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Construct Validity Evidence for the Male Role Norms Inventory-Short Form: A Structural Equation Modeling Approach using the Bifactor Model

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[1] The current study utilizes data and measures used in Levant, Hall, Weigold, and McCurdy (2015), but also adds new data and measures, and reports further results

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Abstract

The construct validity of the Male Role Norms Inventory-Short Form (MRNI-SF) was assessed using a latent variable approach implemented with structural equation modeling (SEM). The MRNI-SF was specified as having a bifactor structure, and validation scales were also specified as latent variables. The latent variable approach had the advantages of separating effects of general and specific factors and controlling for some sources of measurement error. Data (N = 484) were from a diverse sample (38.8% men of color, 22.3% men of diverse sexualities) of community-dwelling and college men who responded to an online survey. The construct validity of the MRNI-SF General Traditional Masculinity Ideology factor was supported for all four of the proposed latent correlations with: (a) Male Role Attitudes Scale; (b) general factor of Conformity to Masculine Norms Inventory-46; (c) higher-order factor of Gender Role Conflict Scale; and (d) Personal Attributes Questionnaire-Masculinity Scale. Significant correlations with relevant other latent factors provided concurrent validity evidence for the MRNI-SF specific factors of Negativity toward Sexual Minorities, Importance of Sex, Restrictive Emotionality, and Toughness, with all eight of the hypothesized relationships supported. However, three relationships concerning Dominance were not supported. (The construct validity of the remaining two MRNI-SF specific factors – Avoidance of Femininity and Self-Reliance through Mechanical Skills was not assessed.) Comparisons were made, and meaningful differences noted, between the latent correlations emphasized in this study and their raw variable counterparts. Results are discussed in terms of the advantages of an SEM approach and the unique characteristics of the bifactor model.

Public Significance Statement: This study finds evidence for the validity of a newly-developed short form of a widely used measure of beliefs about the appropriate roles for boys and men, both for broad general beliefs and for four of its seven specific sets of beliefs.

Keywords: Traditional Masculinity Ideology; Male Role Norms Inventory –Short Form (MRNI-SF); Construct Validity; Structural Equation Modeling; Bifactor Model.

Construct Validity Evidence for the Male Role Norms Inventory-Short Form: A Structural Equation Modeling Approach Using the Bifactor Model

The current paper is a companion piece to a study (Levant, Hall, Weigold, & McCurdy, 2015) published in the April 2015 issue of this journal, which investigated the factor structures of three short-form masculinity measures. Here we assess evidence for the construct validity of the latent factors of the Male Role Norms Inventory-Short Form (MRNI-SF), specified with a bifactor structure. The bifactor model partitions the reliable variance in each item-level response into two components: a broad general influence and a specific influence associated with a narrower content domain, an approach that is consistent with the theoretical meaning of the underlying constructs (see Figure 1). The MRNI-SF measures the endorsement of masculinity ideologies, a construct that is frequently used in the study of psychological issues related to men and masculinities. Masculinity ideologies are cultural beliefs about the appropriate standards or norms for boys' and men's role performance. They are theorized to influence the socialization of boys and to pressure men to conform to masculine norms (Levant, 2011). Such pressure results in various forms of gender role strain and conflict (O'Neil, Good, & Holmes, 1995; Pleck, Sonenstein, & Ku, 1994a).

Traditional masculinity ideology was the dominant ideology prior to the deconstruction of gender driven by second-wave feminism in the U.S., beginning in the late 1960s. Since masculinity ideologies vary by culture and there are many cultures in the U.S., it is more accurate to refer to this construct as "traditional White Western masculinity ideology" (hereinafter referred to as TMI for simplicity) to denote its association with the predominantly White Western world (Levant, 2011). Nonetheless, TMI remains influential in the U.S., and men of color must contend with it as well as their own culture's masculinity ideologies (Thompson & Bennett, 2015).

Although TMI has theoretical status as a broad unitary construct, it always has been conceptualized and measured as a multidimensional construct because the relevant standards and expectations that comprise it draw on different content domains. The first measure of TMI, the Brannon Masculinity Scale (Brannon & Juni, 1984), specified 4 dimensions: do not be feminine, strive to be respected for success, never show weakness, and seek adventure, risk and accept violence. Later TMI instruments include the Male Role Norms Inventory (MRNI; Levant et al., 1992), which was developed as a multidimensional measure of the endorsement of both traditional (7 subscales) and non-traditional (1 subscale) masculinity ideologies. The original MRNI and its revised and adolescent versions have been used in at least 91 empirical studies (Gerdes, Alto, Jadaszewski, D'Auria, & Levant, 2016).

The MRNI-SF (Levant, Hall, & Rankin, 2013) is a short form of the MRNI, derived from the MRNI-Revised (MRNI-R; Levant, Rankin, Williams, Hasan, & Smalley, 2010). It was designed to assess TMI with respect to seven norms: Avoidance of Femininity, Negativity toward Sexual Minorities, Self-Reliance through Mechanical Skills, Toughness, Dominance, Importance of Sex, and Restrictive Emotionality. Three of the highest-loading MRNI-R items (identified by exploratory factor analysis) were selected to represent each norm, while ensuring that their content minimized redundancy. Using confirmatory factor analytic (CFA) techniques and fitting a bifactor model in a new sample, the smaller subset of items comprising the MRNI-SF was found to retain the hypothesized seven-factor structure, while also supporting a general TMI factor (Levant et al., 2013). However, Levant et al. (2013) did not report any additional construct validity evidence, such as correlations of the MRNI-SF with other measures (even though such validity evidence exists for its predecessor, the MRNI-R, i.e., in Levant et al., 2010).

Overview of the Present Study

The current study investigates validity evidence for the latent factors of the bifactor model of the MRNI-SF, utilizing measures used in the Levant et al. (2015) study, but also adding new measures and reporting further results. Using the Levant et al. (2010) assessment of the construct validity of the MRNI-R as a guide, the present study assessed validity evidence both for the MRNI-SF general factor (i.e., representing TMI overall) and for specific MRNI-SF factors representing specific masculine norms, by estimating their bivariate relationships with other constructs in the same nomological network. The rationale for the choice of validation constructs is summarized in the following sections, and specific hypotheses are advanced.

Construct validity hypotheses for the MRNI-SF general factor. If the MRNI-SF general factor does indeed represent endorsement of TMI in general, we would expect there to be a strong correlation with a unidimensional instrument designed to assess TMI in general, which would support convergent validity. Thus, we proposed that the MRNI-SF general factor would relate to the latent factor underlying the Male Role Attitudes Scale (MRAS; Pleck, Sonenstein, & Ku, 1994b). Higher scores on the MRAS represent a lower endorsement of traditional masculinity ideology, whereas the reverse is true for the MRNI-SF. Thus, we expected support for the following hypothesis: **H1** – The MRNI-SF general factor will show a strong negative correlation with the MRAS factor.

Because it would be expected that the endorsement of TMI (as measured by the MRNI-SF) would relate to personal conformity to traditional masculine norms (as measured by the Conformity to Masculine Norms Inventory-46, CMNI-46; Parent & Moradi, 2009) and might also be a source of gender role conflict, as measured by the Gender Role Conflict Scale-Short Form (GRCS-SF; Wester, Vogel, O'Neil, & Danforth, 2012), we expected at least moderately strong, positive relationships among these respective factors, which would support concurrent

validity. Levant et al. (2015) supported the extraction of broad factors for both of these multi-dimensional instruments. The preferred model for the CMNI-46 was a bifactor model with nine specific factors and an additional general conformity to masculine norms factor. The best-fitting model for the GRCS-SF was a hierarchical structure that incorporated the hypothesized four patterns of gender-role conflict as first-order factors while including an additional higher-order gender role conflict factor. Hypotheses for these relationships are: **H2** – The MRNI-SF general factor will show a moderate-to-high positive correlation with the: (a) CMNI-46 general factor and (b) GRCS-SF second-order factor.

Finally, discriminant validity evidence for the MRNI-SF general factor was evaluated by estimating its correlation with the latent factor from a very different measure of masculinity, specifically, the Personal Attributes Questionnaire-Masculinity Scale (PAQ-M; Helmreich, Spence, & Wilhelm,1981). Whereas the MRNI-SF conceptualizes gender as a set of culturally-defined normative expectations for behavior, the PAQ-M conceptualizes masculinity as a set of personality traits (e.g., independent, competitive) that are conventionally understood to be appropriate to the male sex and not appropriate to the female sex. Thus, since both constructs address masculinity, there is likely to be some association between them, but, because the underlying conceptions of the elements of the constructs (i.e., personality traits versus normative behavioral expectations) differ so much, we expected the correlation to be weak. The relevant hypothesis was: **H3** – The MRNI-SF general factor will show at most a weak positive correlation with the PAQ-M factor.

Construct validity hypotheses for the MRNI-SF specific factors. We also expected specific factors from the MRNI-SF bifactor model to be associated with conceptually similar specific or lower-order factors of other multidimensional masculinity measures. Table 1

summarizes potentially related domains across the specific constructs measured by the MRNI-SF, CMNI-46, and GRCS-SF instruments. This table was used as a basis for proposing concurrent validity hypotheses for the five of the seven MRNI-SF specific factors that had related norm conformity and/or gender-role conflict constructs. In addition, for the Restrictive Emotionality factor, the correlation with the Normative Male Alexithymia (NMAS) factor (Levant et al., 2006) was also determined to address concurrent validity. Hypotheses follow:

H4: Negativity toward Sexual Minorities (NT) will show significant and positive correlations with the: (a) CMNI-46 Heterosexual Self-Presentation specific factor and (b) GRCS-SF Restrictive Affectionate Behavior between Men first-order factor.

H5: Dominance (DO) will show significant and positive correlations with the CMNI-46 specific factors of (a) Power over Women; (b) Winning; and (c) GRCS-SF Success/Power/Competition first-order factor.

H6: Importance of Sex (IS) will show a significant positive correlation with the CMNI-46 Playboy specific factor.

H7: Restrictive Emotionality (RE) will show significant and positive correlations with the: (a) NMAS factor; (b) CMNI-46 Emotional Control specific factor; and (c) GRCS-SF Restrictive Emotionality first-order factor.

H8: Toughness (T) will show significant and positive correlations with the CMNI-46 specific factors of: (a) Violence and (b) Risk-Taking.

No validity hypotheses were advanced for the MRNI-SF specific factor of Avoidance of Femininity, since there were no directly comparable subscales on the CMNI-46 or the GRCS-SF. Also, we did not advance any hypotheses for the MRNI-SF Self-Reliance through Mechanical Skills specific factor: it did not relate to the CMNI Self-Reliance subscale in a prior construct

validity assessment of the MRNI-R (Levant et al., 2010), although the Self-Reliance subscale in the original MRNI related to the original CMNI Self-Reliance subscale (Parent & Moradi, 2011).

Method

Participants

Data were collected from an initial sample of 1024 men[3]. However, we eliminated 476 participants who did not complete the MRNI-SF, GRCS-SF, and the CMNI-46, 16 who reported being less than 18 years of age, and 48 who did not identify as male. This data screening procedure left us with a viable sample of N = 484 community-dwelling and college men. A majority of participants self-identified as White/European American (61.2%), although 15.3% identified as Asian or Asian American, 7.2% as Black/African American, 7.0% as Latino, 6.2% as Bi/Multiracial, and 3.1% specified other identities. Ages ranged from 18 to 72 years, with a mean of 29.44 (SD = 10.92, median = 26, mode = 23). Most participants (77.7%) identified as heterosexual, although 12.6% identified as gay, 7.2% as bisexual, and 2.5% as "other." The largest percentage of participants indicated being single (47.1%), although 27.1% were married or partnered, and 20.5% were seriously dating. The remaining participants (5.4%) were divorced, separated, widowed, or "other." In terms of education, 36.6% had a high school diploma or GED, 14.0% had an associate's degree, 31.6% had a bachelor's degree, 15.3 % had master's and/or doctoral degrees, and 2.5% indicated either "no degree" or "other." Reported Family/Household Income levels were as follows: under $20,000, 13.8%; $20,001 – 40,000, 18.2%; $40,001 – 60,000, 18.0%; $60,001 – 80,000, 17.1%; over $80,000 29.2%.

Recruitment and Survey Procedures

The study was approved by the University of Akron IRB. Men were recruited from the home and other U.S. universities, and from the general community via special interest websites

[3] This sample overlaps with that used in Levant et al. (2015), but the current sample includes additional participants.

(i.e., automotive enthusiasts) and Internet forums, as well as social media sites (e.g., Reddit, Backpage, and Craigslist). Participants from the University (*name removed*) received course credit for completing the study; all other participants were given the opportunity to participate in a raffle for one of four $50 gift cards. All participants were provided with a link to a Qualtrics website, which hosted the study. After completing the informed consent page, participants filled out the questionnaires and were provided with an educational debriefing, after which they were directed to a different Qualtrics site where they could enter their contact information to either participate in the raffle or receive course credit.

Measures

The survey consisted of the following instruments, presented in the following order: a demographic questionnaire, the Male Role Norms Inventory-SF (MRNI-SF), the Conformity to Masculine Norms Inventory-46 (CMNI-46), the Gender Role Conflict Scale-SF (GRCS-SF), the Personal Attributes Questionnaire-Masculinity (PAQ-M), the Male Role Attitude Scale (MRAS), and the Normative Male Alexithymia Scale (NMAS). Information on these measures follows, and additional information on the MRNI-SF, CMNI-46, and GRCS-SF is reported in *Citation masked.*

Male Role Norms Inventory-Short Form (MRNI-SF). The 21-item MRNI-SF (Levant et al., 2013) is derived from the MRNI-R and measures the endorsement of TMI. As noted in the Introduction above, the MRNI-SF has seven subscales, each with three items. Responses are made on a 7-point Likert-type scale (1= *strongly disagree*; 7 = *strongly agree*), with higher scores indicating higher levels of the endorsement of TMI. No items are reverse-scored. *(Citation masked*) found that a bifactor model best fit the data. The current study reports the first construct validity information about this instrument.

Conformity to Masculine Norms Inventory-46 (CMNI-46). The CMNI-46 (Parent &

Moradi, 2009) is a shorter version of the CMNI (Mahalik et al., 2003) and indicates the extent to which an individual conforms to nine masculine norms: Winning, Emotional Control, Risk-taking, Violence, Power over Women, Playboy, Self-Reliance, Primacy of Work, and Heterosexual Self-presentation. Responses to items are made on a four-point scale (0 = *Strongly disagree*; 3 = *Strongly agree*). Eighteen items are reverse-scored. Validity evidence is presented in Parent and Moradi (2009) and Mahalik et al. (2003) and summarized in Levant et al. (2015), which also found that a bifactor model best fit the data.

Gender Role Conflict Scale-Short Form (GRCS-SF). The 16-item GRCS-SF (Wester et al., 2012) is derived from the GRCS (O'Neil, Helms, Gable, David, & Wrightsman, 1986). Its four subscales are Restrictive Emotionality, Success/Power/Competition, Restrictive Affectionate Behavior between Men, and Conflict between Work and Family Relations; each subscale has four items. Participants respond on a 6-point Likert-type scale (1= *strongly disagree;* 6 = *strongly agree*), and higher scores indicate greater conflict. No items are reverse-scored. Validity evidence is presented in Wester et al. (2012) and summarized in Levant et al. (2015), which also found that a hierarchical model best fit the data.

The Personal Attributes Questionnaire-Masculinity Scale (PAQ-M). The PAQ-M is an 8-item unidimensional measure which assesses how strongly individuals rate themselves as having stereotypically masculine (i.e., instrumentality/agency) personality traits, demonstrated by factor analysis as distinct from a set of feminine traits (Helmreich et al., 1981). Responses to items are made on a five-point scale, anchored by two dichotomous personality attributes (e.g., *Not at all independent/Very independent*). Higher scores indicate greater masculine personality traits. Helmreich et al. (1981) reported that PAQ discriminated between the sexes, supporting its discriminant validity.

The Male Role Attitude Scale (MRAS). The MRAS (Pleck et al., 1994b) is an 8-item, unidimensional inventory of TMI developed through factor analysis of the Brannon Masculinity Scale (Brannon & Juni, 1984). Participants indicate the extent of their agreement with attitudinal statements regarding TMI on a 4-point Likert-type scale (1 = *agree a lot*; 4 = *disagree a lot*). Lower scores indicate greater endorsement of TMI. A modified 7-item version of this scale was used, based on Levant, Graef, Smalley, Williams, and McMillan (2008). Pleck et al. (1994b) found MRAS scores correlated with coercive sexual behavior, the perception of heterosexual relationships as adversarial, beliefs that making women pregnant validates masculinity, and general delinquency and alcohol/drug use.

Normative Male Alexithymia Scale (NMAS). The NMAS (Levant et al., 2006) is a 20-item, unidimensional inventory in which participants answer questions about their own experience of emotions using a Likert-type format (1 = *strongly disagree*; 7 = *strongly agree*), with higher scores indicating higher levels of alexithymia. Scores on the NMAS displayed evidence of internal consistency (α = .92 for men) and test-retest reliability (r = .91 for men) over a 1 to 2 month period (Levant et al., 2006). Observations of gender differences, relations of the NMAS with other instruments, and its incremental validity in predicting masculinity ideology provide evidence supporting scale interpretations.

Data Analytic Procedures

Power analysis. Soper's (2013) online SEM calculator was used to determine the minimum sample size needed for adequate power in the current study, using effect size = .30, power = .80, and alpha = .05. Calculating this separately for each of the three CFA models, the largest *N* (229) was needed for the model of the MRNI-SF with the MRAS, PAQ-M, and NMAS. Our *N* of 484 greatly exceeded this value.

Missing data and normality. There was a low level of missing data in the analysis sample with an average of .003 missing responses per participant and no evident patterns of non-response. The recommended practice of full information maximum likelihood (FIML) estimation procedures was followed in all SEM analyses (Schlomer, Bauman, & Card, 2010); thus, no cases were deleted and no missing values were imputed. The data were moderately non-normally distributed, with univariate values of skew ranging from 0.002 to 2.28 and values of kurtosis ranging from -0.01 to 2.46.

CFA models and parcels. To test Hypotheses 1-8, we used Mplus v.7.11 (Muthén & Muthén, 1998-2013) SEM software. Maximum Likelihood Robust (MLR) estimation was used to accommodate any non-normality in the data. We estimated four CFA models, each of which paired the MRNI-SF with one or more related constructs: (a) MRNI-SF with CMNI-46; (b) MRNI-SF with GRCS-SF higher-order factor; (c) MRNI-SF with GRCS-SF lower-order factors; and (d) MRNI-SF with MRAS, PAQ-M, and NMAS. Each of these models included freely estimated correlations of the MRNI-SF general and specific factors with latent factors corresponding to the relevant other constructs.

The MRNI-SF and CMNI-46 were both specified as having a bifactor structure in which there was a single general factor on which all items loaded, and seven or nine specific factors, respectively, with item loadings assigned corresponding to the subscales. All specific factors were constrained to be orthogonal (unrelated) to the general factor.[4] The first model including GRCS-SF specified a hierarchical factor structure with four lower-order factors corresponding to the subscales, which all loaded on a single higher-order factor. The second model including

[4]Typically, in a bifactor model, the general factor and all specific factors would be constrained to be orthogonal to each other, as was done in Levant et al. (2015). However this approach resulted in non-positive definite latent variable covariance matrices. Thus, we freed the orthogonality constraints of the specific factors with each other, as was done in Levant et al. (2013).

GRCS-SF only specified the four lower-order factors (allowing them to freely intercorrelate). For the unidimensional MRAS, PAQ-M, and NMAS measures, common factor models were estimated, using item parcels rather than items as indicators of the three latent factors. Item parcels tend to be more reliable, more normally distributed, and if properly constructed, can reduce contamination of the latent factors by shared secondary influences (Hall, Snell, & Foust, 1999). As much as possible, the item parcels for this model were created by combining items that shared an unmodeled secondary influence into the same parcel as suggested by Hall et al. (1999), resulting in the following assignments of items to parcels: (a) for the MRAS, two parcels of 2 items each (p1 = 1, 3; p2 = 5, 6) and one parcel of 3 items (p3 = 2, 4, 7); (b) for the PAQ-M, two parcels of 3 items each (p1 = 2, 16R, 17; p2 = 6, 10, 24), and one parcel of 2 items (p3 = 19, 20); and (c) for the NMAS, four parcels of 5 items each (p1= 4, 10, 16, 17, 20; p2 = 9, 12, 13, 14, 15; p3 = 2R, 8R, 11, 18R, 19R; p4 = 1, 3, 5R, 6R, 7R).

Results

Descriptive Statistics and Fit of CFA Models

Means, standard deviations, and internal consistency reliability estimates for the subscale and total (composite) scores for all of the raw score study variables are shown in Table 2. The fit statistics for the four CFA models estimated to determine the values and statistical significance of the proposed validity coefficients are summarized in Table 3. In all four models, the chi-square goodness-of-fit statistic was statistically significant, indicating some sources of misfit. However, all remaining fit indices were well within the guidelines for adequate fit as recommended by Kahn (2006) and Kline (2016), suggesting that, in most aspects, the measurement model fit the data adequately. Standardized factor loadings for the MRNI-SF specific and general factors were statistically significant for all but one (# 21) of the items in all

models, and ranged in value from .28 to .97. All standardized factor loadings for the CMNI-46 specific factors were statistically significant and ranged in value from .36 to .86. However only 29 of the 46 standardized factor loadings for the CMNI-46 general factor were statistically significant, and ranged in value from .14 to .67. This indicates that only some of the CMNI-46 items reflected both a general and a specific influence. All standardized factor loadings for the GRCS-SF higher-order factor model were statistically significant, with values ranging from .33 to .87. All standardized factor loadings for the GRCS-SF first-order factors were statistically significant, ranging from .46 to .86. All standardized factor loadings for the fourth model were statistically significant; these ranged in value from .64 to .78 for the PAQ-M, .46 to .85 for the MRAS, and.79 to .87 for the NMAS. Thus all CFA models were deemed adequate to describe the factor structures and correlations of their respective scales and factors.

Assessment of Construct Validity Evidence for the MRNI-SF

The full set of latent-variable and raw score based correlations of MRNI-SF with the CMNI-46, GRCS-SF, PAQ-M, MRAS, and NMAS is shown in Table 4.

Validity evidence for the MRNI-SF general factor. Hypotheses 1, 2(a and b), and 3 concerned the validity of the MRNI-SF general factor, and were all supported. The MRNI-SF general factor had a significant and strong negative correlation with the MRAS factor, $r = -.66$, $p < .001$. The MRNI-SF general factor significantly correlated with the general factor of the CMNI-46, $r = .70$, $p < .001$, and with the higher-order factor of the GRCS-SF, $r = .50$, $p < .001$. The MRNI-SF general factor had a non-significant correlation with the trait-based PAQ-M factor, $r = .13$, $p = .12$, in accord with Hypothesis 3.

Validity evidence for specific factors. With respect to validity evidence for the MRNI-SF specific factor of Negativity toward Sexual Minorities (NT), Hypotheses 4a and 4b were

supported. Specifically, the MRNI-SF NT specific factor had a moderate, positive correlation with the CMNI-46 Heterosexual Self-Presentation (HSP) specific factor, $r = .38$, $p < .001$, and with the GRCS-SF Restrictive Affectionate Behavior between Men (RABBM) first-order factor, $r = .34$, $p < .001$.

The three hypotheses advanced to assess the construct validity of the MRNI-SF Dominance (Do) specific factor were not supported. Hypothesis 5a, proposing a significant and positive relationship with the CMNI-46 specific factor of Power over Women, was not significant, $r = .22$, $p = .12$. Hypothesis 5b, proposing a significant and positive relationship with the CMNI-46 specific factor of Winning, was also not significant, $r = .10$, $p = .31$. Finally, Hypothesis 5c, proposing a significant and positive relationship with the GRCS-SF first-order factor of Success/Power/Competition, was not significant, $r = .00$, $p = .97$. Indeed, MRNI-SF Dominance only had one significant correlation with factors for the remaining multidimensional scales, the CMNI-46 Heterosexual Self-Presentation specific factor.

Hypothesis 6, proposing a significant and positive relationship between the MRNI-SF Importance of Sex and the CMNI-46 Playboy specific factors, was supported, $r = .22$, $p = .005$. Three hypotheses were advanced regarding validity evidence for the MRNI-SF specific factor of Restrictive Emotionality. The test of Hypothesis 7a, which proposed a positive relationship with the NMAS, yielded a moderate, positive correlation, $r = .42$, $p < .001$. Similarly, and consistent with Hypothesis 7b, there was a moderate and positive relationship with the CMNI-46 specific factor of Emotional Control, $r = .44$, $p < .001$. Finally, there was evidence for the relationship of the MRNI-SF Restrictive Emotionality specific factor with the GRCS-SF Restrictive Emotionality lower-level factor as proposed in Hypothesis 7c, $r = .44$, $p < .001$.

Hypotheses 8a and 8b concerned the validity evidence for the MRNI-SF Toughness scale and were both supported. Support for Hypothesis 8a consisted of a significant and positive correlation between the MRNI-SF Toughness and the CMNI-46 Violence specific factors, r = .32, p < .001. Support for Hypothesis 8b consisted of a significant and positive relationship between the MRNI-SF Toughness factor and the CMNI-46 Risk-Taking factor, r = .25, p < .001.

Exploratory results: Avoidance of Femininity (AF), comparison of raw score versus latent factor-based correlations. Since no hypotheses were advanced regarding the AF specific factor, we examined it in relation to the other variables in the study in the hopes of illuminating ways to assess its validity. Although the content of AF did not appear to overlap with the content of any of the CMNI-46 and GRCS-SF specific factors (see Table 1), we found statistically significant correlations with 5 of the 9 CMNI-46 specific factors and 4 of the 5 GRCS-SF latent factors. Finally, in regard to raw scores vs. latent factor scores, nearly half (65 out of 131) of the correlations that were significant based on raw scores were not significant when based on latent factors (see Online Supplement).

Discussion

The results of this study using a relatively large (N = 484) and diverse (38.8% men of color, 22.3% men of diverse sexualities) sample provide initial empirical support for the construct validity of the MRNI-SF, supporting interpretation of the MRNI-SF general factor as reflecting traditional masculinity ideology (TMI) in general, and providing concurrent validity evidence for the MRNI-SF specific factors of Negativity toward Sexual Minorities, Importance of Sex, Restrictive Emotionality, and Toughness. The validity evidence did not support the MRNI-SF specific factor of Dominance, and the validity relationships for the remaining two specific factors were not hypothesized. However some evidence may be provided by the

exploratory results for the specific MRNI-SF factor for Avoidance of Femininity (AF), which had statistically significant correlations with the majority of the CMNI-46 and GRCS-SF latent factors. This result suggests that AF may be a broader construct than the other MRNI-SF specific factors. In support of this proposition, O'Neil et al. (1995) posited that Fear of Femininity (a construct closely related to AF) was a general factor that underlay the four patterns of gender role conflict. This possibility merits further study.

The hazards of relying on raw scores (and the advantages of the SEM approach) were strikingly illuminated by our finding that almost half of the correlations that were statistically significant based on raw scores were not significant when based on latent factors. Given that a more typical pattern is stronger relationships between latent than manifest variables, most of this discrepancy is likely due to the unique advantage of the bifactor model of separating out the effects of the general factor from that of the specific factors. That is, in the bifactor model, specific factors explain observed relationships among sets of items *over and above* the explanation that is provided by the general construct (Reise, 2012). In the case of the MRNI-SF, the general factor accounted for a large proportion (61%) of the total explained variance in the pool of items (Levant et al., 2015). Thus, the raw score estimates based on correlations with subscale scores likely vastly over-estimated the correlates of the specific factors.

Study Limitations

Several limitations of the current study may impact the interpretation of the results. First, evidence was not found for the concurrent validity of the Dominance specific factor. Relatedly, the concurrent validities of the Avoidance of Femininity and Self-Reliance through Mechanical Skills specific factors were also not assessed. Hence, future research should address this gap by assessing the concurrent validity of these specific factors. Second, we did not assess predictive

validity, incremental validity, and test-retest reliability, which would be important tasks for future research. Third, one of the CMNI-46 scales (Heterosexual Self-Presentation) had lower-than-desirable internal consistency reliability. Although this would not affect the latent factor used to assess the validity of the MRNI-SF specific factor Negativity toward Sexual Minorities, it would affect validity evidence using the raw scores. Fourth, the self-report nature of the surveys introduces the possibility of socially desirable responding (SDR). SDR was not measured in our study; however, a recent article demonstrated that SDR is not always a problem (Tracey, 2016). To the extent that SDR may contaminate factor scores, it seems much more likely to do so in the general factor (which reflects commonality across responses to all items) than for specific factors, an idea which might be explored in future research. In contrast, raw score correlations based on the MRNI-SF subscales are likely more prone to bias due to SDR because systematic responding shared across all items has not been partialled out.

Conclusions

Two main conclusions can be drawn from this study of the construct validity of the MRNI-SF. First, there is evidence of the convergent, discriminant, and concurrent validity of the MRNI-SF general and specific factors, although additional research is called for in investigating the construct validity of three specific factors, as well as the predictive validity, incremental validity, and test-retest reliability of the MRNI-SF. Second, the present study demonstrates the advantages of the use of structural equation modeling for evaluating evidence for the construct validity of any scale used in counseling psychology research, because it allows the separation of general and specific factors and removes the effects of measurement error to the extent possible.

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Table 1

Subscales of the MRNI-SF, CMNI-46, and GRCS-SF, Showing Conceptually Related Content

MRNI-SF (7 Subscales)	**CMNI-46 (9 Subscales)**	**GRCS-SF (4 Subscales)**
1. Negativity toward Sexual Minorities	-Heterosexual Self-Presentation	-Restrictive Affectionate Behavior between Men
2. Dominance	-Power over Women -Winning	-Success/Power/Competition
3. Importance of Sex	-Playboy	*{no directly comparable subscale}*
4. Restrictive Emotionality	-Emotional Control	-Restrictive Emotionality
5. Toughness	-Risk-Taking -Violence	*{no directly comparable subscale}*
<u>Remaining subscales:</u> 6. Avoidance of Femininity	*{no directly comparable subscale}*	*{no directly comparable subscale}*
7. Self-Reliance through Mechanical Skills	*{no directly comparable subscale}*	*{no directly comparable subscale}*
{no directly comparable subscale}	-Self-Reliance -Primacy of Work	Conflict between Work and Family Relations

Table 2

Descriptive Statistics for Study Variables

Measure & Subscale	*M*	*SD*	*α*
MRNI-SF			
Total Score	3.00	1.21	.94
Restrictive Emotionality	2.62	1.47	.82
Self-Reliance through Mechanical Skills	4.50	1.62	.89
Negativity toward Sexual Minorities	1.96	1.43	.85
Avoidance of Femininity	2.94	1.74	.89
Importance of Sex	2.92	1.62	.86
Toughness	4.03	1.69	.82
Dominance	2.01	1.37	.88
CMNI-46			
Total Score	1.36	0.31	.87
Winning	1.46	0.53	.82
Emotional Control	1.44	0.62	.89
Risk-Taking	1.38	0.50	.79
Violence	1.72	0.63	.85
Power over Women	0.73	0.62	.84
Playboy	1.37	0.71	.77
Self-Reliance	1.38	0.57	.84
Primacy of Work	1.19	0.61	.78
Heterosexual Self-Presentation	1.33	0.54	.60
GRCS-SF			
Total Score	3.21	0.82	.85
Success/Power/Competition	3.61	1.16	.79
Restrictive Emotionality	3.31	1.21	.82
Restrictive Affectionate Behavior between Men	2.53	1.19	.84
Conflict between Work and Family Relations	3.39	1.20	.78
PAQ-Masculinity	3.52	0.65	.77
MRAS	2.66	0.58	.74
NMAS	3.71	1.10	.93

Note. $N = 484$. Response options range from 1-7 for the MRNI-SF and the NMAS; 0-3 for the CMNI-46; 1-4 for the MRAS; 1-6 for the GRCS-SF; and 1-5 for the PAQ-M. On all scales except the MRAS, higher scores indicate greater degrees of the measured construct, whereas for the MRAS, lower scores indicate greater degrees of the measured construct.

Table 3

Fit Statistics for Models Used to Estimate Validity Coefficients

Model	χ^2 (df)	*p*	CFI	TLI	RMSEA 90% CI [LL,UL]	SRMR
1. MRNI-SF (Bi), CMNI-46 (Bi)	2957.30 (1940)	< .0001	.94	.93	.033 [.031, .035]	.038
2. MRNI-SF (Bi), GRCS-SF higher order (Hi)	1168.10 (575)	< .0001	.93	.92	.046 [.042, .050]	.064
3. MRNI-SF (Bi), GRCS-SF lower order only	1016.77 (549)	< .0001	.95	.94	.042 [.038, .046]	.045
4. MRNI-SF (Bi), PAQ-M, MRAS, NMAS	779.38 (365)	< .0001	.95	.94	.048 [.044, .053]	.039

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Bi=bifactor structure; Hi = hierarchical structure.

Table 4

Full table of the correlations of the MRNI-SF with the CMNI-46, GRCS-SF, PAQ-M, MRAS, and NMAS. Correlations based on latent factors (regular font) are in the upper row and correlations based on raw scores (italic font) are in the lower row. Boldface correlations were used for hypothesis testing.

	MRNI Factor/Scale							
Measure & Factor/Scale	NT	DO	SRMS	AF	IS	RE	T	TMI
CMNI-46								
Winning	.03	**. 10**	.12	.20*	.06	.14*	.28*	.16*
	*.16**	*.24**	*.15**	*.27**	*.19**	*.24**	*.28**	*.29**
Emotional Control	.01	.01	.09	.14*	.03	**.44***	.20*	.10
	*.16**	*.19**	*.16**	*.23**	*.17**	*.44**	*.24**	*.29**
Risk-Taking	-.04	.02	.22*	.05	.19*	.10	**.25***	.02
	*.19**	*.26**	*.21**	*.21**	*.29**	*.25**	*.28**	*.32**
Violence	.02	.10	.15*	.23*	.03	.17*	**.32***	.17*
	.08	*.17**	*.19**	*.25**	*.12**	*.21**	*.31**	*.25**
Power over Women	-.03	**.22**	.14	.19	.01	.08	.27*	.34*
	*.53**	*.72**	*.27**	*.56**	*.51**	*.54**	*.44**	*.65**
Playboy	-.32*	-.03	.08	.10	**.22***	.14	.07	.04
	-.03	*.20**	*.11**	*.21**	*.29**	*.26**	*.14**	*.22**
Self-Reliance	-.05	-.07	-.07	-.07	-.09	.23*	.05	.09
	.05	*.08*	*-.01*	*.05*	*.04*	*.23**	*.11**	*.10**
Primacy of Work	-.01	.00	.16*	.18*	.10	.18*	.26*	.02
	*.23**	*.25**	*.17**	*.28**	*.25**	*.30**	*.26**	*.32**
Heterosexual Self-Presentation	**.38***	.28*	.17*	.36*	.14	.16	.32*	.21*
	*.57**	*.50**	*.28**	*.48**	*.36**	*.41**	*.41**	*.55**
CMNI-46 Total Score	.36*	.24	-.08	.09	.13	.16	-.04	**.70***
	*.40**	*.54**	*.32**	*.54**	*.45**	*.61**	*.53**	*.63**
GRCS-SF								
Success/Power/ Competition	-.02	**-.00**	.18*	.14*	.03	.22*	.33*	.30*
	*.14**	*.23**	*.23**	*.26**	*.19**	*.31**	*.35**	*.32**
Restrictive Emotionality	-.01	.04	.05	.19*	.02	**.44***	.17*	.17*
	.08	*.14**	*.11**	*.22**	*.10**	*.37**	*.19**	*.22**

	MRNI Factor/Scale							
Measure & Factor/Scale	NT	DO	SRMS	AF	IS	RE	T	TMI
Restrictive Affectionate Behavior between Men	**.34*** *.47**	.16 *.42**	.08 *.22**	.32* *.46**	.13 *.34**	.35* *.47**	.20* *.34**	.45* *.50**
Conflict between Work & Family Rel'ns	-.03 *.03*	-.02 *.06*	.07 *.07*	.01 *.05*	-.07 *.03*	.13 *.14**	.08 *.10**	.08 *.09**
GRCS-SF Total Score	.22* *.26**	.11 *.31**	.13* *.22**	.32* *.36**	.08 *.24**	.48* *.47**	.30* *.35**	**.50*** *.41**
PAQ-Masculinity	.23* *.20**	.23* *.19**	.09 *.11**	.24* *.22**	.28* *.23**	.14 *.14**	.22* *.20**	**.13** *.24**
MRAS	-.37* *-.51**	-.26 *-.58**	-.32* *-.41**	-.47* *-.62**	-.32* *-.54**	-.45* *-.60**	-.59* *-.61**	**-.66** *-.72**
NMAS	-.02 *.16**	.02 *.28**	.03 *.19**	.10 *.31**	-.03 *.24**	**.42*** *.50**	.14* *.29**	.28* *.36**

Note. N = 444. NT = Negativity toward Sexual Minorities; DO = Dominance; SRMS = Self-Reliance through Mechanical Skills; AF = Avoidance of Femininity; IS = Importance of Sex; RE = Restrictive Emotionality; T = Toughness. * $p < .05$

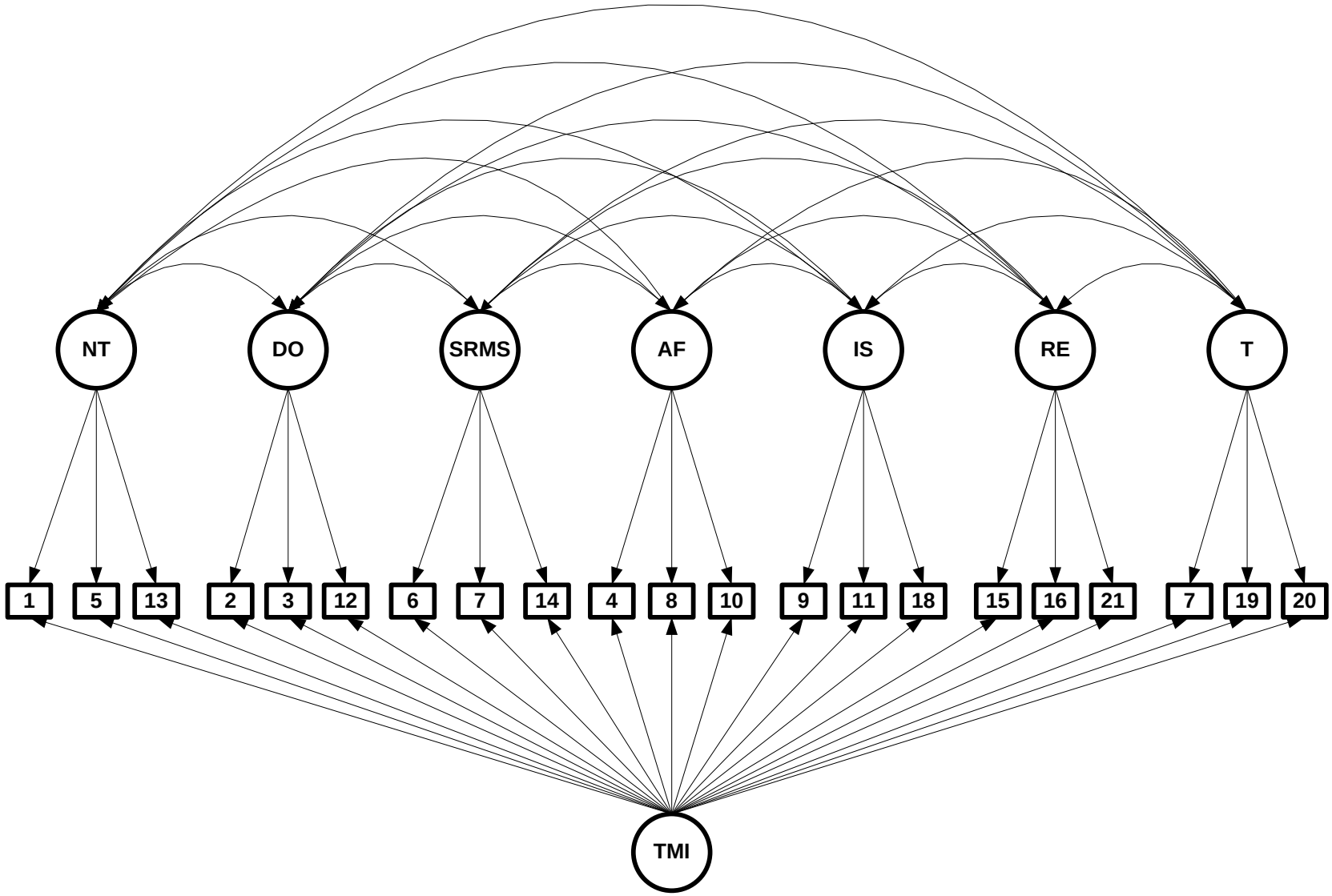

Figure 1. MRNI-SF bi-factor structure in which the set of seven specific factors are allowed to freely covary and the general factor is fixed to be orthogonal to the seven specific factors. Error terms are not displayed for readability.