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Sexism and gender violence in university students from Tabasco (México) and Lleida (Catalonia): Measurement invariance and cross-cultural differences*

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The present article reports a cross-cultural correlational study based on two-groups of young undergraduate students from Mexico and Catalonia (Spain). The main purposes were: (a) to assess the measurement invariance of a sexism inventory in both groups; (b) to compare the group means in hostile and benevolent sexism, and (c) to assess the across-group equivalence in the relations between the sexism scores and measures of gender violence. The ultimate aim of the assessment was to explore the potential appropriateness of the programs used in Catalonia to prevent gender violence if they are used in the Mexican culture. A multiple-group structural model with latent variances was used for analyzing the data, an approach that seems to be a novelty in this type of study. The main results were: (a) the sexism measure showed strong invariance in both groups; (b) the group levels of sexism were substantially higher in Mexico, and (c) the violence-sexism relations were in the expected direction in both groups, but were weaker than expected. Practical implications and directions for future research are discussed.

Keywords: *Sexism, gender violence, structural equation models, cross-cultural studies, Ambivalent Sexism Inventory (ASI).*

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Sexismo y violencia de género en estudiantes universitarios de Tabasco (México) y Lleida (Cataluña): Invariancia en la medida y diferencias transculturales

En este artículo se describe un estudio transcultural basado en dos grupos de estudiantes universitarios de México y Cataluña (España). Los objetivos específicos eran: (a) evaluar la invariancia de un inventario de sexismo en ambos grupos, (b) comparar las medias de grupo en sexismo hostil y sexismo ambivalente y (c) evaluar en ambos grupos las relaciones entre las puntuaciones en sexismo y medidas de violencia de género. El objetivo final de esta evaluación era estudiar la adecuación de los programas iniciados en Cataluña para prevenir la violencia de género si eventualmente se implementaran en México. El análisis de datos se basó en un modelo de ecuaciones estructurales con variables latentes, lo que parece ser una novedad en este campo. Los principales resultados fueron: (a) la medida de sexismo mostró invariancia fuerte en ambos grupos; (b) los niveles estimados de sexismo eran substancialmente más elevados en México y (c) las relaciones sexismo-violencia iban en la dirección esperada en ambos grupos pero eran más débiles de lo previsto. Finalmente se discuten las implicaciones prácticas de los resultados así como las futuras líneas de investigación.

Palabras clave: *sexismo, violencia de género, modelos de ecuaciones estructurales, estudios transculturales, Inventario de Sexismo Ambivalente (ASI).*

Introduction

Violence against women is currently considered to be a global health problem that affects more than one-third of every women in the world. It is, then, a problem of epidemic proportions (WHO, 2013) which requires numerous approaches if needed to be solved. Of these possible approaches we will focus on those that (a) are based on a psychological framework, and (b) try to identify and measure the precedent variables to the violence which can serve as predictors and which, therefore, can be able to be used to prevent it. Within this framework, even more accurate, informative and valid measures should be developed whether the programs are to effectively preventing both the precedent variables and their subsequent manifestation in gender violence. A good evaluation process it is expected to promote the creation of more operational and effective socio-educational intervention programs, in order to prevent the development of noxious harmful attitudes into adulthood.

Several studies by the authors have focused on sexism as a precedent variable. These studies have assessed the psychometric properties of measures of sexism and measures of violence, and they have found significant relations in the expected direction between both constructions. These studies were carried out separately on samples of university students from Mexico (León-Ramirez & Ferrando, 2013) and Catalonia (León-Ramirez & Ferrando, 2014), where the first author performs her professional activity.

The hundreds of women murdered in Ciudad Juárez, Chiuhuahua, during a ten year period made it clear to international public opinion that in Mexico there was a problem of violence against women. According to the *National Survey on the Dynamics of Household Relationships* (ENDIREH, 2011) carried out by the *Mexican National Institute for Geography and Statistics* (INEGI) and the *National Institute of Women* (INMUJERES, 2012), the levels of violence are still very high: 46 out of every 100 women over 15 years old suffer psychological, physical, patrimonial, economic and sexual violence, and some are even killed. This type of violence subjugates, controls and discriminates against women in all areas of their lives. Dating violence is a particularly a serious problem in Mexico because 76% of young Mexicans have been victims of psychological violence, 15% physical violence and 16.5% sexual violence (*Instituto Mexicano de la Juventud*, 2008). Tabasco, since 2010, is one of the five states that have the higher rates of domestic violence. The General Management of Epidemiology (DGE, 2014) reports to the date 1008 cases for injuries as a result of domestic abuse in women over 15 years.

In Catalonia (Spain), the *Catalan Institute for Women* in the data published by the Department of Interior (September 2014) registered 9,209 cases of partner violence for which no conviction was made. In January 2015, 12 women died at the hands of their partners. In the first quarter of 2014 there were 103 major incidents of sexual aggression or violence in which 48 victims (46%) were younger than 20 years old (*Institut Català de la Dona*, 2013 & 2014).

The public programmes and policies implemented in Catalonia seem to have had an, effect because since 2008 the statistics have decreased by about 20% (cases of dating violence for which no convictions were made). Of course there is still much left to do but the programs seem to be efficient and the implementation of similar programs in Mexico may also be useful since the statistics from Mexico are the cause of considerable concern. In principle, the success of preventive programs that are implemented in populations other than the population for which they were designed depends on the degree of equivalence of certain basic conditions. In particular, in terms of the sexism-violence relations studied so far by the authors, these conditions could be summarized in three points: (a) the measures of sexism function with the same psychometric properties in both populations (i.e. measurement invariance), (b) assuming that this is the case, the levels of sexism are similar in both, and (c) the structure of sexism-violence relations is also the same in both populations.

The main purpose of the present study is to evaluate the extent to which these conditions of equivalence are satisfied in Mexico and Catalonia for the type of population studied to date (young university students). This evaluation will be done using a multi-group structural equation model, which is described below.

Theoretical justification

Sexism has traditionally been regarded as a prejudice towards women expressed through feelings of antipathy (Allport, 1954). More recently, Glick and Fiske (1996) have developed a model of sexism that regards it as a bidemensional construct, characterized by the presence of two main dimensions: hostile sexism (HS) and benevolent sexism (BS), and measured using an instrument known as ASI (the Ambivalent Sexism Inventory, Glick & Fiske, 1996). Benevolent sexism is described as an apparently non-prejudicial attitude, expressed in an affective positive tone, which describes women as fragile people who need care and protection and who are men's accessories. On the other hand, hostile sexism consists of prejudicial attitudes expressed negatively and explicitly, and which reflect the discriminatory behaviour based on the alleged inferiority of women. This is a more traditional form of prejudice, which reflects antipathy and intolerance, and which includes the desire for obedience and subordination.

The results provided by ASI suggest that both components are clearly different transcultural phenomena, since the measures obtained with the questionnaire in most cases present quite high reliability coefficients for each subscale and a similar factor structure (Glick et al., 2000). Hostile sexism and benevolent sexism, then, seem to reflect different but related constructs. In most countries the scores on both scales are positively correlated (Glick et al., 2000). Likewise, the evidence generally shows positive correlations between the two dimensions of sexism and other gender ideology scales, particularly traditional sexism scales (Glick & Fiske, 1996; Moya, Expósito & Padilla, 2006).

Dating violence is defined as any intentional attack of a sexual, physical or psychological nature by one member of the dating couple on the other (Hernando, 2007). Hernando also claims that sexism is a prerequisite for partner violence. One of the main questionnaires for evaluating this type of violence is the *Cuestionario de violencia entre novios* (CUVINO), a test that has been validated for evaluating violent behaviour during conflicted relationships. According to the findings of León-Ramírez and Ferrando (2014), CUVINO essentially evaluates two main factors that derive from eight lower-order facets: namely, (a) Physical Violence (PV, Sexual, Physical and Instrumental) and (b) Emotional Violence (EV, Indifference, Coercion, Gender, emotional punishment, humiliation).

According to Glick and Hilt (2000), psychoeducational intervention is most necessary and effective at preventing gender violence in transition periods, because it is in these stages that there is greater flexibility to accept new concepts and a greater openness to influences, before attitudes are consolidated (Ruble, 1994). Various research projects have clearly established a relation between the beliefs and attitudes to violence (emotional components) and the perpetration of violence (behavioural component) (Carrión, Gázquez, Pérez-Fuentes & Santiuste, 2010; Díaz-Aguado, 2002, 2004). Adolescents who have high levels in all types of sexism (hostile, benevolent,

ambivalent, neosexism) also have high levels of justification of violence among peers, domestic violence and violence against minorities (Garaigordobil & Aliri, 2013).

To sum up, in this study we consider sexism, defined by the dimensions of Hostile Sexism (HS) and Benevolent Sexism (BS), to be a predictor of both physical and emotional gender violence insofar as it leads young people to create a stereotyped image of gender. At the same time, this creates an umbalance of 'power' between men and women, which encouraged the emergence of violent behaviour. This general perspective gives rise to the following hypotheses

Aims and hypotheses

The present study has the following three main aims:

1. To assess the measurement invariance of sexism in the two populations under study. Given that in previous exploratory studies the ASI has shown a clear structure that is very similar in different populations, our hypothesis is that the present data is in agreement with a strong invariance structure (will be defined below).
2. To assess mean differences in HS and BS in the two populations assuming that the condition of strong invariance is obtained. As discussed below, mean equivalence would be an 'ideal' condition if existing programs in one population were to be implemented in a second population. Experience of one of the authors, however, together with previous evidence (León-Ramírez & Ferrando, 2013, 2014; Glick et al., 2004) suggests that equivalence is not expected. Rather, we predict higher levels of both BS and HS in the Mexican group.
3. The third type of assessment concerns the analysis of the relations between the PV and EV measures of dating violence and the HS and BS dimensions. At first, according to the view discussed above, we expect to find a 'positive manifold' structure in which higher levels of both HS and BS are associated with higher levels of both physical and emotional violence (e.g. Cruz, Zempoaltécatl & Correa, 2005). Furthermore, based on both conceptual grounds and previous evidence (León-Ramírez & Ferrando, 2013, 2014) we expect the relations between HS and PV to be strongest in both the Mexican and the Catalan groups. However, we do not have enough information to predict whether the structure of relations will be the same in both cultures.

Method

Participants and procedure

Two intentional samples of undergraduate students were used. The first sample was made up of 520 students from a public Catalan university of Lleida (145

boys, 375 girls). The second was made up of 693 students from a public Mexican university of Tabasco (189 boys, 504 girls). The age and the distribution of their socioeconomic status were similar in both samples: the average age was 20.85, and in both cases there was a clear predominance of medium-level status. As previously discussed in Leon-Ramírez and Ferrando (2013, 2014) the study aimed to measure sexism in young people with high educational levels. This aim justifies the intentional sampling mentioned above.

The measures were administrated in paper-and-pencil format in classroom groups and always by the same examiner. Administration was voluntary and anonymous: the only data requested were gender, age, socioeconomic level, whether they had suffered any violence during their childhood and the type of career that studies the university from technical studies (engineering) to humanistic (social service).

Measures

The main questionnaire-type measure of the study was the *Ambivalent Sexism Inventory* (ASI) originally developed by Glick and Fiske (1996) for assessing the ambivalent attitudes of men towards women. This article used the Spanish ASI version by Expósito, Moya and Glick (1998) made up of 22 positively oriented items with a Likert response format going from 0 (absolutely disagree) to 5 (fully agree), in which higher scores indicate higher levels of sexism. In accordance with previous research (León-Ramírez & Ferrando, 2013, 2014), the hypothesized structure for the ASI was bidimensional with a general dimension of Hostile Sexism and a general dimension of Benevolent Sexism.

The second group of questionnaire-based measures were the "physical violence" (PV) and "emotional violence" (EV) scores taken from the "*Cuestionario de Violencia de Novios* [*sic*] –CUVINO– (Rodríguez, Antuña, Rodríguez, Herrero & Nieves, 2007) which were used as dependent variables in the model to be discussed below. Details on how these scores are derived can be found in León-Ramírez and Ferrando (2014).

Data analysis

Data was analyzed using a multiple-group extension of a structural equation model (SEM) with two latent variables and two external regressors (e.g. Bollen, 1989). The measurement part of the SEM was a bidimensional linear factor-analytic model in which the ASI items 2, 4, 5, 7, 10, 11, 14, 15, 16, 18 and 21 defined a factor of HS and items 1, 3, 6, 8, 9, 12, 13, 17, 19, 20 and 22 defined a factor of BS. So, the measurement sub-model had an independent cluster structure. The regression part of the model consisted of the regression of the CUVINO PV and

EV scores on the SB and SH factors. This proposed structure must be considered to be an approximation for two reasons: (a) the linear measurement model is an approximation when categorical item responses are fitted, and (b) the external variables used in the regression part of the model are, in fact, fallible test scores. These simplifications, however, are assumed to be justified because an 'optimal' model based on categorical-variable methodology and full regression relations between latent variables is considered to be too complex to arrive at stable results (Ferrando & Lorenzo-Seva, 2014). In contrast, the (relatively) simple approach taken here was workable, behaved and fitted well, and provided meaningful results.

As discussed above, the first hypothesis of the study was that the measurement properties of the ASI are the same in the two populations under study. In methodological terms, this hypothesis implies measurement invariance in the items' intercepts and factor loadings (e.g. Hernández & González-Romá, 2003), a condition which is known as "strong invariance" in the factor-analytic literature (Millsap & Meredith, 2007). So, the measurement sub-model we fitted was a strongly-invariant model in which the 22 intercepts and 22 loadings were constrained to be the same in the Catalan and Mexican groups. An acceptable fit of this model would then support the hypothesis of invariance or, in other words, that the ASI functions equivalently in both groups. It should be pointed out that an even more constrained condition in which the item intercepts, loadings and residual variances are the same, and which is known as strict invariance (Millsap & Meredith, 2007) would be theoretically ideal for assuming measurement equivalence. Experience, however, suggests that this condition is generally unrealistic in practice and so unnecessarily restrictive (see Little [1997] for a discussion).

The parameters that were not constrained to be equal in both groups were: (a) the means and variances of the HS and BS factors, and (b) the regression weights of PV and EV on HS and BS. Assessment of between group-differences in these parameters would provide evidence for the remaining aims of the study. More in detail, the issue of whether the sexism levels are or are not the same in both populations is assessed by testing the mean differences in HS and BS in both groups. And the issue of whether the violence-sexism relations are or are not the same in both groups is assessed by testing the differences in the regression weights PV and EV on HS and BS in both groups.

The model described so far was fitted by using robust MLM estimation as implemented in the Mplus versión 5.1 program (Muthén & Muthén, 2007). As a baseline reference model we first fitted a weakly invariant model in which only the 22 loadings were constrained to be the same in both groups. The goodness-of-fit indices which were used for assessing model appropriateness were: (a) RMSEA with its 90% confidence interval (Browne & Cudeck, 1993), (b) GFI , (c) CFI (e.g. Hu & Bentler, 1999), and (d) the root mean square of the standardized residuals (z-RMSR). As incremental indices for assessing the loss of fit when going from the weakly invariant model to the strongly invariant model we examined two cri-

teria: the RMSEA-based root deterioration per restriction (RDR, Browne, & Du Toit 1992), and the ΔCFI (Cheung & Rensvold, 2002).

Results

Table 1 shows the model-data fit results for the two nested models described in the section above. According to the literature (e.g. Browne & Cudeck, 1993, Hu & Bentler, 1999, Cheung and Rensvold, 2002), the fit of the weakly invariant model can be regarded generally as quite acceptable, except for the relatively lof CFI value. Examination of this issue suggested that the source of the problem was not model misspecification, but rather relatively low inter-item correlations in many cases. Because of the modest internal consistency, the chi-square value for the null model was relatively low, and this explains the low value of the CFI.

As far as incremental fit is concerned, the weakly invariant model fits indeed better than the target model. However, the fit does not seem to worsen excessively when the additional strong invariance restrictions are imposed. The RDR value of 0.08 suggests that the loss of fit is non-substantial (Browne, & Du Toit 1992), and the 0.01 value of ΔCFI suggests that it is negligible (Cheung & Rensvold, 2002). Overall, the results give support to the hypothesis of strong measurement invariance, and so, we conclude that the ASI items function equivalently in the Mexican and Catalan groups, and that there are no items with culture-related differential functioning or, more conceptually, that Mexican and Catalan undergraduates interpret the ASI items in the same way.

TABLE 1. MULTIPLE-GROUP ANALYSIS: FIT RESULTS FOR THE MEASUREMENT MODELS.

Model	χ^2	*df*	*RMSEA*	*90% C.I.*	*RDR*	*CFI*	*GFI*	*z-RMSR*
Weak I.	1106.12	510	0.044	(0.040;0.047)		0.91	0.96	0.054
Strong I.	1308.07	530	0.049	(0.046;0.053)	0.08	0.90	0.96	0.064

Table 2 (see next page) shows the structural estimates for both groups. To interpret them, it must be taken into account that the means of HS and BS were set to zero in the Mexican group, and were freely estimated relative to this scaling in the Catalan group (e.g. Muthén & Christofferson, 1981). With this reference scaling, results are quite clear: the mean group levels in both HS and BS are significantly and substantially lower in the Catalan group. As far as significance is concerned, note that the zero mean value is outside the 90% confidence interval in both contrasts. As for practical significance, the effect-sizes (Cohen's *d*) are medium for the HS contrast and high for the BS contrast (Cohen, 1988). So, the difference between the two populations is even more pronounced for BS.

TABLE 2. STRUCTURAL PARAMETER ESTIMATES AT THE GROUP LEVEL.

Group	***HS***		***BS***		***P (HS, BS)***
	Mean	*Std*	*Mean*	*std*	
Mexico	0 (fixed)	0.54	0 (fixed)	0.87	0.62
Catalonia	-0.37 (-0.45; -0.29)	0.58	-0.85 (-0.94; -0.74)	0.70	0.69
Effect size	0.49 (medium)		0.95 (large)		

Table 3 shows the regression estimates concerning the sexism-violence relationships. In general terms, the results agree with the predictions: HS is a predictor of both PV and EV, and the strength of the relations is similar in both groups. Furthermore, the clearest relation appears to be that between HS and PV. Although this set of relations is clear and statistically significant, higher validity coefficients were expected. As discussed in León-Ramirez and Ferrando (2014), a possible explanation for these results is a certain lack of sensitivity of the CUVINO PV and EV scores as measures of violence.

It should be noted that relations between BS and violence were non-significant in the Catalan sample. In the Mexican sample, however, the relations were weak but significant and negative. So, higher levels of benevolent sexism appear to be associated to lower levels of violence in this sample. Our results here are similar to those obtained by Cruz at al. (2005) who correlated the components of hostile sexism positively with partner violence. However, the components of benevolent sexism correlated negatively.

TABLE 3. STANDARDIZED VALIDITY ESTIMATES IN BOTH GROUPS.

	Mexico		***Catalonia***	
Validity term	*raw*	*disattenuated*	*raw*	*disattenuated*
ρ(HS, EV)	0.192 (0.05)	0.20	0.22 (0.07)	0.23
ρ(BS, EV)	-0.12 (0.05)	-0.13	0.02 (0.06) N.S.	0.02 N.S.
ρ(HS, PV)	0.25 (0.05)	0.26	0.19 (0.06)	0.20
ρ(BS, PV)	-0.13 (0.05)	-0.14	0.09 (0.06) N.S.	0.09 N.S.
ρ(PV, EV)	0.81	0.67		

Discussion and conclusions

Since the initial proposal made by Glick and Fiske in 1996, the measurements obtained with the ASI have shown a remarkable degree of cross-cultural equivalence across different studies. Thus, in a cross-cultural study based on more than 15,000 participants from 19 nations (Glick et al., 2000) the same factorial structure was found in 16 of the 19 countries assessed. The present research provides further support for the appropriateness of the ASI-based measurements, but is far more rigorous than the previous research. In more detail, previous studies were exploratory and based on an unrestricted factor-analytic model. In contrast, the present study uses a multiple-group restricted measurement model which allows invariance to be statistically assessed on an item-by-item basis. The result that strong measurement invariance is attained in both the Catalan and the Mexican groups is, in our opinion, highly noteworthy.

The extensions of the measurement model allow further important points to be rigorously assessed. Mean group differences are assessed as structural parameters in latent-trait scaling instead of the usual comparisons based on raw mean scores which are purely descriptive and likely to contain measurement error. As expected, the results showed that both mean levels were substantially higher in the Mexican group. However the largest effect size was for Benevolent Sexism. The previous results obtained in comparative studies (Martín-Llaguno & Navarro-Beltrá, 2013) suggest that the high levels of benevolent Sexism seem to be a differential characteristic of the Mexican population.

Benevolent sexism does not represent sympathy for women. Rather it is a fundamentally traditional attitude to gender (Glick & Fiske, 2001), which represents subjective affect as a form of prejudice, more specifically as a paternalistic prejudice (Díaz, Rosas and González, 2010). The results obtained here, therefore, agree with this paternalistic prejudice and with the ideology that women are inferior to men.

The extended model enables the violence-sexism relations to be rigorously assessed. The most general results agree with the expectations. In both groups, hostile sexism is the strongest predictor of both emotional and, specially, physical violence. However, even when the disattenuated validity coefficients are acceptable in personality measurement, we believe that predictions could be better if improved measures of violence could be used. This point is discussed in Leon-Ramírez and Ferrando (2014).

The most interesting differential results are those on benevolent sexism. In the Mexican group there are weak but significant negative correlations between BS and both physical and emotional violence. In contrast, in the Catalan group these relations are non-significant. As mentioned above, the BS-related results have been previously obtained in Mexico, but not in other cultures. In our opinion, male chauvinism/sexism is part of the Mexican culture (Díaz et al., 2010), so tolerance of

benevolent sexism (paternalistic subjective prejudice) is greater and this explains the low correlation with violence. Because of its conceptual charge, only the components of hostile sexism correlate positively with partner violence (Cruz et al., 2005). However, the relations between the two types of sexism show that they both tend to present together although benevolent sexism is less predictive of violence.

In conclusion, even though some interesting differential results appeared in the study, the main results suggest that the preventive programs implemented in Catalonia would also work in Mexico. First, the strong measurement invariance attained by the ASI scores suggests that sexism as an antecedent variable can be assessed with the same degree of accuracy and validity in both populations. Second, the most important relation as far as preventive programs is concerned –Hostile Sexism as a predictor of Physical Violence– appears to have about the same direction and intensity in both groups. These preventive programmes would focus on providing young people the tools for the early detection of abusive behaviours with the aim of reducing the percentage of women who are victims without their being aware of it (Rodríguez-Franco, 2012). In this regard, research such as that carried out by Garaigordobil and Aliri (2013) has found that both sexist men and women tend to lay the blame more on the victim of partner violence and less on the perpetrator, which agrees with the relations found in the present study between sexist attitudes and physical violence.

The implementation of preventive programmes focusing on reducing ambivalent sexism may reduce the levels of gender violence in Mexico and, at the same time, may also help improve the existing programmes in Catalonia. In this regard, validated tools that have universal validity need to be developed so that they can be used to combat a problem of global dimensions.

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