



Published in final edited form as:

Adolesc Res Rev. 2022 December ; 7(4): 523–536. doi:10.1007/s40894-021-00171-4.

Gender Equitable Attitudes Among Adolescents: A Validation Study and Associations with Sexual Health Behaviors

Amber L. Hill^{1,2,3}, Elizabeth Miller^{1,2}, Galen E. Switzer^{4,5}, Kaleab Z. Abebe⁴, Judy C. Chang^{1,4,6}, Julie Pulerwitz⁷, Lisa D. Brush⁸, Ashley V. Hill^{2,9}

¹University of Pittsburgh School of Medicine, 3550 Terrace St, Pittsburgh, PA 15213, USA

²Division of Adolescent and Young Adult Medicine, UPMC Children’s Hospital of Pittsburgh, 120 Lytton Ave, Pittsburgh, PA 15213, USA

³Department of Pediatrics, Michigan Medicine, 1522 Simpson Road East, Ann Arbor, MI 48109, USA

⁴Department of Medicine, University of Pittsburgh, 3550 Terrace St, Pittsburgh, PA 15213, USA

⁵Center for Health Equity Research and Promotion (CHERP), Veterans Affairs Pittsburgh Healthcare System, 151C University Drive, Pittsburgh, PA 15240, USA

⁶Department of Obstetrics, Gynecology, and Reproductive Sciences, University of Pittsburgh, 300 Halket St, Pittsburgh, PA 15213, USA

⁷Population Council, 4301 Connecticut Ave NW #280, Washington, DC 20008, USA

⁸Department of Sociology, University of Pittsburgh, 230 S Bouquet St, Pittsburgh, PA 15213, USA

⁹Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, 130 De Soto St, Pittsburgh, PA 15261, USA

Abstract

Gender inequitable attitudes are associated with violence perpetration and poor sexual health. There is limited diversity in U.S. samples used to validate gender attitudes measurements. This study assessed a 13-item gender equitable attitudes scale’s validity among a sample of predominantly Black adolescent boys (n = 866; mean age = 15.5, range = 13–19 years) and examined associations with sexual health behaviors. Exploratory and confirmatory factor analyses tested construct validity. Logistic mixed-effects models were used to explore associations between gender equitable attitudes, adolescent relationship abuse, pornography use, and condom use behaviors; linear mixed-effects models explored associations between gender equitable attitudes and condom negotiation self-efficacy. By pooling data from two other gender transformative

*Amber L. Hill ambhil@med.umich.edu.

Authors’ Contributions ALH conceived the study, performed the statistical analysis, and drafted and revised the manuscript; EM conceived the study, acquired all data, interpreted data, and helped draft and revise the manuscript; GES helped oversee statistical analysis, interpreted data, and helped draft and revise the manuscript; KZA helped oversee statistical analysis, interpreted data, and helped draft and revise the manuscript; JCC interpreted data and helped draft and revise the manuscript; JP interpreted data and helped draft and revise the manuscript; LDB interpreted data and helped draft and revise the manuscript; AVH conceived the study, oversaw statistical analysis, interpreted data, and helped draft and revise the manuscript. All authors read and approved the final manuscript.

Conflict of interest The authors report no conflict of interests.

programs, Sisterhood 2.0 (n = 246, 13–19-year-old females (mean age = 15.2), 73.6% Black/African American) and Coaching Boys into Men Middle School (n = 958, 11–14-year-old males—6th grade: 10.4%, 7th grade: 36.5%, 8th grade: 53.1–56.6% white), measurement invariance was assessed across Black (n = 400) and white (n = 298) race and male (n = 429) and female (n = 246) gender. A three-factor 11-item scale showed construct validity among a sample of Black adolescent boys, weak factorial invariance across Black and white race, and configural invariance across male and female gender. Gender equitable attitudes were associated with less adolescent relationship abuse, higher condom negotiation self-efficacy, and less pornography use. These findings demonstrate some variability in measurements of gender equitable attitudes by race and gender. Targeting harmful gender norms may help prevent adolescent relationship abuse and improve sexual health behaviors.

Keywords

Psychometric evaluation; Measurement invariance; Gender equitable attitudes; Violence prevention; Sexual health

Introduction

Gender inequitable attitudes include individually- and societally-held beliefs about the norms in which people of certain genders should adhere to (Barker et al., 2011). Over the past two decades, there has been an increasing number of studies linking these attitudes to poor health outcomes (American Psychological Association, 2018). These findings have motivated the design and implementation of gender-transformative programs, equipping participants with critical analytic skills to challenge norms that perpetuate gender inequity (Brush & Miller, 2019). However, there are several key research gaps, particularly around the validity of measures used to assess gender inequitable attitudes among marginalized or minoritized adolescents. This study seeks to help fill this gap in knowledge by validating an adapted scale using samples from multiple gender-transformative programs involving adolescents of diverse backgrounds.

Studies have demonstrated that individual gender inequitable attitudes (i.e., stereotypical beliefs about gender) are strongly associated with the perpetration of intimate partner violence (Pulerwitz & Barker, 2008), adolescent relationship abuse (Reyes et al., 2016), bullying (Leemis et al., 2018), and sexual harassment (Miller et al., 2019). In addition, researchers have shown how gender inequity at the neighborhood-level can also adversely impact rates of relationship abuse perpetration among adolescents (Okeke et al., 2019). In response, violence prevention experts have implemented gender-transformative programs to shift attitudes that condone violence (Brush & Miller, 2019). Studies evaluating one of these programs, for example, showed improvements in positive bystander behaviors, interventions to intervene, and recognition of abusive behaviors immediately after the intervention (Miller et al., 2012) and reductions in perpetration of adolescent relationship abuse one year later (Miller et al., 2013).

In the United States, there are limited data about the effectiveness of gender-transformative programs among younger adolescents, communities of color, and non-male populations

(Abebe et al., 2018). Studies from other countries, such as India, have shown that gender-transformative programs may be more effective at shifting attitudes during younger adolescents (13–14 years) compared to older adolescents (15–19 years) (Gupta & Santhya, 2020). To address this concern, programs such as Manhood 2.0 (Miller, et al., 2020a, 2020b), Sisterhood 2.0, and Coaching Boys into Men (CBIM) Middle School (Miller, et al., 2020a, 2020b), all of which are adaptations of existing research-informed interventions (Miller et al., 2012; Promundo, 2020), have been implemented and evaluated, showing promising results. These interventions will likely serve as a roadmap for future programs. However, researchers must be particularly mindful of how they assess programmatic success as a measure's validity may differ depending on the population, and findings are only as good as the measurement tools used to collect data.

Validating measures in each new population is critical. Currently, there is limited evidence that existing scales will perform well in younger, non-white, and gender-diverse populations. In a recent critical reflection on existing gender-transformative health programming, researchers called for an improvement in measures used to assess gender attitudes with a greater focus on multiple, intersecting identities (Dworkin et al., 2015). For example, studies have shown that ideas around gender equitable attitudes, particularly those pertaining to “traditional masculinity,” are deeply intertwined with structural racism (Quam et al., 2020). Furthermore, if differences in gender equitable attitudes by race are examined prior to additional validation, there is a risk of misinterpreting group differences due to measurement error. As such, it is important to ensure widely-used metrics are valid across different identities. Internationally, studies in Brazil (Pulerwitz & Barker, 2008), China (Pulerwitz et al., 2015), India (Pulerwitz et al., 2012), and Uganda (Vu et al., 2017) demonstrated this adaptation and validation process using the Gender Equitable Men (GEM) Scale in adolescents and young adults. These studies highlight best practices of examining construct validity (i.e., how accurately a scale is measuring the construct it was intended to measure) in new populations. Evidence of construct validity builds understanding of gender equitable attitudes among particular populations (i.e., adolescents who participate in gender-transformative programs); measurement invariance across gender and race increases confidence in using the instrument with different populations (Fisher et al., 2020).

In addition to violence perpetration and victimization, there has been growing evidence of the adverse impact that endorsing harmful masculine norms during adolescence and adulthood has on related health outcomes, including increased risk of sexually transmitted infections (Rolleri, 2013), HIV (Closson et al., 2020), unintended pregnancy, poor mental health, and general help-seeking behaviors (American Psychological Association, 2018; Marcell et al., 2007). Furthermore, preliminary evidence shows that gender-transformative programs on healthy relationships (e.g., WiseGuyz) are associated with improvements in mental health (Exner-Cortens et al., 2020). However, the studies investigating associations between gender attitudes and harmful health outcomes use a wide variety of measures, which have not necessarily been validated among the targeted populations, making cross-comparisons challenging. To address this gap, work has been done internationally using the GEM Scale among numerous countries. For example, two studies determined that gender equitable norms are associated with HIV testing and treatment and timing of sexual debut in South Africa (Pulerwitz et al., 2019) and Uganda (Vu et al., 2017), respectively.

Within the U.S., gaps remain in understanding how gender equitable attitudes are associated with key sexual and reproductive health outcomes among historically marginalized adolescent populations using a scale that is grounded in their lived experiences. These gaps limit the ability to adopt and implement gender-transformative approaches to address broader health outcomes that impact young people, and particularly young people of color who are often disproportionately impacted by violence (Centers for Disease Control & Prevention, 2017). For example, a recent systematic review of reviews (Ruane-McAteer et al., 2019) looked at all programs that engaged men in sexual and reproductive health promotion. Among those that addressed violence against women and girls, roughly half used a gender-transformative approach. In contrast, among those that focused on promoting sexual health, an area of health inextricably linked to violence victimization, only 5.7% used a gender-transformative approach (Ruane-McAteer et al., 2019). In another systematic review, the authors determined that among 12 programs addressing harmful gender norms in the U.S., eight pertained to violence and only four pertained to sexual and reproductive health (Levy et al., 2020). To help inform gender-transformative approaches that seek to improve sexual health among historically marginalized adolescent populations, it is necessary to strengthen the evidence base on valid and reliable measures of gender equitable attitudes and how these measures are associated with various sexual health behaviors.

Current Study

This study seeks to fill the aforementioned research gaps, in which there is limited evidence of a validated tool to assess gender inequitable attitudes across individuals of diverse ages, race/ethnicities, and genders. Additionally, this study examines how gender inequitable attitudes impact violence and harmful sexual health outcomes among minoritized adolescents by evaluating the construct validity of an adapted 13-item scale (Chu et al., 2005; Pulerwitz & Barker, 2008) among a sample of 13–19-year-old adolescent boys from predominantly Black neighborhoods in Pittsburgh, Pennsylvania (Aim 1), assessing measurement invariance of the same scale by race and gender (Aim 2), and examining the association between gender equitable attitudes and sexual health behaviors in this sample (Aim 3). Testing and improving upon the validity of the measures used to assess for gender inequitable attitudes among specific populations will allow researchers to better identify areas for intervention and accurately evaluate said interventions.

Methods

Participants and Procedures

The sample was derived from baseline data of three studies conducted in one geographic area between 2015 and 2018 in which the 13-item gender equitable attitudes scale was used. Manhood 2.0 was a cluster randomized trial designed to reduce adolescent relationship abuse perpetration and victimization among adolescent boys living in neighborhoods with concentrated social disadvantage in Pittsburgh, Pennsylvania (Abebe et al., 2018). CBIM Middle School was a cluster randomized trial testing the effectiveness of a coach-delivered program targeting middle school male athletes in reducing perpetration and victimization of teen dating violence (Abebe et al., 2017). Finally, Sisterhood 2.0 was a quasi-experimental

study in which adolescent girls received a curriculum complementary to Manhood 2.0 focused on enhancing resiliency and promoting sexual health and healthy relationships (Clinicaltrials.gov, 2020).

For the first and third aims, the authors used baseline data from Manhood 2.0, which included 866 male participants, aged 13–19 years, recruited through various community organizations (Abebe et al., 2018). For the second aim, to compare measurement invariance by race, the authors pooled baseline data from Manhood 2.0 and CBIM, only selecting individuals of overlapping ages (Grades 8 and 9) to minimize potential confounding. Only individuals who identified as Black/African American or white were selected due to sample size limitations with other races (Abebe et al., 2017, 2018). To compare measurement invariance by gender, baseline samples of adolescent boys from Manhood 2.0 and adolescent girls from Sisterhood 2.0 were pooled; participants from these samples were the same age (13–19 years) and from the same neighborhoods (Fig. 1). The University of Pittsburgh's Institutional Review Board approved study procedures.

The majority of participants in Manhood 2.0 (100% identifying as male) identified as Black/African American (73.1%), Non-Hispanic (86.0%), between the ages of 14–17 years (74.6%) (Table 1). When combining samples of Black and white individuals (100% identifying as male) from Manhood 2.0 and CBIM, the majority of both races reported being in Grade 8 at 67.3% and 96.3%, respectively (shown as “Black” and “white” populations in Table 1). Sisterhood 2.0 participants (100% identifying as female) largely identified as Black/African American (73.6%), Non-Hispanic (80.9%), between the ages of 14–17 years (79.2%).

Measures

The original 13-item scale (six positively-worded and seven negatively-worded items) was designed to assess gender equitable attitudes, created through an iterative process that involved (1) adapting items (McCauley & Miller, 2014) from the GEM Scale (Pulerwitz & Barker, 2008) and Adolescent Masculinity Ideology in Relationships Scale (AMIRS) (Chu et al., 2005), (2) using concept mapping and Visual Voices techniques among adolescent boys (Yonas et al., 2013), and (3) cognitive interviewing and pilot testing among a community-based sample of adolescents and young adults. Participants answered each item on a 5-point Likert scale (“strongly agree” to “strongly disagree”). We reverse-coded negatively-worded items; a higher mean score indicates more equitable gender attitudes.

Data Analytic Approach

To evaluate construct validity of the 13-item scale among the Manhood 2.0 population, the authors conducted exploratory and confirmatory factor analyses. First, the sample of 866 was randomly divided in half. Among the first half, an exploratory factor analysis (EFA) with oblique rotation using polychoric matrices for ordinal factor indicators in Stata SE (Version 16) determined the underlying factors. The factor loading cut-off was set at 0.3. The second half was used to confirm the factor structure through confirmatory factor analysis (CFA) with ordinal factor indicators and weighted least square mean and variance adjusted estimators in Mplus (Version 8). Commonly accepted goodness-of-fit measures

were used (CFI > 0.95, TLI > 0.95, RSMEA < 0.06, SRMR < 0.08) (Hu & Bentler, 1999). Internal consistency reliability was assessed through Cronbach's alpha, ordinal alpha, and ordinal theta coefficients using the full sample (Zumbo et al., 2007).

To evaluate measurement invariance by race, the authors pooled participants (Grades 8 and 9) from Manhood 2.0 and CBIM, and divided the samples into Black/African American and white (Abebe et al., 2017, 2018). To evaluate measurement invariance by gender, participants were pooled from Manhood 2.0 and Sisterhood 2.0. To determine configural invariance, goodness-of-fit statistics were compared between Black and white race (or male and female gender, in separate models) using the CFA model derived from the Manhood 2.0 analysis. If there was configural invariance (i.e., goodness-of-fit statistics were qualitatively similar), model parameters were constrained to be equivalent to test different levels of metric invariance (e.g., weak, strong, and strict). For each level of metric invariance, the authors used theta parameterization, and evaluated changes in goodness-of-fit statistics and used chi-squared difference testing to compare increasingly constrained models with previous models (i.e., weak vs. configural, strong vs. weak, and strict vs. strong). Across two different groups, configural invariance proves that the construct is measured by the same items. Weak factorial invariance shows that the underlying factors are also comprised of the same items. Increasing levels of measurement invariance (e.g., strong and strict factorial invariance) allows for increasing confidence in the ability to compare mean scores across different populations (Bialosiewicz et al., 2013). Missingness among items in the gender equitable attitudes scale was limited, ranging from 2.8 to 3.7% across different samples. Analyses were conducted in Mplus (Version 8). A flow diagram of analyses is shown in Fig. 1.

Two exploratory analyses were conducted. First, the authors reviewed the percent agreement ("strongly agree"/"agree") to each item (Vu et al., 2017). Two sample proportional tests were used to examine differences in percent agreement by race between Black and white samples and by gender between Manhood 2.0 and Sisterhood 2.0 samples in Stata SE (Version 16). Second, using the Manhood 2.0 sample (n = 866), the authors evaluated the association of the mean score on the final gender equitable attitudes scale with: 1) any lifetime adolescent relationship abuse perpetration (dichotomous variable: "yes" vs. "no", 3 items on physical (Straus et al., 1996) and sexual relationship abuse (Koss et al., 2007)); 2) condom negotiation self-efficacy (mean score of 5 items, "strongly disagree" to "strongly agree") (Brafford & Beck, 1991); and 3) reported pornography use (dichotomous variable: "yes" vs. "no", 3 items) (Wolak et al., 2007). Finally, using a subsample of the Manhood 2.0 who reported past 3-month vaginal/anal sex (n = 263), the authors evaluated the association of the mean score on the final gender equitable attitudes scale with: (1) past 3-month frequency of condom use (dichotomized variable: "never" vs. "hardly ever"/"sometimes" /"almost all the time"/"every time") (Szucs et al., 2020) and (2) past 3-month frequency of condom use discussions (dichotomized variable: "never" vs. 1–3/4–6/7+ times) (Milhausen et al., 2007). These analyses of mean gender equitable attitudes with specific health outcomes were done using mixed-effects logistic and linear regression depending on the nature of the outcome variable. Mixed-effects regression was selected to adjust for neighborhood clustering. The authors chose to only use the Manhood 2.0 sample for the outcome analysis for several reasons. First, the aim was to both assess the validity of a gender equitable attitudes scale among a sample of predominantly Black adolescent

boys (while assessing the extent to which the scale is still applicable to different races/genders through measurement invariance), and to evaluate how this new scale, validated within this specific population, may be associated with sexual health outcomes to fill a gap in existing literature. Second, there were limitations in the ability to make cross-sample comparisons across gender-transformative programs given differences in the sexual health outcome measures collected within each dataset.

Results

Construct Validity

Using Manhood 2.0, the EFA ($n = 393$) provided evidence for two- and three-factor solutions. The highest Eigen-values were 2.40, 1.93, and 0.81 (Fig. 2). All 13 items loaded (> 0.3) onto at least one factor. In the three-factor solution, Item 10 (“I would be friends with a guy who is gay”) cross-loaded onto Factors 2 and 3. The goodness-of-fit statistics were determined from a CFA ($n = 429$) conducted using three models: (1) two-factor solution with all 13 items, (2) three-factor solution with all 13 items, and (3) three-factor solution without Item 10 (removed due to cross-loading). The best-fit model was the 12-item three-factor solution (CFI = 0.890, TLI = 0.858, RMSEA = 0.077 (90% CI 0.065–0.089), SRMR = 0.052). EFA and CFA factor loadings for the final model are shown in Table 2. Factor 1 was labeled: “Emotional and Sexual Stereotypes in Relationships”, Factor 2: “Moral Code”, and Factor 3: “Heteronormativity.” Cronbach’s alpha coefficients for Factors 1 and 2 were 0.68 and 0.65, respectively, indicating adequate internal consistency. Ordinal alpha coefficients for Factors 1–2 were 0.72 and 0.69; ordinal theta coefficients were 0.67 and 0.71. Spearman’s rank correlation coefficient between the two items in Factor 3 was 0.48.

Gender Equitable Attitudes by Race

A CFA of the three-factor 12-item model was conducted on Black and white samples to test measurement invariance. Among Black adolescents ($n = 398$), the model fit well (CFI = 0.961, TLI = 0.949, RMSEA = 0.044 (90% CI 0.029–0.059), SRMR = 0.038). Among white counterparts ($n = 297$), the model had the following fit statistics: CFI = 0.905, TLI = 0.877, RMSEA = 0.088 (90% CI 0.072–0.103), SRMR = 0.057. One item (“Guys should put women and children first”) did not load strongly onto its designated factor (factor loading = 0.19). Models were re-run for both races excluding this item, with the final scale including 11 items total, which resulted in improved results (Table 3) across all fit statistics and demonstrated configural invariance. To test for weak metric invariance, factor loadings were constrained to be equivalent by race. The chi-square difference revealed the two models were not significantly different ($p = 0.0809$), and model fit statistics improved (CFI = 0.950, TLI = 0.939, RMSEA = 0.059 (90% CI 0.048–0.070), SRMR = 0.043). However, modification indices showed Item 11 (“A guy should share in household chores”) was inappropriately constrained. After further constraining the model to set item thresholds as equivalent, the fit significantly worsened ($p < 0.0001$). Given there was no strong metric invariance, the model was not constrained any further.

As an exploratory analysis, the percent agreement with each item by race was examined (Table 4). Across almost all items, Black participants endorsed higher percent agreement with more gender inequitable norms than white participants ($p < 0.05$). For two items (“Guys should sleep with as many girls as possible” and “If a guy tells people his worries, he will look weak”), there was no significant difference. Of all items, “a guy takes responsibility for his actions” had the highest percent agreement (80.5% among Black participants and 89.3% among white participants). Of all the items, “if a guy tells people his worries, he will look weak” had the lowest percent agreement among Black participants (8.8%) and “in a good dating relationship, the guy gets his way most of the time” had the lowest percent agreement among white participants (4.7%).

Gender Equitable Attitudes by Gender

Analyses were repeated using the three-factor 12-item model for Manhood 2.0 (boys) and Sisterhood 2.0 (girls). Configural invariance was demonstrated by gender as the model had the following fit statistics among the girls ($n = 240$): CFI = 0.886, TLI = 0.852, RMSEA = 0.085 (90% CI 0.068–0.102), SRMR = 0.064. All factor loadings were sufficiently strong (> 0.3). Given the results of the race analysis, the model was run excluding Item 13 (“Guys should put women and children first”), which improved fit among girls (CFI = 0.944, TLI = 0.924, RMSEA = 0.064 (90% CI 0.044–0.084), SRMR = 0.050). Among the original sample of boys ($n = 429$), the fit also improved (CFI = 0.913, TLI = 0.883, RMSEA = 0.072 (90% CI 0.059–0.086), SRMR = 0.047) (Table 3). To test metric invariance, factor loadings were constrained to be equivalent. While the chi-square difference test did reveal that the newly constrained model did not significantly worsen ($p = 0.0548$), fit statistics did not improve above commonly cited thresholds and modification indices revealed several items were inappropriately constrained (Liu et al., 2017; Meade et al., 2008).

An exploratory analysis of percent agreement by gender was conducted (Table 4). Girls had higher percent agreement with “A guy should share in household chores” (65.5% vs. 52.4%, $p < 0.05$) and significantly lower percent agreement with “Guys should sleep with as many girls as possible” (6.5% vs. 12.5%), “If a guy tells people his worries, he will look weak” (6.1% vs. 13.1%), “It bothers me when a guy acts like a girl” (20.3% vs. 49.5%), and “Guys should only have sex with girls” (28.1% vs. 63.5%). This indicated that girls had more gender equitable attitudes on many of the items.

Gender Equitable Attitudes and Sexual Health Behaviors

Among Manhood 2.0 participants, for every 1.0 unit increase in the mean score of the 11-item gender equitable attitudes scale, there was a 54% reduction in odds of lifetime adolescent relationship abuse perpetration (OR 0.46, 95% CI 0.29–0.75). Respondents with more equitable gender norms perpetrated significantly less relationship abuse. For Factor 1, “emotional and sexual stereotypes in relationships” (all reverse-coded), odds ratios were also significant at 0.67 (95% CI 0.49–0.92). However, for Factor 2 and Factor 3, odds ratios were not significant at 0.77 (95% CI 0.58–1.01) and 0.86 (95% CI 0.69–1.06), respectively.

Four sexual health behaviors were also investigated; these included: condom negotiation self-efficacy, reported pornography use, past 3-month frequency of condom use, and past

3-month frequency of condom use discussions. Gender equitable attitudes were significantly associated with condom negotiation self-efficacy ($\beta=0.42$, 95% CI 0.34–0.51). When examining individual factors, Factors 1 and 2 remained significantly associated, but Factor 3 did not (Table 5). Gender equitable attitudes were significantly associated with ever using pornography (OR 0.65, 95% CI 0.49–0.86). Similar to previous outcomes, this association varied by factor; the relationship was significant for Factors 1 and 3, but not Factor 2. Among those who reported having vaginal or anal sex in the past 3 months, gender equitable attitudes were not significantly related to past 3-month frequency of condom use (OR 1.06, 95% CI 0.55–2.04) or past 3-month frequency of condom use discussions with a sexual partner (OR 1.07, 95% CI 0.64–1.80). The same pattern was observed for all three factors individually.

Discussion

There is a dearth of data on the validity of measures to assess for gender inequitable attitudes across marginalized and minoritized adolescents. Measures grounded in the lived experiences of these youth are needed. These measures should consider how multiple identities can intersect to influence norms and beliefs, yet also consider broader generalizability across different populations. This study sought to disentangle these complexities by examining the validity of an adapted scale and whether it can be implemented among adolescents of Black and white race and male and female gender. In the following discussion, the authors of this study compare findings to previous scales and expand on why certain items were included and excluded. Furthermore, this study sought to improve existing evidence on how gender inequitable attitudes are linked to violence and sexual health behaviors. These findings are discussed in the context of known disparities in rates of violence victimization and poor sexual health among young people of color.

This study assessed how accurately an adapted 13-item scale measured gender equitable attitudes (i.e., construct validity) among adolescent boys from predominantly Black neighborhoods in Pittsburgh, Pennsylvania and whether it was appropriate to use this scale across individuals of different races and genders (i.e., measurement invariance). The analyses resulted in an 11-item scale with three underlying factors to measure personal agreement with gender equitable attitudes, which demonstrated construct validity, and showed weak metric invariance across Black and white race and configural invariance by gender. Furthermore, more gender equitable attitudes were associated with lower odds of lifetime adolescent relationship abuse perpetration, increased condom negotiation self-efficacy, and lower odds of reported pornography use.

The initial 13-item scale, adapted from two existing scales, GEM Scale (Pulerwitz & Barker, 2008) and AMIRS (Chu et al., 2005) and grounded in the experiences of Black adolescent boys, strengthens the psychometric evidence base. In the final 11-item scale, the first factor is comprised of five items that pertain to emotional and sexual stereo-types about boys and girls (e.g., “Guys should sleep with as many girls as possible” and “A girl wearing revealing clothing deserves to have comments made about her”). The second factor is comprised of four items that represent a man’s “moral code” related to respect and responsibilities (e.g., “A guy takes responsibility for his actions”). The third factor consists of two items (“Guys

should only have sex with girls” and “It bothers me when a guy acts like a girl”), which tap into connections between homophobia and a lack of acceptance of gender fluidity.

The original AMIRS (Chu et al., 2005), from which five of the initial 13-item scale’s items were derived (Items 2, 6, 7, 9, and 10), was comprised of a unidimensional construct among a predominantly white sample of U.S. middle school and high school (n = 246) students. In contrast, among Manhood 2.0 participants (almost 78% Black) these five items fall into more than one factor. While this cannot be attributed to racial differences alone, this study’s results may reflect unique cultural, historical, and societal contexts that contribute to Black adolescent boys’ views on “masculinities” (Levant & McCurdy, 2018; Mincey et al., 2014). Another study provided further context for these differences by discussing the intersection of gender and race in the development of Black male identity within the U.S. (Hewitt, 2013). The complexity of “Black masculinity” is proposed as both a rejection and internalization of hegemonic norms (Hewitt, 2013; Mincey et al., 2014). While this rejection of mainstream traditional male roles by Black adolescent boys may underlie the differences seen by race in this present analysis, it is the internalization of these norms that may contribute to the scale’s measurement invariance across Black and white populations.

In addition to AMIRS, three of the scale’s items were derived from the GEM Scale (Items 4, 8, and 10). Items 4 and 8 were dropped in the GEM Scale validation study among 15–24-year-old men in Brazil, as they did not load strongly onto the two underlying factors (“inequitable gender norms” and “equitable gender norms”) (Pulerwitz & Barker, 2008). Similarly, these two items separated out in these analyses, indicating a possible third latent construct pertaining to adolescents’ homophobic and heteronormative attitudes. The authors found it important to retain these items as homophobic attitudes have been shown to be one of the strongest predictors for future sexual violence perpetration among studies in the U.S. (Espelage et al., 2018).

In contrast, Item 10 (“I would be friends with a guy who is gay”) was removed from the final scale, but a similarly worded item was retained in the original GEM Scale (Pulerwitz & Barker, 2008). In the present study’s analyses, Item 10 loaded strongly onto multiple factors, making it difficult to understand how this item was correlated with underlying constructs. These results were consistent with recent findings from a psychometric evaluation of the “Man Box Scale,” demonstrating construct validity among men aged 18–30 across the U.S., United Kingdom, and Mexico (Hill et al., 2020). In the study of the “Man Box Scale”, a similarly worded item was removed from the scale after showing that it did not load onto the unidimensional construct of the “Man Box” (Hill et al., 2020). Item 10 may not be the most appropriate measure of personal homophobic attitudes for participants in the U.S. Similarly, items related to homophobia, but different from Item 10, were not included in any of the GEM Scales used in African countries (e.g., Ghana, Tanzania) given their poor performance (Shattuck et al., 2013). While the theme of homophobia was present among both U.S. and Brazil samples, the differences in item wording and inconsistent performance of these measures highlight the importance of validation studies to ensure accurate measurement.

The other item that was removed from the final scale was: “Guys put women and children first” (Item 13). Item 13 strongly cross-loaded onto multiple factors among adolescent

girls. This may represent a societal shift in gender norms and a rejection of the potentially antiquated notion of “putting women and children first,” which may evoke portrayals of men as protectors and women and children as weak. For adolescent girls, beliefs about women’s independence may produce mixed reactions to this item.

As an exploratory analysis, the authors were interested in examining differences in the percent agreement of each item by race and gender. The results showed consistent evidence of more gender inequitable attitudes among Black adolescent boys compared to their white peers. This may be a result of several factors: (1) while we demonstrated weak metric invariance, we did not have strong metric invariance and measurement error is a possibility; (2) the majority of Black participants were from neighborhoods of concentrated social disadvantage; and (3) there exist several theories about Black men’s increased internalization of harmful societal stereotypes as a result of living in a systemically oppressive society, which influence identity development (Hewitt, 2013; Mincey et al., 2014; Quam et al., 2020).

When comparing adolescent girls and boys in this study, girls had higher gender equitable attitudes across almost all items. This has interesting implications given that young Black women are particularly vulnerable to negative health and social outcomes due to their identities that lay at the crossroads of systemic oppression, misogyny, and persistent gender inequities (Crenshaw, 1991; Parent et al., 2013). The findings were similar to a recent cross-sectional study from India demonstrating that girls were more likely to have higher gender equitable attitudes scores than boys (Landry et al., 2020). However, the findings differ from those of Vu et al. (Vu et al., 2017), who found no significant differences in gender inequitable norms between adolescent boys and girls in Uganda. Although interrupting gender inequitable norms among boys and young men has proven promising, little is known about how shifting gender attitudes among girls will impact violence victimization (Miller et al., 2019). As more gender-transformative programs are evaluated, the authors of this study anticipate gaining further insight into how these attitudes are internalized, particularly among girls of color, and may influence patterns of violence.

The final exploratory analysis provides some insight as to how this particular scale, assessing gender equitable attitudes, is associated with both use of violence and sexual health behaviors. The association between the overall scale and lower odds of lifetime adolescent relationship abuse perpetration is consistent with prior literature demonstrating the harmful impact inequitable norms can have on partner violence (Hill et al., 2020; Pulerwitz & Barker, 2008). However, this relationship appears to be largely driven by the five items in Factor 1, which represent “emotional and sexual stereotypes in relationships.” As such, violence prevention programming may want to more specifically target modifying attitudes related to sexual and emotional stereotypes in relationships and use items in Factor 1 as a subscale to evaluate success.

Similarly, the items in Factor 1 were also significantly associated with condom negotiation self-efficacy. Yet, items in Factor 2 (“moral code”) also appeared important in driving this significant relationship. These findings indicate that taking personal responsibility and having healthy perceptions of how a man earns respect, in addition to not endorsing

hegemonic stereotypes about men and women, may be an important contributor to feeling confident in negotiating condom use.

Finally, while heteronormativity and homophobia (Factor 3) were not associated with any of the other sexual health behaviors, they were significantly associated with reported use of sexually explicit material, i.e., pornography (in addition to Factor 1). In previous literature, the association between pornography use and gender attitudes is inconsistent. For instance, a study examining attitudes towards women among U.S. pornography users determined that pornography use was not associated with harmful gender attitudes (Kohut et al., 2016). On the other hand, another study found that exposure to violent pornographic images were associated with reported violence perpetration and victimization (Rostad et al., 2019). The results of the present study may have important research and programmatic implications regarding the effects of gender attitudes on sexual behaviors, and can inform the adaptation of gender-transformative approaches to address sexual health and wellbeing including developing youth's skills in critical appraisal of sexually explicit material (Rothman et al., 2020).

This study must consider several limitations. First, samples from Manhood 2.0 and Sisterhood 2.0 were from neighborhoods from one geographic area limiting generalizability. Given sample size restrictions, we were unable to conduct dimensional invariance analyses, comment on other races, and examine within group variability. Some of the measures of internal consistency fall marginally below the commonly cited threshold of 0.7 (Nunnally, 1978). This was unsurprising given the relatively few items per factor, which can be modified in future iterations. CBIM Middle School collected demographic data on participants' grade but not age. Finally, the scale only measured adolescents' personal endorsement of gender equitable attitudes (i.e., how much does each participant endorse a belief), and did not capture their assessment of perceived societal endorsement (i.e., how much does each participant believe that society endorses that belief). Future studies should investigate differences between personal and societal beliefs (i.e., descriptive and injunctive norms) and their impact on behavior change.

Conclusion

Given growing interest in gender-transformative programming among more diverse populations in the U.S., both research and practice concerns call the research community to update the psychometric literature to measure gender equitable attitudes in different populations (Brush & Miller, 2019; Gerdes et al., 2018). This 11-item gender equitable attitudes scale was refined by adapting items to be culturally relevant and evidence-based through formative research and pilot testing. This psychometric evaluation led the authors to demonstrate construct validity among a sample of predominantly Black adolescent boys and to identify weak metric measurement invariance by race and configural invariance gender. The results highlight the importance of assessing validity of measures when adapting programming (and associated evaluation) across diverse populations. The results also highlight the association between gender equitable attitudes and less violence perpetration and greater sexual health promoting behaviors. Violence prevention programming and

interventions that seek to improve condom use and healthy sexual education should further investigate how targeting gender equitable attitudes may improve outcomes.

Acknowledgements

The authors would like to express gratitude to the community partners, participants, facilitators, and research team who contributed to these studies.

Funding

This work was supported by the Centers for Disease Control and Prevention [Grant Numbers U01CE002528, R01CE002543 to Miller]; Department of Human Services; National Center for Advancing Translational Sciences [Grant Number TL1R001858, Amber Hill]; National Institute of Child Health and Human Development [Grant Number T32HD087162, Ashley Hill].

References

- Abebe KZ, Jones KA, Ciaravino S, Ripper L, Paglisotti T, Morrow SE, Grafals M, Van Dusen C, & Miller E (2017). A cluster-randomized trial of a middle school gender violence prevention program: Design, rationale, and sample characteristics. *Contemporary Clinical Trials*, 62, 11–20. 10.1016/j.cct.2017.08.007 [PubMed: 28821469]
- Abebe KZ, Jones KA, Culyba AJ, Feliz NB, Anderson H, Torres I, Zelazny S, Bamwine P, Boateng A, Cirba B, Detchon A, Devine D, Feinstein Z, Macak J, Massof M, Miller-Walfish S, Morrow SE, Mulbah P, Mulwa Z, ... Miller E (2018). Engendering healthy masculinities to prevent sexual violence: Rationale for and design of the Manhood 2.0 trial. *Contemporary Clinical Trials*, 71, 18–32. 10.1016/j.cct.2018.05.017 [PubMed: 29802967]
- American Psychological Association. (2018). APA guidelines for psychological practice with boys and men. Retrieved February, 2021 from <https://www.apa.org/about/policy/boys-men-practice-guidelines.pdf>
- Barker G, Contreras JM, Heilman B, Singh AK, Verma RK, & Nascimento M (2011). Evolving men: Initial results from the international men and gender equality survey (IMAGES). Retrieved February, 2021 from <https://www.icrw.org/wp-content/uploads/2016/10/Evolving-Men-Initial-Results-from-the-International-Men-and-Gender-Equality-Survey-IMAGES-1.pdf>
- Bialosiewicz S, Murphy K, & Berry T (2013). Do our measures measure up? The critical role of measurement invariance. Retrieved February, 2021 from <http://comm.eval.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=63758fed-a490-43f2-8862-2de0217a08b8>
- Brafford LJ, & Beck KH (1991). Development and validation of a condom self-efficacy scale for college students. *Journal of American College Health*, 39(5), 219–225. 10.1080/07448481.1991.9936238 [PubMed: 1783705]
- Brush LD, & Miller E (2019). Trouble in paradigm: “Gender transformative” programming in violence prevention. *Violence against Women*, 25(14), 1635–1656. 10.1177/1077801219872551 [PubMed: 31640536]
- Centers for Disease Control and Prevention. (2017). Youth risk behavior surveillance system. Retrieved February, 2021 from <https://www.cdc.gov/healthyyouth/data/yrbs/results.htm>
- Chu JY, Porche MV, & Tolman DL (2005). The adolescent masculinity ideology in relationship scale: Development and validation of a new measure for boys. *Men and Masculinities*, 8(1), 93–115.
- Clinicaltrials.gov. (2020). A feasibility trial of sisterhood 2.0. Retrieved February, 2021 from <https://clinicaltrials.gov/ct2/show/NCT04388696?term=miller&cond=sisterhood&draw=2&rank=1>
- Closson K, Hatcher A, Sikweyiya Y, Washington L, Mkhwanazi S, Jewkes R, Dunkle K, & Gibbs A (2020). Gender role conflict and sexual health and relationship practices amongst young men living in urban informal settlements in South Africa. *Culture, Health & Sexuality*, 22(1), 31–47. 10.1080/13691058.2019.1568578
- Crenshaw K (1991). Mapping the margins: Intersectionality, identity, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1300.

- Dworkin SL, Fleming PJ, & Colvin CJ (2015). The promises and limitations of gender-transformative health programming with men: Critical reflections from the field. *Culture, Health & Sexuality*, 17(Suppl 2), S128–143. 10.1080/13691058.2015.1035751
- Espelage DL, Basile KC, Leemis RW, Hipp TN, & Davis JP (2018). Longitudinal examination of the bullying-sexual violence pathway across early to late adolescence: Implicating homophobic name-calling. *Journal of Youth and Adolescence*, 47(9), 1880–1893. 10.1007/s10964-018-0827-4 [PubMed: 29500577]
- Exner-Cortens D, Hurlock D, Wright A, Carter R, & Krause P (2020). Preliminary evaluation of a gender-transformative healthy relationships program for adolescent boys. *Psychology of Men and Masculinities*, 21(1), 168–175.
- Fisher S, Zapolski TB, Wheeler L, Arora PG, & Barnes-Najor J (2020). Multigroup ethnic identity measurement invariance across adolescence and diverse ethnic groups. *Journal of Adolescence*, 83, 42–51. 10.1016/j.adolescence.2020.07.006 [PubMed: 32711160]
- Gerdes ZT, Alto KM, Jadaszewski S, D'Auria F, & Levant RF (2018). A content analysis of research on masculinity ideologies using all forms of the male role norms inventory (MRNI). *Psychology of Men and Masculinities*, 19(4), 584–599.
- Gupta AK, & Santhya KG (2020). Promoting gender egalitarian norms and practices among boys in rural India: The relative effect of intervening in early and late adolescence. *Journal of Adolescent Health*, 66(2), 157–165. 10.1016/j.jadohealth.2019.03.007
- Hewitt A (2013). Toward the development of the stereotypical roles of black young men scale. (doctor of philosophy). Loyola University Chicago, IL. Retrieved February, 2021 from https://ecommons.luc.edu/cgi/viewcontent.cgi?article=1521&context=luc_diss
- Hill AL, Miller E, Switzer GE, Yu L, Heilman B, Levitov RG, Vlahovicova K, Espelage DL, Barker G, & Coulter RWS (2020). Harmful masculinities among younger men in three countries: Psychometric study of the Man Box Scale. *Preventive Medicine*, 139, 106185. 10.1016/j.ypmed.2020.106185 [PubMed: 32593728]
- Hu LT, & Bentler PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Kohut T, Baer JL, & Watts B (2016). Is pornography really about “making hate to women”? Pornography users hold more gender egalitarian attitudes than nonusers in a representative American sample. *Journal of Sex Research*, 53(1), 1–11. 10.1080/00224499.2015.1023427 [PubMed: 26305435]
- Koss MP, Abbey A, Campbell R, Cook S, Norris J, Testa M, Ullman S, West C, & White J (2007). Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization. *Psychology of Women Quarterly*, 31, 357–370.
- Landry M, Vyas A, Malhotra G, & Nagaraj N (2020). Adolescents' development of gender equitable attitudes in India. *International Journal of Adolescence and Youth*, 25(1), 94–103.
- Leemis RW, Espelage DL, Basile KC, Mercer LM, & Davis JP (2018). Traditional and cyber bullying and sexual harassment: A longitudinal assessment of risk and protective factors. *Aggressive Behavior*, 45(2), 1–12.
- Levant RF, & McCurdy ER (2018). Toward diversifying research participants: measurement invariance of the male role norms inventory-short form (MRNI-SF) across recruitment method. *Psychology of Men and Masculinities*, 19(4), 531–539.
- Levy JK, Darmstadt GL, Ashby C, Quandt M, Halsey E, Nagar A, & Greene ME (2020). Characteristics of successful programmes targeting gender inequality and restrictive gender norms for the health and wellbeing of children, adolescents, and young adults: A systematic review. *The Lancet Global Health*, 8(2), e225–e236. 10.1016/S2214-109X(19)30495-4 [PubMed: 31879212]
- Liu Y, Millsap RE, West SG, Teip JY, Tanaka R, & Grimm KJ (2017). Testing measurement invariance in longitudinal data with ordered-categorical measures. *Psychological Methods*, 22(3), 486–506. [PubMed: 27213981]
- Marcell AV, Ford CA, Pleck JH, & Sonenstein FL (2007). Masculine beliefs, parental communication, and male adolescents' health care use. *Pediatrics*, 119(4), e966–975. 10.1542/peds.2006-1683 [PubMed: 17403834]

- McCauley HL, & Miller E (2014). McCauley and Miller respond to measurement gender equity: A clarification. *American Journal of Public Health*, 104(3), e6–7.
- Meade AW, Johnson EC, & Braddy PW (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology*, 93(3), 568–592. [PubMed: 18457487]
- Milhausen RR, Sales JM, Wingood GM, DiClemente RJ, Salazar LF, & Crosby RA (2007). Validation of a partner sexual communication scale for use in HIV/AIDS prevention interventions. *Journal of HIV/AIDS Prevention in Children & Youth*, 8(1), 11–33.
- Miller E, Culyba AJ, Paglisotti T, Massof M, Gao Q, Ports KA, Kato-Wallace J, Pulerwitz J, Espelage DL, Abebe KZ, & Jones KA (2019). Male adolescents' gender attitudes and violence: Implications for youth violence prevention. *American Journal of Preventive Medicine*, 58(3), 396–406. 10.1016/j.amepre.2019.10.009 [PubMed: 31889621]
- Miller E, Jones KA, Culyba AJ, Paglisotti T, Dwarakanath N, Massof M, Feinstein Z, Ports KA, Espelage D, Pulerwitz J, Garg A, Kato-Wallace J, & Abebe KZ (2020). Effect of a community-based gender norms program on sexual violence perpetration by adolescent boys and young men: A cluster randomized clinical trial. *JAMA Network Open*, 3(12), e2028499. 10.1001/jamanetworkopen.2020.28499 [PubMed: 33351083]
- Miller E, Jones KA, Ripper L, Paglisotti T, Mulbah P, & Abebe KZ (2020). An athletic coach-delivered middle school gender violence prevention program: A cluster randomized clinical trial. *JAMA Pediatrics* 10.1001/jamapediatrics.2019.5217
- Miller E, Tancredi DJ, McCauley HL, Decker MR, Virata MCD, Anderson HA, O'Connor B, & Silverman JG (2013). One-year follow-up of a coach-delivered dating violence prevention program: A cluster randomized controlled trial. *American Journal of Preventive Medicine*, 45(1), 108–112. 10.1016/j.amepre.2013.03.007 [PubMed: 23790995]
- Miller E, Tancredi DJ, McCauley HL, Decker MR, Virata MC, Anderson HA, Stetkevich N, Brown EW, Moideen F, & Silverman JG (2012). “Coaching boys into men”: A cluster-randomized controlled trial of a dating violence prevention program. *Journal of Adolescent Health*, 51(5), 431–438. 10.1016/j.jadohealth.2012.01.018
- Mincey KD, Alfonso M, Hackney A, & Luque J (2014). Being a Black Man: Development of the Masculinity Inventory Scale (MIS) for Black Men. *Journal of Men's Studies*, 22(3), 167–179.
- Nunnally JC (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.
- Okeke NL, Mumford EA, & Rothman EF (2019). Adolescent relationship aggression perpetration and victimization in the context of neighborhood gender equality. *Violence and Gender*. 10.1089/vio.2018.0028
- Parent MC, DeBlaere C, & Moradi B (2013). Approaches to research on intersectionality: perspectives on gender, LGBT, and racial/ethnic identities. *Sex Roles*, 68(11–12), 639–645.
- Promundo. (2020). Program H. Retrieved February, 2021 from <https://promundoglobal.org/programs/program-h/>
- Pulerwitz J, Barker G, & Verma RK (2012). Changing gender norms for HIV and violence risk reduction: A comparison of male-focused programs in Brazil and India. In Obregon R & Waisbord S (Eds.), *The handbook of global health communication*. Wiley.
- Pulerwitz J, & Barker G (2008). Measuring attitudes toward gender norms among young men in Brazil. *Men and Masculinities*, 10(3), 322–338.
- Pulerwitz J, Gottert A, Kahn K, Haberland N, Julien A, Selin A, Twine R, Peacock D, Gómez-Olivé X, Lippman SA, & Pettifor A (2019). Gender norms and HIV testing/treatment uptake: Evidence from a large population-based sample in South Africa. *AIDS and Behavior*, 23(Suppl 2), 162–171. 10.1007/s10461-019-02603-8 [PubMed: 31359218]
- Pulerwitz J, Hui W, Arney J, & Scott LM (2015). Changing gender norms and reducing HIV and violence risk among workers and students in China. *Journal of Health Communication*, 20(8), 869–878. 10.1080/10810730.2015.1018573 [PubMed: 25950187]
- Quam S, VanHook C, Szoko N, Passarello A, Miller E, & Culyba AJ (2020). Racial identity, masculinities, and violence exposure: Perspectives from male adolescents in marginalized neighborhoods. *Journal of Adolescent Health*, 67(5), 638–644. 10.1016/j.jadohealth.2020.08.003

- Reyes HL, Foshee VA, Niolon PH, Reidy DE, & Hall JE (2016). Gender role attitudes and male adolescent dating violence perpetration: Normative beliefs as moderators. *Journal of Youth and Adolescence*, 45(2), 350–360. 10.1007/s10964-015-0278-0 [PubMed: 25831994]
- Rolleri LA (2013). Gender norms and sexual health behaviors. Act for Youth Center of Excellence. http://www.actforyouth.net/resources/rf/rf_gender2_1213.pdf
- Rostad WL, Gittins-Stone D, Huntington C, Rizzo CJ, Pearl-man D, & Orchowski L (2019). The association between exposure to violent pornography and teen dating violence in grade 10 high school students. *Archives of Sexual Behavior*, 48(7), 2137–2147. 10.1007/s10508-019-1435-4 [PubMed: 31309432]
- Rothman EF, Daley N, & Alder J (2020). A pornography literacy program for adolescents. *American Journal of Public Health*, 110(2), 154–156. 10.2105/AJPH.2019.305468 [PubMed: 31855489]
- Ruane-McAteer E, Amin A, Hanratty J, Lynn F, Corbijn van Willenswaard K, Reid E, Khosla R, & Lohan M (2019). Interventions addressing men, masculinities and gender equality in sexual and reproductive health and rights: An evidence and gap map and systematic review of reviews. *BMJ Global Health*, 4(5), e001634. 10.1136/bmjgh-2019-001634
- Shattuck D, Burke H, Ramirez C, Succop S, Costenbader B, Attafuaah JD, Mndeme E, Mbwambo J, & Guest G (2013). Using the inequitable gender norms scale and associated HIV risk behaviors among men at high risk for HIV in Ghana and Tanzania. *Men and Masculinities*, 16(5), 540–559.
- Straus MA, Hamby SL, Boney-McCoy S, & Sugarman DB (1996). The revised conflict tactics scale (CTS2): Development and preliminary psychometric data. *Journal of Family Issues*, 17, 283–316.
- Szucs LE, Lowry R, Fasula AM, Pampati S, Copen CE, Hussaini KS, Kachur RE, Koumans EH, & Steiner RJ (2020). Condom and contraceptive use among sexually active high school students —youth risk behavior survey, United States, 2019. *MMWR Suppl*, 69(1), 11–18. 10.15585/mmwr.su6901a2 [PubMed: 32817600]
- Vu L, Pulerwitz J, Burnett-Zieman B, Banura C, Okal J, & Yam E (2017). Inequitable gender norms from early adolescence to young adulthood in Uganda: Tool validation and differences across age groups. *Journal of Adolescent Health*, 60(2), S15–S21. 10.1016/j.jadohealth.2016.09.027
- Wolak J, Mitchell K, & Finkelhor D (2007). Unwanted and wanted exposure to online pornography in a national sample of youth Internet users. *Pediatrics*, 119(2), 247–257. 10.1542/peds.2006-1891 [PubMed: 17272613]
- Yonas MA, Burke JG, & Miller E (2013). Visual voices: A participatory method for engaging adolescents in research and knowledge transfer. *Clinical and Translational Science*, 6(1), 72–77. 10.1111/cts.12028 [PubMed: 23399093]
- Zumbo BD, Gadermann AM, & Ziesser C (2007). Ordinal versions of coefficients alpha and theta for likert rating scales. *Journal of Modern Applied Statistical Methods*, 6(1), 21–29.

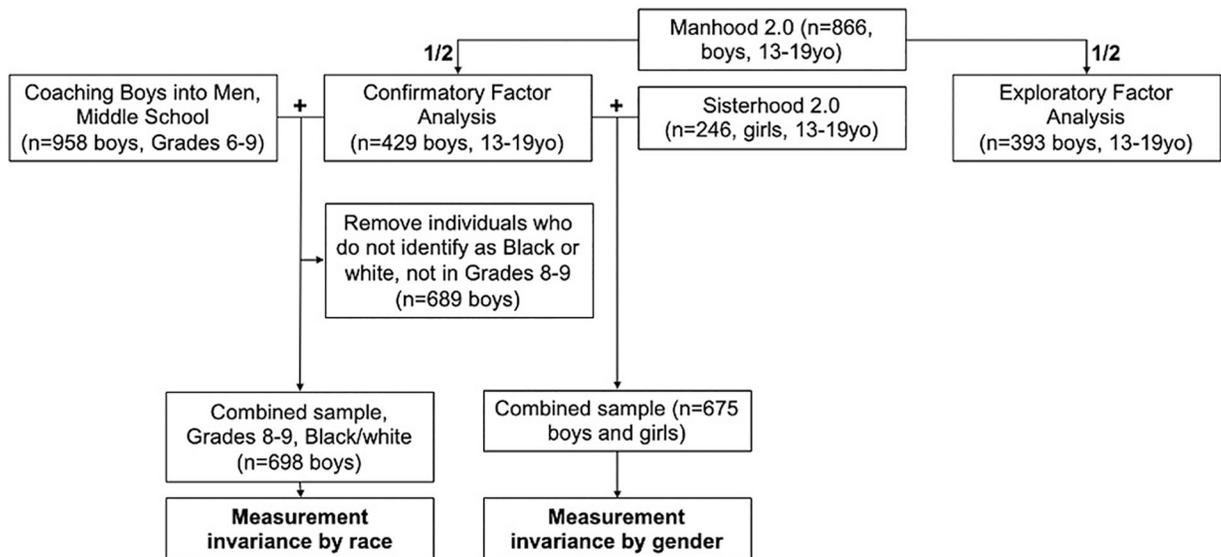


Fig. 1.

Flow diagram of analyses: construct validity and measurement invariance by race and gender. The Manhood 2.0 sample was randomly divided in half to conduct exploratory and confirmatory factor analyses. The Manhood 2.0 confirmatory factor analysis sample was combined with the Sisterhood 2.0 sample to assess for measurement invariance by gender. The Manhood 2.0 confirmatory factor analysis sample was also combined with the Coaching Boys into Men Middle School sample to assess for measurement invariance by race (including only individuals who were in Grades 8–9 and identified as Black or white race to minimize confounding)

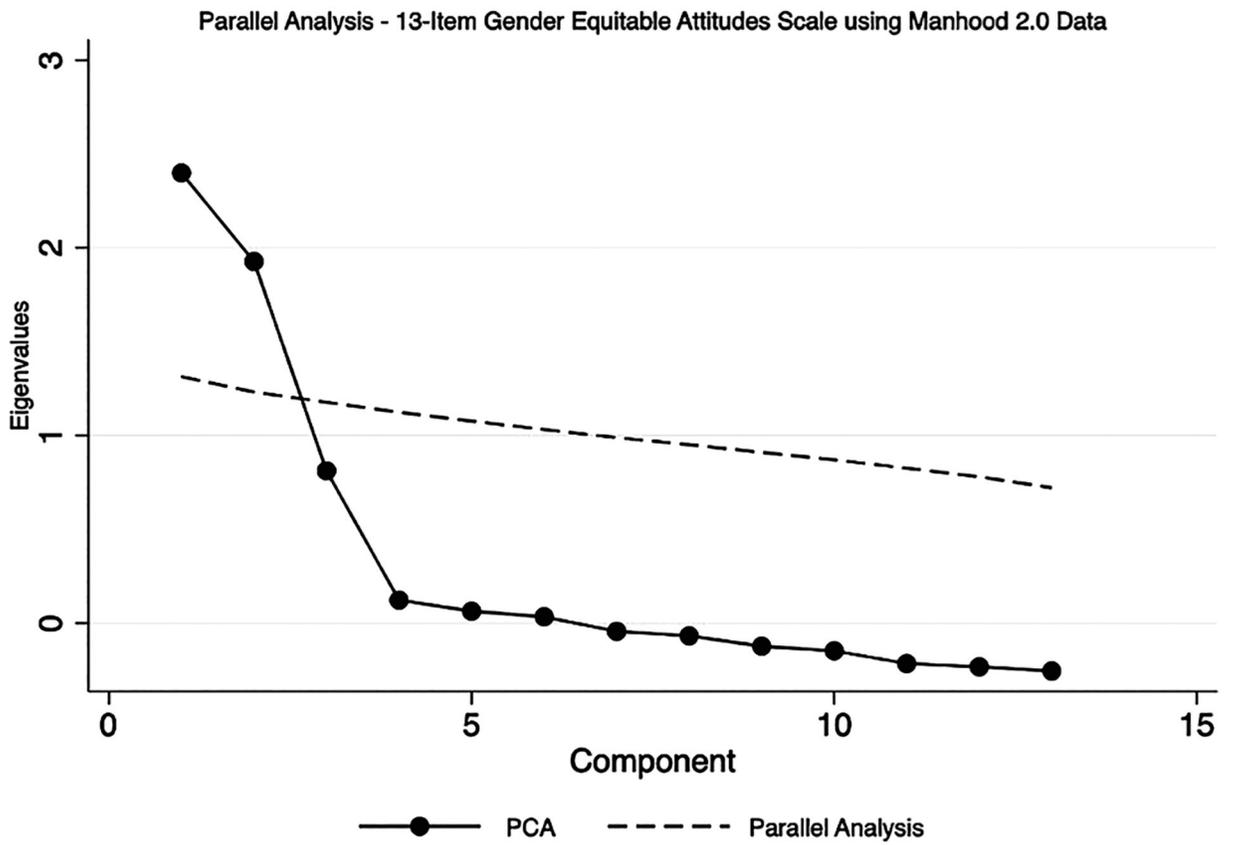


Fig. 2. Parallel analysis and scree plot on the 13-item Gender Equitable Attitudes Scale among Manhood 2.0 Participants

Table 1

Participant demographic characteristics

	Manhood 2.0 (n = 866 boys)	Black ^b (n = 400 boys)	White ^b (n = 298 boys)	Sisterhood 2.0 ^c (n = 246 girls)
Age				
13	104 (12.0%)	–	–	30 (12.2%)
14	176 (20.3%)	–	–	64 (26.0%)
15	161 (18.6%)	–	–	53 (21.5%)
16	178 (20.6%)	–	–	41 (16.7%)
17	131 (15.1%)	–	–	37 (15.0%)
18	84 (9.7%)	–	–	14 (5.7%)
19	30 (3.5%)	–	–	6 (2.4%)
Grade ^d				
8	163 (22.2%)	269 (67.3%)	287 (96.3%)	40 (18.1%)
9	180 (24.5%)	131 (32.7%)	11 (3.7%)	53 (24.0%)
10	151 (20.5%)	0 (0%)	0 (0%)	52 (23.5%)
11	130 (17.7%)	0 (0%)	0 (0%)	36 (16.3%)
12	72 (9.8%)	0 (0%)	0 (0%)	34 (15.4%)
Finished high school/GED	9 (1.2%)	0 (0%)	0 (0%)	–
College	6 (0.8%)	0 (0%)	0 (0%)	–
Currently in school				
Yes	735 (84.9%)	–	–	221 (89.8%)
No	75 (8.7%)	–	–	23 (9.4%)
Race				
American Indian or Alaska Native	36 (4.2%)	0 (0%)	0 (0%)	16 (6.5%)
Asian	31 (3.6%)	0 (0%)	0 (0%)	2 (0.8%)
Black/African American	633 (73.1%)	400 (100%)	0 (0%)	181 (73.6%)
Native Hawaiian or other Pacific Islander	1 (0.1%)	0 (0%)	0 (0%)	4 (1.6%)
White/Caucasian	30 (3.5%)	0 (0%)	298 (100%)	17 (6.9%)
Multi-racial	65 (7.5%)	0 (0%)	0 (0%)	24 (9.8%)
Other	21 (2.4%)	0 (0%)	0 (0%)	7 (2.9%)
Ethnicity				

	Manhood 2.0 (n = 866 boys)	Black ^b (n = 400 boys)	White ^b (n = 298 boys)	Sisterhood 2.0 ^c (n = 246 girls)
Hispanic	53 (6.1%)	-	-	12 (4.9%)
Non-Hispanic	736 (85.0%)	-	-	199 (80.9%)
Gender				
Male	866 (100%)	400 (100%)	298 (100%)	0 (0%)
Female	0 (0%)	0 (0%)	0 (0%)	246 (100%)

^aCalculated among those who are currently in school (n = 735 for Manhood 2.0; n = 221 for Sisterhood 2.0)

^bMissing data among Black and white columns due to differences in data collection methods of those variables between samples; sample was derived by combining Black and white participants in Grades 8-9 from Coaching Boys into Men Middle School and Manhood 2.0

^cNumbers add up to more than 100% given that participants were able to select all that applied

Table 2

Exploratory and confirmatory factor analyses among manhood 2.0 participants

Item	Exploratory factor analysis (n = 393)			Confirmatory factor analysis (n = 429)		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
1. A guy takes responsibility for his actions	0.0607	0.6284*	- 0.1485	-	0.732*	-
2. A guy never needs to hit another guy to get respect	- 0.0103	0.5595*	0.0098	-	0.425*	-
3. A girl wearing revealing clothing deserves to have comments made about her ^a	0.6432*	- 0.0155	- 0.0471	0.555*	-	-
4. It bothers me when a guy acts like a girl ^a	0.1644	- 0.0211	0.6078*	-	-	0.868*
5. Guys should sleep with as many girls as possible ^a	0.4911*	0.1102	0.1486	0.621*	-	-
6. If a guy tells people his worries, he will look weak ^a	0.6069*	0.0896	0.0615	0.654*	-	-
7. In a good dating relationship, the guy gets his way most of the time ^a	0.5750*	- 0.0279	0.1399	0.652*	-	-
8. Guys should only have sex with girls ^a	0.0722	- 0.1830	0.6702*	-	-	0.675*
9. I can respect a guy who backs down from a fight	0.0766	0.6551*	0.0208	-	0.486*	-
10. I would be friends with a guy who is gay	- 0.1490	0.4582*	0.5717*	N/A	N/A	N/A
11. A guy should share in household chores	- 0.0333	0.5819*	0.0563	-	0.544*	-
12. If a girl is raped it is often because she did not say no clearly enough ^a	0.5783*	- 0.0230	- 0.0722	0.516*	-	-
13. Guys put women and children first	0.0337	0.5038*	- 0.1852	-	0.563*	-

* Factor loading > 0.3

^a Reverse-coded items

Table 3

Confirmatory factor analyses goodness-of-fit statistics

Model	χ^2	df	CFI	TLI	RMSEA		SRMR
					Value	90% CI	
Manhood 2.0							
3-Factor ^a	179.286	51	0.890	0.858	0.077	0.065–0.089	0.052
3-Factor ^b	133.300	41	0.913	0.883	0.072	0.059–0.086	0.047
Black							
3-Factor ^a	90.664	51	0.961	0.949	0.044	0.029–0.059	0.038
3-Factor ^b	62.133	41	0.977	0.970	0.036	0.015–0.053	0.032
White							
3-Factor ^a	168.719	51	0.905	0.877	0.088	0.072–0.103	0.057
3-Factor ^b	132.360	41	0.924	0.899	0.087	0.070–0.103	0.051
Sisterhood 2.0							
3-Factor ^a	139.435	51	0.886	0.052	0.085	0.068–0.102	0.064
3-Factor ^b	81.567	41	0.944	0.924	0.064	0.044–0.084	0.050

^aItem 10 removed due to cross-loading in exploratory factor analysis (EFA)^bItem 10 removed due to cross-loading in EFA and Item 13 removed due to poor factor loading in confirmatory factor analysis

Table 4

Percent agreement with gender norms by race and gender

Items	Race			Gender	
	Black (n = 400)	White (n = 298)	Manhood 2.0 (n = 866)	Sisterhood 2.0 (n = 246)	
Factor 1—emotional and sexual stereotypes					
A girl wearing revealing clothing deserves to have comments made about her ^a	13.5%*	8.4%*	15.6%	11.8%	
Guys should sleep with as many girls as possible ^a	10.3%	7.1%	12.5%*	6.5%*	
If a guy tells people his worries, he will look weak ^a	8.8%	9.7%	13.1%*	6.1%*	
In a good dating relationship, the guy gets his way most of the time ^a	9.5%*	4.7%*	12.7%	9.8%	
If a girl is raped it is often because she did not say no clearly enough ^a	13.5%*	8.4%*	13.6%	12.2%	
Factor 2—moral code					
A guy takes responsibility for his actions ^b	80.5%*	89.3%*	77.9%*	56.5%*	
A guy never needs to hit another guy to get respect ^b	57.0%*	70.1%*	50.2%	51.6%	
I can respect a guy who backs down from a fight ^b	55.0%*	72.2%*	49.4%	52.9%	
A guy should share in household chores ^b	56.8%*	74.8%*	52.4%*	65.5%*	
Factor 3—heteronormativity					
It bothers me when a guy acts like a girl ^a	46.5%*	34.9%*	49.5%*	20.3%*	
Guys should only have sex with girls ^a	62.0%*	48.0%*	63.5%*	28.1%*	
Excluded items					
I would be friends with a guy who is gay ^b	23.3%*	46.0%*	21.7%*	76.0%*	
Guys put women and children first ^b	64.8%*	72.5%*	60.7%*	48.4%*	

^aNegatively worded questions, % agreement indicates more gender inequity

^bPositively worded questions, % agreement indicates more gender equity

* = p < 0.05; Black adolescent boys compared to white adolescent boys (Grades 8–9) using a combined sample from Coaching Boys into Men Middle School and Manhood 2.0; Manhood 2.0 (boys, 13–19 years old) compared to Sisterhood 2.0 (girls, 13–19 years old)

Table 5

Gender equitable attitudes and sexual health outcomes among manhood 2.0 participants

Independent variable: gender equitable attitudes	Total Mean Score	Factor 1 Mean Score	Factor 2 Mean Score	Factor 3 Mean Score
Among all Manhood 2.0 participants (n = 866)				
Lifetime adolescent relationship abuse perpetration ^a	0.46 (0.29–0.75) *	0.67 (0.49–0.92) *	0.77 (0.58–1.01)	0.86 (0.69–1.06)
Condom negotiation self-efficacy ^b	$\beta=0.42$ (0.34–0.51) *	$\beta=0.21$ (0.14–0.28) *	$\beta=0.29$ (0.23–0.34) *	$\beta=-0.02$ (-0.06–0.03)
Pornography use ^a	0.65 (0.49–0.86) *	0.71 (0.57–0.89) *	1.02 (0.85–1.22)	0.83 (0.73–0.94) *
Among those who reported having vaginal/anal sex in the past 3 months (n = 263)				
Past 3-month frequency of condom use ^a	1.06 (0.55–2.04)	1.06 (0.67–1.70)	1.26 (0.81–1.96)	0.82 (0.61–1.09)
Past 3-month frequency of condom use discussions with partner ^a	1.07 (0.64–1.80)	1.07 (0.74–1.56)	0.98 (0.68–1.40)	1.04 (0.82–1.32)

^aMixed-effects logistic regression adjusting for neighborhood clustering; mean gender equitable attitudes score (independent variable); adjusted odds ratios reported with 95% CI

^bMixed-effects linear regression adjusting for neighborhood clustering; mean gender equitable attitudes score (independent variable); beta-coefficients reported with 95% confidence intervals (CI)

* = p < 0.05