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ORIGINAL ARTICLE

Validation of the Interpersonal Exchange Model of Sexual Satisfaction Questionnaire in adults with a same-sex partner☆

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Abstract
Background/Objective: The Interpersonal Exchange Model of Sexual Satisfaction Questionnaire (IEMSSQ) is one of the few instruments that has been developed from a theoretical model and assess sexual satisfaction. In addition, it has been successfully validated in Spanish heterosexual population. The objective of this study is to adapt and examine its psychometric properties (reliability, evidence of validity, and measurement invariance across sexual orientation and sex) in gay people in a relationship. Method: A sample of 1,820 adults, of whom 50% are gay people and 55% men, answered the Spanish version of the IEMSSQ. In addition, subjects with gay orientation answered the Massachusetts General Hospital-Sexual Functioning Questionnaire and the Dyadic Adjustment Scale. Results: When comparing by sex and sexual orientation, the IEMSSQ has a strict invariant structure. Its reliability is good, and the evidence of construct and concurrent validity is adequate. However, the components of equality are moderate. Conclusions: The IEMSSQ makes it possible to compare the sexual satisfaction between gay/heterosexual men and women, presenting good psychometric properties in gay people, constituting an useful instrument in the clinical and research field.

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PALABRAS CLAVE
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estudio instrumental

Validación del Interpersonal Exchange Model of Sexual Satisfaction Questionnaire en adultos con pareja del mismo sexo

Resumen
Antecedentes/Objetivo: El *Interpersonal Exchange Model of Sexual Satisfaction Questionnaire* (IEMSSQ) es uno de los escasos instrumentos que evalúan la satisfacción sexual desde un modelo teórico y ha sido validado con éxito en población española heterosexual. El objetivo de este estudio es adaptar y examinar sus propiedades psicométricas (fiabilidad, evidencias de validez e invarianza según orientación sexual y sexo) en adultos gais con una relación de pareja. Método: Una muestra de 1.820 adultos, de los cuales el 50% son gais/lesbianas y el 55% hombres, contestó a la versión española del IEMSSQ. Además, los sujetos con orientación gay contestaron el *Massachusetts General Hospital-Sexual Functioning Questionnaire* y la Escala de Ajuste Diádico. Resultados: El IEMSSQ posee una estructura invariante estricta, por sexo y orientación sexual. Su fiabilidad es buena, y las evidencias de validez de constructo y concurrente adecuadas, aunque moderadas en los componentes de igualdad. Conclusiones: El IEMSSQ permite comparar la satisfacción sexual entre hombres gais y mujeres lesbianas y heterosexuales, presentando buenas propiedades psicométricas en adultos gais, constituyendo un instrumento útil en el ámbito clínico y en el de la investigación.

Sexual satisfaction is an essential dimension of human sexuality and is associated with individual, interpersonal, social, and cultural variables (Calvillo, Sánchez-Fuentes, & Sierra, 2018; Sánchez-Fuentes, Santos-Iglesias, & Sierra, 2014). Lawrance and Byers (1995, p. 268) define it as ''an affective response arising from oneś subjective evaluation of the positive and negative dimensions associated with oneś sexual relationship''. Despite its importance, few consolidated theoretical models are addressing its study. These include the Interpersonal Exchange Model of Sexual Satisfaction (IEMSS; Lawrance & Byers, 1995), which explains sexual satisfaction based on the exchange of sexual rewards and costs associated with sexual relationships within the couple. Positive or pleasant aspects of sexual relations represent rewards, whereas negative or unpleasant aspects represent costs. The IEMSS states that sexual satisfaction is determined by four components: (a) the balance between sexual rewards and sexual costs (REW - CST), (b) the comparative level or balance between expected sexual rewards/costs and actual sexual rewards/costs (CL_{REW} - CL_{CST}), (c) the perceived equality of sexual rewards and sexual costs between the member of the couple (EQ_{REW} and EQ_{CST}), and (d) relationship satisfaction (Byers & Macneil, 2006). The IEMSS has been validated in Spain in heterosexual couples (Sánchez-Fuentes & Santos-Iglesias, 2016).

The Interpersonal Exchange Model of Sexual Satisfaction Questionnaire (IEMSSQ; Lawrance, Byers, & Cohen, 2011) is based on the IEMSS, and it has been adapted and validated for heterosexual Spanish population with excellent psychometric properties (Sánchez-Fuentes, Santos-Iglesias, Byers, & Sierra, 2015). It includes four theoretically related measures: the Exchange Questionnaire (EXQ), the Global Measure of Sexual Satisfaction (GMSEX), the Global Measure of Relationship Satisfaction (GMREL), and the Rewards/Costs Checklist (RCC). The EXQ is composed of six items, and it measures the different components of the IEMSS. These six items use nine-point scales. Item 1 assesses the overall level of sexual rewards (REW) ranging from *Not at all rewarding* (1) to *Extremely rewarding* (9). Item 2 assesses the actual level of sexual rewards in comparison with the expected level (CL_{REW}) ranging from *Much less rewarding in comparison* (1) to *Much more rewarding in comparison* (9). Item 3 assesses the perceived level of rewards in comparison to partnerś level of rewards (EQ_{REW}) ranging from *My rewards are much higher* (1) and *My partner's rewards are much higher* (9). The three remaining items (4, 5, and 6) are similar to the first three, but they assess sexual costs (CST). The components of the IEMSS (REW - CST, CL_{REW} - CL_{CST}, EQ_{REW}, and EQ_{CST}) are calculated as follows. The total balance between rewards and costs (REW - CST) is the result of the subtraction between the score of item 4 and the score of item 1. The level of comparison between sexual rewards and costs (CL_{REW} - CL_{CST}) is calculated by subtracting the score of item 5 from the score of item 2. In both cases, possible scores range from −8 to +8, and higher scores represent more sexual rewards. Finally, for calculate the perceived equality of sexual rewards and costs (EQ_{REW} and EQ_{CST}, respectively), items 3 and 6 are recoded in such a way that the middle point of the response scale (5), which represents perfect balance, is assigned a score of 4, and the remaining points are assigned decreasing scores down to 0. Therefore, higher scores represent higher equality between the partners. The GMSEX assesses overall satisfaction with the sexual relationship using five seven-point bipolar subscales: *Very bad/Very good; Very unpleasant/Very pleasant; Very negative/Very positive; Very unsatisfying/Very satisfying; and Worthless/Very valuable*. The GMREL is identical to the previous measure of sexual satisfaction, but it assesses overall satisfaction with one's relationship. Finally, the RCC consists of 58 items representing different sexual exchanges (e.g., level of affection you and your partner express during sexual

activities), which can be valued as rewards, costs, both or neither.

Despite that the IEMSSQ has not yet been validated for gay people, a recent systematic review on sexual satisfaction in same-sex couples (Calvillo et al., 2018) shows that one in every five articles uses the IEMSSQ to assess sexual satisfaction among gay people. Therefore, the aim of the present instrumental study (Montero & León, 2007) is to assess the psychometric properties of the Spanish version of the IEMSSQ when used with adults with a same-sex partner. Firstly, an item analysis will be carried out and the internal consistency reliability of the GMSEX and GMREL measures will be obtained. Secondly, evidence of the validity of all measures of the IEMSSQ (GMSEX, GMREL, REW - CST, CL_{REW} - CL_{CST}, EQ_{REW}, EQ_{CST}, number of sexual rewards, and number of sexual costs) will be provided, correlating their scores with each other, and with sexual functioning and dyadic adjustment. Thirdly, the invariance of GMSEX and GMREL will be examined by sexual orientation and sex. Finally, GMSEX and GMREL measures will be compared based on sexual orientation and between gay men and lesbians. The present study proposes the following hypotheses: (1) The scores of the components will correlate positively with sexual satisfaction, sexual functioning, and dyadic adjustment, except the number of sexual costs, which will correlate negatively (Sánchez-Fuentes et al., 2015; Sánchez-Fuentes, Salinas, & Sierra, 2016); (2) GMSEX and GMREL will be invariant measures based on sexual orientation and sex (Arcos-Romero & Sierra, 2019); (3) gay and heterosexual people will not differ in terms of sexual satisfaction and relationship satisfaction (Sánchez-Fuentes & Sierra, 2015); and (4) lesbian women will have greater sexual satisfaction than gay men (Holmberg & Blair, 2009; Peplau, Cochran, & Mays, 1997).

Method

Participants

A sample of 1,820 adults divided into two independent subsamples was used: gay people and heterosexual people. Non-probabilistic convenience sampling was used to obtain a subsample of 910 participants (505 men and 405 women) who met the following inclusion criteria: (a) Spanish language as their mother tongue; (b) be 18 years of age or older; (c) have a gay orientation; (d) be cisgender; and (e) maintained a relationship with another cisgender and same-sex person for at least three months. In addition, there was a second subsample of 910 participants selected by incidental sampling (505 men and 405 women), who met the same inclusion criteria, except that they were exclusively heterosexual and maintained a relationship with a cisgender person of different sex for at least three months at the time of the evaluation. Table 1 shows the sociodemographic information of the participants.

Instruments

Sociodemographic and Sexual History Questionnaire. This *ad hoc* questionnaire collects information on sexual identity, age, nationality, relationship, partner's sexual identity, partner's age, duration of the relationship, exclusivity of the relationship, cohabitation with the partner, sexual relations with the current partner, age of first sexual relation (anal, oral, or vaginal) and number of sexual partners.

Kinsey scale (Kinsey, Pomeroy, & Martin, 1998). Identifies sexual orientation using eight response options from *exclusively heterosexual* (1) to *exclusively homosexual* (7). An eighth option was included to account for asexuality. Only subjects who marked the exclusively homosexual option (gay subsample) or exclusively heterosexual (heterosexual subsample) were selected.

Spanish version of the IEMSSQ (Lawrance et al., 2011), validated by Sánchez-Fuentes et al. (2015) described above.

Spanish version of the Massachusetts General Hospital-Sexual Functioning Questionnaire (MGH-SFQ; Fava, Rankin, Alpert, Nierenberg, & Worthington, 1998), validated by Sierra, Vallejo-Medina, Santos-Iglesias, and Lameiras Fernández (2012). Its five items assess sexual functioning during the past month: interest, arousal, orgasm, erection (only for men), and overall sexual satisfaction (e.g., How has your interest in sex been over the past month?). Answers are given on a five-point scale from *Has decreased completely* (0) to *Normal* (4). Given that the possible range of scores is different for men and women, the mean score was used instead of the total score. Item 5 (Sexual satisfaction) was excluded from the calculation of the mean score to avoid the overlapping of the sexual functioning and sexual satisfaction measures; this item was then used independently as an additional measure of sexual satisfaction. Higher scores indicate better sexual functioning. This version has shown good reliability and convergent validity (Sierra et al., 2012). In the present study, a Cronbach's alpha of .84 was obtained in gay men and .83 in lesbian women.

Reduced Spanish version of the Dyadic Adjustment Scale (DAS; Spanier, 2017), adapted by Santos-Iglesias, Vallejo-Medina, and Sierra (2009). Its 13 items (e.g., How often do you and your partner quarrel?) assess dyadic adjustment in the couple based on three dimensions (Satisfaction, Consensus, and Cohesion). The scale uses six-point response options (from *Always disagree* to *Always agree*) and five-point response options (from *Never* to *Everyday*), depending on the item. Higher scores indicate higher adjustment. The scale presents adequate reliability and validity (Santos-Iglesias et al., 2009). A Cronbach's alpha of .79 was obtained in the present study, both for gay men and lesbian women.

Procedure

Firstly, a linguistic adaptation of the RCC was carried out so that it could be answered by gay people. Subsequently, the draft was sent to three experts in Human Sexuality for the examination of the wording of the items. Nine items that explicitly allude to heterosexual people were modified (e.g., Ability/inability to have a child was replaced with Ability/inability to have a child [either adopted or biological]). After the expert judgment, a pilot study was conducted in which the questionnaire was administered to ten gay adults (five men and five women). After each item, they were asked whether the text was understandable, and if they expressed doubts, they were asked to specify. Given that all the items were reported as understood, no additional changes were made, which resulted in the final version of the RCC for

Table 1 Sociodemographic characteristics of the participants.

	Gay people ($n = 910$)					Heterosexual people ($n = 910$)				
	Men ($n = 505$)		Women ($n = 405$)			Men ($n = 505$)		Women ($n = 405$)		
	Rank	*M (SD)*	Rank	*M (SD)*	t / χ^2	Rank	*M (SD)*	Rank	*M (SD)*	t / χ^2
Age (years)	18–62	31.11 (9.43)	18–63	28.75 (8.55)	3.94***	18–74	34.67 (12.26)	18–65	30.64 (11.16)	5.18***
	M (SD)		*M (SD)*			*M (SD)*		*M (SD)*		
First sexual relation (years)	17.14 (3.99)		17.23 (2.98)		−0.34	17.73 (2.81)		17.89 (2.94)		−1.07
Duration of relationship with current partner (months)	58.71 (67.55)		47.41 (52.43)		2.84**	158.10 (137.65)		136.73 (121.56)		2.60**
	M_e	*M (SD)*	M_e	*M (SD)*		M_e	*M (SD)*	M_e	*M (SD)*	
Number of sexual partners	10	39.18 (82.97)	5	7.46 (9.43)	8.30***	4	6.10 (9.89)	2	3.52 (4.19)	5.17***
	n (%)		*n* (%)			*n* (%)		*n* (%)		
Nationality										
Spanish	318 (63)		275 (67.90)		2.41	505 (100)		405 (100)		
Other Hispanic countries	187 (37)		130 (32.10)			0		0		
Education level										
Primary Education	7 (1.40)		8 (2)			68 (3.50)		31 (7.70)		
Secondary Education	107 (21.20)		90 (22.20)		0.66	188 (37.20)		102 (25.20)		29.71***
University Degree	391 (77.40)		307 (75.80)			249 (49.30)		272 (67.20)		
Exclusive Relationship										
Yes	418 (82.80)		387 (95.60)		35.99***	494 (97.80)		387 (95.60)		3.74
No	87 (17.20)		18 (4.40)			11 (2.20)		18 (4.40)		
Cohabit with your current partner										
Yes	285 (56.40)		212 (52.30)		1.57	275 (54.50)		187 (46.20)		6.17*
No	220 (43.60)		193 (47.70)			230 (45.50)		218 (53.80)		

Note. *M*: mean; *SD*: standard deviation; M_e: median.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

people with a same-sex partner. No linguistic adaptation was required for the rest of the IEMSSQ scales. See Appendix 1.

The instruments were administered using both the traditional paper and pencil format, and online format; these two methods have been shown to present no differences in terms of the information on sexual behaviors that they can obtain (Sierra, Moyano, Vallejo-Medina, & Gómez-Berrocal, 2018; Velten, Scholten, & Margraf, 2018). The participants who completed questionnaires in paper and pencil format were contacted at educational centers, social centers, public and leisure places, as well as through lesbian, gay, bisexual, and transgender (LGBT) associations. The online version was distributed using virtual platforms (Facebook®, Twitter®, WhatsApp®, and e-mail), using the Limesurvey® software; the IP addresses of the respondents were controlled. To access the survey, the participant had to confirm the access by answering a security question consisting of a random sum. All participants completed the evaluation voluntarily, and their anonymity and the confidentiality of the data were guaranteed at all times. Before answering the questionnaire, the respondents were asked to read and accept the informed consent forms, which included a description of the purpose of the study and information on data confidentiality and privacy. The study was approved by the Ethics Committee in Human Research of the University of Granada.

Data analysis

The omega (McDonald, 1999; Ventura-León, 2018) and ordinal alpha coefficients (Zumbo, Gadermann, & Zeisser, 2007) were used to estimate the internal consistency of GMSEX and GMREL. The MBESS package (version 4.2.0; Kelley, 2018) was used for calculating omega, and the userfriendlyscience package (version 0.7.2; Peters, 2018) was used for calculating ordinal alpha. Both packages run in the R® environment (version 3.4.4; R Core Team, 2016) with its RStudio® integrated interface (version 1.1.447; RStudio Team, 2018). The analysis used the omega hierarchical, which gives the proportion of variance of the scores of each scale based on a general factor (McDonald, 1999; Zinbarg, Revelle, & Yovel, 2007). Pearson's correlations were used to examine construct and concurrent validity. Due to the large size of the sample, a conservative alpha ($p < .01$), as well as Cohen (1988) criterion was used to establish the rank of the effect according to its size: small (0.10), moderate (0.30) and large (0.50). To determine whether GMSEX and GMREL assess two different but related constructs invariably in gay and heterosexual men and women, a Confirmatory Factor Analysis (CFA) was performed using the lavaan package (version 0.6-3; Rosseel, 2012). An analysis of multigroup invariance was carried out, in which four groups were defined: gay men, lesbian women, heterosexual men, and heterosexual women. The progressive invariance (configural, weak, strong, and strict) of the two-factor model was also tested. GMSEX and GMREL were established as the two factors; each factor had five observable variables between errors. The analysis included the Diagonally Weighted Least Squares (WLSMV) estimation method, a robust estimator in case of a lack of multivariate normality designed for ordinal data (Li, 2016). The following criteria were taken into account to assess the multigroup AFC fit: CFI and TLI > .90 and RMSEA < .08 (Hu & Bentler, 1999; Wang & Wang, 2012); in addition, it was established that if the difference between the values of two nested models in the CFI was higher than .01 in favor of the model with fewer restrictions (Bentler, 1990), the model with more restrictions would be rejected (Cheung & Rensvold, 2002). Ultimately, the invariance levels concerning the relationship between observable variables and latent variables were examined (Milfont & Fischer, 2010). Finally, for the analysis of the comparisons of GMSEX and GMREL by sex and sexual orientation, and given that their scores did not adjust to a normal distribution, the Mann-Whitney U was used.

Results

Item analysis

An analysis was made of the median, mean scores and the standard deviation of the items to detect extreme scores (Guillot-Valdés, Guillén-Riquelme, & Buela-Casal, 2019). The means ranged between 5.85 and 6.64 (theoretical range of 1 to 7). Standard deviations ranged from 1 to 1.44. This indicates that the subjects have a response pattern with high frequencies at the upper end (Table 2).

Reliability

In the case of GMSEX, gay men obtained an omega of .90 and an ordinal alpha of .93; in lesbian women, the coefficients were .88 and .92, respectively. In the case of GMREL, gay men obtained an omega coefficient of .94 and ordinal alpha of .95; in lesbian women, values of .92 and .94 were obtained, respectively. The reliability of internal consistency of both scales does not improve with the elimination of any of its items.

Construct and concurrent validity

Evidence on the construct validity of the different IEMSSQ measures except for EQ_{REW} and EQ_{CST} reflects that they were significantly associated with each other in both gay men and lesbian women (Table 3). Regarding concurrent validity, all IEMSSQ measures except for EQ_{REW} and EQ_{CST} were significantly associated with the scores of an individual item of sexual satisfaction, sexual functioning, and dyadic adjustment, both in gay men and lesbian women, presenting sex-based differences in the strength of the associations. In men, EQ_{REW} was associated with the Consensus component of dyadic adjustment and EQ_{CST} with the Satisfaction component; in women, EQ_{CST} was correlated with the Satisfaction component of dyadic adjustment and the global dyadic adjustment score (Table 3).

A series of Fisher r to z transformations were performed to assess the magnitude of the differences between each pair of correlation coefficients and determine whether the magnitude of the correlations between each pair differed significantly between men and women (Sánchez-Fuentes et al., 2015). Due to a large number of comparisons (90), the Bonferroni correction was used to avoid the type I inflated error (Cabin & Mitchell, 2000) ($\alpha = .0005$). Only two pairs of

Table 2 Análisis descriptivo de los ítems de GMSEX y GMREL.

	Men				Women			
	Gay men		Heterosexual people		Lesbian women		Heterosexual people	
GMSEX	M_e	*M (SD)*	M_e	*M (SD)*	M_e	*M (SD)*	M_e	*M (SD)*
Item 1	6	5.94 (1.28)	6	6.08 (1.08)	7	6.24 (1.12)	6	6.04 (1.27)
Item 2	6	6.02 (1.25)	6	6.11 (1)	7	6.36 (1.02)	6	5.95 (1.25)
Item 3	6	5.98 (1.39)	6	6.16 (1.15)	7	6.25 (1.24)	7	6.18 (1.21)
Item 4	6	5.85 (1.44)	6	5.99 (1.16)	7	6.20 (1.28)	6	5.95 (1.32)
Item 5	7	6.20 (1.32)	7	6.25 (1.03)	7	6.55 (1.03)	7	6.19 (1.31)
GMREL	M_e	*M (SD)*	M_e	*M (SD)*	M_e	*M (SD)*	M_e	*M (SD)*
Item 1	7	6.16 (1.21)	6	6.20 (1.09)	7	6.40 (1)	7	6.22 (1.09)
Item 2	6	6.15 (1.15)	6	6.05 (1.16)	7	6.39 (1.03)	6	6.04 (1.23)
Item 3	7	6.13 (1.29)	7	6.22 (1.16)	7	6.27 (1.20)	7	6.22 (1.19)
Item 4	6	6.03 (1.33)	6	6.10 (1.16)	7	6.30 (1.13)	6	6.07 (1.26)
Item 5	7	6.45 (1.11)	7	6.34 (1.05)	7	6.64 (0.93)	7	6.39 (1.12)

Note. M_e: median; *M*: mean; *SD*: standard deviation; GMSEX: Global Measure of Sexual Satisfaction; GMREL: Global Measure of Relationship Satisfaction.

correlations (number of rewards-dyadic adjustment and the number of rewards-Satisfaction component of dyadic adjustment) were statistically different between men and women and significantly higher among men. In other words, the patterns of correlations between the IEMSSQ measures of dyadic adjustment and sexual functioning are similar for gay men and lesbian women.

Factorial invariance

The results obtained show the two-dimensional model (GMSEX and GMREL), evidencing a strict adjustment in the factorial invariance using four groups: gay men, lesbian women, heterosexual men, and heterosexual women. As no differences higher than .01 were obtained in the CFI, the maximum level of adjustment was reached (see Figure 1 and Table 4).

Comparison between GMSEX and GMREL by sexual orientation

Once the strict invariance of GMSEX and GMREL was established, the mean scores of gay men and women were compared with those of heterosexual men and women. Significant differences were found between lesbian and heterosexual women, both in GMSEX ($U = 69950.50$, $p < .001$, $d = 0.24$) and in GMREL ($U = 71788$, $p < .01$, $d = 0.21$); higher scores were obtained by lesbian women in both cases (Table 5).

Sexual satisfaction in men and women with a same-sex partner

Table 6 shows the scores of gay men and women for each IEMSSQ measure. In general, gay men and lesbian women obtained high scores in all the measures. Given its factor invariance, GMREL and GMSEX measures were compared between gay men and lesbian women. Significant differences were found in GMSEX ($U = 83815$, $p < .001$, $d = -.30$) and GMREL ($U = 89223$, $p < .01$, $d = .21$); women scored higher in both cases.

Discussion

The psychometric properties of the Spanish version of the Interpersonal Exchange Model of Sexual Satisfaction Questionnaire (IEMSSQ; Sánchez-Fuentes et al., 2015) were examined in adults with a same-sex partner. Our results showed that the Spanish IEMSSQ version is a reliable and valid instrument to assess sexual satisfaction in this population, as valid as when used in heterosexual people (Sánchez-Fuentes et al., 2015), which allowed for a comparison of the scores between sexual orientations.

With regard to reliability, as in samples from heterosexual people (Arcos-Romero & Sierra, 2020; Moyano, Vallejo-Medina, & Sierra, 2017; Sánchez-Fuentes et al., 2016, 2015; Tavares, Schlagintweit, Nobre, & Rosen, 2019) GMSEX and GMREL presented high internal consistency reliability coefficients.

In relation to the IEMSSQ measures (GMSEX, GMREL, REW - CST, CL_{REW} - CL_{CST}, total number of sexual rewards, and total number of sexual costs), they were correlated, as predicted by the first hypothesis, with sexual satisfaction, sexual functioning, and dyadic adjustment; all correlations were positive except for the total number of sexual costs. As in heterosexual people, higher sexual satisfaction is associated with higher relationship satisfaction, higher dyadic adjustment and better sexual performance (Péloquin, Byers, Callaci, & Tremblay, 2019; Sánchez-Fuentes et al., 2015; Tavares et al., 2019). Conversely, the equality components (EQ_{REW} and EQ_{CST}) were not correlated (or were scarcely correlated) with the measures of sexual functioning and dyadic adjustment. These results are consistent with similar studies focused on heterosexual people (Byers & Macneil, 2006; Sánchez-Fuentes & Santos-Iglesias, 2016; Sánchez-Fuentes

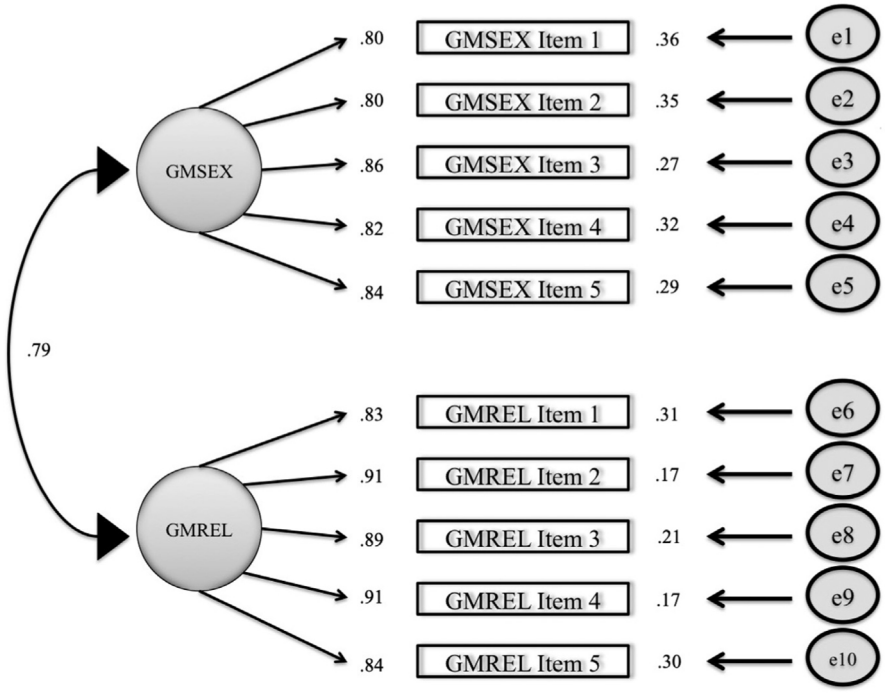
Table 3 Correlations between the components of the IEMSSQ, and between these and external variables in gay men and lesbian women.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. GMSEX	–	.68**	.59**	.58**	.00	.09*	.52**	−.49**	.41**	.34**	.42**	.43**	.29**	.25**
2. GMREL	.67**	–	.45**	.41**	−.06	.03	.35**	−.35**	.34**	.31**	.61**	.59**	.47**	.31**
3. REW - CST	.52**	.41**	–	.72**	−.01	.22**	.48**	−.50**	.45**	.37**	.42**	.47**	.27**	.21**
4. CL_{REW}- CL_{CST}	.55**	.42**	.71**	–	-.03	.17**	.42**	−.43**	.36**	.27**	.34**	.38**	.23**	.15**
5. EQ_{REW}	.06	.02	.08	−.03	–	.41**	-.06	.01	−.06	−.07	−.08	−.02	−.09*	−.07
6. EQ_{CST}	.20**	.12*	.20**	.15**	.45**	–	.06	−.07	−.02	−.03	.05	.11*	.02	−.00
7. REW	.37**	.26**	.30**	.32**	.03	.08	–	−.69**	.38**	.29**	.41**	.37**	.30**	.27**
8. CST	−.44**	−.38**	−.46**	−.42**	−.06	−.16**	−.63**	–	−.37**	−.28**	−.36**	−.25**	−.31**	−.28**
9. Sexual satisfaction item	.39**	.20**	.50**	.43**	.07	.10*	.35**	−.37**	–	.67**	.36**	.28**	.27**	.28**
10. Sexual functioning	.37**	.18**	.37**	.35**	.00	.07	.24**	−.31**	.73**	–	.39**	.34**	.26**	.31**
11. Dyadic adjustment	.41**	.61**	.39**	.39**	.04	.15**	.19**	−.34**	.21**	.21**	–	.80**	.83**	.65**
12. Satisfaction	.38**	.58**	.39**	.38**	.07	.16**	.10	−.25**	.16**	.17**	.79**	–	.48**	.33**
13. Consensus	.31**	.44**	.28**	.29**	.04	.09	.17**	−.28**	.20**	.17**	.81**	.42**	–	.34**
14. Cohesion	.27**	.40**	.23**	.24**	−.04	.09	.17**	−.25**	.12*	.15**	.72**	.41**	.38**	–

Note. GMSEX: Global Measure of Sexual Satisfaction; GMREL: Global Measure of Relationship Satisfaction; REW - CST: balance between sexual rewards and costs; CL_{REW} - CL_{CST}: comparative level of sexual rewards and costs; EQ_{REW}: equality of sexual rewards; EQ_{CST}: equality of sexual costs; REW: number of sexual rewards; CST: number of sexual costs. Above the diagonal are the correlations in men and below the diagonal are in women.

* $p < .05$.

** $p < .01$.



Note. Total sample ($N = 1,820$): gay men ($n = 505$), lesbian women ($n = 405$), heterosexual men ($n = 505$) and heterosexual women ($n = 405$). GMSEX: Global Measure of Sexual Satisfaction; GMREL: Global Measure of Relationship Satisfaction.

Figure 1 Confirmatory Factor Analysis (CFA).

Table 4 Factorial invariance according to sexual orientation and sex: gay men, lesbian women, heterosexual men and heterosexual women.

Model	RMSEA	90% CI RMSEA	CFI	TLI	GFI	RMSR	CMIN/DF	χ^2	*p*
1. Configural	.000	.000–.000	1	1	1	.040	0.311	42.399	1
2. Weak	.023	.009–.032	.995	.995	1	.085	1.231	204.497	.023
3. Strong	.023	.010–.032	.995	.995	1	.087	1.229	233.672	.017
4. Strict	.030	.021–.037	.990	.992	.999	.107	1.395	307.073	<.001

Note. RMSEA: Root Mean Square Error of Approximation; CI: Confidence Interval; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; GFI: Goodness of Fit Index; RMSR: Root Mean Square Residual; CMIN/DF: Chi Square per Degree of Freedom.

Table 5 Comparison of GMSEX and GMREL between gay and heterosexual men and women.

GMSEX	*M*	*SD*	Mann-Whitney U *(U)*	*p*
Gay men	30	5.69	124150	.462
Heterosexual men	30.59	4.76		
Lesbian women	31.61	4.68	69950.50	<.001
Heterosexual women	30.31	5.77		
GMREL				
Gay men	30.92	5.50	125391	.638
Heterosexual men	30.90	5.23		
Lesbian women	31.99	4.62	71788	.001
Heterosexual women	30.95	5.37		

Note. *M*: mean; *SD*: standard deviation; GMSEX: Global Measure of Sexual Satisfaction; GMREL: Global Measure of Relationship Satisfaction.

Table 6 Means (*M*) and standard deviations (*SD*) of the IEMSSQ measures in gay men and lesbian women.

	Rank	Men ($n = 505$) *M (SD)*	Women ($n = 405$) *M (SD)*
GMSEX	5 to 35	30 (5.69)	31.60 (4.68)
GMREL	5 to 35	30.90 (5.50)	31.99 (4.62)
REW - CST	−8 to +8	3.93 (3.44)	4.55 (3.49)
CL_{REW}- CL_{CST}	−8 to +8	3.90 (3.49)	4.14 (3.12)
EQ_{REW}	0 to 4	2.46 (1.43)	2.40 (1.49)
EQ_{CST}	0 to 4	2.87 (1.33)	2.98 (1.32)
REW	0 to 58	43.96 (8.03)	44.14 (7.08)
CST	0 to 58	14.59 (8.89)	12.57 (7.70)

Note. GMSEX: Global Measure of Sexual Satisfaction; GMREL: Global Measure of Relationship Satisfaction; REW - CST: balance between sexual rewards and costs; CL_{REW}- CL_{CST}: comparative level of sexual rewards and costs; EQ_{REW}: equality of sexual rewards; EQ_{CST}: equality of sexual costs; REW: number of sexual rewards; CST: number of sexual costs.

et al., 2015), which suggests that these two components of the IEMSSQ have little or no impact on sexually satisfied people, as was the case in the present study; the two components may have a much more relevant role in sexually unsatisfied people, as pointed out by Byers and Macneil (2006). Further research with gay individuals and low sexual satisfaction should shed light on the role of these two components of equality. Only two (total number of rewards with dyadic adjustment and the Satisfaction component of dyadic adjustment) of the 90 correlations differed significantly between gay men and lesbian women, especially among men. This suggests that the positive perception of sexual exchanges (sexual rewards) in gay men must be high enough for them to feel satisfied with the relationship. Cohen, Byers, and Walsh (2008) reported that, for gay men, rewards were more related to emotional and relational aspects than to other types of satisfactions. Based on this, one might think that the existence of more benefits of this type would enhance the relationship satisfaction since according to the Investment Model, people who are very satisfied with the relationship perceive more benefits (Duffy & Rusbult, 1986; Kurdek, 1991; Kurdek & Schmitt, 1986). In general, the results obtained in the present study coincide those of other previous research with heterosexual people (Lawrance & Byers, 1995; Sánchez-Fuentes et al., 2015), showing that the non-sexual aspects of the relationship have a significant role in sexual satisfaction and the experience of sexual exchanges in both people with a same-sex partner and heterosexuals.

On the other hand, GMSEX and GMREL were shown to be related constructs, and they were invariant regarding sexual orientation and sex, thus confirming hypothesis 2. The present study is the first to demonstrate the possibility of establishing valid comparisons between gay and heterosexual people and between men and women in terms of sexual satisfaction and relationship satisfaction using the GMSEX and GMREL scales, respectively. Our results will support future comparisons between sexual orientations, as well as between men and women from both populations.

Regarding the comparison by sexual orientation, Sánchez-Fuentes and Sierra (2015) reported the absence of significant differences in sexual satisfaction and relationship satisfaction between heterosexual and gay adults; the third hypothesis was focused on this statement. However, we observed this difference only among men, whereas lesbian women reported higher levels of sexual satisfaction and relationship satisfaction than heterosexual women; therefore, hypothesis 3 could not be fully confirmed. The small number of lesbian women in the study by Sánchez-Fuentes and Sierra (2015) could explain the differences with our results. The results obtained in the present study for women were also different from those reported by Ritter, Morris, and Knox (2018), who reported that heterosexual people express higher sexual satisfaction than gay people. Moreover, the assessment of sexual satisfaction was carried out with an ad hoc question, which rules out any further comparison between the studies. In addition, the cultural context is an essential element of any such comparison. Spain is a country with a high acceptance of LGBT manifestations, such as same-sex marriage (Pew Research Center, 2018); this openness could be contributing to the social normalization of people gay, which would, in turn, increase the self-acceptance of gay people, decreasing internalized homophobia and, consequently, increasing sexual satisfaction (Calvillo et al., 2018). These comparative results concerning the fact that lesbian women have reported higher sexual satisfaction than heterosexual women are similar to those obtained by Coleman, Hoon, and Hoon (1983). These differences could be due to the fact that lesbian women, as opposed to heterosexual women, use a greater diversity of sexual practices to achieve orgasms (Coleman et al., 1983). They could also be because the mean of the duration of the current relationship between lesbian women is much lower than heterosexuals; being demonstrated that sexual satisfaction decreases as the duration of the relationship increases (Castellanos-Torres, Álvarez-Dardet, Ruiz-Muñoz, & Pérez, 2013; Schmiedeberg & Schröder, 2016)

In the present study, gay people reported high levels of sexual satisfaction and relationship satisfaction, which reflects results reported by Sánchez-Fuentes et al. (2015) in heterosexuals and Sánchez-Fuentes and Sierra (2015) in gay people. Our comparison between gay men and lesbian women showed significant differences in both GMSEX and GMREL, with higher scores for women. This observation evidences higher sexual satisfaction and relationship satisfaction among lesbian women than among gay men, which confirms hypothesis 4 and is consistent with Holmberg

and Blair (2009). The fact that lesbian women feel more satisfied could be due to the particular characteristics of women and their sexual relationships. For instance, heterosexual women have been shown to place more emphasis and value on the emotional aspects of their relationships and sexual life than men (Peplau, 2003), and emotional and relational aspects are more often perceived as rewards by lesbian women than by lesbian men (Cohen et al., 2008). Based on this, one might think that, in lesbian couples, emotional aspects, such as sexual intimacy, emotional security, and connectedness, would help to make sexual relationships more satisfying (Scott, Ritchie, Knopp, Rhoades, & Markman, 2018), having a more important weight than in male couples.

In summary, the results of the present study demonstrate that the psychometric properties of the Spanish version of the IEMSSQ for gay people with a same-sex partner are adequate, which enabled comparisons of sexual satisfaction and relationship satisfaction among men and women of different sexual orientations. However, the present study is not without limitations. Most participants reported high sexual satisfaction; therefore, it would be necessary to replicate the study in gay samples with different levels of sexual satisfaction. Further research should examine the divergent validity and discriminant validity of the Spanish version of the IEMSSQ in the entire LGBT population, for example in transsexual or intersex people, and same-sex serodiscordant couples.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ijchp.2019.07.005.

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