Validity and measurement invariance of the Modern Homonegativity Scale for students in the field of education

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Título: Validez e invariancia de medida de la Escala de Homonegatividad Moderna en alumnado del ámbito de la educación.

Resumen: Aquellas investigaciones orientadas a analizar las actitudes hacia la homosexualidad sugieren el uso de instrumentos que detecten los aspectos sutiles en la discriminación hacia hombres gais y mujeres lesbianas. Asimismo, se señala que la invariancia de medida de los constructos es imprescindible para que las comparaciones entre grupos sean válidas. Este trabajo pretende validar la Escala de Homonegatividad Moderna (MHS) en estudiantes universitarios del ámbito de la educación ($N = 1.283$) con un rango de edad entre los 17 y los 49 años ($M = 2.88$; $DT = 3,02$). Del mismo modo, se interesa por examinar la invariancia de medida de la MHS en relación con ciertas variables sociodemográficas y personales (p. ej. identidad de género), así como ideológicas (p. ej. inclinación política). Los resultados aportaron evidencias sobre la unidimensionalidad de la escala y un alto grado de consistencia interna ($\omega_{MHS-G} = .879$; $\omega_{MHS-L} = .906$), además de unos índices de ajuste ($CFI_{MHS-G} = .95$, $CFI_{MHS-L} = .97$; $RMSEA_{MHS-G} = .064$, 90% IC: .057-.071, $RMSEA_{MHS-L} = .059$, 90% IC: .052-.066) y unos valores de validez externa (MHS-G y AN-T: $r = .753$, I.C. 95% = .722-.785; MHS-L y AN-T: $r = .76$. I.C. 95% = .730-.790) satisfactorios. Asimismo, sugirieron que tanto la subescala hacia hombres gais (MHS-G) como mujeres lesbianas (MHS-L) son constructos invariantes conforme a las variables estudiadas. Las conclusiones apuntan a la validez y la invariancia de medida del modelo propuesto para comparar los niveles de homonegatividad moderna entre los grupos estudiados.

Palabras clave: Homonegatividad moderna. Hombres gays. Mujeres lesbianas. Estudiantes universitarios. Actitudes. Validez. España.

Abstract: The research aimed at analysing attitudes towards homosexuality recommends the use of instruments that can detect subtle aspects of discrimination against gay men and lesbian women. It also asserts that the measurement invariance of constructs is essential for valid comparisons between groups. The present study aims to validate the Modern Homonegativity Scale (MHS) in university students in the field of education ($N = 1.283$) with an age range of 17 to 49 years old ($M = 2.88$; $SD = 3.02$). In addition, we seek to examine the measurement invariance of the MHS in relation to certain sociodemographic and personal variables (e.g. gender identity), as well as ideological variables (e.g. political inclination). The results provided evidence of the scale's unidimensionality and a high degree of internal consistency ($\omega_{MHS-G} = .879$; $\omega_{MHS-L} = .906$), as well as satisfactory fit indices ($CFI_{MHS-G} = .95$, $CFI_{MHS-L} = .97$; $RMSEA_{MHS-G} = .064$, 90% CI: .057-.071, $RMSEA_{MHS-L} = .059$, 90% CI: .052-.066) and external validity values (MHS-G and AN-T: $r = .753$, CI 95% = .722-.785; MHS-L and AN-T: $r = .76$. CI 95% = .730-.790). They also indicated that both the subscales – towards gay men (MHS-G) and lesbian women (MHS-L) – are invariant constructs according to the variables studied. The findings point to the validity and measurement invariance of the proposed model for comparing levels of modern homonegativity between the groups studied.

Keywords: Modern homonegativity. Gay men. Lesbian women. University students. Attitudes. Validity. Spain.

Introduction

Sexual orientation, gender identity and expression (SOGIE) is considered to be one of the main motives for discrimination and social rejection. Different reports issued by both national and international agencies and institutions verify this reality. The data from the Special Eurobarometer 493 (2019) show that more than half (53%) of people surveyed across Europe feel that discrimination for being gay, lesbian or bisexual is widespread in their respective countries of origin. For Spain, the figure increases to 56%. Likewise, 48% of European informants believe that discrimination based on non-normative or transgender identity has become more widespread, with this figure being higher in Spain (58%). The report produced by the Spanish Interior Ministry (2020) showed that 277 incidents were recorded as hate crimes against sexual orientation and gender identity in the year 202. For Andalusia, the Observatorio Andaluz contra la Homofobia, Bifobia y Transfobia [Andalusian Watchdog against Homophobia, Biphobia and Transphobia] (2020) recorded a total of 349 incidences that were deemed to be hate crimes against the lesbian, gay, bisexual and transgender (LGBT) population between 2019 and 202.

To deal with this reality, there have been various advances in Spain to legally and socially protect the LGBT community, such as the recent passing of Law 4/2023, of 28th February, for the real and effective equality of transgender people and for the guarantee of the rights of LGBTI people, or Andalusian Law 8/2017 to guarantee the rights, equality of treatment and non-discrimination of LGBTI people and their families in Andalusia. This evolution has emphasized the importance of education for promoting the well-being of this community, as well as for the recognition and defence of their rights. Nevertheless, the data produced by the European Union Fundamental Rights Agency (2020) show that in Spain 49% of LGBTI people state that they have been ridiculed, mocked, insulted or threatened at some time in their place of education. Schools are still perceived to be hostile spaces for LGBT students. To address this, professionals from various disciplines can make important contributions for the social and educational care of diversity and the promotion of inclusive education, as studies have shown (e.g. Barozzi & Ruiz-Cecilia, 2020).

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In the last few years, various studies (e.g. Franco-Morales et al., 2016; Hall & Rodgers, 2019) have been carried out that attempt to analyse the attitudes of this body of professionals towards LGBT people in relation to different personal, sociodemographic and ideological variables. Although the majority of these investigations show differences in the results, it seems that they do not take into account whether the constructs are measured in the same way between the groups being compared, and can therefore be compared with validity (Meade & Wright, 2012). Building upon other studies in this research area (Cheung & Resvold, 2002; Kline, 2011; Romero et al., 2015), this study seeks to prove whether the structural model that is proposed below to analyse negative attitudes toward homosexuality is reproduced between groups of the same population before the hypothesis test. The results we obtain will be used in future studies to further examine the analysis of attitudes of education professionals towards SOGIE, with the aim of contributing to the progress of this field of research.

Hall and Rodgers (2019) argue that "attitudes are individual's evaluative judgements of an object and play an important role in dynamics of prejudice and discrimination" (p. 25). In this regard, the multicomponent model of attitudes states that cognitive, affective, and behavioural components determine their manifestation (Maio et al., 2019). Various studies have used this model to analyse hostility against and rejection of gay and lesbian people. Regarding negative attitudes toward homosexuality, Morrison and Morrison (2002) put forward the term homonegativity, which is defined as "negative affect, cognitions, and behaviors directed toward individuals who are perceived – correctly or incorrectly – to be gay or lesbian" (Morrison & Morrison, 2011, p. 2573). From this, Morrison and Morrison (2002) designed and validated the *Modern Homonegativity Scale* (MHS). The purpose of this scale is to measure negative attitudes based on modern prejudice against gay men and lesbian women. The validation study showed the existence of two parallel subscales of 12 items: one to measure modern homonegativity toward gay men (MHS-G) and the other for modern homonegativity toward lesbian women (MHS-L). Both subscales produced high levels of reliability both in the male (MHS-G = .91; MHS-L = .89) and the female samples (MHS-G = .91; MHS-L = .85), as well as a unidimensional factor structure (MHS-G = 45% and MHS-L = 47% of the total variance), and different from other scales of old-fashioned homonegativity (e.g. *Attitudes Toward Lesbians and Gay Men Scale*, ATLG, Herek, 1988).

Various studies (e.g. Morrison & Morrison, 2002) have analysed the relationship of the MHS with other constructs, the results of which demonstrate the existence of direct correlations between modern homonegativity with other forms of prejudice (such as modern sexism) and with ideological variables (e.g. political conservatism), and inverse relations such as the acceptance of the rights of gay men and lesbian women. The MHS shows a better fit compared to all other scales for evaluating contemporary expressions of prejudice

against homosexuality (Górska et al., 2017; Rye & Meaney, 2010). However, most research has used instruments based on traditional prejudices and other conceptualizations of homonegativity (e.g. ATLG, Herek, 1988), which tend to find contradictory results regarding the sample of negative attitudes toward homosexuality.

In this regard, those studies showed that homonegativity is associated with different variables, both sociodemographic and personal (gender identity, sexual orientation, and LGTB friendship) and ideological (religiousness, political ideology, and conceptualization of homosexuality). In terms of personal and sociodemographic variables, those people who identified as men (Heras-Sevilla & Ortega-Sánchez, 2020) and heterosexual (Foy & Hodge, 2016) expressed these attitudes to a greater degree. These results could be due to the existence of a hegemonic type of masculinity that determines a more or less traditional perspective of gender roles (Rodríguez-Castro et al., 2013). Similarly, the principle of heteronormativity, which establishes, among other aspects, heterosexuality as the predominant sexual orientation in society, can have an influence on the sample of attitudes toward homosexuality (Francisco-Amat & Moliner-Miravet, 2017). Obversely, having a positive contact or friendship with LGBT people is related to having greater positive attitudes (Scandurra et al., 2017), since it enhances the reduction in prejudices and stereotypes of the homosexual reality.

In terms of ideological variables, those people who consider themselves to be religious and identify with conservative politics show poorer attitudes toward SOGIE (Hall & Rodgers, 2019). The religiousness and political inclination that are linked to those beliefs that promote heteronormativity and traditional gender roles tend to show a higher degree of negative attitudes toward homosexuality. Lastly, the conceptualization of homosexuality is shown to be a decisive factor. These attitudes are related to the perception of people concerning the controllability (environmental factors or individual choice) or non-controllability (biologically determined) of homosexuality. Those who associate homosexuality with environmental factors show poorer attitudes toward the LGBT community than those who link it to genetic factors (Frías-Navarro et al., 2015).

The studies that have demonstrated differences in the sample of negative attitudes toward homosexuality have not taken into account the existence of measurement invariance (Górska et al., 2017; Romero et al., 2015). It should be noted that invariance is an essential factor in measurements when carrying out comparisons between observed groups, since it is only valid to compare them when the constructs are measured exactly the same in all groups (Kline, 2011; Meade & Wright, 2012). Where this is not the case, comparisons between groups are invalidated (De Roover, 2021). We have found few studies (Gómez et al., 2022; Górska et al., 2017; Romero et al., 2015) that have examined the invariance of the parallel forms of the MHS. The results of these studies reveal that both the subscales – of gay men and lesbian women – show measurement invariance between the hetero-

sexual men and women, which permits the comparison of modern homonegativity levels between the two groups. Likewise, they show that there are no differences in the degree of homonegativity toward gay men and lesbian women based on the MHS.

The objective of this study is twofold. First, we set out to validate the model proposed for the MHS by Morrison and Morrison (2002) in a sample of university students in the sphere of education. Second, we seek to examine the measurement invariance of the MHS in terms of sociodemographic and personal variables (e.g. gender identity) and ideological variables (e.g. political inclination) for the scale. Based on the previous research on this matter, it is expected that (Hypothesis 1) the goodness-of-fit indices of the scale's factor structure will present acceptable values. It is also estimated that (Hypothesis 2) the scores obtained on the MHS will be invariant in relation to both the sociodemographic and personal variables and the ideological variables under study.

Method

Participants

We carried out non-probability convenience sampling involving 1283 students taking the following degrees at the University of Granada: Early-Childhood Education ($n = 379$; 28.9%), Primary Education ($n = 403$; 31.4%), Social Education ($n = 281$; 21.9%), and Pedagogy ($n = 228$; 17.8%) (see Table 1). Of the total, 86% ($n = 1.103$) identified as women, 13.5% ($n = 173$) as men, and .5% ($n = 7$) as other (nonbinary). The age range was between 17 and 49 years old ($M = 2.88$; $SD = 3.02$). Regarding sexual orientation, 85.1% ($n = 1.088$) declared that they were heterosexual, 3.1% ($n = 39$) as homosexual, 11% ($n = 141$) as bisexual, and .8% ($n = 10$) as a type of sexual orientation other than those shown. Five participants left this section blank.

Two other characteristics given were the religious beliefs and political inclination of the participants. A little more than half (55.4%, $N = 708$) declared that they were religious, of whom 97.6% ($N = 688$) professed Roman Catholicism, while 44.6% ($N = 570$) professed no religion. A total of five people did not answer this question. Lastly, a higher percentage of people stated that they leaned toward left-wing (44.2%; $N = 538$) and centre-left politics (3.5%; $N = 371$), with a minority preferring centre-right (18%; $N = 219$) and right-wing politics (7.3%; $N = 89$).

Table 1
Sociodemographic characteristics of the participants according to academic degree

	Degree			
	Early-childhood Education	Primary Education	Social Education	Pedagogy
Age Range (*M; DT*)	17-46 (2.85; 2.77)	18-45 (2.82; 3.20)	18-49 (21.31; 3.23)	17-49 (2.52; 2.71)
	n(%)	*n*(%)	*n*(%)	*n*(%)
Gender Identity				
Women	349 (31.7%)	302 (27.4%)	248 (22.5%)	204 (18.4%)
Men	21 (12.1%)	97 (56.1%)	32 (18.5%)	23 (13.3%)
Other (non-binary)	-	4 (57.1%)	1 (14.3%)	2 (28.6%)
Sexual Orientation				
Heterosexual	326 (30%)	365 (33.5%)	206 (19%)	190 (17.5%)
Homosexual	11 (28.2%)	10 (25.6%)	14 (35.9%)	4 (1.3%)
Bisexual	32 (22.7%)	26 (18.4%)	53 (37.6%)	30 (21.3%)
Others	1 (10%)	2 (20%)	4 (40%)	3 (30%)
Religiousness				
Yes	237 (33.5%)	284 (4.2%)	94 (13.3%)	92 (13%)
No	132 (23.2%)	119 (2.9%)	185 (32.5%)	134 (23.5%)
Political Inclination				
Left	118 (21.9%)	117 (21.7%)	187 (34.8%)	116 (21.6%)
Centre-Left	108 (29.2%)	138 (37.3%)	63 (17%)	61 (16.5%)
Centre-Right	71 (32.4%)	105 (47.9%)	13 (5.9%)	30 (13.7%)
Right	30 (33.7%)	43 (48.3%)	6 (6.7%)	10 (11.2%)

Data Collection Instruments

The strategy for data collection was cross-sectional, through self-reporting (questionnaires and scales) (Ato et al., 2013). We used three instruments to gather information. The first consisted of a questionnaire that includes questions about the sociodemographic data of the participants (gender identity, friendship with LGTB people, sexual orientation religious beliefs, political inclination, and conceptualization of homosexuality).

The scales of attitudes toward SOGIE comprise the two remaining instruments: the Modern Homonegativity Scale (MHS) (Morrison & Morrison, 2002) and the Negative Attitudes toward Transgender People Scale (Páez et al., 2015). The MHS comprises 22 items distributed into two subscales of attitudes that evaluate the homonegativity of students toward gay men (MHS-G: items 1 to 1. 21 and 22; e.g. "Gay men have all the rights they need") and lesbian women (MHS-L: items 11 to 22; e.g. "Lesbian women should stop shoving their lifestyle down other people's throats"). Two of

the items (item 5 and item 15) require reverse scoring, hence they were recoded regarding this aspect. The responses were given using a Likert scale, from 1 (strongly disagree) to 5 (strongly agree). High scores correspond to a higher degree of modern homonegativity.

The Negative Attitudes towards Transgender People scale (Páez et al., 2015) consists of 9 items (items 23 to 31) that evaluate discrimination against the transgender community (transsexual, transgender, cross-dressing, etc.) (AN-T: ω = .88; e.g. "Transgender people tend to be sexually promiscuous"). One of the items (item 23) requires reverse scoring. It uses a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). As this scale was only used to evaluate the convergent and discriminant validity, the global scores were considered as a direct measurement of all the items.

Data Analysis

Of the selected participants ($N = 151$), 11.7% did not answer some part of the questionnaire, and were eliminated from the analysis. The total percentage of missing values was 2.1%, which were treated using multiple imputation methods (Cuesta et al., 2013). We carried out Mardia's Test to analyse the multivariate normality. In accordance with the coefficients established by Mardia (1970) for skewness ($\beta_{1, p} = 0$) and kurtosis ($\beta_{2, p} = p(p+2)$), the values obtained for the two subscales (MHS-G: $\beta_{1, p} = 26.50$; $\beta_{2, p} = 247.48$; MHS-L: $\beta_{1, p} = 34.25$; $\beta_{2, p} = 276.28$) indicate that the data do not follow a multivariate normal distribution.

Regarding the Exploratory Factor Analysis (EFA), the adequacy of the data was verified using the Kaiser-Meyer-Olkin test (*KMO*) and Bartlett's test of sphericity. Values above .80 were taken to be satisfactory (Lloret-Segura et al., 2014) for the *KMO*, while for the latter test, statistically significant chi-squared (X^2) values were accepted. Absolute values of skewness and kurtosis higher than three and seven, respectively, were considered to be deviations from the principle of univariate normality (Kline, 2011). As per other studies (e.g. Morrison & Morrison, 2002; Morrison et al., 2009; Rye & Meaney, 2010) that find a unifactorial scale structure, one single factor was extracted for each subscale using the Robust Maximum Likelihood method of estimation (MLE) applied to Pearson's correlation matrix and with Oblimin rotation (Lloret-Segura et al., 2014). Regarding the criterion for interpretating an item's saturation, we took values above .40 (Byrne, 2016). The statistical software used was IBM SPSS® 23..

The first-order Confirmatory Factor Analysis (CFA) was carried out through structural equation modelling with the IBM SPSS® Amos 23.0 statistical software package. To undertake the robust MLE estimation method, we opted for the Bollen-Stine bootstrap (with 1000 replications) and a bias-corrected confidence interval (*90% CI*) to treat the problems of multivariate normality (Kim & Millsap, 2014; Kline, 2011). The model fit was evaluated with a combination of

criteria (e.g. Byrne, 2016; Kline, 2011): Bollen-Stine bootstrap and associated probability ($p < .05$), the chi-squared statistic, *CFI* (Comparative Fit Index), *TLI* (Tucker Lewis Index), and *AGFI* (Adjusted Goodness of Fit Index). Values higher than .90 indicate an adequate fit, while equal to or higher than .95 is acceptable. We take the *RMSEA* (Root Mean Square Error of Approximation) and the *Confidence Interval* at 90% (90% CI) with values of .08 or less.

We analysed the convergent and discriminant validity of the MHS. The convergent validity was evaluated using Spearman's correlation. For the discriminant validity, we took those correlations between constructs whose confidence interval at 95% did not include 1.0 (Anderson & Gerbing, 1988). Regarding the composite reliability, values between .80 and .89 were considered acceptable, and greater than or equal to .90 were considered good (Viladrich et al., 2017).

In order to compare the model of homonegativity toward gay men and lesbian women according to both sociodemographic and personal variables (gender identity, sexual orientation and LGBT friendships) and ideological variables (religion, politics and belief about the cause of homosexuality), we evaluated the measurement invariance between groups using the multigroup analysis method (Byrne, 2016; Kline, 2011). To analyse the invariance of the structural model between groups, we followed the sequence of nested models proposed by Kline (2011). First we conducted the configural invariance test (Model 0), which implies that the participants from the different groups conceptualize the constructions in the same way. Next, we carried out the metric invariance test (Model 1), which requires the unstandardized factor loadings to be equal between groups. Then we conducted the structural invariance test (Model 2), which postulates that the variances of the latent variables and the correlations between them are equal between groups. Lastly, we carried out the residual invariance test (Model 3), which assumes that the variances of the errors of the observed variables and all the corresponding error covariances are equal between groups. The invariability of each model is tested using different indicators (ΔX^2 with $p \geq .05$; $\Delta CFI < .01$ and $\Delta RMSEA < .015$) (Byrne, 2016; Cheung & Resvold, 2002). As the chi-squared statistic can be affected by large samples and indicate an absence of measurement invariance, we took the ΔCFI and $\Delta RMSEA$ values to assess the model fit (Byrne, 2016; Cheung & Resvold, 2002; Kline, 2011).

Procedure and ethical considerations

The request for participants to collaborate in the study was made in the classroom, in the teaching hours corresponding to the degrees given at the Faculty of Education Sciences of the University of Granada, Spain. First the informed consent was given and the ethical aspects of the research were detailed. There were no problems for participation in the study. The instructions were then explained and the importance of answering all statements with the greatest

sincerity possible was emphasized. The process lasted approximately 30 minutes. At all times the researcher was present to ensure the correct application of the instruments. The right to confidentiality of the people who participated in the study was respected. The ethical issues were in line with the Code of Good Practice in Research and the study was certified by the Ethics Committee of the University of (place and reference omitted for the peer review process).

Results

Analysis of the factor structure of the MHS

In accordance with previous studies (Morrison & Morrison, 2002; Morrison et al., 2009), the structural equation model was evaluated bearing in mind that modern homonegativity toward gay men and lesbian women can be considered parallel and unidimensional factors. Each factor comprises 12 items, of which one had reverse scoring. The results obtained were presented independently.

Regarding the Exploratory Factor Analysis (EFA), the values obtained for the *KMO* (MHS-G: .939; MHS-L: .957) and Bartlett's sphericity test (MHS-G: $\chi2$ (66) = 5351.68, $p <$ .001; MHS-L: $\chi2$ (66) = 7282.94, $p <$.001) suggested the adequacy of the data matrix. The distribution of the items of both subscales presented acceptable values for skewness and kurtosis. The analysis of the proper values and the respective dispersion diagram supported the keeping of a single factor, which explains 41.517% of the variance for MHS-G and 5.215% of the variance for MHS-L.

The factor loading of most of the items that make up both subscales was higher than .40 (see Table 2). Only two items (5 and 15), which require reverse scoring, present a low factor loading.

Confirmatory Factor Analysis (CFA) was carried out to determine the goodness of fit of the model with the variables and the proposed structure. The variables used were the subscales (MHS-G and MHS-L) of the MHS, which comprised a single factor. The results show an acceptable fit of the model (MHS-G: X^2/df = 300.80/54; *CFI* = .95; *TLI*: .94; *AGFI*: .93; *RMSEA*: .064; *90% CI*: .057-.071; MHS-L: X^2/df = 267.19/54; *CFI* = .97; *TLI*: .96; *AGFI*: .94; *RMSEA*: .059; *90% CI*: .052-.066).

In order to evaluate the convergent validity of the MHS, we calculated the Spearman correlations between the gay men subscale (MSH-G), the lesbian women subscale (MHS-L), and the Negative Attitudes toward Transgender People Scale (AN-T). We found positive and strong correlations, which were statistically significant (see Table 3). Regarding the discriminant validity, the values obtained for correlations between the MHS-G, MHS-L and AN-T variables were strong and statistically significant, with a confidence interval within recommended values (MHS-G and AN-T: r = .753; CI 95% = .722-.785; MHS-L and AN-T: r = .760; CI 95% = .730-.790). Furthermore, they showed an adequate composite reliability (ω_{MHS-G} = .89; ω_{MHS-L} = .92; ω_{AN-T} = .88).

Table 2
Results of the factor loadings, variances and internal consistency of the MHS

Factor Loadings		MHS-G		MHS-L
	Item 1	.471	Item 11	.764
	Item 2	.681	Item 12	.699
	Item 3	.756	Item 13	.734
	Item 4	.664	Item 14	.805
	Item 5	.042	Item 15	.010
	Item 6	.647	Item 16	.644
	Item 7	.583	Item 17	.833
	Item 8	.607	Item 18	.803
	Item 9	.752	Item 19	.784
	Item 10	.816	Item 20	.699
	Item 21	.657	Item 21	.654
	Item 22	.703	Item 22	.720
% of variance		41.517		5.215

Note. MHS-G: Modern Homonegativity toward gay men; MHS-L: Modern homonegativity toward lesbian women.

Table 3
Spearman Correlations for the convergent validity

	MHS-G	MHS-L	AN-T
MHS-G	-		
MHS-L	.932***	-	
AN-T	.689***	.695***	-

Note. MHS-G: Modern Homonegativity toward gay men; MHS-L: Modern homonegativity toward lesbian women; AN-T: Negative Attitudes toward Transgender People; ***p < .001

Multigroup analysis by sociodemographic and personal variables

The results we obtained in relation to the sequence of nested models showed the existence of configural (Model 0), metric (Model 1), and structural (Model 2) invariance according to gender identity, sexual orientation and LGBT friendships for both subscales. Likewise, we found that there was residual invariance (Model 3) for the MHS-G and MHS-L in terms of LGBT friendships (see Table 3 and Table 4).

The values of the different indices revealed an adequate and acceptable fit of these models. No statistically significant differences were found in the value of ΔX^2 for the metric invariance (Model 1), structural invariance (Model 2), and residual invariance (Model 3) tests in relation to LGBT friendships of MHS-L. This was also found for the metric invariance test (Model 1) regarding sexual orientation in this same subscale (see Table 4). Despite finding statistically significant differences between Model . Model 1, Model 2 and Model 3 for both subscales, the values of ΔCFI and $\Delta RMSEA$ for the metric, structural and residual invariance were within recommended values (see Table 3 and Table 4). However, the results produced in relation to ΔCFI for the structural invariance of MHS-G regarding sexual orientation were above the recommended values (see Table 3). The structural invariance model was partially achieved, since the factor loading of item 7 was freed ("Gay men no longer need to protest for equal rights") (MHS-G: λ = .617; MHS-L: λ = .794) according to the modification indices suggested by the model and the estimates of the configural model. This fact indicates the sameness of the items between heterosexual and non-heterosexual people, with the exception of this item. Lastly, the ΔCFI and $\Delta RMSEA$ values for the residual test in relation to gender identity and sexual orientation of both scales were above those recommended (see Table 3 and Table 4).

Table 3
Results of the invariance analysis according to sociodemographic and personal variables for MHS-G

Mode	X^2/df	CFI	TLI	AGFI	RMSEA	90% IC
Gender identity						
Model 0	408.80/108	.940	.926	.914	.050	.045-.055
Model 1	428.53/119	.938	.931	.919	.048	.043-.053
Model 2	437.23/120	.936	.930	.918	.049	.044-.053
Model 3	539.78/132	.918	.918	.892	.052	.048-.057
Sexual orientation						
Model 0	373.21/108	.948	.936	.921	.047	.042-.052
Model 1	433.10/119	.938	.931	.918	.048	.044-.053
Model 2[a]	414.82/118	.942	.933	.921	.047	.042-.052
Model 3	596.70/132	.908	.908	.916	.056	.051-.060
LGBT friendship						
Model 0	352.51/108	.954	.944	.924	.045	.040-.050
Model 1	375.21/119	.952	.947	.928	.044	.039-.049
Model 2	375.31/120	.952	.947	.928	.043	.038-.048
Model 3	399.13/132	.950	.950	.931	.042	.038-.047

Comparison of models	$\Delta X^2/\Delta df$	ΔCFI	$\Delta RMSEA$
Gender identity			
Model 0 vs. Model 1	19.73/11*	.002	.002
Model 0 vs. Model 2	28.43/12**	.004	.001
Model 2 vs. Model 3	102.55/12***	.018	.002
Sexual orientation			
Model 0 vs. Model 1	59.89/11***	.010	.001
Model 0 vs. Model 2[a]	41.61/10***	.006	.000
Model 2[a] vs. Model 3	181.88/12***	.034	.009
LGTB friendship			
Model 0 vs. Model 1	22.70/11*	.002	.001
Model 0 vs. Model 2	.10/12*	.002	.002
Model 2 vs. Model 3	23.82/12**	.004	.001

Note. [a]Modified structural model freed from factor loading of item 7; *$p <$ .05; **$p <$ .01; ***$p <$ .001.

Table 4
Results of the invariance analysis according to sociodemographic and personal variables for MHS-L

Model	X^2/df	CFI	TLI	AGFI	RMSEA	90% CI
Gender identity						
Model 0	359.35/108	.963	.955	.925	.046	.040-.051
Model 1	38.16/119	.962	.958	.928	.044	.039-.049
Model 2	389.12/120	.961	.957	.926	.045	.040-.050
Model 3	623.24/132	.928	.928	.875	.058	.053-.062
Sexual orientation						
Model 0	415.54/108	.956	.947	.918	.050	.045-.055
Model 1	434.31/119	.955	.950	.923	.048	.044-.053
Model 2	457.69/120	.952	.947	.921	.050	.045-.055
Model 3	732.74/132	.915	.915	.909	.064	.059-.068
LGBT friendships						
Model 0	34.86/108	.968	.961	.930	.044	.039-.049
Model 1	348.64/119	.968	.965	.935	.041	.036-.046
Model 2	349.55/120	.968	.965	.936	.041	.036-.046
Model 3	372.87/132	.967	.967	.938	.040	.035-.045

Comparison of models	$\Delta X^2/\Delta df$	ΔCFI	$\Delta RMSEA$
Gender identity			
Model 0 vs. Model 1	2.81/11*	.001	.002
Model 0 vs. Model 2	29.77/12**	.002	.001
Model 2 vs. Model 3	234.12/12***	.033	.012
Sexual orientation			
Model 0 vs. Model 1	18.77/11	.001	.002
Model 0 vs. Model 2	42.15/12***	.004	.000
Model 2 vs. Model 3	275.05/12***	.037	.014
LGBT friendships			
Model 0 vs. Model 1	7.78/11	.000	.003
Model 0 vs. Model 2	8.69/12	.000	.003
Model 2 vs. Model 3	32.01/12	.001	.004

*Note. *$p <$ .05; **$p <$ .01; ***$p <$ .001.

Multigroup analysis by ideological variables

The analysis of the sequence of nested models showed the existence of configural (Model 0), metric (Model 1), and structural (Model 2) invariance regarding religiousness, political inclination, and explanation of the cause of homosexuality, for both subscales. However, we did not find residual invariance (Model 3) in any of the cases (see Table 5 and Table 6).

The values of the different indices revealed an adequate fit of these models. No statistically significant differences were found in the *ΔX^2* for the structural invariance test (Model 2) regarding the explanation of the cause of homosexuality in MHS-G. We also found this result for the metric invariance test (Model 1) in terms of religiousness in MHS-L. Although there were statistically significant differences between Model . Model 1, Model 2 and Model 3 of both subscales, the *ΔCFI* and *$\Delta RMSEA$* results were within recommended values. The *ΔCFI* value of the residual invariance test (Model 3) never fell below the maximum recommended value (see Table 5 and Table 6).

Table 5
Results of the invariance analysis according to ideological variables for MHS-G

Model	X^2/df	CFI	TLI	AGFI	RMSEA	90% CI
Religiousness						
Model 0	376.19/108	.946	.934	.919	.047	.042-.052
Model 1	398.14/119	.944	.937	.923	.046	.041-.051
Model 2	413.50/120	.941	.935	.921	.047	.042-.052
Model 3	623.13/132	.901	.901	.897	.057	.053-.062
Political inclination						
Model 0	342.51/108	.950	.939	.926	.045	.040-.050
Model 1	374.41/119	.946	.940	.927	.045	.039-.050
Model 2	389.21/120	.943	.937	.923	.046	.041-.051
Model 3	55.37/132	.911	.911	.898	.054	.049-.059
Explanation cause LG						
Model 0	462.25/162	.941	.928	.895	.042	.037-.046
Model 1	496.45/184	.938	.934	.902	.040	.036-.044
Model 2	497.25/186	.939	.935	.903	.040	.035-.044
Model 3	66.79/210	.911	.916	.893	.045	.041-.049

Comparison of models	$\Delta X^2/\Delta df$	ΔCFI	$\Delta RMSEA$
Religiousness			
Model 0 vs. Model 1	21.25/11*	.002	.001
Model 0 vs. Model 2	37.36/12***	.005	.000
Model 2 vs. Model 3	209.63/12***	.040	.010
Political inclination			
Model 0 vs. Model 1	31.9/11**	.004	.000
Model 0 vs. Model 2	46.7/12***	.007	.001

Model	X²/df	CFITLIAGFIRMSEA	90% CI
Model 2 vs. Model 3	161.16/12***	.032	.008
Explanation cause LG			
Model 0 vs. Model 1	34.20/22*	.003	.002
Model 0 vs. Model 2	34.75/24	.002	.002
Model 2 vs. Model 3	163.54/24***	.028	.005

Note. *p < .05; **p < .01; ***p < .001.

Table 6
Results of the invariance analysis according to ideological variables for MHS-L

Model	X²/df	CFI	TLI	AGFI	RMSEA	90% CI
Religiousness						
Model 0	368.58/108	.961	.953	.924	.046	.041-.052
Model 1	382.25/119	.961	.957	.929	.044	.039-.049
Model 2	412.55/120	.957	.952	.925	.047	.042-.051
Model 3	662.12/132	.922	.922	.897	.060	.055-.064
Political inclination						
Model 0	317.43/108	.968	.961	.933	.042	.037-.048
Model 1	342.49/119	.966	.962	.934	.042	.037-.048
Model 2	361.47/120	.963	.959	.930	.043	.038-.048
Model 3	604.63/132	.927	.927	.883	.058	.053-.062
Explanation cause LG						
Model 0	439.25/162	.960	.951	.906	.040	.036-.044
Model 1	447.77/184	.958	.955	.909	.039	.034-.043
Model 2	478.37/186	.958	.955	.909	.038	.034-.043
Model 3	646.42/210	.937	.941	.889	.044	.040-.048

Comparison of models	ΔX²/Δdf	ΔCFI	ΔRMSEA
Religiousness			
Model 0 vs. Model 1	13.67/11	.000	.002
Model 0 vs. Model 2	43.97/12***	.004	.003
Model 2 vs. Model 3	249.57/12***	.035	.013
Political inclination			
Model 0 vs. Model 1	25.06/11**	.002	.000
Model 0 vs. Model 2	44.04/12***	.005	.001
Model 2 vs. Model 3	243.16/12***	.036	.015
Explanation cause LG			
Model 0 vs. Model 1	8.52/22*	.002	.001
Model 0 vs. Model 2	39.12/24*	.002	.002
Model 2 vs. Model 3	168.05/24***	.021	.006

Note. *p < .05; **p < .01; ***p < .001.

Discussion and Conclusions

This study attempts to validate the MHS model proposed by Morrison and Morrison (2002) in a sample of Spanish university students taking degrees in education. Other studies (e.g. Kline, 2011; De Roover, 2021; Meade & Wright, 2012) recommend studying the measurement invariance before comparison between groups. Along similar lines, we were also interested in analysing this aspect in relation to certain sociodemographic and personal variables (e.g. sexual orientation) and ideological variables (e.g. religiousness).

Regarding the first object, the EFA produced results for the *KMO* and Bartlett's sphericity that are similar to other validation studies of this instrument (García-Berbén et al., 2022; Gómez et al., 2022; Morrison et al., 2009). This gives rise to the existence of one single factor of modern homonegativity in both subscales, which determines a percentage of explained variance of around 40-50% and an adequate internal consistency (Da Silva et al., 2019; Morrison & Morrison, 2002). Morrison and Morrison (2002) obtained similar data, with a one-factor solution being the most suitable, explaining 45% and 47% of the total variance for MHS-G and MHS-L, respectively. As per Lloret-Segura et al. (2014), the retention of a single common factor is due to the fact that it is well defined by the items of each scale and explains most of the possible common variance. However, they advise against using the criterion of percentage of explained variance, as this can confuse matters.

The analysis of the skewness and kurtosis of the items shows a good response distribution, and factor loading above .40 (Lloret-Segura et al., 2014). Nevertheless, item 1 of MHS-G has a loading that is lower than the rest of the items of that subscale. Some studies (for example, Costello & Osborne, 2005) state that factor loadings above .50 can be considered strong. Therefore, it is suggested that the items that do not meet this criterion can be eliminated as long as it improves the model fit indices. Furthermore, the items that require reverse coding (items 5 and 15) have a low factor loading, just as in other validation studies of this instrument (e.g. García-Berbén et al., 2022; Gómez et al., 2022). Other validation studies (e.g. Gómez et al., 2022; Morrison et al., 2005) chose not to include these two items, since this would not have a negative impact on the theoretical model (Morrison et al., 2009). In this study, however, we decided to keep them, since they did not affect the model fit, with the intention of analysing why these items function badly in future studies. Lloret-Segura et al. (2014) argue that one should always check the fit of the scale items' content to the construct that one seeks to measure. In this sense, different studies (such as Sliter & Zickar, 2014; and Tomás et al., 2010) point out the difficulties arising from the method effect that are found in scales that use items drawn up in a negative and/or reversed sense. In any case, Sliter and Zickar (2014) show that these types of items require greater verbal comprehension, hence it is recommended that translations be reviewed and the original wording of these items improved for future studies.

The results suggest the unidimensionality of the MHS subscales (Morrison & Morrison, 2002; Rye & Meaney, 2010; Morrison et al., 2009). As expected (Hypothesis 1), the unifactor construct subjected to CFA shows fit indices within the values recommended by Morrison et al. (2009) (*CFI* ≥ .90; *RMSEA* ≤ .08). These findings were also found in recent validation studies in other contexts (Da Silva et al., 2019, in Brazil; García-Berbén et al., 2022, in Portugal; García-Berbén et al., under review, in Spain; Górska et al., 2017, in Poland). The MHS is therefore deemed to have good construct validity.

Regarding the convergent validity, the results show a positive and strong correlation between modern homonegativity and negative attitudes toward transgender people (e.g. Rodríguez-Castro et al., 2013). Based on what Norton and Herek (2012) have called the "secondary transfer effect", it has been suggested that the structure of prejudice against transgender people is similar to that of the prejudice toward

gay men and lesbian women. We can therefore intuit that the discriminatory attitudes toward sexual orientation and gender identity could hold very similar constructs. However, other studies (Hill & Willoughby, 2005; Nagoshi et al., 2008) argue that this possibility could fail in the discriminant validity test. In this regard, Paez et al. (2015) recommend avoiding the simplification of associating prejudice against homosexual people with prejudice against transgender people. In light of this, the results obtained in this study regarding the external validity (Anderson & Gerbing, 1988) and composite reliability (Viladrich et al., 2017) were adequate.

In terms of the second objective, the results obtained for the invariance on a configural, metric and structural level confirm Hypothesis 2. They suggest that both MHS-G and MHS-L are invariant constructs in accordance with the variables – both sociodemographic and personal and ideological – studied. These results agree with the findings of other studies (e.g. Gómez et al., 2022; Romero et al., 2015) that examine this aspect according to gender identity, which allows the comparison of the levels of modern homonegativity between the groups studied. However, residual invariance was only found for both subscales in relation to LGBT friendships. As per Putnick and Bornstein (2016), this aspect is not a prior requisite for the comparison of means, since the residual values do not form part of the latent factor, and thus many investigations tend not to include it. Complete measurement invariance was not met on a structural level for MHS-G regarding sexual orientation either. To overcome this aspect, Putnick and Bornstein (2016) propose releasing the constraints of equivalence of factor loadings from the corresponding items until achieving a partially invariant model. Other similar studies (e.g. Gómez et al., 2022; Romero et al., 2015), which released some intercepts of the scale to obtain partial strong invariance, considered that the results obtained were sufficient to demonstrate the measurement invariance. We confirm that Item 7 is variable according to sexual orientation, which means that the meaning associated with the item could be different between heterosexual and non-heterosexual people. This could be due to the fact that LGBT-phobia continues to be unseen because this phenomenon manifests itself in a more subtle form, which, tied to the promotion of laws that defend the rights of LGBT people, can cause false beliefs in a section of society about the well-being and social justice of this community (Lara-Garrido et al., 2022).

We aim for the findings of this study to be an advance in this area of research. On the one hand, they represent a contribution to the growth of this field of study, whose presence is becoming increasingly larger in psychology (Putnick & Bornstein, 2016). In addition, this research helps remedy the scarcity of studies that examine the invariance of the MHS

(Gómez et al., 2022). In this regard, our results make it possible for future studies to compare the levels of modern homonegativity between groups in relation to the sociodemographic and personal, and ideological, variables studied. Moreover, this study promotes the use of instruments like the MHS that detect negative attitudes in university classrooms in a more accurate way (Górska et al., 2017; Morrison & Morrison, 2002; Rye & Meaney, 2010).

This study has certain limitations. First, as noted in the literature (e.g. Gómez et al., 2022; Kline, 2011) concerning the distribution of the sample for carrying out multigroup analyses according to the gender identity and sexual orientation of the participants, the number of both male and non-heterosexual students needs to be increased using probability sampling. Second, other studies (e.g. Morrison & Morrison, 2002) analyse the convergent and discriminant validity of the MHS using different instruments such as the ATLG. These should be extended further using other scales based on traditional prejudices and other conceptualizations of homonegativity, along with related scales with other constructs such as modern sexism (Morrison et al., 2009). Finally, these studies have been carried out with university students, which means that the results are not generalizable to the rest of the population. It would be worthwhile to replicate this scale with non-academic populations to see whether the characteristics of the instrument are upheld (Gómez et al., 2022).

In conclusion, the model proposed for the MHS is valid for evaluating modern homonegativity in students in the field of education who participated in this study. Along the same lines as similar studies, the use of this scale is recommended to analyse those modern manifestations of homonegativity that are present among university students. The results obtained based on the measurement invariance establish that the construct has the same meaning among the studied groups, with the exception of Item 7 for sexual orientation of the subscale MHS-G. It thus enables comparison between groups for the study of modern homonegativity in university students. For future research, we recommend further examination of the psychometric properties of the scale in relation to the reversed items and the dimensionality of the scale, as well of the invariance of the MHS.

Conflict of Interest: The authors of this article declare that they have no conflict of interest.

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