Fate of the Total Score: Dimensionality of the Conformity to Masculine Norms Inventory-46 (CMNI-46)

Note: This article may not exactly replicate the final version published in the APA journal. It is not the copy of record. Please use the DOI link on my website to access the PDF through your institution, allowing full access to the published type-set article.

This copy obtained from https://drjosephhammer.com

Link to Supplemental Material for this article:
https://drjosephhammer.com/wp-content/uploads/2016/04/PMM_HAMMER_0391_supp.pdf

APA-Style Citation:

Hammer, J. H., Heath, P. J., & Vogel, D. L. (2018). Fate of the total score: Dimensionality of the Conformity to Masculine Role Norms Inventory (CMNI-46). *Psychology of Men & Masculinity, 19*, 645-651. doi: 10.1037/men0000147

Joseph H. Hammer, Ph.D.
243 Dickey Hall
University of Kentucky
Lexington, KY 40506
jhhammer@gmail.com

Patrick H. Heath, M.A.
Department of Psychology
Iowa State University
W112 Lagomarcino Hall
Ames, IA 50014
pheath@iastate.edu

David L. Vogel, Ph.D.
Department of Psychology
Iowa State University
W112 Lagomarcino Hall
Ames, IA 50014
dvogel@iastate.com

Abstract

The Conformity to Masculine Norms Inventory-46 (CMNI-46) measures conformity to hegemonic masculine gender role norms. Research offers conflicting conclusions regarding the CMNI-46's dimensionality, with varying degrees of support for models that consist of nine correlated factors and second-order or bifactor models that include a general conformity to masculine norms factor. To clarify the instrument's dimensionality, the present study utilized confirmatory factor analysis and ancillary bifactor measures in two samples of community (N = 627) and college men (N = 811). Results generally supported the use of the correlated factors solution for conceptualizing and modeling the CMNI-46. In turn, there was a lack of support for using the CMNI-46 to measure a general CMN factor, as the general CMN factor accounted for little variance in both samples. The theoretical implication is that the CMNI-46 can measure conformity to specific masculine norms but not overall conformity.

Keywords: conformity to masculine norms; bifactor analysis; validity; scale development; scoring

Fate of the Total Score: Dimensionality of the Conformity to Masculine Norms Inventory-46 (CMNI-46)

Conformity to socialized masculine norms, the standards with which people deem men's behavior as "acceptable" or "unacceptable" (Mahalik et al., 2003), is a central construct in the study of men's health and behavior. Wong, Ho, Wang, and Miller's (2016) meta-analysis established that conformity to certain norms is inversely associated with mental health and psychological help seeking. Conformity to masculine norms has also been linked with poorer physical health (e.g., Hamilton & Mahalik, 2009) and relationship satisfaction (e.g., Burn & Ward, 2005). However, there are concerns with how best to conceptualize and measure conformity to masculine norms (Levant, Hall, Weigold, & McCurdy, 2015; Thompson & Bennett, 2015). This study used confirmatory factor analysis (CFA) and ancillary bifactor measures to clarify the dimensionality (i.e., factor structure) of the Conformity to Masculine Norms Inventory-46 (CMNI-46; Parent & Moradi, 2009).

Measurement of Conformity to Masculine Norms

The CMNI-94 was originally developed to assess men's self-reported conformity to 11 hegemonic masculine gender role norms (Mahalik et al., 2003). Items were generated from a literature review on traditional masculine norms and two months of focus groups on the actions, thoughts, and feelings that constituted masculine norms in the U.S. Subsequent exploratory factor analyses extracted 11 different masculine norm factors from the item pool. An abbreviated version—the CMNI-46 (Parent & Moradi, 2009)—was developed using confirmatory factor analyses on the original 94-item scale, resulting in a 46-item measure that assessed nine different masculine norms. Those norms were Emotional Control (i.e., emotional restriction and suppression), Winning (i.e., drive to win), Playboy (i.e., desire for multiple non-committed

sexual relationships), Violence (i.e., penchant for violence), Self-Reliance (i.e., desire to solve problems on one's own), Risk-Taking (i.e., inclination towards risky behaviors), Power Over Women (i.e., perceived control over women), Primacy of Work (i.e., viewing work as the primary focus in life), and Heterosexual Self-Presentation (i.e., importance of presenting oneself as heterosexual). The CMNI-46 has been used to measure a general conformity to masculine norms (CMN) construct via a total/composite score, as well as conformity to the nine specific masculine norms via subscale scores. However, researchers have questioned how best to conceptualize the dimensionality of the CMNI-46, which has important theoretical and practical implications. For example, there is mixed support (Parent & Moradi, 2009; 2011; Parent & Smiler, 2013) for a correlated factors model in which all nine factors correlate with each other (see Figure 1). Levant, Hall, Weigold, and McCurdy (2015) compared the fit of the correlated factors model with both a second-order and bifactor model. The second-order model (i.e., a higher-order model in which the nine first-order factors load onto a second-order general CMN factor) suggests that a general CMN construct is the common element that ties all nine masculine norms together. In contrast, the bifactor model (i.e., a model in which the CMNI items load both onto a general CMN factor and nine specific factors) defines the broad CMN construct as the common element that ties all 46 items together. In the bifactor model, the general factor is uncorrelated with, and thus exists independently of, the nine specific masculine norm factors. Levant and colleagues (2015) found that the bifactor model, while providing borderline-adequate fit to the data, was still a better fitting model than the second-order and correlated factors models. However, as bifactor models may benefit from overfitting (i.e., the bifactor model has a higher propensity to fit any possible data; see Bonifay, Lane, & Reise, 2017), Levant and colleagues called for additional model comparisons for the CMNI-46. Furthermore, because even a good

fitting model can include misspecification (e.g., item loadings could still be incorrectly estimated; Reise, Horan, & Blanchard, 2011), ancillary bifactor measures can provide additional information to interpret construct dimensionality (Rodriguez, Reise, & Haviland, 2016).

Levant and colleagues (2015) calculated one type of ancillary bifactor measure: the general factor Explained Common Variance (ECV; Reise, Moore, & Haviland, 2010), which measured the extent to which the CMNI-46 was unidimensional or multidimensional. An ECV of .22 was reported (i.e., 22% of the variance was explained by the general CMN factor), which the authors suggested provided evidence that the CMNI-46 could be used to measure a general CMN factor (i.e., the total score could measure an overall conformity to hegemonic masculine norms). However, as the authors noted, a general factor ECV of .22 implies that most of the common variance (78%) is explained by the specific factors (i.e., subscale factors). Additionally, traditional bifactor models force the general factor to account for as much item-level variance as possible; the specific factors can only account for leftover variance. In other words, the general factor is given priority even if it is more parsimonious for the specific factors alone to account for the item covariance (i.e., a correlated factors model). As such, it is possible that previous model comparisons could have favored a bifactor model due to a statistical artifact and that other models (i.e., a correlated factor model) may provide a more appropriate interpretation of the CMNI-46 factor structure. Supporting this, a subsequent study found that the bifactor model provided an inadequate fit to the CMNI-46 data (Heath et al., 2017). Taken together, these points call into question the validity of a general CMN factor as measured by the CMNI-46.

These conflicting results warrant additional empirical examination of the CMNI-46's dimensionality. This is important given the historical emphasis on examining the association between general conformity to masculine norms and outcomes (e.g., Griffiths et al., 2015;

Levant & Wimer, 2014; Parent & Moradi, 2009; 2011; Wimer & Levant, 2011). If one of the most used measures of masculinity (i.e., the CMNI-46) does not reliably assess a general CMN construct, the validity of previous research utilizing the CMNI-46 for this purpose is called into question. In other words, it is important to know if the common practice of creating a total CMNI-46 score is justified or if an alternative scoring approach is needed (i.e., only using the nine subscale scores to measure conformity to each specific masculine norm).

The Present Study

This study sought to verify the dimensionality of the CMNI-46 via comparisons of four competing models (i.e., unidimensional, correlated factors, second-order, bifactor) and examination of ancillary bifactor measures. Given the low ECV reported by Levant et al. (2015) and the poor fit of the bifactor model reported by Heath et al. (2017), we hypothesized that the correlated factors model would demonstrate adequate fit and ancillary bifactor measures would support the selection of this model over the selection of a unidimensional, second-order, or bifactor model. We sought to verify the stability of our findings using two large, independent samples: adult men living in the community and men attending college.

Method

Participants, Measures, and Procedure

Sample 1 included 627 community-dwelling adult men (age M = 46.74, SD = 16.86) recruited from ResearchMatch, a national health volunteer registry created by several academic institutions and supported by the U.S. National Institutes of Health as part of the Clinical Translational Science Award (CTSA) program. ResearchMatch has a large population of volunteers who have consented to be contacted by researchers about health studies for which they may be eligible. The study was advertised as a study of what it means to be a man in

today's society. Interested participants were directed to an online survey that began with an informed consent page, continued with the CMNI-46 and demographic items, and ended with a debriefing page.

Sample 2 included 811 male college students from a large Midwestern university (age *M* = 22.35, *SD* = 4.89). Participants were recruited through an email sent out to all male students, with a response rate of 5.8%. The study was advertised as a study of how best to study masculinity. Interested students clicked on a link that brought them to an online survey where they completed an informed consent, the CMNI-46, and demographic items.

See Table 1 for demographic information and Table 2 for Cronbach alpha (α) estimates, means, and standard deviations for both samples. Data cleaning procedures for both samples, recruited with Institutional Review Board approval, are described in the Supplemental Material.

The CMNI-46 (Parent & Moradi, 2009) derives from the original 94-item CMNI (Mahalik et al., 2003). Nine subscales are included in the 46-item measure, including Emotional Control (6 items), Winning (6 items), Playboy (4 items), Violence (6 items), Self-Reliance (5 items), Risk-Taking (5 items), Power Over Women (4 items), Primacy of Work (4 items), and Heterosexual Self-Presentation (6 items). Each subscale has demonstrated strong correlations with its respective subscale from the 96-item version of the scale (.89 < *r*'s < .98; Parent & Moradi, 2009). Items are scored on a four-point Likert scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher scores indicating greater conformity to masculine norms. Parent & Moradi (2009) suggested scholars could calculate a total score (i.e., averaging all 46 items) and subscale scores (i.e., averaging the items on each subscale). The total score has demonstrated good internal consistency (α = .88), as have the nine subscales (.77 < α's < .91; Parent & Moradi, 2009).

Analysis Plan

The CMNI-46's dimensionality was tested via CFA using M*plus* version 6.11 (Muthén & Muthén, 1998-2012). Four competing measurement models (i.e., unidimensional, correlated factors, second-order, bifactor) were examined. M*plus*' maximum likelihood estimation with robust standard errors (MLR) option was used, which calculates the scaled chi-square test statistic (scaled χ^2). MLR was used in lieu of the categorical WLSMV estimator because MLR provides additional indices (i.e., Akaike's information criterion [AIC], and Bayesian information criterion [BIC]), that facilitate model comparison for non-nested models. Re-running analyses with WLSMV resulted in similar model fit, ancillary bifactor measures, and conclusions. Model fit was evaluated using the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standard Root Mean Square Residual (SRMR). The following fit criteria were used: RMSEA $\leqslant$ .06, CFI $\geqslant$ .95, TLI $\geqslant$ .95, SRMR < .08 for good fit and RMSEA $\leqslant$ .10, CFI $\geqslant$ .90, TLI $\geqslant$ .90, SRMR < .10 for adequate fit (Weston & Gore, 2006).

The unidimensional and second-order models were nested within the correlated factors and bifactor models. However, the correlated factors model was not nested within the bifactor model because the bifactor model contained more than three latent variables. Thus, scaled chi-square difference test ($\Delta\chi2$), AIC, and BIC, were used for model comparisons, with one exception: only AIC and BIC could be used to compare the fit of the correlated factors and bifactor models as they were non-nested. Value differences greater than 10 on AIC and BIC indicate model fit difference (Burnham & Anderson, 2002; Kass & Raftery, 1995); lower values indicate better fit. Only models achieving at least adequate model fit were compared.

Results

The correlated factors, second-order, and bifactor solutions provided adequate to good model fit in the Community and College samples, while the unidimensional model did not display adequate fit (Table 3). Model fit comparisons suggested the bifactor solution fit better than other solutions in the Community sample, whereas the correlated factors solution fit better than the other solutions in the College sample (see note in Table 3). Given this discrepancy, ancillary bifactor measures (see Supplemental Material for details) were calculated to more accurately determine the dimensionality of the CMNI-46.

The Percentage of Uncontaminated Correlations (PUC) was .91, but the general ECV was .18 (Community) to .27 (College), indicating the general CMN factor only explained 18 to 27% of the item variance. While a high PUC value often signals the decreased importance of the ECV in determining the potential for bias, this is not always the case, especially when the ECV is not high (Rodriguez et al., 2016), which was true here. Furthermore, 89% to 91% of the items had Individual Explained Common Variance coefficients below .50, indicating most items had stronger ties with their specific factors than the general factor (Table 4). The Average Relative Measurement Parameter Bias for the factor loadings was 18% to 39%, indicating that treating the CMNI-46 as a unidimensional instrument is likely to lead to inaccurate factor loadings. Taken together, the ancillary bifactor measures from both samples support conceptualizing the CMNI-46 as multidimensional.

These ancillary bifactor measures also indicate the general CMN factor posited by the bifactor model accounts for very little variance. Furthermore, the second-order model, in which an overall CMN factor is modeled as the covariation among the nine first-order factors, fit worse than the correlated factors model. Therefore, because the correlated factors model (a) avoids the

problems associated with asserting the existence of a substantive general CMN dimension (which does not exist in either of the present samples) and (b) provided an adequate to good global fit to the data, we suggest that the CMNI-46 is best conceptualized as being defined by nine independent-yet-related first-order factors. Therefore, traditional internal consistency estimates are more appropriate than bifactor model-based reliability estimates (provided in the Supplemental Material).

Discussion

Ancillary bifactor measures clarified that the general CMN factor accounted for little variance in the Community and College samples, suggesting a correlated factors solution may be most appropriate for conceptualizing the CMNI-46 and the conformity to masculine norms construct. Our rejection of the bifactor model aligns with Heath et al.'s (2017) findings that the bifactor model did not offer an appropriate fit and departs from Levant et al.'s (2015) suggestion that the bifactor model is appropriate for the CMNI-46. Our findings hold important implications, though they depend on the replicability and generalizability of the results. From a theoretical perspective, our findings do not support the existence of a measurable "overall conformity" construct. The overall score has been used in the past to suggest that higher overall masculine norm adherence is related to things like muscle dissatisfaction (Griffiths et al., 2015) and increased help-seeking stigma (Heath et al., 2017). However, the present results caution against this practice going forward. Until an instrument demonstrates the ability to measure this global construct, it may be best for scholars to focus on conformity to specific masculine norms (Wong et al., 2016), which the CMNI-46 is well-suited to measure.

The current findings also have important practical implications for scoring and modeling the CMNI-46. The results suggest that the CMNI-46 does not reliably measure overall

conformity to masculine norms. Thus, nine separate subscale scores can be calculated, but a total/composite score should not be calculated. This approach has been taken by previous researchers, with specific masculine norms like Risk-Taking and Playboy being linked to alcohol related problems (Iwamoto et al., 2011), and emotional control and self-reliance being linked to help-seeking self-stigma (Heath et al., 2017). Additionally, researchers who wish to model the CMNI-46 in a SEM framework are encouraged to verify its dimensionality during preliminary analyses. The current results suggest that researchers are likely to find that a correlated factors model is most suitable, but this must be checked and not assumed, particularly with samples dissimilar from ours.

Bifactor scholarship is evolving, so we offer these conclusions tentatively. Regarding limitations, both of our samples were primarily composed of White, heterosexual, well-educated men living in the U.S.; generalizability to People of Color, LGBT individuals, those with less formal education, and citizens of other countries remains an open question. It is possible that the CMNI-46 may demonstrate a substantive general CMN dimension within certain populations, which may re-open the possibility of using a total score. Similarly, translations or alternative versions of the CMNI (e.g., CMNI-94, CMNI-22) may demonstrate different dimensionality that permits reliable measurement of a general CMN factor.

References

Burn, S. M., & Ward, A. Z. (2005). Men's conformity to traditional masculinity and relationship satisfaction. *Psychology of Men & Masculinity*, *6*, 254-263. doi: 10.1037/1524-9220.6.4.254

Burnham, K. P., & Anderson, D. R. (2002). *Model selection and multimodel inference, 2nd ed*. New York, NY: Springer.

Bonifay, W., Lane, S. P., & Reise, S. P. (2017). Three concerns with applying a bifactor model as a structure of psychopathology. *Clinical Psychology Science*, *5*, 184-186.

Griffiths, S., Murray, S. B., & Touyz, S. (2015). Extending the masculinity hypothesis: An investigation of gender role conformity, body dissatisfaction, and disordered eating in young heterosexual men. *Psychology of Men & Masculinity*, *16*, 108-114. doi: 10.1037/a0035958

Hamilton, C. J., & Mahalik, J. R. (2009). Minority stress, masculinity, and social norms predicting gay men's health risk behaviors. *Journal of Counseling Psychology*, *56*, 132-141. doi: 10.1037/a0014440

Hammer, J. H., & Toland, M. D. (2016, November). *Bifactor analysis in Mplus*. [Video file]. Retrieved from http://sites.education.uky.edu/apslab/upcoming-events/

Hammer, J. H., & Brenner, R. E. (2017). Disentangling gratitude: A theoretical and psychometric examination of the Gratitude Resentment and Appreciation Test- Revised Short (GRAT-RS). *Journal of Personality Assessment*. Advance online publication. doi: 10.1080/00223891.2017.1344986

Hammer, J. H., & McDermott, R. C., Levant, R. F., & McKelvey, D. K. (in press). Dimensionality, Reliability, and Validity of the Gender Role Conflict Scale – Short Form (GRCS-SF). *Psychology of Men and Masculinity*.

Heath, P. J., Brenner, R. E., Vogel, D. L., Lannin, D. G., & Strass, H. A. (2017). Masculinity and barriers to seeking counseling: The buffering role of self-compassion. *Journal of Counseling Psychology, 64,* 94-103. http://dx.doi.org/10.1037/cou0000185

Iwamoto, D. K., Cheng, A., Lee, C. S., Takamatsu, S., & Gordon, D. (2011). “Man-ing” up and getting drunk: The role of masculine norms, alcohol intoxication and alcohol-related problems among college men. *Addictive Behaviors, 36,* 906-911. https://doi.org/10.1016/j.addbeh.2011.04.005

Kass, R. E., & Raftery, A. E. (1995) Bayes factors. *Journal of the American Statistical Association, 90,* 773–795. doi: 10.2307/2291091

Levant, R. F., Hall, R. J., Weigold, I. K., & McCurdy, E. R. (2015). Construct distinctiveness and variance composition of multi-dimensional instruments: Three short-form masculinity measures. *Journal of Counseling Psychology, 62,* 488–502. https://doi.org/10.1037/cou0000092

Levant, R. F., & Wimer, D. J. (2014). Masculinity constructs as protective buffers and risk factors for men’s health. *American Journal of Men's Health, 8,* 110-120. https://doi.org/10.1177/1557988313494408

Mahalik, J. R., Locke, B. D., Ludlow, L. H., Diemer, M. A., Scott, R. P., Gottfried, M., & Freitas, G. (2003). Development of the Conformity to Masculine Norms Inventory. *Psychology of Men & Masculinity, 4,* 3-25. doi: 10.1037/1524-9220.4.1.3

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide (7th ed)*. Los Angeles, CA: Authors.

Parent, M. C., & Moradi, B. (2009). Confirmatory factor analysis of the Conformity to Masculine Norms Inventory and development of the Conformity to Masculine Norms Inventory-46. *Psychology of Men & Masculinity*, *10*, 175-189. http://dx.doi.org/10.1037/a0015481

Parent, M. C., & Moradi, B. (2011). An abbreviated tool for assessing conformity to masculine norms: Psychometric properties of the Conformity to Masculine Norms Inventory-46. *Psychology of Men & Masculinity, 12*, 339-353. http://dx.doi.org/10.1037/a0021904

Parent, M. C., & Smiler, A. P. (2013). Metric invariance of the Conformity to Masculine Norms Inventory-46 among women and men. *Psychology of Men & Masculinity*, *14*, 324-328. http://dx.doi.org/10.1037/a0027642

Reise, S. P., Horan, W. P., & Blanchard, J. J. (2011). The challenges of fitting an item response theory model to the Social Anhedonia Scale. *Journal of Personality Assessment, 93*, 213-224. doi: 10.1080/00223891.2011.558868

Reise, S. P., Moore, T. M., & Haviland, M. G. (2010). Bifactor models and rotations: Exploring the extent to which multidimensional data yield univocal scale scores. *Journal of Personality Assessment, 92*, 544-559. doi: 10.1080/00223891.2010.496477

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating bifactor models: Calculating and interpreting statistical indices. *Psychological Methods*, *21*, 137. http://dx.doi.org/10.1037/met0000045

Thompson Jr, E. H., & Bennett, K. M. (2015). Measurement of masculinity ideologies: A (critical) review. *Psychology of Men & Masculinity, 16*, 115-133. http://dx.doi.org/10.1037/a0038609

Weston, R., & Gore, P. (2006). A brief guide to structural equation modeling. *The Counseling Psychologist, 34*, 719-751. https://doi.org/10.1177/0011000006286345

Wimer, D. J., & Levant, R. F. (2011). The relation of masculinity and help-seeking style with the academic help-seeking behavior of college men. *The Journal of Men's Studies*, *19,* 256–274. https://doi.org/10.3149/jms.1903.256

Wong, Y. J., Ho, M.-H. R., Wang, S.-Y., & Miller, I. S. K. (2016). Meta-analyses of the relationship between conformity to masculine norms and mental health-related outcomes. *Journal of Counseling Psychology, 64*, 80-93. https://doi.org/10.1037/cou0000176

Table 1

Demographic Characteristics of Community and College Samples

	Community (n = 627)	College (n = 811)
Race		
White or Caucasian	67.6%	85.5%
Black/African American	7.7%	1.0%
Hispanic/Latino(a)	7.3%	2.1%
Asian/Asian-American	3.7%	5.4%
American Indian/Alaska Native	0.8%	0.3%
Multiracial	2.9%	2.7%
Other/Self-Identify	1.9%	2.3%
Preferred not to answer	2.9%	0.7%
Year in School		
First		14.2%
Second		18.7%
Third		23.3%
Fourth		19.4%
Other		23.8%
Preferred not to answer		0.6%
Education Level		
Less than high school	16.0%	
High school diploma or GED	4.0%	
Associate's degree or vocational school	9.3%	
Some college	18.8%	
Bachelor's degree	34.0%	
Graduate or professional degree	32.7%	
Preferred not to answer	1.1%	
Region		
New England	2.4%	
Middle Atlantic	13.1%	
East North Central	21.9%	
West North Central	7.5%	
South Atlantic	15.2%	
East South Central	12.6%	
West South Central	7.2%	
Mountain	5.4%	
Pacific	13.1%	
Preferred not to answer	1.8%	
Relationship Status		
Single	25.7%	
Married/Civil Union/Committed Relationship	61.2%	

Separated/Divorced	9.6%	
Widowed	1.6%	
Preferred not to answer	1.9%	
Sexual Orientation		
Heterosexual		85.2%
Gay		6.7%
Bisexual		4.6%
Questioning		0.9%
Self-Identify		1.9%
Preferred not to answer		0.9%

Table 2

Score Means, Standard Deviations, and Internal Consistency Estimates (α)

	α (95% CI)	*M*	*SD*
Community Sample			
CMNI total score	.87 (.85, .89)	2.25	.29
Emotional Control subscale score	.90 (.89, .91)	2.40	.61
Winning subscale score	.82 (.80, .84)	2.41	.52
Violence subscale score	.86 (.85, .88)	2.59	.64
Self-Reliance subscale score	.84 (.82, .86)	2.20	.56
Risk-Taking subscale score	.80 (.77, .82)	2.30	.47
Heterosexual Self-Presentation subscale score	.90 (.88, .91)	2.14	.72
Playboy subscale score	.82 (.79, .84)	2.23	.72
Power Over Women subscale score	.80 (.77. .82)	1.62	.52
Primacy of Work subscale score	.81 (.78, .83)	2.11	.61
College Sample			
CMNI total score	.91 (.90, .92)	2.40	.34
Emotional Control subscale score	.92 (.91, .92)	2.54	.64
Winning subscale score	.84 (.82, .86)	2.60	.51
Violence subscale score	.89 (.88, .90)	2.84	.61
Self-Reliance subscale score	.87 (.86, .89)	2.34	.58
Risk-Taking subscale score	.86 (.85, .88)	2.42	.55
Heterosexual Self-Presentation subscale score	.93 (.92, .93)	2.33	.80
Playboy subscale score	.82 (.80, .84)	2.07	.69
Power Over Women subscale score	.84 (.82, .86)	1.68	.57
Primacy of Work subscale score	.82 (.80, .84)	2.35	.59

Note: CMNI-46 = Conformity to Masculine Norms Inventory-46.

Table 3

Goodness of Fit Statistics for All Tested Measurement Models

Model	Scaled $\chi 2$	*df*	RMSEA [90% CI]	CFI	TLI	SRMR	AIC	BIC
Unidimensional (Community)	8953.87	989	.113 [.111, .115]	.229	.193	.135	62559.85	63172.70
Unidimensional (College)	13762.72	989	.126 [.124, .128]	.300	.267	.139	78563.44	79211.80
Correlated Factors (Community)	1728.57	953	.036 [.033, .039]	.925	.918	.052	54048.07	54820.80
Correlated Factors (College)	**2140.08**	**953**	**.039 [.037, .041]**	**.935**	**.929**	**.049**	**65932.56**	**66750.06**
Second Order (Community)	1877.55	980	.038 [.036, .041]	.913	.908	.068	54175.42	54828.24
Second Order (College)	2477.36	980	.043 [.041, .046]	.918	.913	.075	66248.86	66939.51
Bifactor (Community)	**1657.20**	**943**	**.035 [.032, .037]**	**.931**	**.924**	**.062**	**53978.10**	**54795.24**
Bifactor (College)	2168.36	943	.040 [.038, .042]	.933	.926	.067	65975.72	66840.20

Note: All models were statistically significant at the $p < .001$ level. Statistics are based on MLR estimation. Scaled χ^2 = scaled chi-square test statistic, RMSEA = Root Mean Square Error of Approximation, CI = Confidence Interval, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, SRMR = Standard Root Mean Square Residual. The bolded model demonstrated the best fit in the sample per relative model fit comparisons. In the Community sample, the bifactor model fit better than the correlated factors model (ΔAIC = 69.97, ΔBIC = 25.56) and the second order model (ΔAIC = 197.32, ΔBIC = 33.01, scaled $\Delta\chi^2[37] = 199.88$, $p < .001$). In the College sample, the correlated factors model fit better than the bifactor model (ΔAIC = 43.16, ΔBIC = 90.14) and the second order model (ΔAIC = 316.30, ΔBIC = 189.45, scaled $\Delta\chi^2[27] = 328.58$, $p < .001$).

Table 4

Confirmatory Factor Analysis Standardized Loadings, Relative Parameter Bias, and Individual Explained Common Variance

Item Number		Uni	RPB	Bifactor		
				IECV	General Factor Loading	Specific Factor Loading
	Emotional Control					
13r	I bring up my feelings when talking to others.	.43 (.47)	0% (-20%)	.16 (.22)	.32 (.40)	.74 (.74)
18	I never share my feelings.	.37 (.49)	13% (-11%)	.18 (.33)	.30 (.44)	.64 (.63)
25r	I like to talk about my feelings.	.39 (.47)	-40% (-23%)	.07 (.22)	.21 (.38)	.77 (.71)
32	I tend to keep my feelings to myself.	.38 (.43)	-16% (-34%)	.11 (.15)	.26 (.32)	.74 (.77)
40r	I tend to share my feelings.	.41 (.47)	-11% (-34%)	.09 (.16)	.26 (.35)	.84 (.82)
45	I hate it when people ask me to talk about my feelings.	.45 (.51)	12% (-11%	.31 (.42)	.39 (.46)	.58 (.54)
	Winning					
1	In general, I will do anything to win.	.30 (.41)	43% (9%)	.52 (.70)	.40 (.45)	.39 (.29)
7r	Winning is not my first priority.	.35 (.48)	31% (4%)	.35 (.60)	.36 (.50)	.50 (.41)
15r	I don't mind losing.	.38 (.52)	4% (-9%)	.21 (.41)	.27 (.48)	.54 (.58)
22	It is important for me to win.	.36 (.47)	17% (1%)	.18 (.43)	.32 (.48)	.69 (.55)
27r	More often than not, losing does not bother me	.38 (.49)	3% (-17%)	.14 (.29)	.27 (.42)	.67 (.65)
33r	Winning is not important to me.	.30 (.40)	-41% (-21%)	.03 (.21)	.14 (.33)	.78 (.64)
	Playboy					
2	If I could, I would frequently change sexual partners.	.12 (.15)	60% (27%)	.10 (.06)	.25 (.20)	.78 (.79)
12r	I would only have sex if I was in a committed relationship.	-.05 (.00)	269% (93%)	.00 (.00)	.03 (.04)	.61 (.68)
21	I would feel good if I had many sexual partners.	.12 (.19)	62% (21%)	.11 (.08)	.28 (.24)	.81 (.77)
36	It would be enjoyable to date more than one person at a time	.15 (.18)	57% (29%)	.18 (.14)	.29 (.25)	.62 (.63)
	Violence					
4r	I believe that violence is never justified.	.28 (.42)	-67% (-20%)	.03 (.18)	.15 (.35)	.79 (.73)
9r	I am disgusted by any kind of violence	.34 (.43)	-7% (-19%)	.13 (.23)	.26 (.36)	.68 (.66)
19	Sometimes violent action is necessary	.28 (.39)	-24% (-24%)	.06 (.15)	.18 (.31)	.72 (.75)
30	I am willing to get into a physical fight if necessary	.33 (.46)	5% (-5%)	.22 (.40)	.30 (.44)	.56 (.54)
34r	Violence is almost never justified.	.34 (.50)	-4% (-6%)	.18 (.38)	.28 (.47)	.61 (.60)
41r	No matter what the situation I would never act violently.	.27 (.40)	-80% (-24%)	.03 (.17)	.12 (.33)	.74 (.71)
	Self-Reliance					
3	I hate asking for help.	.27 (.38)	0% (8%)	.07 (.20)	.30 (.35)	.66 (.70)
10r	I ask for help when I need it.	.38 (.33)	6% (-30%)	.17 (.14)	.21 (.29)	.76 (.73)

26	I never ask for help.	.34 (.36)	29% (-2%)	.18 (.24)	.31 (.35)	.65 (.62)
38r	I am not ashamed to ask for help.	.33 (.34)	19% (-15%)	.16 (.14)	.27 (.29)	.61 (.72)
43	It bothers me when I have to ask for help.	.40 (.38)	14% (-12%)	.22 (.20)	.34 (.34)	.65 (.68)
	Risk-Taking					
6r	In general, I do not like risky situations.	.04 (.26)	63% (8%)	.01 (.14)	.07 (.29)	.64 (.70)
8	I enjoy taking risks.	.10 (.17)	50% (8%)	.02 (.05)	.13 (.19)	.83 (.82)
16	I take risks.	.04 (.15)	-24% (6%)	.00 (.04)	.02 (.16)	.71 (.77)
28	I frequently put myself in risky situations.	.18 (.26)	59% (23%)	.22 (.20)	.30 (.34)	.57 (.67)
35	I am happiest when I'm risking danger.	.31 (.41)	60% (16%)	.51 (.49)	.45 (.49)	.44 (.49)
	Power Over Women					
20	In general, I control the women in my life.	.46 (.51)	44% (4%)	.75 (.64)	.53 (.53)	.31 (.40)
9	Women should be subservient to men.	.48 (.56)	43% (-2%)	.53 (.49)	.51 (.55)	.48 (.56)
42	Things tend to be better when men are in charge.	.50 (.63)	27% (-5%)	.52 (.59)	.51 (.60)	.49 (.50)
44	I love it when men are in charge of women	.49 (.56)	44% (-3%)	.48 (.44)	.57 (.55)	.59 (.61)
	Primacy of Work					
11	My work is the most important part of my life.	.13 (.21)	42% (14%)	.06 (.10)	.18 (.24)	.71 (.73)
23r	I don't like giving all my attention to work.	.09 (.18)	32% (9%)	.04 (.10)	.10 (.20)	.49 (.58)
31	I feel good when work is my first priority.	.20 (.30)	46% (8%)	.10 (.18)	.27 (.33)	.80 (.70)
39	Work comes first.	.18 (.29)	50% (7%)	.10 (.16)	.26 (.32)	.78 (.71)
	Heterosexual Self-Presentation					
5r	Being thought of as gay is not a bad thing.	.61 (.62)	-45% (-31%)	.26 (.38)	.38 (.47)	.63 (.61)
14	I would be furious if someone thought I was gay.	.63 (.66)	-32% (26%)	.26 (.39)	.41 (.53)	.68 (.66)
17r	It would not bother me at all if someone thought I was gay.	.66 (.65)	-70% (-41%)	.19 (.30)	.35 (.46)	.73 (.70)
24	It would be awful if people thought I was gay.	.66 (.70)	-34% (-26%)	.25 (.40)	.41 (.55)	.72 (.68)
37	I would feel uncomfortable if someone thought I was gay.	.62 (.65)	-79% (-41%)	.16 (.28)	.32 (.46)	.73 (.74)
46	I try to avoid being perceived as gay.	.58 (.63)	-26% (-28%)	.41 (.44)	.42 (.49)	.50 (.55)

Note: Uni = unidimensional model, Bifactor = bifactor model, RPB = Relative Parameter Bias, IECV = Individual Explained Common Variance. Loadings are standardized and based on MLR estimation. Community sample results are displayed first and College sample results are displayed second in parentheses.

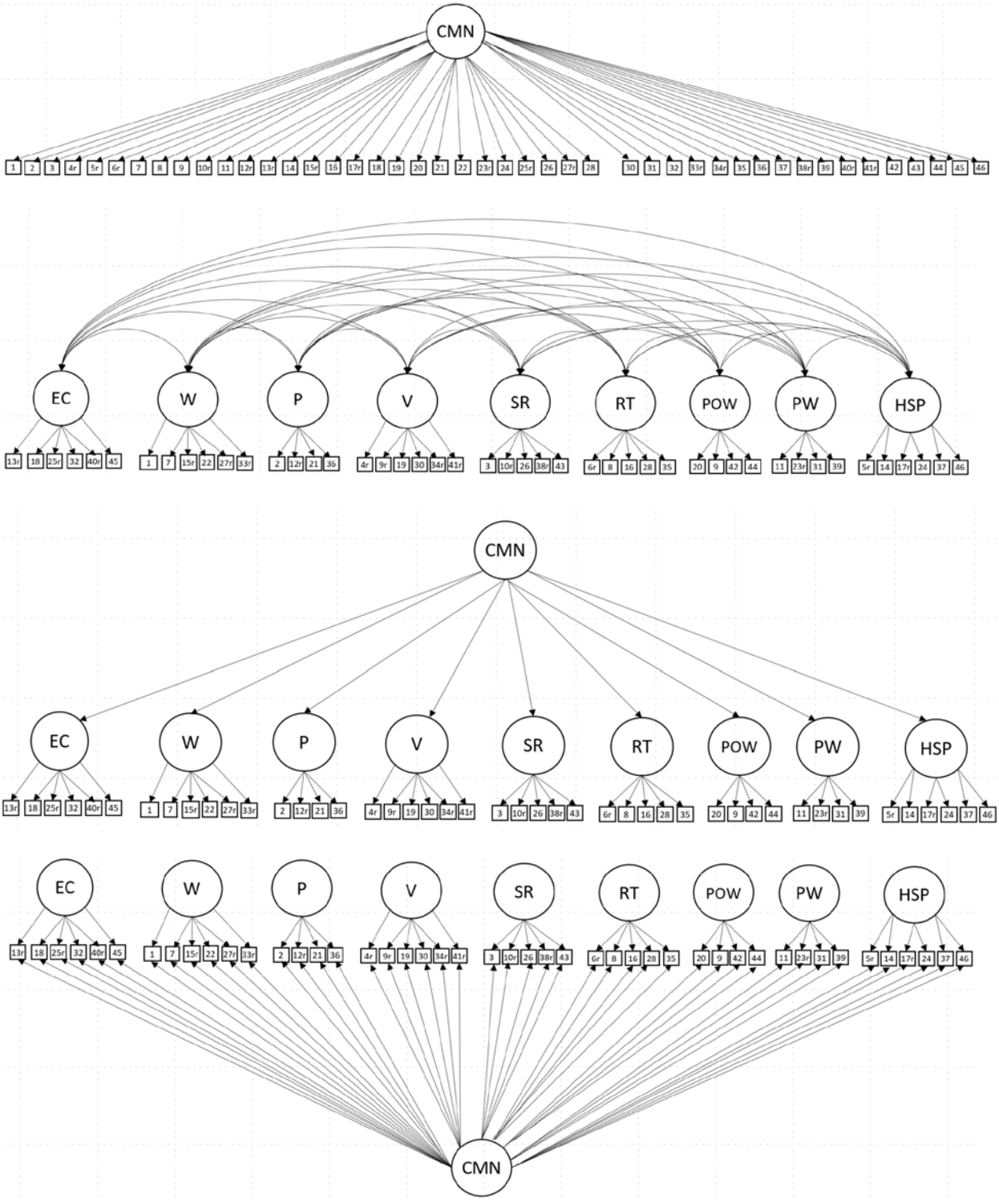

CMN
1 2 3 4r 5r 6r 7 8 9 10r 11 12r 13r 14 15r 16 17r 18 19 20 21 22 23r 24 25r 26 27r 28 30 31 32 33r 34r 35 36 37 38r 39 40r 41r 42 43 44 45 46
EC
W
P
V
SR
RT
POW
PW
HSP
13r 18 25r 32 40r 45
1 7 15r 22 27r 33r
2 12r 21 36
4r 9r 19 30 34r 41r
3 10r 26 38r 43
6r 8 16 28 35
20 9 42 44
11 23r 31 39
5r 14 17r 24 37 46
CMN

Figure 1a, 1b, 1c, 1d. Different ways of modeling the CMNI-46. Models pictured from top to bottom: Unidimensional (1a), Correlated Factors (1b), Second-order (1c), and Bifactor (1d). CMNI-46 = Conformity to Masculine Norms Inventory – 46, EC = Emotional Control, W = Winning, P = Playboy, V = Violence, SR = Self-Reliance, RT = Risk-Taking, POW = Power Over Women, PW = Primacy of Work, HSP = Heterosexual Self-Presentation. Item error terms and latent variable disturbance terms are not displayed.