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## Testing for Measurement Invariance in the Conformity to Masculine Norms-46 Across White and Asian American College Men: Development and Validity of the CMNI-29

Kean Hsu and

Department of Psychology, University of Southern California

Derek Kenji Iwamoto

Department of Psychology, University of Maryland-College Park

### Abstract

The Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003) and revised CMNI-46 (Parent & Moradi, 2009) have received a great deal of empirical attention and support for their strong psychometric properties and evidence of construct validity. However, one important area that remains unexplored is how adherence to these masculine norms may vary across race and ethnicity. The current investigation examines the possible racial measurement noninvariance in the CMNI-46 among Asian American and White American college students ( $N = 893$ ). The results revealed significant measurement differences across groups; specifically, the CMNI-46 was more theoretically consistent for the White American men than the Asian American men. Through exploratory and multigroup confirmatory factor analysis, an 8-factor, 29-item version of the CMNI emerged, displaying an excellent overall model fit for both racial groups. This study provides strong evidence for the use of a streamlined 29-item version of the CMNI, validated with Asian American and White American men. The findings also lend further empirical and psychometric evidence regarding the variance of masculine norms among ethnic groups as well as the variance of the multidimensional construct of masculinity.

### Keywords

masculinity; conformity to masculine norms; measurement invariance; racial differences; college men

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Adherence and nonadherence to masculine norms have been strongly associated with a plethora of outcomes, including mental and physical health, violence, substance use, and clinical treatment adherence (Levant & Richmond, 2007; O'Neil, 2008). Given the importance of understanding how masculine norms may impact men's experiences, numerous instruments assessing multiple dimensions of traditional masculine norms have been developed, including the Male Role Norms Inventory (Levant et al., 1992), the Gender Role Conflict Scale (O'Neil, Helms, Gable, David, & Wrightsman, 1986), the Masculine

Gender Role Stress Scale (Eisler & Skidmore, 1987), and the Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003). One multidimensional measure in particular, the CMNI (Mahalik et al., 2003) and revised CMNI-46 (Parent & Moradi, 2009), has recently received a great deal of attention and support for its strong psychometric properties and evidence of construct validity (Parent & Moradi, 2011b). The CMNI is based on mainstream American cultural beliefs and values about what it means to be a man, and includes norms such as winning, emotional control, risk taking, violence, dominance, being a playboy, self-reliance, primacy of work, power over women, heterosexual self-presentation, and pursuit of status. Previous research indicates that the CMNI subscales display high internal consistency and test–retest reliability estimates, as well as differential validity between men and women (Mahalik et al., 2003). Parent and Moradi (2009) refined this instrument through further factor analysis, yielding a 46-item (CMNI-46), nine-factor (i.e., the Dominance and Pursuit of Status subscales were removed) inventory with acceptable reliability and high correlations with the original subscales. Parent, Moradi, Rummell, and Tokar (2011) also provided further support for the construct distinctiveness of the CMNI-46 from self-esteem and from the NEO Five-Factor Inventory Form S (NEO-FFI-2S; Costa & McCrae, 1989, 1992). However, one important area that remains unexplored is how adherence to these masculine norms may vary across race and ethnicity.

Theory and research suggest that masculinity might not have the same meaning across ethnically/racially diverse men's lives (Griffith, Gunter, & Watkins, 2012). This implication is especially compelling, as studies on the psychometric properties of the CMNI have been primarily based on White samples. Generalizing from these findings to other ethnic groups therefore may not accurately capture associations between masculinity and health outcomes, and may also possibly misrepresent a variety of factors that shape the expression of masculinity for men of color (Griffith et al., 2012; Liu, 2002; Schwing, Wong, & Fann, 2013; Wong, Owen, Tran, Collins, & Higgins, 2012). That is, although many men of color in the United States may adhere to mainstream masculine norms, there is reason to believe that ethnic minority men may also draw upon other aspects of masculinity to form their own standards and definitions of what it is to be masculine (Abreu, Good-year, Campos, & Newcomb, 2000; Griffith et al., 2012; Liu, Iwamoto, & Chae, 2010; Wong, Owen, et al., 2012).

Emerging research indicates that Asian American men may experience a particularly contentious interplay between mainstream masculine expectations and racial stereotypes (Wong, Nguyen, et al., 2012). A recent study by Wong, Owen, et al. (2012) suggests that many Asian American men are aware of societal stereotypes of their character, such as (a) interpersonal deficits, (b) intense diligence, (c) intelligence, (d) perpetual foreigner status, (e) unflattering physical attributes, (f) sexual/romantic inadequacies, and (g) physical ability distortions. Relatedly, studies indicate that White and Asian women perceive Asian American and White men differently: Asian men are perceived as nurturing and endorsing more traditional masculine norms, whereas White men are perceived as more stable, powerful, independent, and significantly more attractive (Chua & Fujino, 1999). Thus, Asian American men experience the challenge of navigating expectations and standards for masculinity that are rooted in the dominant (i.e., White) culture, as well as contend with negative societal stereotypes (Liu, 2002; Wong, Owen, et al., 2012).

Based on historical racism, perceptions by others, and emasculation experienced by Asian American men, some scholars suggest that these environmental factors uniquely impact how Asian American men form and construct their masculinity, especially when compared with other minority groups (Iwamoto & Liu, 2009; Liu & Chang, 2006; Wong, Owen, et al., 2012). Although a full review of this literature is beyond the scope of this article, the unique issues that Asian American men face with regard to their masculinity will be briefly touched upon in this review. Asian Americans have experienced institutionalized discrimination and racism over the course of American history (e.g., the Chinese Exclusion Act of 1882, Japanese American internment camps). Asian men have also faced isolation from their loved ones in the form of sex-specific anti-immigration laws (e.g., the Page Law of 1985 that limited or restricted the immigration of Asian women) and anti-miscegenation laws that strongly discouraged interracial marriage through revocation of a White woman's citizenship (Espiritu, 1997). In contemporary times, this historical racism has continued in a less institutionalized form through perseveration of stereotypes against Asian men. Asian men are often portrayed as evil villains in movies that promulgate the Yellow Peril stereotype—the fear that Western civilization will be conquered by Asians (e.g., *Red Dawn* by Flynn & Bradly, 2012; Espiritu, 1997; Shek, 2006). However, more often, Asian American men's portrayal in the media has been that of an asexual or effeminate man. Mainstream Western views and media outlets often depict Asian American men as nerdy, effeminate, nonmasculine, and lacking sexual prowess, among other negatively associated attributes (Brooks & Hébert, 2006; Chan, 1998; Mok, 1998). These depictions stand in contrast to media portrayals of other men of color. For example, Latino men have often been portrayed in Hollywood as the “Latin Lover . . . a consistent figure in the cinema with his eroticism and suave ways” (Diaz Soto, 2011, p. 20), intermingled, at times, with depictions of aggression and violence (e.g., the Latin American drug runner). Black men are often shown as “inherently angry, potentially violent, and sexually aggressive” (Brooks & Hébert, 2006, p. 306). Consequently, whereas these two minority groups have been depicted as hypermasculine through excessive aggression and violence, Asian American men have been depicted as the opposite: passive and effeminate.

In addition to contending with conflict brought on by pervasive media portrayals of masculinity in the context of dominant White culture or hypersexual men of other minorities, Asian American men may also have to confront stringent gender role expectations from their own Asian culture and upbringing. Several scholars (Lee, 1996; Liu, Iwamoto, & Chae, 2010; Wong, Nguyen, et al., 2012) have noted that different socialization upbringings and standards of masculinity are propagated in Asian cultures; this varying socialization process creates a different mind-set for Asian American men relative to White American men. Chua and Fujino's (1999) study found greater cultural variability in what was considered masculine in U.S.-born and immigrant Asian men relative to White American men. Specifically, the results revealed that White men expressed a strong negative association between masculinity and feminine characteristics, whereas Asian men showed no such association. These findings suggest that for Asian American men, masculinity and femininity are distinct entities that do not directly conflict (i.e., it is possible for an individual to be highly masculine and highly feminine), whereas White American men may construe masculinity and femininity as polar opposites (e.g., a behavior that is high in

masculinity is low in femininity; see Smiler, 2004, for further discussion of these differing conceptualizations of masculinity and femininity).

## Current Research

These differences suggest that standard measures of masculinity developed based on American mainstream cultural and masculine norms may not fully capture Asian American men's experiences of masculinity. Considering that the CMNI was developed using a sample of predominately White men, the factors might not operate the same for Asian American men because of the varying cultural and social experiences between these two groups. As Parent and Moradi (2011b) reported,

[The] psychometrics of the CMNI-46 need to be evaluated with diverse populations . . . it is important to recall that the CMNI-46 and its parent instrument are designed to assess conformity to dominant cultural norms in the U.S., based on the premise that U.S. men of various backgrounds are held to dominant cultural construals of masculinity. (p. 350)

Owen's (2011) psychometric analysis of the CMNI (examining a 55-item version) also reiterated the importance of considering differences between ethnic groups, specifically between Asian Americans and White American men, given both the relative dearth of research on this topic as well as the empirically demonstrated differences between these two ethnic groups on other measures of masculinity (Levant et al., 2007; Wu, Levant, & Sellers, 2001). Accordingly, measurement invariance of core masculine norms has not been empirically established among Asian American and White American men (Liu, Iwamoto, & Chae, 2010). It is thus critical to establish the measurement invariance (or account for noninvariance) of these constructs across ethnic groups to aid in accurate measurement of masculinity, to allow for more meaningful cross-cultural comparisons, to ensure that research findings effectively capture the constructs relevant to specific psychological and health outcomes, and to test group-differences in conceptualization of masculinity across Asian American and White American men (Griffith et al., 2012). Measurement invariance establishes the validity of a measure across samples. If a measure does not demonstrate measurement invariance between groups, any comparisons between groups using this measure are not valid, whether due to the measure not tapping the same constructs between groups or showing systematic biases in item response beyond what would be predicted from other relevant predictors, for example. Measurement invariance testing also allows us to consider a measure's psychometric properties in the context of existing masculinity theory by examining specific masculinity constructs and their associations across different groups. Previous studies have examined measurement invariance across ethnic groups (e.g., Parent & Moradi, 2011a) and sex (e.g., Parent & Smiler, 2013). Thus, it is important, theoretically, to examine the extent to which the CMNI-46 operates similarly for Asian American and White American college men through measurement invariance testing.

Measurement invariance testing is a multitiered process that utilizes constraints from previous levels for each subsequent model in a stepwise fashion. Measurement invariance may either be full or partial; full invariance suggests that all constraints of a particular level of invariance testing are invariant between groups, whereas partial invariance allows for some

relaxation of constraints in order to improve model fit. We first fit the model separately in each group (described in the Results) before fitting the model in both groups, allowing all parameters to be free; this model, with freed parameters, serves as a baseline model for comparison and is a test of configural invariance. By constraining factor loadings across groups for the suggested model, metric invariance can be assessed. Metric invariance implies that the measure and underlying construct(s) are reflected similarly by the items across groups. Thus, metric noninvariance suggests that the measure examines different constructs across groups. Scalar invariance suggests that the regression intercepts of items onto their respective factors are similar; scalar noninvariance may reflect group bias to answer higher or lower on an item than expected based on other structural parameters. Scalar invariance is tested through constraining item intercepts between groups. Metric invariance and scalar invariance suggest the measure shows measurement invariance; that is, on the item level, the measure performs similarly across groups. Further testing of the measure looks at a more structural level, examining the latent factors associated with the measure, with measurement noninvariance at these steps possibly suggesting differences on a theoretical level between groups. In these instances, measurement noninvariance may indicate that constructs differ across groups and that these differences are being reflected by the measure between the two groups. Invariance of factor variances signifies that factors have equivalent variances across groups, and this is tested by constraining latent factor variances across groups. Invariance of factor covariances indicates that the associations between latent variables are the same across groups, and this is tested by constraining latent factor covariances to be equal across groups. Constraining latent factor means across groups tests invariance of factor means; this invariance suggests that mean factor scores are similar across groups. Accordingly, testing for measurement invariance examines a variety of possible differences between racial groups on the measure being examined in a systematic, stepwise fashion. To our knowledge, the current investigation is the first study to examine possible racial measurement invariance in the CMNI-46 (Parent & Moradi, 2009) among Asian American and White American college students.

## Method

### Participants and Procedures

Participants consisted of 893 men attending a large public university located in Southern California. The racial composition included 681 Asian Americans (Chinese American = 218; Vietnamese American = 145; Filipino American = 90; Korean American = 84; Multiethnic = 66; Indian American = 45; Japanese American = 33) and 212 White Americans. The average age of the men was 20.41 years ( $SD = 2.34$ ), and in terms of academic standing, 23% of the participants identified as freshmen, 18.7% as sophomore, 26.7% as juniors, 29% as seniors, and 2.7% as “other.” The overall study sample ( $N = 893$ ) represents aggregated data from two independent data sets comprised of Asian American and White American college men. The first independent study investigated the relationship between dimensions of masculine norms, positive alcohol expectancies, and heavy alcohol use among college men ( $N = 683$ ; Iwamoto, Corbin, Lejuez, & MacPherson, in press). The second independent study examined the determinants of health behaviors among college students ( $N = 210$ ). Using the aggregated data from the two independent studies, the present

study examined the degree to which the demographics, including class standing, age, and race, differed between the two studies and found no differences. No differences between demographic characteristics were detected between racial groups as well. With respect to exclusion criteria in the current study, men who identified as Latino ( $n = 110$ ) or other races ( $n = 79$ ) were excluded because we were predominantly interested in measurement invariance between Asian American and White American men.

### Measure: CMNI-46 (Parent & Moradi, 2009)

The CMNI-46 is an abbreviated version of the original 94-item CMNI (Mahalik et al., 2003), based on the results of a confirmatory factors analysis (Mahalik et al., 2003; Parent & Moradi, 2009). The CMNI-46 assesses conformity to dominant masculine norms set out by standards of masculinity in the United States; this is a nine-factor measure that gauges traditional and nontraditional masculine norms, including winning, emotional control, risk taking, violence, power over women, being a playboy, self-reliance, primacy of work, and heterosexual self-presentation (Mahalik et al., 2003). Sample items include, “My work is the most important part of my life” (subscale: Primacy of Work) and “I would feel good if I had many sexual partners” (subscale: Playboy). Items on this measure were scored on a 4-point Likert-type scale from 0 (*strongly disagree*) to 3 (*strongly agree*), in which higher scores indicate stronger adherence to the specific masculine norm. The internal consistency estimates (Cronbach’s alphas) for the CMNI-46 subscales in the current study ranged from .71 to .87.

### Data Analytic Plan

Before conducting the primary analyses, we performed Little’s (1988) missing completely at random (MCAR) test using the SPSS missing values program, and the results suggested that the data were missing at random,  $\chi^2(df = 2915) = 2187, p = 1.00$ . Because our data appeared to be MCAR, we used full information maximum likelihood estimation in Mplus (Muthén & Muthén, 1998–2010) to handle missing data (Enders, 2001).

Confirmatory factor analysis was performed using Mplus. The latent factors in the model were drawn from the traditional and nontraditional masculine norms outlined by Mahalik et al. (2003). The item loadings used initially in this study followed the nine-factor model set forth by Parent and Moradi (2009) for the CMNI-46. To assess the fit of the measurement and structural models, the comparative fit index (CFI) and root mean square error of approximation (RMSEA) were utilized. Model fit standards indicating near model-to-data fit require a CFI greater than .90 and RMSEA values less than .10 (Quintana & Maxwell, 1999).

Multigroup confirmatory factor analysis was used to examine group differences in measurement parameters. Each model is a progression from the previous model (e.g., metric invariance is necessary before scalar invariance can be tested). Model progression is compared through the CFI and RMSEA fit indices based on sample characteristics, as suggested by Chen (2007). We took into consideration the unequal sample sizes when selecting our cutoff points for testing of measurement invariance based on research conducted by Chen (2007). However, although our sample sizes were unequal across

groups, we had a large overall sample size, and measurement noninvariance was not necessarily expected to be uniform. Consequently, changes of  $-0.010$  or greater for CFI and  $0.015$  or greater for RMSEA were utilized as cutoffs points; differences between the previous model and the current model exceeding the cutoffs suggest that the assumptions of the current model (e.g., scalar invariance) do not hold true between groups (Chen, 2007). If full invariance is not found, modification indices (MIs) can be used to determine what parameters to relax to test for partial invariance. Partial invariance still supports some degree of invariance in the measure between the groups within that model level (e.g., metric or scalar invariance) and allows for progression in testing of measurement invariance (Chen, 2007).

## Results

### Nine-Factor model

All items on the CMNI-46 were included in the model specified a priori by Parent and Moradi (2009), with items constrained to load onto their originally specified factor, using the entire Asian American and White American sample. Latent factors were also allowed to correlate across the model. The model demonstrated poor fit to the data,  $\chi^2 = (909, N = 893) = 3768.81, p = .001, CFI = 0.82, RMSEA = 0.05, 90\% CI [0.05, 0.06],$  Standardized Root Mean Square Residual (SRMR) = 0.07. MIs for this model suggested the largest improvements in model fit would be gained by freeing the covariance for a few sets of items (e.g., between “In general, I will do anything to win” and either “It is important for me to win” or “More often than not, losing does not bother me”) as well as cross-loading some items onto additional factors (e.g., loading “In general, I will do anything to win” onto the Playboy and Self-Reliance factors on top of the Winning factor). However, these changes (16 in all) were still unable to provide a model of good fit,  $\chi^2 (893, N = 893) = 3077.59, p < .001, CFI = 0.86, RMSEA = 0.052, 90\% CI [0.05, 0.054],$  and SRMR = 0.06.

This poor model fit was reiterated when testing the nine-factor model with each group (i.e., the Asian American and White American men); although the model showed poor fit to the data of both samples, the Asian sample generally showed worse model fit,  $\chi^2 (909, N = 681) = 3413.4, p < .001, CFI = 0.78, RMSEA = 0.06, 90\% CI [0.06, 0.07], SRMR = 0.07,$  than the White sample,  $\chi^2 (909, N = 212) = 1640.1, p < .001, CFI = 0.849, RMSEA = 0.062, 90\% CI [0.05, 0.06],$  and SRMR = 0.06.

### Model Improvement

In order to generate a better-fitting model and measure, we followed the same steps and criteria utilized by Mahalik et al. (2003) and Parent and Moradi (2009). First, we began with an exploratory factor analysis of the data using maximum likelihood estimation for nine factors in order to examine item cross-loading for our sample. Oblique rotations (geomin) were performed due to the correlated nature of the factors. For an improved model and shortened measure, items were considered for retention if they loaded at  $|0.4|$  or higher on one factor and did not cross-load any higher than  $|0.30|$  on any other factor. These restrictions yielded an eight-factor, 35-item measure that no longer retained the Primacy of Work factor and utilized the same item and factor loadings as the CMNI-46 for the reduced

set of items. Although this shortened measure showed improved model fit for the sample ( $\chi^2 [532, N = 893] = 2275.28, p < .001, CFI = 0.85, RMSEA = 0.06, 90\% CI [0.05, 0.06], SRMR = 0.07$ ), the CFI still fell below the specified criteria. We further refined the measure by following recommendations from Worthington and Whittaker (2006) that were utilized by Parent and Moradi (2009) to optimize their iteration of the CMNI, specifically to retain items with loadings of 0.60 or greater on intended factors.

Following this guideline, an eight-factor, 29-item version of the CMNI emerged that still utilized three or more items per factor (Worthington & Whittaker, 2006) while also displaying excellent overall model fit,  $\chi^2(349, N = 893) = 965.26, p < .001, CFI = 0.93, RMSEA = 0.04, 90\% CI [0.041, 0.048], SRMR = 0.04$ . This model displayed good fit with the Asian American men,  $\chi^2(349, N = 681) = 868.80, p < .001, CFI = 0.92, RMSEA = 0.04, 90\% CI [0.04, 0.05], SRMR = 0.05$ , and White American men,  $\chi^2(349, N = 212) = 550.65, p < .001, CFI = 0.93, RMSEA = 0.05, 90\% CI [0.04, 0.06], SRMR = 0.06$ . This shortened measure also demonstrated similar factor loadings to those of Parent and Moradi (2009; see Table 1). The four items that were eliminated in this short form, but had previously demonstrated high factor loadings and rank order (i.e., Items 19, 22, 30, and 32), were examined in order to determine if content was still retained in the remaining items. In each of these cases, item content was retained in other items in that factor—specifically, opposite statements: Item 19, “Sometimes violent action is necessary,” was reflected in reverse by Item 4, “I believe that violence is never justified,” whereas Item 30, “I am willing to get into a physical fight if necessary,” was similar in content to Item 41, “No matter what the situation I would never act violently”; Item 22, “It is important for me to win,” was captured by Item 33, “Winning is not important to me”; and Item 32, “I tend to keep feelings to myself” was captured through reverse scoring of item 40, “I tend to share my feelings.” Thus, content for each of these items was retained by other factor items in this reduced model. Reliability estimates were performed with the refined CMNI subscales, which revealed that the Cronbach’s alphas were adequate to strong and ranged from .71 to .87 (see Table 1).

### Measurement Invariance

Using the guidelines by Chen (2007), our reduced CMNI model showed metric invariance, scalar invariance, and invariance of latent variance (i.e., it did not exceed cutoffs for the fit indices for those model progressions; see Table 2). Constraining the models to equivalent factor loadings across groups resulted in a 0.001 decrease in CFI and no change in RMSEA, suggesting that the factors loaded similarly across groups on this reduced measure. Equating item intercepts across groups yielded a 0.004 decrease in CFI and no change in RMSEA, implying that there was no group bias to answering items higher or lower than expected based on other structural parameters. Constraining the variance of latent factors across groups also did not yield a meaningful drop in CFI (0.002 from previous model) or RMSEA (0.001 increase from previous model). This invariance of latent variances suggests that the variance of factors does not significantly differ across groups, indicating similar distributions.



The model for invariance of latent covariance did show a  $-0.03$  decrease in CFI from the comparative model (though only a  $0.007$  change in RMSEA), suggesting there are differences between Asian and White men on how different masculine norms are associated with one another. Similar to Parent and Moradi's (2011a) study examining measurement invariance in the CFNI, we employed MIs to examine partial invariance for our measure (cf. Byrne, Shavelson, & Muthén, 1989; Steenkamp & Baumgartner, 1998; Steinmetz, Schmidt, Tina-Booh, Wieczorek, & Schwartz, 2009). Examination of MIs suggest that relaxing the equality constraints across groups between the specific factor pairings Winning with Violence; Power Over Women with Heterosexual Self-Presentation; Playboy with Power Over Women; Winning with Risk Taking; Playboy with Emotional Control; Risk Taking with Emotional Control; and Risk Taking with Power Over Women leads to partial invariance of latent covariances. Relaxing these constraints and examining the corresponding covariances suggest a variety of differences between the two groups. The Violence latent factor was more strongly associated with Winning in the Asian group ( $0.36$ ,  $p < .001$ ) but not the White group ( $0.22$ ,  $p < .005$ ). There was a negative association between the Playboy and Emotional Control latent variables in the Asian group, but a positive association for the White group, even if neither association was significant (both  $p > .05$ ). The Playboy latent factor was more strongly associated with the Power Over Women factor in Asian American men ( $0.44$ ,  $p < .001$ ) relative to White American men ( $0.407$ ,  $p < .001$ ). Risk Taking was significantly associated with Emotional Control for the Asian group ( $-0.22$ ,  $p < .001$ ) but not the White group ( $0.11$ ,  $p > .05$ ).

With a decrease in CFI of  $0.004$  and increase of RMSEA of  $0.001$  (i.e., did not exceed cutoff) when testing the model of invariance of latent means with no partial invariance of latent covariances (Model G) against the model of invariance of latent covariances with no partial invariance of latent covariances (Model F), this reduced measure displays invariance of latent means (see Table 2). Furthermore, when accounting for partial invariance of latent covariances, the model of invariance of latent means (Model G<sub>PC</sub>) showed a  $0.003$  decrease in CFI and  $0.001$  increase in RMSEA relative to the model of latent covariances (Model F<sub>PC</sub>), further supporting this finding of invariance of latent means. Invariance of latent means implies that groups do not differ in strength of constructs endorsed on this measure (e.g., Asian American and White American participants conform to a similar degree to masculine norms for Winning or Heterosexual Self-Presentation).

Overall, these findings indicate that this reduced 29-item version of the CMNI shows measurement invariance and partial structural invariance. In particular, although the model shows invariance of factor variance and factor means, there appear to be significant differences between the Asian American and White American samples in how the latent factors are associated with each other, either in terms of strength of association or direction of association.

### Comparison With the CMNI-46

In order to determine whether the findings of partial invariance of latent covariances were specific to our reduced measure or were representative of general differences in how masculine norms are related in Asian American and White American populations, we

conducted measurement invariance testing on the CMNI-46 from our sample. The CMNI-46 demonstrated metric and scalar invariance, as well as invariance of latent factor variance, with decreases of 0.002, 0.004, and 0.002 in CFI, and no change in RMSEA (i.e., below the suggested cutoffs outlined by Chen, 2007), respectively, to comparative models. Again, constraining latent factor covariance across groups resulted in a large drop in CFI (0.021), suggesting differences in relations between masculine norms across the Asian American and White American groups in our sample. Examining MIs suggests that relaxing constraints between Power Over Women with Heterosexual Self-Presentation; Emotional Control with Self-Reliance; Primacy of Work with Violence; Heterosexual Self-Presentation with Winning; and Risk Taking with Winning, Emotional Control, and Power Over Women results in partial invariance of latent factor covariances. Similar to the findings from our reduced CMNI measure, Risk Taking was significantly associated with Emotional Control in the Asian American sample ( $-0.09, p < .05$ ) but not the White American sample ( $0.10, p < .05$ ). Risk Taking was also more strongly associated with Power Over Women in the Asian American group ( $0.28, p < .001$ ) than the White American group ( $0.169, p < .05$ ). The Asian American sample showed a significant association between Primacy of Work and Violence ( $-0.24, p < .001$ ) that was not found in the White American sample ( $-0.04, p > .05$ ). The CMNI-46 also displayed invariance of factor means. The CMNI-46 and our reduced CMNI measure display the same pattern of measurement and structural invariance (i.e., metric and scalar invariance, invariance of factor variances and means, and partial invariance of factor covariances).

### Comparability of the CMNI-46 and the CMNI-29

Using procedures outlined by Parent and Moradi (2009), we investigated the similarities between the CMNI-29 and CMNI-46 with respect to conceptual consistency of the subscales, reliability estimates, means, standard deviations, and correlations (see Table 3). The values of the descriptive statistics and reliability estimates of the CMNI-46 data in our study were consistent with Parent and Moradi's findings, with the exception of the Primacy of Work subscale in our sample ( $\alpha = .66$  compared with  $.77$  in Parent & Moradi). The conceptual consistency between the CMNI-29 and the CMNI-46 was evident by the robust correlations between the CMNI-46 and the CMNI-29 subscale estimates ( $r = .91$  to  $1.00$ ; note that the Heterosexual Self-Presentation subscale in the CMNI-29 and CMNI-46 was the same). These results suggest that the CMNI-29 appears to be conceptually similar to the CMNI-46, providing strong support for the construct validity of this revised 29-item CMNI.

### Racial and Ethnic Differences Between the CMNI-29 and the CMNI-46

We explored mean differences between the CMNI-29 and CMNI-46 across racial groups (Asian American and White American men) and within Asian ethnic groups (Tables 4 and 5). Asian American men reported significantly higher mean scores than White American men on the CMNI-29 subscales Heterosexual Presentation,  $F(1, 875) = 12.45, p < .001$ , and Power Over Women,  $F(1, 882) = 17.88, p < .001$ . With respect to the CMNI-46, Asian American men also reported higher mean scores on the Power Over Women  $F(1, 880) = 20.59, p < .001$ , and Primacy of Work  $F(1, 878) = 12.69, p < .001$ , subscales.

Finally, we explored whether there were differences in the CMNI-29 subscales among Asian ethnicities (see Table 5). Inspection of the ANOVA post hoc Bonferroni analyses revealed that Chinese American men scored lower on Winning when compared with Indian American men, but higher than Vietnamese American men, whereas Korean American men scored higher than Vietnamese American men on that subscale. Korean American men scored higher on the Heterosexual Presentation subscale relative to Chinese, Filipino, and Vietnamese American men. Korean American men also scored significantly higher on the Power Over Women subscale when compared with Filipino American men. These differences highlight the significant heterogeneity among Asian American ethnicities.

## Discussion

The current study investigated the potential racial measurement noninvariance of the CMNI-46 among a sample of Asian American and White American college students. The results revealed that there are significant measurement differences across groups; specifically, the CMNI-46 is more theoretically consistent for White American participants when compared with the Asian American participants. As a majority of the research on masculinity and masculine norms utilizes predominantly White men, this finding does not invalidate the great deal of innovative research on masculinity that has utilized the CMNI. Rather, this finding suggests that more attention needs to be directed toward the measurement of masculinity and how certain environmental factors shape masculinity for diverse men, including Asian Americans (Liu, Iwamoto, & Chae, 2010). Paring the CMNI-46 down to a 29-item version based on previous measurement creation and refinement guidelines yielded a measure that did not significantly differ across groups in terms of the number and types of factors measured and showed no evidence for systematic response biases between groups on individual items (i.e., this CMNI-29 displayed measurement invariance across the groups of White American and Asian American men).

Testing for measurement invariance (in both the CMNI-46 and CMNI-29) did reveal differences between ethnic groups on how masculine constructs were associated with one another on this measure. Specifically, the Winning and Power Over Women factors showed markedly different associations with other masculinity factors between the Asian American and White American men. Parent and Moradi (2011b) suggested that the Heterosexual Self-Presentation, Power Over Women, and Winning subscales “tap a broader range of masculine norms than intended,” and “[these specific masculinity norms] thread across the masculinity constructs captured . . . in this study” (p. 349). This partial invariance of factor covariance may represent theoretical differences in how Asian American and White American men conceptualize and negotiate their own masculinity and societal gender norms, supporting the notion that masculinity may significantly differ in meaning between different ethnicities (Griffith et al., 2012). To some extent, these different conceptualizations of what it is to be masculine among different ethnic groups are supported with extant research. Chua and Fujino (1999) found masculinity to be negatively correlated with femininity in White American men but independent in Asian American men. It is of note that although the pattern of association between masculine constructs differs between ethnic groups in this study, there were no differences in the constructs identified in the CMNI between groups (i.e., both the CMNI-46 and CMNI-29 displayed metric invariance). Our set of findings

support Chua and Fujino's results that the association between masculinity constructs may be the primary difference between White American and Asian American men, rather than the specific components representing masculinity. Given the differences between Asian American and White American men in traditional cultural construals of masculinity, historical racism, and current portrayals, it is not of complete surprise our study found differences in how masculine norms were conceptualized and associated between the two ethnic groups.

The findings and implications of this study ought to be tempered by a number of limitations. This study drew exclusively upon a sample of college men; thus, these findings may not generalize to men in their early adulthood, middle age, or beyond, whose masculine norms may be more defined and static. In addition, participants were drawn from a Southern California public university, which may have very different social norms relative to other studies, given that Asian Americans represent the largest group at this particular campus. Even though a strength of this study was the fact that we gathered a large sample of Asian American men, given power issues, we were unable to examine the role of generation or nativity (e.g., acculturated, fifth-generation Japanese vs. first-generation international students) and ethnicity (e.g., Chinese, Korean, or Japanese Americans) on the measurement of masculinity. There were also unequal sample sizes across groups, which was taken into consideration when selecting cutoff points for testing of measurement invariance. Even if the current study implemented less stringent criteria, as suggested by Chen (2007), for testing measurement invariance (for a total sample <300 and in which patterns of noninvariance are uniform, changes of  $-0.005$  or greater for CFI and  $0.010$  or greater for RMSEA were utilized as cutoff points for such study characteristics), the results would not differ from using these alternative criteria. In other words, based on less stringent criteria, measurement invariance of the 29-item CMNI would still be supported, with only the model for testing invariance of latent covariances exceeding these cutoffs. Related to unequal sample sizes between racial groups, it would have been ideal if the current study had a larger sample of White American men as well as men from other ethnic and racial backgrounds. Moreover, even though we used previously established psychometric methodology to arrive at the CMNI-29, the CMNI was significantly reduced from the previous CMNI-46 version. This reduction may contribute to the better fit; consequently, future studies are needed to replicate the item and factor loadings and strong model fit across Asian American and White American groups for the CMNI-29.

Despite these limitations, the findings of the current study have important implications and strengths that significantly contribute to the literature in the area of racial differences in the measurement of masculine norms. One of the primary strengths of this current study was the fact that we were able to recruit a large sample of Asian American and White American men to help characterize performance on a measure of conformity to masculine norms with adequate power. With respect to the clinical implications, given the brevity of the CMNI-29, it could be administered by clinicians as a brief assessment of masculine norms with their clients to explore and discuss issues surrounding masculinity. Specifically, the CMNI might be able to help the client identify the norms that they adhere to or do not endorse, and clinicians could explore how the pros and cons of endorsing these norms have impacted the client's presenting concerns. Furthermore, the CMNI-29 appears well suited for use with

both Asian American and White American client populations, given its superior model fit when compared with the CMNI-46. Regarding research implications, the streamlined 29-item, eight-factor version of the CMNI appears to show measurement invariance across Asian American and White American men, and across robust psychometric properties, thus potentially enhancing the use of the CMNI with diverse groups. The strength of this refined version is supported by the similar factor loadings and comparable rank ordering of items onto factors relative to the CMNI-46, as well as robust correlations between the CMNI-46 and the CMNI-29 subscale estimates. Furthermore, the CMNI-29 showed better model fit to the overall sample as well as with each ethnic group than the CMNI-46. Future research that utilizes large samples of Asian American and White American men may benefit from adopting the CMNI-29, given the poor model fits of the CMNI-46 with respect to race in our study.

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**Table 1**

Eight-Factor, 29-Item Conformity to Masculine Norms Inventory (CMNI; for the current study) Relative to Nine-Factor, 46-Item Model Proposed by Parent and Moradi (2009)

CMNI-46 item number	Parent & Moradi (2009) Loading	Current study	
		Loading	Uniqueness
Winning			
7.	0.61	0.61	0.66
15.	0.75	0.71	0.51
27.	0.76	0.73	0.44
33.	0.61	0.69	0.53
Playboy			
2.	0.80	0.83	0.34
21.	0.84	0.82	0.31
36.	0.81	0.67	0.55
Self-Reliance			
3.	0.77	0.70	0.52
26.	0.66	0.56	0.69
43.	0.81	0.76	0.43
Violence			
4.	0.65	0.72	0.46
9.	0.65	0.65	0.57
34.	0.63	0.74	0.46
41.	0.78	0.65	0.59
Heterosexual Self-Presentation			
5.	0.71	0.62	0.62
14.	0.88	0.79	0.38
17.	0.85	0.71	0.50
24.	0.91	0.86	0.26
37.	0.72	0.77	0.41
46.	0.67	0.64	0.59
Risk Taking			
8.	0.80	0.72	0.36
16.	0.71	0.64	0.52
28.	0.70	0.67	0.67
Emotional Control			
13.	0.69	0.74	0.46
25.	0.79	0.82	0.29
40.	0.76	0.87	0.26
Power Over Women			
29.	0.62	0.76	0.42
42.	0.72	0.76	0.43
44.	0.79	0.82	0.33



Table 2

Results of Invariance Testing for Eight-Factor, 29-Item Version of CMNI

Model	$\chi^2$ (df)	$\chi^2/df$ ratio	CFI	RMSEA (90% CI)	SRMR	AIC	CFI	RMSEA	Model ref
A	965.27 (349)	2.76	0.93	0.044 (0.041 0.048)	0.046	47639.17			
A <sub>1</sub>	868.80 (349)	2.48	0.92	0.047 (0.043 0.051)	0.052	36495.92			
A <sub>2</sub>	550.65 (349)	1.57	0.92	0.052 (0.044 0.060)	0.055	11070.88			
B	1419.46 (698)	2.03	0.92	0.048 (0.045 0.052)	0.053	47566.80			
C	1445.96 (719)	2.01	0.92	0.048 (0.044 0.051)	0.054	47551.31	-0.001	0	C-B
D	1507.39 (740)	2.03	0.92	0.048 (0.045 0.052)	0.054	47570.74	-0.004	0	D-C
E	1532.71 (747)	2.05	0.91	0.049 (0.045 0.052)	0.059	47582.06	-0.002	0.001	E-D
F	1906.62 (796)	2.39	0.88	0.056 (0.053 0.059)	0.094	47857.97	-0.033	0.007	F-E
F <sub>PC</sub>	1661.13 (781)	2.12	0.91	0.050 (0.047 0.054)	0.075	47642.48	-0.009	0.001	F <sub>PC</sub> -E
G	1949.65 (804)	2.42	0.88	0.056 (0.053 0.060)	0.096	47885.00	-0.004	0	G-F
G <sub>PC</sub>	1696.82 (789)	2.15	0.90	0.051 (0.047 0.054)	0.079	47662.17	-0.003	0.001	G <sub>PC</sub> -F <sub>PC</sub>

Note. CMNI = Conformity to Masculine Norms Inventory; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR =  $\sqrt{\text{mean square error of approximation}}$ ; SRMR =  $\bullet\bullet\bullet$ ; CI = confidence interval; AIC =  $\bullet\bullet\bullet$ ; ref =  $\bullet\bullet\bullet$ ; CFA =  $\bullet\bullet\bullet$ .

**Table 3**  
Descriptive Statistics and Correlations for the Conformity to Masculine Norms Inventory (CMNI)-29

Subscale	1	2	3	4	5	6	7	8	Mean	SD	$\alpha$	$r^2$
1. Winning	—								1.57 (1.59)	.52 (.49)	.77 (.80)	.93
2. Playboy	.07*	—							1.03 (1.12)	.69 (.65)	.82 (.80)	.95
3. Self-Reliance	.03	.23**	—						1.35 (1.26)	.53 (.48)	.71 (.78)	.93
4. Violence	.25**	.05	-.08	—					1.65 (1.68)	.55 (.51)	.79 (.81)	.95
5. HP	.26**	.03	.10**	.05	—				1.57 (1.57)	.66 (.66)	.87 (.87)	1.00
6. Risk Taking	-.03	.25**	.06	.04	.00	—			1.54 (1.39)	.50 (.45)	.72 (.75)	.93
7. Emotional	.21**	.01	.17**	.10**	.12**	.11**	—		1.42 (1.36)	.59 (.51)	.86 (.85)	.91
8. Power	.10**	.34**	.20*	-.04	.38**	.18**	.05	—	1.01 (1.01)	.61 (.58)	.82 (.82)	.96

Note. Values in parentheses are the descriptive scores of the CMNI-46. HP = Heterosexual Presentation; Emotional = Emotional Control; Power = Power Over Women.

<sup>a</sup>Correlations between CMNI-29 and CMNI-46. The values in the Heterosexual Presentation scale are the same because there were no items removed in the CMNI-29 version.

\*  $p < .05$ .

\*\*  $p < .01$ .

**Table 4**  
 Subscale Means and Standard Deviations for the Asian American and White Men on the CMNI-46 and CMNI-29

Subscale (# old items/# new items)	CMNI-46				CMNI-29			
	Asian American		White		Asian American		White	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Winning (6 old/4 new)	1.59	.48	1.60	.52	1.57	.51	1.60	.59
Playboy (4 old/3 new)	1.10	.62	1.16	.75	1.03	.66	1.02	.75
Self-Reliance (5 old/3 new)	1.27	.47	1.24	.50	1.37	.54	1.32	.53
Violence (6 old/4 new)	1.67	.49	1.72	.57	1.64	.57	1.70	.60
Heterosexual Self-Presentation (6 old/6 new)	1.61	.63	1.43	.75	1.61 <sup>a</sup>	.63	1.43	.75
Risk Taking (5 old/3 new)	1.39	.44	1.39	.45	1.55	.49	1.53	.49
Primacy of Work (3 old/not retained)	1.41	.47	1.27	.51				
Emotional Control (6 old/3 new)	1.36	.51	1.36	.52	1.41	.60	1.47	.59
Power Over Women (4 old/3 new)	1.06	.57	.85	.58	1.06	.61	.85	.61

Note. CMNI = Conformity to Masculine Norms Inventory.

**Table 5**  
Subscale Means and Standard Deviations for Asian American Ethnic Groups on the CMNI-29

	Filipino American	Korean American	Multiethnic	Indian American	Japanese American	Chinese American	Vietnamese American
Winning	1.53 (.48)	1.48 (.46)	1.60 (.52)	1.72 (.56)	1.57 (.55)	1.81 (.55)	1.47 (.47)
Playboy	.95 (.59)	1.05 (.69)	.98 (.71)	1.09 (.67)	1.08 (.62)	1.12 (.78)	1.16 (.71)
Self-Reliance	1.36 (.52)	1.33 (.53)	1.35 (.53)	1.36 (.58)	1.47 (.64)	1.38 (.51)	1.37 (.42)
Violence	1.68 (.50)	1.59 (.51)	1.59 (.50)	1.62 (.57)	1.53 (.59)	1.60 (.61)	1.81 (.59)
HP	1.60 (.60)	1.59 (.63)	1.52 (.62)	1.85 (.57)	1.54 (.66)	1.63 (.73)	1.54 (.59)
Risk Taking	1.54 (.48)	1.56 (.50)	1.59 (.49)	1.54 (.48)	1.47 (.54)	1.53 (.62)	1.70 (.52)
Emotional	1.36 (.58)	1.47 (.62)	1.27 (.59)	1.48 (.55)	1.48 (.64)	1.45 (.65)	1.38 (.61)
Power	1.06 (.56)	2.08 (.63)	.86 (.62)	1.21 (.59)	1.13 (.62)	1.04 (.66)	1.01 (.62)

*Note.* Standard deviations are noted in parentheses. CMNI = Conformity to Masculine Norms Inventory; HP = Heterosexual Presentation; Emotional = Emotional Control; Power = Power Over Women.