one-factor construct should be dropped from the database (see New Recommended Scoring Syntax, below).

For investigators who wish to provide details regarding the measure in their manuscripts, an example description is: "Machismo gender role beliefs were assessed using eight items from the MAN for Health Survey (Ayala et al., 2008). This scale consists of two subscales: *traditional machismo* (characterized by hypermasculinity, dominance, sexism, and emotional restrictiveness; 5-items) and *caballerismo* (characterized by bravery, honor, and chivalry; 3-items)."

References

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