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EVALUATING THE FACTOR STRUCTURE AND CONSTRUCT VALIDITY OF THE INTENSIONS HEALTH-RELATED MASCULINE VALUES SCALE: IS IT REALLY A MEASURE OF HEALTH-RELATED MASCULINE VALUES?

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ABSTRACT

The Intensions Health-Related Masculine Values Scale (IHRMVS) was recently developed to address the growing interest in examining the associations between strengths-based masculinity and men's health. However, while the original development and validation work was promising, replication and extension of several aspects of the scale's validity should be undertaken before the scale can be adopted for widespread use. Using a large sample of British men, aged 18-80 years, exploratory factor analyses revealed a single factor for both the original age grouping (18-29 years, n = 166) and an older group of men (≥ 30 years, n = 404), failing to replicate the two-factor structure proposed in the parent study. Additionally, correlations between scores on the IHRMVS and scores on a measure of traditional male role norms were mostly non-significant or very small. Similar findings emerged in our analyses of the associations between scores on the IHRMVS and indices of depression, anxiety, help-seeking attitudes, sleep disturbance, and smoking. These findings draw into question the utility of the IHRMVS as a measure of positive, health-related masculine values.

Keywords: *masculinity; men's health; values; psychometrics; validity*

Over the years, there has been increasing interest in studying the ways in which masculinity influences men's health, particularly in terms of better understanding men's health disparities.[1] What seems like a fairly straightforward question, however, is complicated by the fact that masculinity is not a simple construct to assess.[2] That is, because masculinity is typically defined as a multi-faceted social construct that varies according to the social context,[3] it is a construct that is not adequately measured on simple unidimensional Likert-type scales. Rather, researchers have developed various indirect ways to assess masculinity, such as measures of the extent to which people have internalized gender-typed personality traits,[4–6] engage in gender-typed behaviors,[7,8] value masculine role norms,[9–11] and experience masculinity-related stress or conflict.[12,13] These constructs, however, are only modestly correlated and are not always associated with the same health outcomes.[14–16]

When researchers use these masculinity measures to examine the relationship between the male gender role and men's health, many of their studies tend to focus on the negative relationships between the two (i.e., how negative elements of masculinity are

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associated with poorer health outcomes).[17] There are two potential reasons for this. First, because psychology is a helping discipline, many researchers would like to identify potential barriers to positive health and well-being so that appropriate interventions can be developed and implemented. Masculinity is often perceived as one of those barriers (e.g., the Gender Role Strain paradigm[18]). Secondly, because masculinity is often thought of in this way, most of the measures developed to assess its many aspects have tended to emphasize undesirable attitudinal or behavioral facets, such as fear of showing weakness and avoiding things that are stereotypically feminine. Examples of measures that deviate from this typical approach include the masculinity subscales from personality measures, such as the Bem Sex Role Inventory and Personal Attributes Questionnaire, which focus on the socially-desirable traits of instrumentality and agency, respectively, and have been shown to be associated with positive outcomes.[5,6]

In more recent years, however, a growing discussion has emerged, urging researchers to balance their focus on both the positive and negative relationships between masculinity and health.[1] This is based on the suggestion that masculinity is contextual, rather than being nominally "good" or "bad" in terms of men's health outcomes[3] and, in turn, has led some researchers to study the associations between traditional masculinity measures and more positive health outcomes.[19] Doing so, however, may be less than ideal because traditional masculinity measures may be less adept at capturing the fluidity and complexity of contemporary masculinities.[3] Instead, some scholars have suggested that we need to develop newer tools based around a strengths-based approach to masculinity.[20] The belief is that, by conceptualizing and measuring masculinity from a more positive stance, researchers will be able to focus more thoroughly on the ways in which masculinity improves men's lives.

This latter notion was recently taken up by Oliffe and colleagues[21] as part of a study of socially-positive masculine values. Based on interviews with a sample of 30 Western Canadian men between the ages of 15 and 29 years, they identified five positive overarching, health-related masculine values: selflessness, openness, well-being, strength, and autonomy. Using their qualitative findings as a basis for item-generation, Oliffe and colleagues[21] created a 15-item self-report questionnaire by producing three items per value. They then recruited a sample of similarly-aged, English-speaking Canadian men (n = 600) from the same geographic region, and had them complete their novel masculine values questionnaire. When they examined the factorial validity of their new measure using principal components analysis (PCA), two intercorrelated (r = .63) factors emerged: a focus on being Open and Selfless (six items; sample item: "A man should be open to new experiences") and a focus on being Healthy and Autonomous (six items; sample item: "A man should be independent"). These 12 items form the Intensions Health-Related Masculine Values Scale (IHRMVS). This scale is unique for its focus on health-related masculine values, as opposed to role norms, behaviors, or personality traits, and has the potential to add to the scientific discourse on the associations between masculinity and men's health.

Before it can be used more broadly, however, the properties of the measure require replication, extension, and further validation. With regard to replication, there are two major issues that should be addressed. First, the IHRMVS was created and structurally validated based on samples of geographically-restricted young men. Thus, an important question to ask is whether the same factor structure would emerge in a similarly aged sample from other geographic regions,[2,22] including regions with similar cultural heritages and comparable lived experiences (e.g., the United Kingdom). The second issue around replication concerns the data analytic strategy employed by Oliffe and colleagues.[21] Specifically, they used PCA to identify the two-factor structure of the IHRMVS. However, PCA may not be an appropriate statistical method for first-pass examination of the dimensionality of scores on a measure. PCA reduces the number of observed variables to a smaller number of "principal components" that accounts for most of the variance of the observed variables and tends to underestimate the strength of correlations between factors. Most scholars recommend first-pass examination of score dimensionality using exploratory factor analysis (EFA),[23–25] which identifies the latent constructs and the underlying factor structure of a set of variables.

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Once replication is addressed, it is important to examine the extension of the original research findings to new populations. That is, it remains an open question whether the two-factor structure that emerged from Oliffe and colleagues[21] original study will be replicable (using EFA) in a more age-diverse sample or whether their findings are limited by the sample's restricted age range.[22]

Also missing from the development and validation study was support for the concurrent and convergent validity of IHRMVS scores. Concurrent validity measures the extent to which scores on a novel scale are significantly correlated with scores on similar scales. Given that most of the previous research focusing on the relationships between masculinity and men's health research has assessed masculinity using measures of traditional male role norms (e.g., Conformity to Masculine Norms Inventory[10]), it would be important to examine associations between IHRMVS scores and at least one measure from this older construct. Since this scale was positioned to counter the more negative aspects of current masculinity measurement, it makes sense to expect a negative correlation between scores on the two types of measures. However, as there is no theory upon which to make any *a priori* assumptions about this aspect of concurrent validity, it is an empirical question as to both the direction and the magnitude of any expected correlations between this measure of positive health-related masculine values and a measure of traditional male role norms.

There are similar issues in regard to testing the convergent validity of IHRMVS scores. Since Oliffe and colleagues[21] position the IHRMVS as a health-related measure of positive masculine values, it is logical to assume that the aspects of masculinity included in the questionnaire should be protective of men's health. However, as in our discussion of concurrent validity, there is no theory underpinning our expectations for how this relationship might work. Using smoking as an example, research shows that men smoke more than women,[26,27] Moreover, there is literature suggesting men view their smoking behavior as an expression of masculinity.[28] The question then arises: would scores on the IHRMVS correlate with smoking behavior and, importantly, would the association occur in a protective manner? Extending this notion leads to the question of whether scores on the IHRMVS would be associated with healthier levels of other health-related factors that are known to increase men's morbidity and premature mortality (e.g., sleep disturbance, delays in mental health treatment seeking[29–31]), as well as specific health concerns faced by men (e.g., depression, anxiety[32–34]).

Thus, the purpose of the present paper is to provide a replication, extension, and further assessment of the factorial and construct validity of IHRMVS scores. This study has the following aims: (1) to assess whether the original, two-factor structure of IHRMVS scores can be replicated in a sample of young (< 30 years of age), British men; (2) to determine whether the original, two-factor structure can be extended to an older (≥ 30 years of age) sample of British men; (3) to examine the concurrent validity of IHRMVS scores by assessing relationships with scores on a measure of traditional male role norms; and (4) to consider the convergent validity IHRMVS scores by examining associations with indices of men's poorer physical health and well-being (i.e., smoking, sleep disturbance, depression and anxiety symptoms, mental health help-seeking). For the assessment of concurrent validity, we expected the correlations to be negative, whereas for the tests of convergent validity, we expected to show associations in the direction of positive (as opposed to negative) health. Evidence of both concurrent and convergent validity would also ideally be demonstrated through associations of moderate effect size and consistency across both participant age groups.

METHOD

Participants

The participants of this study were 570 men, all of whom were citizens of the United Kingdom. They ranged in age from 18 to 80 years (M = 38.50, SD = 12.87) and the majority self-reported as being heterosexual (90.4%; bisexual = 4.2%; gay = 3.5%; asexual = 1.1%; other = 0.9%). In terms of marital status, 33.2% were single, 30.3% were partnered but not married, 35.8% were married, and the remainder had another status. In terms of educational attainment, 14.9% had completed minimum secondary schooling, 21.9% had an Advanced-Level (A-Level) qualification, 41.2% had an undergraduate degree,

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16.0% had a postgraduate degree, 1.8% were still in full-time higher education, and 4.2% had another qualification. The majority self-reported as being of British White ancestry (88.9%), while 5.6% were of Asian or British Asian ancestry, and the remainder were of another ethnic group, which is broadly consistent with the ancestry proportions from the latest United Kingdom census[35].

MEASURES

Masculine Values

The parent version of the IHRMVS consisted of 15 items, with three items assessing each of five positive health-related masculine values, namely selflessness, openness, well-being, strength, and autonomy.[21] Although the parent study reduced the number of items from 15 to 12, we suggest that the use of PCA as a data reduction strategy may have underestimated the strength of correlations between factors. Thus, participants in the present study responded to all 15 original IHRMVS items. All items were rated on a 5-point scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*), and scores on all items were reverse-coded prior to analyses for comparability with previous work. Higher scores are indicative of a greater degree of positive, health-related masculine values. The full list of items is presented in the Appendix.

Traditional Masculine Norms

Participants were asked to complete the 46-item short form[36] of the Conformity to Masculine Norms Inventory (CMNI).[10] The CMNI-46 is a measure of conformity to masculine norms along nine dimensions, namely Winning (six items; sample item: "In general, I will do anything to win"), Emotional Control (six items; sample item: "I never share my feelings"), Risk-Taking (five items; sample item: "I enjoy taking risks"), Violence (six items; sample item: "Sometimes, violent action is necessary), Power Over Women (four items; sample item: "In general, I control the women in my life"), Playboy (four items; sample item: "If I could, I would frequently change sexual partners"), Self-Reliance (five items; sample item: "I hate asking for help"), Primacy of Work (four items; sample item: "My work is the most important part of my life"), and Heterosexual Self-Presentation (six items; sample item: "I would be furious if someone thought I was gay"). All items were rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Eighteen items were reverse-coded and subscale scores were computed as the mean of items associated with each factor, so that higher scores reflect greater conformity to masculine norms. Parent and Moradi[36] reported that scores on the CMNI-46 have adequate internal consistencies, acceptable psychometric properties, and good construct and factorial validity. In the present study, the omega (ω) estimates of internal consistency for the CMNI-46 subscale scores were as follows: Winning = .87 (95% CI = .83, .91), Emotional Control = .82 (95% CI = .79, .85), Risk-Taking = .88 (95% CI = .84, .82), Violence = .83 (95% CI = .79, .87), Power Over Women = .85 (95% CI = .82, .88), Playboy = .88 (95% CI = .85, .91), Self-Reliance = .90 (95% CI = .87, .93), Primacy of Work = .83 (95% CI = .79, .87), and Heterosexual Self-Presentation = .82 (95% CI = .78, .86) .

Seeking Professional Help

Participants were asked to complete the Short Form of the Attitudes Toward Seeking Professional Psychological Help (ATSPPH) scale.[37] This is a 10-item measure that assesses an individual's openness to seeking professional help for mental ill-health (sample item: "I might want to have psychological counseling in the future"). All items were rated on a 4-point scale, ranging from 1 (*disagree*) to 4 (*agree*). Five items were reverse-coded prior to analyses and an overall score was computed as the mean of all items. Higher scores reflect more positive attitudes toward seeking professional psychological help. Whittlesey[38] reported that scores on the short form of the ATSPPH have adequate psychometric properties. In the present study, ω for the ATSPPH was .82 (95% CI = .79, .85).

Depression Risk

Participants completed the Male Depression Risk Scale-22 (MDRS-22), a 22-item measure that assesses externalizing depression symptom domains in men.[39] Exploratory and confirmatory factor analytic work has shown that scores on the MDRS-22 reduce to six dimensions,[39] namely Emotion Suppression (four items; sample item: "I have bottled up my feelings"),

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Drug Use (three items; sample item: "I used drugs to cope"), Alcohol Use (four items; sample item: "I needed to have easy access to alcohol"), Anger and Aggression (four items; sample item: "I overreacted to situations with aggressive behaviors"), Somatic Symptoms (four items; sample item: "I had regular headaches"), and Risk-Taking (three items; sample item: "I took unnecessary risks"). Items were rated on an 8-point scale (0 = *not at all*, 7 = *almost always*) relative to the preceding month and subscales were scored so that higher scores reflect greater depression symptomatology. Previous work has shown that scores on the MDRS-22 have adequate internal consistencies, good test-retest reliability, and acceptable construct validity.[39,40] In the present study, ω for the MDRS-22 subscale scores were as follows: Emotional Suppression = .86 (95% CI = .83, .89), Drug Use = .84 (95% CI = .81, .87), Alcohol Use = .86 (95% CI = .83, .89), Anger and Aggression = .88 (95% CI = .85, .91), Somatic Symptoms = .89 (95% CI = .86, .92), and Risk-Taking = .87 (95% CI = .84, .90).

Anxiety

The survey package included the Generalized Anxiety Disorder-7 scale (GAD-7), a 7-item measure assessing severity of symptoms of generalized anxiety disorder.[41] Participants were asked to report how frequently they had experienced these symptoms (sample item: "Feeling anxious, nervous, or on edge") over the preceding two weeks. Items were rated on a 4-point scale (0 = *not at all*, 3 = *nearly every day*) and an overall score was computed as the mean of all items. Higher scores on this scale reflect greater symptomatology of generalized anxiety disorder. Previous work has shown scores on the GAD-7 have adequate internal consistency, as well as good criterion, construct, and factorial validity.[41] In the present study, ω for GAD-7 scores was .92 (95% CI = .89, .95).

Sleep Disturbance

To measure sleep disturbance, we used the Sleep Disturbance component of the Pittsburgh Sleep Quality Index (PSQI).[42] This is a 9-item measure of difficulty sleeping in the preceding month (sample item = feeling too hot), with items rated on a 4-point scale (0 = *Not during the past month*, 3 = *Three or more times a week*). In the present study, an overall sleep disturbance score was computed as the mean of all 9 items. Buysse and colleagues[42] reported that scores the PSQI had adequate internal consistency, construct validity, test-retest reliability over 1 month, and diagnostic sensitivity. In the present study, ω for the Sleep Disturbance component was .77 (95% CI = .74, .80).

Smoking Status

A single item assessment of smoking status was taken from the Canadian Tobacco Use Monitoring Survey.[43] This item asks to self-report their smoking status as a regular smoker, occasional smoker, ex-smoker, or non-smoker. Scores were recoded such that being a regular or occasional smoker was categorized as being unhealthy (0), while the other two options were categorized as healthy (1).

Demographics

Participants were asked to provide their demographic details consisting of sexual orientation, relationship status, highest educational attainment, age, and ethnicity (based on higher-order categories used in the latest United Kingdom census).

PROCEDURES

Ethics approval was obtained from the relevant departmental ethics committee (approval number: EHS17-015). Data were collected between July 23-27, 2018, via the Prolific Academic website. This is a crowdsourcing Internet marketplace that allows individuals to complete academic surveys for monetary compensation. Crowdsourcing Internet marketplaces have been found to produce reliable and valid data on differential constructs as compared with offline samples.[44] The project was advertised as a study on "men's health and values" and included an estimated duration of 15 minutes (average completion time = 12.32 min). Participation was limited to United Kingdom citizens of adult age and those with self-reported fluency in English, so as to achieve a relatively homogeneous sample in terms of cultural and national identity. In addition, participation was limited to those who had an Academic Prolific score of ≥ 96. Academic Prolific ID codes and IP addresses were examined to ensure that no participant took the survey more than once. The survey also included an

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attention detection item, which no participant failed, and total completion times were manually checked to ensure that all participants completed the survey in a reasonable amount of time. After providing digital informed consent, participants were directed to the scales described above, which were presented in counter-balanced order in Qualtrics. Demographic items were always completed last. The questionnaire was anonymous and, in exchange for completion, participants were paid £1.25, which is commensurate with Academic Prolific recommendations based on questionnaire completion times. All participants received debriefing information at the end of the survey.

ANALYTIC STRATEGY

There were no missing data in the present study, possibly because we alerted participants to missing entries. To examine the factor structure of IHRMVS scores, we first split our sample between those aged 18-29 years (n = 166; age M = 24.14, SD = 3.23, Mdn = 24.00) and those aged ≥ 30 years (n = 404; age M = 44.41, SD = 10.46, Mdn = 42.00). This allowed us to examine the factor structure of IHRMVS scores in a sample that was similar in terms of age to the one recruited by Oliffe and colleagues[21] and helped to minimize sample bias.[24] It also allowed us to determine the underlying scale structure in an older demographic. The two groups differed significantly in terms of age, $t(568) = 24.71$, $p < .001$, $d = 2.07$. In both subsamples separately, we conducted principal-axis EFAs in IBM SPSS Statistics v. 24. Sample sizes in both subgroups met recommendations[25] for EFA based on item communalities, as well as conservative guidelines based on participant-to-item ratios.[45] In addition, data from both subsamples met assumptions for EFA based on item distributions, average item correlations, and item-total correlations.[46]

To determine whether our data were factorable, we computed the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy[47] (which should ideally be ≥ .80) and Bartlett's test of sphericity (which should be significant). For the EFAs, a direct oblimin rotation was used, as we expected inter-correlated factors based on the findings of Oliffe and colleagues.[21] Factor retention was based on the results of parallel analysis,[48,49] which is a more accurate method of determining the number of factors to retain compared to the minimum eigenvalue (λ) greater than one criterion and examination of the Scree plot.[50] Parallel analysis involves the construction of correlation matrices of random variables based on the same sample size and number of variables in the real dataset. Factors in the real dataset are only retained if their λ are greater than the λ from the random data; factors in the real dataset with λ less than or equal to the parallel average random λ are considered to be due to sampling error and should be discarded. Item retention was based on the recommendation[51] that items with fair loadings or better (i.e., ≥ .33) should be retained and items that cross-load with values ≥ .33 on at least two factors should be discarded.

To examine the extent to which the factor structures were similar across age groups, we computed Tucker's congruence coefficient.[52] Simulations by Lorenzo-Seva and ten Berge[53] suggested that values between .85 and .94 correspond to fair similarity across groups, whereas values ≥ .95 suggest that factor structures can be considered equal across groups. In addition, in both subsamples, internal consistency was assessed using ω, with values greater than .70 reflecting adequate internal reliability.[54] Omega was preferred over Cronbach's alpha because the latter is often a negatively-biased estimate of reliability when using Likert-type scales.[55] Finally, to assess concurrent and convergent validity, we examined bivariate correlations between IHRMVS scores and scores on all other continuous measures included in the study. For smoking, we examined group differences in IHRMVS scores using t-tests.

RESULTS

Replication and Extension: Exploratory Factor Analyses

EFA with principal-axis factoring was conducted on the younger subsample (n = 166). Both the KMO (.90) and Bartlett's test of sphericity, $\chi^2(105) = 1350.49$, $p < .001$, indicated that the data had adequate factorability. The results of the EFA indicated that three factors had λ > 1.0, explaining 46.3%, 11.7%, and 7.4% of the variance, respectively. However, the parallel analysis indicated that only one factor should be retained: only the first λ from the random data (4.67)

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was smaller than the real data λ (6.94), whereas the second and third λ from the random data (3.22 and 1.78) were larger than the second and third λ (1.76 and 1.10) from the real data. Factor loadings for the first factor are reported in Table 1 and, as can be seen, only one item (Item 1) was excluded based on its low factor loading. Internal consistency, as measured using ω, for the 14-item, overall score in this subsample was .90 (95% CI = .87, .93).

A second EFA with principal-axis factoring was conducted with data from the older subsample (n = 404). Both the KMO (.88) and Bartlett's test of sphericity, $\chi^2(105) = 3011.18$, $p < .001$, indicated that the data had adequate factorability. As with the earlier subsample, the results of the EFA indicated that three factors had λ > 1.0, explaining 40.8%, 14.9%, and 7.4% of the variance, respectively. As before, the results of the parallel analysis indicated that only one factor should be retained: only the first λ from the random data (4.15) was smaller than the real data λ (6.12), whereas the second and third λ from the random data (3.56 and 1.92) were larger than the second and third λ (2.23 and 1.11) from the real data. Factor loadings for the first factor are reported in Table 1. In this older subsample, two items (Items 1 and 2) were excluded based on their low factor loadings. Internal consistency, as measured using ω, for the 13-item, overall score in this subsample was .87 (95% CI = .84, .90).

Next, we compared the emergent factor structures of the IHRMVS across the two age-based subsamples. As expected, based on the elimination of Item 1 from

TABLE 1 Factor Loadings from the Results of the Exploratory Factor Analyses with Younger (n = 166) and Older Participants (n = 404)

Item	Younger Participants		Older Participants		Item Mean Comparisons		
	Factor loading	*M* (*SD*)	**Factor loading**	*M* (*SD*)	*t*	*p*	*d*
1	.21	4.52 (0.69)	.23	4.48 (0.61)	0.61	.545	0.05
2	**.38**	4.47 (0.67)	.23	4.48 (0.59)	0.23	.820	0.02
3	**.84**	4.07 (0.85)	**.78**	4.11 (0.70)	0.69	.488	0.06
4	**.71**	4.14 (0.79)	**.70**	4.06 (0.71)	1.20	.229	0.10
5	**.46**	3.94 (0.77)	**.50**	3.94 (0.83)	0.01	.991	0.00
6	**.41**	4.31 (0.74)	**.40**	4.40 (0.64)	1.47	.143	0.12
7	**.51**	4.20 (0.77)	**.36**	4.28 (0.63)	1.29	.197	0.11
8	**.87**	3.93 (0.84)	**.80**	3.99 (0.71)	0.78	.437	0.07
9	**.65**	3.97 (0.87)	**.63**	4.03 (0.73)	0.88	.381	0.07
10	**.40**	3.90 (0.80)	**.35**	4.03 (0.76)	1.83	.068	0.15
11	**.35**	3.85 (0.86)	**.54**	3.81 (0.82)	0.52	.602	0.04
12	**.43**	3.00 (0.87)	**.42**	4.05 (0.73)	0.77	.445	0.06
13	**.76**	3.83 (0.84)	**.76**	3.85 (0.72)	0.34	.733	0.03
14	**.76**	3.49 (0.84)	**.68**	3.45 (0.87)	0.43	.669	0.04
15	**.43**	3.81 (0.85)	**.37**	3.88 (0.77)	0.98	.328	0.08

Note. Items in bold were retained in each subsample.

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the younger subsample and Items 1 and 2 from the older subsample, Tucker's congruence coefficient (.69) suggested that the factor structures of the two subsamples should not be considered equal. Finally, for each item on the IHRMVS, we computed a series of Bonferroni-corrected ($\alpha = .05/15 = .003$) independent samples *t*-tests and Cohen's *d* effect size statistics on the difference between the means for the younger and older age groups. There were no significant mean differences between the two groups on any items (see Table 1).

Demographics Concurrent and Convergent Validation

To test for concurrent and convergent validity, we computed bivariate correlations between the one-dimensional IHRMVS scores (computed separately with the 14 relevant items for the younger age group and the 13 relevant items for the older group) and scores from all other measures (except smoking, which used *t*-tests). With regard to our assessment of concurrent validity, in the younger group, responses to the IHRMVS were significantly and negatively correlated with scores on only two CMNI-46 subscales, namely Risk-Taking and Disdain for Homosexuals (see Table 2). However, caution should be used when interpreting those correlations because the strength of the associations was weak ($\leq .18$). In the older group, IHRMVS scores were significantly and negatively correlated with scores on two different CMNI-46 subscales (Emotional Control and Self Reliance) and positively correlated with scores on the CMNI Winning and Risk-Taking subscales (see Table 2). As with the younger sample, the correlations were weak ($\leq .17$), so caution must be used when interpreting the findings. With regard to convergent validity, the IHRMVS scores were only weakly correlated with one of the health measures we used, the Alcohol Use subscale of the MDRS (see Table 2), and only for the older adults. All other associations failed to reach statistical significance, including those for smoking.

DISCUSSION

The goals of the present study were to provide a replication, extension, and an initial test of the concurrent and convergent validity of a new positive, health-related, masculine-values scale developed by Oliffe and colleagues.[21] In providing this comparison data, we utilized samples of similarly-aged and older men from the United Kingdom, who likely share a comparable cultural heritage to the men sampled by Oliffe and colleagues. However, our data failed both to replicate and extend the IHRMVS's original two-factor structure and were also indicative of poor concurrent and convergent validity. These findings bring into question the utility of the IHRMVS as a measure of positive, health-related masculine values.

With regard to our inability to replicate and extend the IHRMVS's original factor structure, two interesting differences between this and the parent study emerged: a different factor structure and different patterns of item loading, both compared to the parent study and across age two groups in the present study. Even though we both started out with the same 15 items, the PCA by Oliffe and colleagues[21] revealed two factors, with three items failing to load onto either factor (Items 9-11 from their Table 3). By contrast, in our EFA of data from a similarly-aged sample of British men, a single factor emerged, with only one item (Item 1) failing to load. Additionally, when we explored the factor structure of the IHRMVS in data from a sample of older British men, we found a one-dimensional factor structure, but with two items (Items 1 and 2) failing to load. It is important to note that the two items that did not load in our EFAs were not the same items that failed to load in the original PCA by Oliffe and colleagues[21].

We suggest there are two potential reasons for these discrepancies across studies. The first is based on the geographic location of the samples. The original study used a sample of young, English-speaking men from Western Canada, whereas the men in our replication (< 30 years old) and extension (≥ 30 years old) samples were English speakers from the United Kingdom. The fact that we were unable to both replicate and extend the original findings suggests that the positive, health-related, masculine values being assessed in the IHRMVS may be geographically dependent[22]. That is, despite sharing the same linguistic background and a similar cultural heritage, it is possible that lived experiences based on geography or social identity trajectories result

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TABLE 2 Bivariate Correlations between All Variables Included in the Present Study, Separated for Younger (n = 166; Upper Diagonal) and Older Participants (n = 404; Bottom Diagonal)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) IHRMVS-13/14		.04	-.02	.03	-.03	.17*	-.05	.06	.05	-.10	.05	.18*	-.01.	.01	-.04	-.04	-.01	-.05	-.03	.05
(2) ATSPPH	.10		.01	-.18*	-.18*	-.10	-.18*	-.34**	-.08	-.08	-.07	-.44**	-.09	.06	-.02	-.02	-.03	.06	-.03	.06
(3) Anxiety	-.02	-.06		-.03	-.01	-.20**	-.02	.16*	-.01	.17*	.07	.12	.45**	.37**	.45**	.60**	..51**	.40**	.66**	.18*
(4) CMNI-Winning	.13*	-.08	.04		.08	.15	.25**	.20**	.11	.07	.21**	.20**	.16*	-.09	.05	-.02	.11	.04	-.04	-.16*
(5) CMNI-EC	-.17*	-.39**	.14*	.03		-.03	.02	.02	-.02	.59**	.06	.25**	.34**	-.02	-.02	.09	.05	.22**	.05	.02
(6) CMNI-Risk Taking	.14*	.02	.04	.27**	-.07		.09	.28**	.19**	-.06	-.01	.14	.03	.18*	.29**	.05	.08	.16*	-.01	.02
(7) CMNI-Violence	.01	-.15*	.04	.17*	.19**	.22**		.22**	.07	.03	-.04	.20*	.01	.09	.18*	.04	.23**	.12	-.03	-.11
(8) CMNI-POW	.01	-.23**	.05	.32**	.08	.21**	.24**		.33**	.18*	.28**	.51**	.19*	.23**	.37**	.20*	.34**	.24**	.14	-.06
(9) CMNI-Playboy	-.03	-.16*	.14*	.21**	.19**	.21**	.21**	.22**		.15	.02	.13	.17*	.27**	.29**	.18*	.19*	.27**	.10	.03
(10) CMNI-Self Reliance	-.12*	-.37**	.35**	.06	.60**	.04	.07	.14*	.23**		.12	.20**	.40**	.10	.22**	.20*	.21**	.26**	.15	.02
(11) CMNI-PW	.08	-.08	.03	.25**	-.05	.19**	-.01	.27**	.08	.02		.15	.14	.07	.14	.16*	.22**	.09	.06	-.25**
(12) CMNI-DH	-.01	-.32**	.10*	.27**	.12*	.02	.14*	.46**	.04	.19*	.10*		.24**	.02	.22**	.08	.20**	.09	.16*	-.05
(13) MDRS-ES	-.04	-.26**	.56**	.12*	.38**	.15*	.20**	.11*	.23**	.52**	.01	.09		.43**	.42**	.47**	.43**	.66**	.35**	.12
(14) MDRS-Alcohol Use	-.10*	-.12*	.30**	.11*	.08	.14*	-.02	.17*	.23**	.17*	.12*	.10*	.34**		.61**	.50**	.39**	.73**	.28**	.14
(15) MDRS-Risk Taking	.02	-.11*	.42**	.15*	.13*	.33**	.17*	.18**	.31**	.28**	.08	.10*	.45**	.51**		.58**	.72**	.62**	.39**	.03
(16) MDRS-SS	.05	-.09	.55**	.18*	.06	.15*	.01	.16*	.20**	.27**	.09	.14*	.49**	.44**	.57**		.53**	.51**	.60**	.02
(17) MDRS-AA	.03	-.10*	.55**	.16*	.07	.22**	.17*	.17*	.25**	.26**	.03	.18*	.42**	.42**	.66**	.57**		.50**	.32**	.02
(18) MDRS-Drug Use	-.08	-.17*	.50**	.15*	.24**	.15*	.15*	.19**	.27**	.40**	.06	.14*	.74**	.72**	.57**	.52**	.50**		.32**	.17*
(19) Sleep disturbance	-.06	-.01	.57**	-.01	.10*	.04	.06	.07	.13*	.22**	-.06	.15*	.43**	.24**	.32**	.51**	.42**	.38**		.22**
(20) Age	-.08	-.07	-.09	-.06	.10*	-.15*	-.13*	.03	-.15*	.09	-.06	.19**	-.09	.01	-.18*	-.06	-.10*	-.13*	.15*	

Note. *$^*p < .05$, $^{**}p < .001$. IHRMVS = Intensions Health-Related Masculine Values Scale; ATSPPH = Attitudes Toward Seeking Professional Psychological Help; CMNI = Conformity to Masculine Norms Inventory; EC = Emotional Control; POW = Power Over Women; PW = Primacy of Work; DH = Disdain for Heterosexuals; MDRS = Male Depression Risk Scale; ES = Emotion Suppression; SS = Somatic Symptoms; AA = Anger and Aggression.*

in different understandings of the conceptual meaning of health-related masculine values. To take a simple example, the notion that men should have intellectual and emotional strength does not appear within conceptualizations of health-related masculine values among Canadian men, whereas it does figure for British men. To put it in other terms, it is likely that understandings of health-related masculine values vary across different groups of men. This could be problematic for cross-group, and especially cross-cultural, comparisons where multi-group factorial invariance is a requirement.

However, a second potential reason for the differences in factor structure and item retention is our use of EFA rather than PCA, as well as our strategy for determining factor retention. As we argued earlier, EFA is considered to be the most appropriate first pass analytic technic when exploring the factorial validity of new or amended latent variable measures.[24–25] While EFA and PCA can sometimes provide similar results, this is not always the case.[56] Thus, even though factor loadings reported by Oliffe and colleagues[21] looked like they presented a clear two-factor structure, this structure may not have emerged under different analytic techniques (e.g., using principal-axis EFA). Moreover, Oliffe and colleagues[21] relied on weaker approaches to factor retention (i.e., minimum eigen values < 1.0 and examination of the Scree plot), rather than on the current gold standard of parallel analysis,[49] or even Velicer's minimum average partial method.[57] The former, less robust approaches often result in more factors being retained (i.e., factor over-retention) than would be the case with, for example, parallel analysis. Still, it is possible that, even using an EFA with a parallel analysis, a two-factor model would have emerged from Oliffe and colleague's data.

The goal now is to tease apart the issue of geographic instability from the more technical aspects associated with data analytic best practices. To do this, we recommend researchers collect data from a new sample of young men (< 30 years old), in either of the previous locations (Western Canada or the United Kingdom) or a new one, and conduct a series of exploratory structural equation models (ESEMs)[58] comparing the hypothesized 15-item five-factor model from the parent study, the final 12-item two-factor model by Oliffe and colleagues,[21] our 14-item one-factor model, and our 13-item one-factor model. ESEM is the ideal statistical approach for this context because it allows for a more robust assessment of latent variable dimensionality than confirmatory factor analysis.[58] In turn, this would allow scholars to arrive at a better understanding of the dimensionality of health-related masculine values both within and across samples of men from different geographic regions. This is particularly important as the content of the IHRMVS was derived from qualitative interviews with young Canadian men, and may not generalize to men from other cultural, geographic, or demographic contexts. In future work, it will also be important to address the issue of measurement invariance across groups, particularly as our preliminary evidence (based on Tucker's congruence coefficient) indicates that the factor structure of IHRMVS is not likely equal across these two British age groups.

The lack of concurrent validity, based on the measures used here, is not wholly unexpected. While previous masculinity measures have assessed positive and negative masculine personality traits and behaviors, a wide range of traditional male role norms, and stress and conflict related to traditional masculinity, the IHRMVS is very specifically targeting positive, health-related masculine values. Additionally, even though past research has suggested there is some low to moderate overlap amongst these pre-existing measures,[10,13,14] it is not clear if there is a theoretical or psychometric rationale for any significant overlap between the IHRMVS and these older questionnaires. Moreover, it is uncertain whether the IHRMVS is actually measuring masculine values. Even though Oliffe and colleagues[21] developed their measure based on interviews with young men, it was not always obvious that their respondents were specifically linking the questions and their responses to masculinity, rather than a sense of general health and well-being that is important for all genders. Furthermore, even though items on the IHRMVS are directly focused on men, they appear to be gender neutral. There has been no research to date linking these values to men more than women, to stereotypes of men (*vs*. women), or directly to perceived masculinity. Thus, we suggest that the relative lack of consistent, significant or meaningfully high correlations between scores on

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the IHRMVS and the CMNI-46 subscales reflects the fact that the former is more likely a measure of non-gender-specific values. This, however, is an empirical question and we encourage future researchers to explore our interpretation.

That the IHRMVS is not a measure of masculine values may also help to explain the lack of significant associations between its scores and our indices of health and well-being. The only significant correlation was a very small, negative relationship with the Alcohol Use subscale of the MDRS, but only for the older men. The relationship between alcohol use and other masculinity measures has been studied for a long time,[15,17] and there has developed a decent understanding that masculinity is a risk factor for alcohol use. Thus, the negative correlation between these two variables is suggestive of a protective relationship. This is important, especially given the IHRMVS's purpose. However, the association was so small as to be meaningless in terms of practical value, and was not consistent across the two age groups.

It is important to note that we selected a range of physical and mental health risks to provide as robust an assessment of the IHRMVS's convergent validity as possible, within the confines of our survey length limitations. On the physical health side, smoking and sleep disturbance are two risks for morbidity and premature mortality that men experience at higher than optimal levels.[26,27] Similarly, depression and generalized anxiety are the two mental health disorders most commonly experienced by men.[26] Finally, we included a measure of mental health help-seeking behavior because research has shown that men are less likely to seek mental health treatment, and that various aspects of masculinity are associated with that reluctance.[29,31,59] That the IHRMVS was not meaningfully correlated with any of these measures suggests either that this positive, health-related masculine values scale is not sensitive to men's health risks or it is sensitive to some (as yet unknown) men's health risks, but not all of them. Researchers examining the associations between values and behaviors suggest that the associations can be strong when values are linked to the appropriate behavior, but that the value-behavior relationship can also be mitigated by third party variables.[60] Until there is proper theoretical guidance to create testable expectations about what a scale like the IHRMVS is expected to tell researchers, practitioners, and those engaged in health promotion activities, our ability to determine which health indices the IHRMVS are correlated with in a meaningful manner may be a function of brute force testing.

While our findings suggest that the IHRMVS may not yet be ready for general research use in the men's health and masculinity context, it is important to address the strengths and weaknesses of the current study. The many strengths of this study include the use of a sample with a wide range in age, education, and marital status that helps increase its generalizability. In addition, we used current best practices in the structural validation of latent variable measures, including a built-in replication/extension, as well as validated and appropriate measures of concurrent and convergent validity. The main weaknesses, as is always the case in self-report research, tend to focus on biased responding (e.g., social desirability bias). While we found no evidence of inappropriate responding (e.g., non-differential responding, exceptionally fast completion times) in our data, future researchers should examine the associations between the IHRMVS and social desirability bias.

These issues aside, our results raise important questions about the dimensionality of scores on the IHRMVS across different groups of men and, perhaps more important, about what exactly the IHRMVS is measuring. Our conclusion, based on the evidence available to date, is that the IHRMVS may not in fact be measuring positive, health-related masculine values, but we urge other scholars to re-assess this question in new samples of men. The most direct way of accomplishing this would be to investigate the dimensionality of IHRMVS scores in new samples of men from diverse national contexts and to examine the invariance of scores across different groups of men. Utilizing additional analytic methods, including ESEM (or confirmatory factor analysis in Canadian and British men), may also be useful in helping scholars better understand the robustness of the present results, as well as that of Oliffe and colleagues.[21] Until such research has been conducted, we suggest that caution should be exercised in treating the IHRMVS as a measure of positive, health-related masculine values.

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APPENDIX

Items of the Intentions Health-Related Masculine Values Scale (IHRMVS), with Item Numbers Matching Those in Table 1.

Item No.	Item
1	A man should care about other people.
2	A man should be open to new ideas.
3	A man should be fit and healthy.
4	A man should have intellectual strength.
5	A man should be self-sufficient.
6	A man should help other people.
7	A man should be open to new experiences.
8	A man should stay in good shape.
9	A man should have emotional strength.
10	A man should make his own decisions.
11	A man should give back to his community.
12	A man should be open to new people.
13	A man should take care of his appearance.
14	A man should have physical strength.
15	A man should be independent.

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