Article

Validation of the Orgasm Rating Scale in the Context of Masturbation

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Abstract

Background: The Orgasm Rating Scale (ORS) assesses the subjective experience of orgasm. Its psychometric properties have only been examined in the context of sexual intercourse. This study aims to validate the ORS in the context of solitary masturbation. **Methods:** A sample of 1,171 men and 1,424 women aged 18-83 years ($M = 40.51$, $SD = 12.07$) completed the ORS in the solitary masturbation context along with other scales to assess sexual attitudes, solitary sexual desire, propensity for sexual arousal/inhibition, and sexual functioning. **Results:** A four-dimensional structure was confirmed, similar to the homologous version for the context of sexual intercourse. Measures obtained from the ORS were sex and age invariant, exhibited adequate internal consistency, discriminated between people with orgasmic difficulties, and were associated with related variables. **Conclusions:** The ORS is a multidimensional measure that provides reliable, valid measures of the subjective experience of orgasm in the context of solitary masturbation.

Keywords: Orgasm Rating Scale, subjective orgasm experience, masturbation, reliability, validity.

Resumen

Validación de la Orgasm Rating Scale en el Contexto de la Masturbación.
Antecedentes: la Orgasm Rating Scale (ORS) evalúa la experiencia subjetiva del orgasmo. Sus propiedades psicométricas únicamente se examinaron en el contexto de las relaciones sexuales. El objetivo de este estudio es validar la ORS en el contexto de la masturbación en solitario. **Método:** una muestra formada por 1.171 hombres y 1.424 mujeres de 18 a 83 años ($M = 40,51$; $DT = 12,07$) completaron la ORS en el contexto de la masturbación en solitario junto con otras escalas para evaluar actitudes sexuales, deseo sexual solitario, propensión a la excitación/inhibición sexual y funcionamiento sexual. **Resultados:** se confirma una estructura de cuatro dimensiones, al igual que su versión homóloga para el contexto de las relaciones sexuales. Las medidas obtenidas mediante la ORS son invariantes por sexo y edad, sus dimensiones muestran una adecuada consistencia interna, discriminan entre personas con y sin dificultades orgásmicas y se relacionan con variables afines. **Conclusiones:** la ORS es una medida multidimensional que aporta medidas fiables y válidas de la experiencia subjetiva del orgasmo en el contexto de la masturbación en solitario.

Palabras clave: Orgasm Rating Scale, experiencia subjetiva del orgasmo, masturbación, fiabilidad, validez.

Orgasm is characterized by a maximum, variable, and transitory experience of intense pleasure, accompanied by psycho-physiological responses that, as a result of sexual activity, culminate in a marked feeling of well-being (Arcos-Romero & Sierra, 2018; Meston et al., 2004). It is an effective indicator of pleasurable and healthy sexuality because it is related to satisfaction with sexual relationships (Edard & Rusinek, 2020). Traditionally, studies into the orgasm have paid attention to its physiological dimension, and the subjective experience associated with it (i.e., psychological perception of the effects caused by this sexual response) has been less studied (Arcos-Romero & Sierra, 2018; Mah & Binik, 2001).

Lack of standard measures to assess the subjective dimension of the orgasm has probably been one of the reasons why very few studies have shown an interest in this dimension of human sexuality

(Arcos-Romero & Sierra, 2018; Arcos-Romero et al., 2018; Mah & Binik, 2005). The Orgasm Rating Scale (ORS; Mah & Binik, 2002, 2005, 2020) is one of the few instruments that evaluates and quantifies the subjective experience of an orgasm in the contexts of sexual relationships and solitary masturbation.

The ORS was adapted to the Spanish population in the sexual relationships context by Arcos-Romero et al. (2018), who proposed a shorter version with 25 items grouped into four factors: Affective ($\alpha = .90$), which refers to the feelings experienced during an orgasm (e.g., Satisfying); Sensory ($\alpha = .93$), which refers to perceiving the physiological sensations of an orgasm (e.g., Pulsating); Intimacy ($\alpha = .78$), which includes the items that reflect an intimate aspect of the orgasm experience (e.g., Tender); Rewards ($\alpha = .86$), which includes those items about the consequences or gratifying effects of an orgasm (e.g., Relaxing). This shorter version adequately demonstrates validity by relating the scores of its four dimensions to similar constructs, such as erotophilia or sexual satisfaction. The scale also discriminates between people with and without orgasm difficulties.

Despite the sound evidence of the ORS' validation in the sexual relationships context, its psychometric properties have not yet been examined in the solitary masturbation context.

Nowadays, masturbation is understood as a relevant indicator of sexual development (Coleman, 2003). Practicing masturbation favors learning about the type of stimulation that leads to an orgasm by facilitating body self-knowledge and promoting more consistent orgasms (Matsick et al., 2016). Practicing masturbation is related to having sexual fantasies, more frequent sexual activity and a broader sexual repertoire (Driemeyer, 2013). In women, masturbation has been observed to be practiced for pleasure, to relax, to release tension, among other reasons (Burri & Carvalheira, 2019; Carvalheira & Leal, 2013; Kılıç Onar et al., 2020). The frequency of practicing masturbation also predicts orgasmic pleasure and orgasm difficulties (Rowland, Kolba et al., 2020). In fact training in masturbation is a relevant technique to therapeutic approach orgasm problems (Kingsberg et al., 2017; Zamboni & Crawford, 2003).

Having an instrument that evaluates subjective orgasm experience that is validated in the solitary masturbation context would allow us to understand the relation between the context and orgasmic response. Evidence along these lines exists and indicates that orgasmic experience can be determined by the context in which it takes place. Specifically, the orgasm in context of sexual relationships is experienced more intensely than in the solitary masturbation (Bensman, 2011; Goldey et al., 2016; Levin, 2007; Mah & Binik, 2002; Sierra et al., 2021). These differences could be due to not only sensorial factors, which differ according to the context (e.g., being in contact with someone), but also to the negative attitude that traditionally comes with solitary masturbation (Cervilla et al., 2021; Sierra et al., 2021).

Therefore, the overall objective of this study was to validate the Spanish version of the ORS in the solitary masturbation context.

Factorial invariance was examined per sex with the validated version in the sexual relationships context, internal consistency was calculated with evidence for validity based on the relation of the ORS to other variables, for which a positive relation with erotophilia and a positive attitude toward sexual fantasies were expected (Arcos-Romero et al., 2018; Sierra et al., 2020), and in the negative sense with a negative attitude toward masturbation (Cervilla et al., 2021). Likewise, scores were expected to be positively associated with both solitary sexual desire and orgasmic capacity/satisfaction in sexual relationships (Burri & Carvalheira, 2019; Rowland, Hevesi et al., 2020). Finally, it is expected to find discriminant validity evidence based on its capacity to distinguish between people with/without orgasm difficulties, and the group with orgasm difficulties was expected to experience less orgasm intensity with masturbation. This confirms the relation between the orgasm in the sexual relationships and masturbation context (Rowland, Hevesi et al., 2020).

Method

Participants

In this study, 2,595 Spanish heterosexual adults (1,171 men, 1,424 women) participated from 18 to 83 years ($M = 40.51$, $SD = 12.07$). The inclusion criteria were being a Spanish heterosexual adult and having masturbated on some occasion. The mean age for the first masturbation experience was 13 years in men, and was 16.42 years in women. Presently, 96.9% of the participants practice masturbation with different frequencies. Table 1 shows the sample's socio-demographic characteristics.

Table 1 Sociodemographic characteristics of the participants			
	Total $N = 2,595$	**Men** $n = 1,171$	**Women** $n = 1,424$
Age *M (SD)*	40.51 (12.07)	41.22 (12.86)	39.92 (11.36)
Education level *n* (%)			
Primary Education	153 (5.9)	81 (6.9)	72 (5.1)
Secondary Education	856 (33.0)	408 (34.8)	448 (31.5)
University Degree	1.482 (57.1)	637 (54.4)	845 (59.3)
Partner relationship *n* (%)			
Yes	1,893 (72.9)	895 (76.4)	998 (70.1)
No	702 (27.1)	276 (23.6)	426 (29.9)
If you have a partner, do you have sexual activity within that relationship? *n* (%)			
Yes	1,756 (92.8)	827 (92.4)	929 (93.1)
No	137 (7.2)	68 (7.6)	69 (6.9)
If you do not have a partner, have you had sex in the last six months? *n* (%)			
Yes	436 (68.2)	148 (59.2)	288 (74)
No	203 (31.8)	102 (40.8)	7.1 (26)
Age of first sexual experience *M (SD)*	17.72 (3.22)	18.02 (3.50)	17.48 (2.96)
Age of first masturbation experience *M (SD)*	14.86 (5.35)	13 (2.42)	16.42 (6.52)
Current masturbation frequency *n* (%)			
Never	78 (3.1)	34 (3)	44 (3.2)
Less than once a month	219 (8.8)	58 (5.1)	161 (11.8)
Once a month	69 (2.8)	17 (1.5)	52 (3.8)
A few times a month	526 (21.1)	146 (12.9)	380 (27.9)
Once a week	186 (7.5)	66 (5.8)	120 (8.8)
A few times a week	1.012 (40.5)	516 (45.5)	496 (36.4)
Once a day	291 (11.7)	214 (18.9)	77 (5.7)
More than once a day	115 (4.6)	84 (7.4)	31 (2.3)

Instruments

Background Questionnaire. It collected data about sex, age, level of education, nationality, couple relationship, sexual activity, sexual orientation, age when the first sexual relation occurred, masturbation experience, age when the first masturbation experience occurred and masturbation practice frequency.

The Spanish version of the Orgasm Rating Scale (ORS; Arcos-Romero et al., 2018). This scale evaluates the subjective orgasm experience with 25 adjectives answered on a 6-point Likert-type scale: 0 (*Does not describe it at all*) to 5 (*Describe perfectly*). The scores of its dimensions are obtained by the direct addition of its items ranging from 0 to 30 for the Affective dimension, 0 to 65 for the Sensorial dimension, and from 0 to 15 for the Intimacy and Rewards dimensions, respectively. The participants answered in relation to their more recent orgasm during solitary masturbation (during any sexual activity they had alone).

The Spanish version of the Negative Attitudes Toward Masturbation Inventory (NATMI; Cervilla et al., 2021). It measures negative attitudes toward masturbation with 10 items (e.g., "I feel guilty about masturbating"), which are answered on a 5-point Likert-type scale ranging between 1 (*Not at all true for me*) and 5 (*Extremely true for me*). Total score results from the addition of the direct and inverse items, ranging from 10 to 50. Its internal consistency (alpha ordinal) is .95. It adequately evidences construct and discriminant validity with other psychosexual variables and sexual functioning. In our study the ordinal alpha coefficient was .94.

The Spanish version of the Sexual Opinion Survey-6 (SOS-6; Vallejo-Medina et al., 2014). It evaluates erotophilia with six items (e.g., "Masturbation can be an exciting experience") answered on a 7-point Likert-type scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The addition of their direct and inverse item scores ranges from 6 to 42. Its internal consistency is Cronbach's $\alpha = .74$. Its scores correlate with similar constructs, such as sexual satisfaction or sexual functioning (Vallejo-Medina et al., 2014). In the present study the ordinal alpha coefficient was .82.

The Spanish version of the Hurlbert Index of Sexual Fantasy (HISF; Sierra et al., 2020). Its 10 items measure the positive attitude toward sexual fantasies (e.g., "I enjoy fantasizing about sex") on a Likert-type scale from 0 (*Never*) to 4 (*All of the time*). Its total score is obtained by adding its items, ranging from 0 to 40. Its ordinal alpha is .94, it adequately shows evidences of validity and its measurements are related to similar constructs. The ordinal alpha coefficient in this study was .91.

The Solitary Sexual Desire subscale from the Spanish version of the Sexual Desire Inventory (SDI; Moyano et al., 2017). Its four items (e.g., "How strong is your desire to engage in sexual behavior by yourself?") evaluate interest in solitary sexual activity using different Likert response scales depending on the item (e.g., from 0 = *No desire* to 8 = *Strong desire*). Total scores are the result of the addition of its four items ranges from 0 to 31. Its internal consistency is good (Cronbach's α of .90 in men, .93 in women) and it presents evidences of validity due to its relation to similar constructs. In this study Cronbach's alpha was .84.

The Spanish version of the Sexual Inhibition/Sexual Excitation Scales-Short Form (SIS/SES-SF; Moyano & Sierra, 2014). It evaluates the tendency to feel excited/inhibited with 14 items distributed into three subscales: Excitation (SES; e.g., "When I think of a very attractive person, I easily become sexually aroused") ranging its scores from 6 to 24, Inhibition to the threat of performance

failure (SIS1; e.g., "I cannot get aroused unless I focus exclusively on sexual stimulation") in a range from 4 to 16; Inhibition to the threat of performance consequences (SIS2; e.g., "If I am masturbating on my own and I realize that someone is likely to come into the room at any moment, I will lose my erection/my sexual arousal") in a score range from 4 to 16. It uses a Likert-type scale from 1 (*Strongly disagree*) to 4 (*Strongly agree*). Dimensions scores are the results of the addition of its correspondent items. High scores evidence a higher sexual excitement/inhibition tendency. Its internal consistency (Cronbach's α) ranges between .60 (SIS2) and .72 (SES). It presents suitable evidences of validity. In the present study, the ordinal alpha values were .83 for SES, .72 for SIS1 and .71 for SIS2.

The Spanish version of the Arizona Sexual Experience Scale (ASEX; McGahuey et al., 2000) of Sánchez-Fuentes et al. (2019). It evaluates general sexual functioning in the last 7 days in the sexual relationships context with six items: drive, arousal, lubrication/erection, orgasm, satisfaction from orgasm. It is answered on a Likert-type scale from 1 (*hyperfunction*) to 6 (*hypofunction*). Only the last two orgasm-related items were taken into account, considering that the last objective was to analyze the capacity of the ORS to discriminate between people with and without orgasmic problems. Scores equaling or exceeding 5 for items 5 or 6 evidence orgasmic problems (McGahuey et al., 2000). Its internal consistency is adequate (Cronbach's alpha of .81 in men, .79 in women), and present evidences of validity. Its ordinal alpha was .81 in men and .85 in women.

Procedure

The International Test Commission guidelines guided the ORS validation (see Hernández et al., 2020; Muñiz & Fonseca-Pedrero, 2019). The battery was published and distributed using Facebook. Payment (900€) was made to Facebook to promote the survey from 23 December 2019 to 15 March 2020 by adults from all over Spain. The online evaluation is the usual procedure followed to evaluate sexual conducts behaviors (Arcos-Romero & Sierra, 2019; Calvillo et al., 2020; Tavares et al., 2019), particularly recommended for studying masturbation (Burri & Carvalheira, 2019; Carvalheira & Leal, 2013). Former studies have confirmed that no differences exist with the traditional paper-and-pencil method (Álvarez-Muelas et al., 2021; Sierra et al., 2018). Repeated responses were controlled by IP address and CAPTCHA was used to avoid automatic responses. Responses were thoroughly examined to rule out any cases with non-conclusive responses or abnormal patterns. Participation was voluntary without compensation for taking part in the study, and ensured both the participants' anonymity and the confidentiality of all their responses. Along with the survey, all the participants received informed consent indicating the study purpose. This study was approved by the Ethics Committee of Human Research of the University of Granada.

Data analysis

Missing data did not exceed 3% of the total and were imputed using an algorithm for non-parametric distributions by creating a random forest model for each variable. The ORS factorial invariance was first analyzed for the masturbation context between men and women and age group following the factorial structure of Arcos-Romero et al. (2018) for the ORS in the sexual relationships context. Age groups were made according to previous studies (Arcos-Romero et al., 2019; Sierra et al., 2020). The weighted least squares mean adjusted estimation method was used (WLSM), appropriate for ordinal

Table 2
Measurement invariance across sex and age

Model	χ^2	df	p	CFI	TLI	RMSEA	RMSEA 90% CI
Sex (men, women)							
Configural	6587.45	538	< .001	.981	.979	.055	.053, .056
Weak	5444.48	559	< .001	.979	.977	.056	.055, .058
Strong	5846.62	580	< .001	.977	.976	.057	.056, .059
Strict	6090.89	605	< .001	.976	.976	.058	.057, .059
Age (18-34, 35-49, ≥ 50 years old)							
Configural	7050.64	807	< .001	.982	.980	.055	.054, .056
Weak	5719.74	849	< .001	.979	.978	.058	.056, .059
Strong	5993.77	891	< .001	.978	.978	.058	.056, .059
Strict	6237.90	941	< .001	.977	.978	.058	.056, .059

Note: CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval

scales (Tarka, 2017). The root mean square error of approximation (RMSEA) values below .06, and the comparative fit index (CFI) and Tucker-Lewis index (TLI) values over .90, indicate a good fit. Factorial invariance was gradually analyzed at four levels: configural, weak, strong and strict. When following recommendations about the CFI as the main invariance fit (Milfont & Fischer, 2010; Putnick & Bornstein, 2016) to accept models' equivalence for the different levels, a change in the CFI that equals or exceeds .01 is considered to adopt the less limited model and to reject the most restrictive one. Next the items were analyzed by calculating the reliability of internal consistency by means of the ordinal alpha and the distribution of responses. To obtain evidence for validity, the scores of the four ORS dimensions correlated with similar variables. One group with orgasmic dysfunction was compared (scores equaling or exceeding 5 for ASEX items 5 or 6), as was another with no orgasm difficulties (scores equaling or below 4 for ASEX items 5 or 6). In addition to classical statistics, Fisher's ANOVA Bayesian analysis was applied to examine differences according to recommendations (Ruiz-Ruano y López-Puga, 2018, 2020) and logarithm was used to facilitate its interpretation. An $r^{JZS} = 0.71$ was employed. A more robust result would move away from zero if the following intervals were contemplated (Jeffreys, 1961): 1-3 anecdotal, 3-10 substantial, 10-30 strong, 30-100 very strong, >100 decisive.

Analyses were carried out in the R® environment (version 3.6.3; R Core Team, 2020) with its RStudio® interface (version 1.2.5042; RStudio Team, 2020). The following packages were used: missForest (version 1.4; Stekhoven & Bühlmann, 2012) to impute missing data; Parameters (version 0.8.0; Lüdecke et al., 2020) to explore the factorial structure; Psych (version 1.9.12.31; Revelle, 2019) to calculate the ordinal alpha; lavaan for invariance (Rosseel, 2012); tidyBF (version 0.4.0; Patil, 2018) for the Bayesian analyses.

Results

Validity evidence of the internal structure and factorial invariance

Factorial invariance was examined by sex of the ORS structure proposed by Arcos-Romero et al. (2018), made up of four factors: Affective (items 1, 4, 6, 14, 15, 21), Sensory (items 2, 3, 5, 8, 9, 10, 11, 19, 20, 22, 23, 24, 25), Intimacy (items 7, 12, 13), Rewards (items 16, 17, 18). This factorial structure showed strict invariance per sex (CFI = .976, RMSEA = .058, 90% *CI* [.057, .059]); and

group age [CFI = .977, RMSEA = .058, 90% *CI* [.056, .059]) in the solitary masturbation context, with a good fit (Table 2). Factors loadings and covariances are shown in Table 3.

Table 3
Factor loadings (λ) by items and covariances by dimensions of the ORS

Items	Orgasm Rating Scale dimensions			
	Affective	**Sensory**	**Intimacy**	**Rewards**
1. Elated	.69			
4. Satisfying	.62			
6. Blissful	.91			
14. Exciting	.85			
15. Fulfilling	.75			
21. Pleasurable	.73			
2. Flooding		.65		
3. Pulsating		.69		
5. Uncontrolled		.63		
8. Quivering		.69		
9. Shooting		.77		
10. Euphoric		.78		
11. Flushing		.65		
19. Throbbing		.81		
20. Exploding		.81		
22. Rising		.75		
23. Spreading		.80		
24. Trembling		.68		
25. Wild		.76		
7. Loving			.81	
12. Tender			.73	
13. Close			.47	
16. Peaceful				.75
17. Relaxing				.74
18. Shooting				.90
Dimensions				
Affective	–	.64	.49	.58
Sensory	–	–	.72	.52
Intimacy	–	–	–	.53
Rewards	–	–	–	–

Note: Factor loadings below .30 are not shown

Dimensions	Item	*M*	*SD*	Skew	Kurtosis	Alpha if item deleted	Item total-correlation	Ordinal alpha
				Table 4 Item analysis of the ORS				
Affective	1	4.32	0.95	-1.68	3.44	.93	.76	
	4	4.52	0.79	-1.95	4.65	.92	.82	
	6	4.00	1.21	-1.26	1.25	.93	.80	.94
	14	4.19	1.13	-1.65	2.63	.93	.80	
	15	4.31	1.05	-1.87	3.74	.92	.84	
	21	4.44	0.93	-2.03	4.64	.92	.85	
Sensory	2	3.09	1.53	-0.59	-0.54	.95	.68	
	3	3.45	1.50	-0.90	-0.06	.95	.69	
	5	2.29	1.73	0.06	-1.27	.95	.69	
	8	2.80	1.76	-0.31	-1.19	.95	.71	
	9	2.39	1.72	-0.05	-1.26	.94	.82	
	10	2.91	1.67	-0.43	-0.98	.95	.78	
	11	2.26	1.75	0.07	-1.31	.95	.69	.95
	19	3.16	1.64	-0.64	-0.71	.95	.79	
	20	3.03	1.74	-0.51	-1.01	.94	.83	
	22	2.98	1.69	-0.52	-0.92	.95	.74	
	23	2.61	1.73	-0.22	-1.19	.94	.81	
	24	2.11	1.77	0.20	-1.29	.95	.74	
	25	2.38	1.78	0.01	-1.30	.95	.79	
Intimacy	7	2.10	1.76	0.22	-1.28	.67	.43	
	12	1.73	1.67	0.50	-1.01	.67	.43	.71
	13	4.05	1.26	-1.54	2.00	.29	.89	
Rewards	16	3.69	1.45	-1.09	0.41	.92	.84	
	17	4.00	1.20	-1.35	1.58	.93	.82	.90
	18	3.72	1.43	-1.16	0.62	.88	.91	

Reliability

An ordinal alpha of .94 was obtained for the Affective dimension, .95 for the Sensory dimension, .71 for the Intimacy component and, finally, .90 for Rewards (Table 4). As Figure 1 shows, all the adjectives describe the subjective orgasm experience, where the dimensions Affective and Rewards represent this experience to a greater extent.
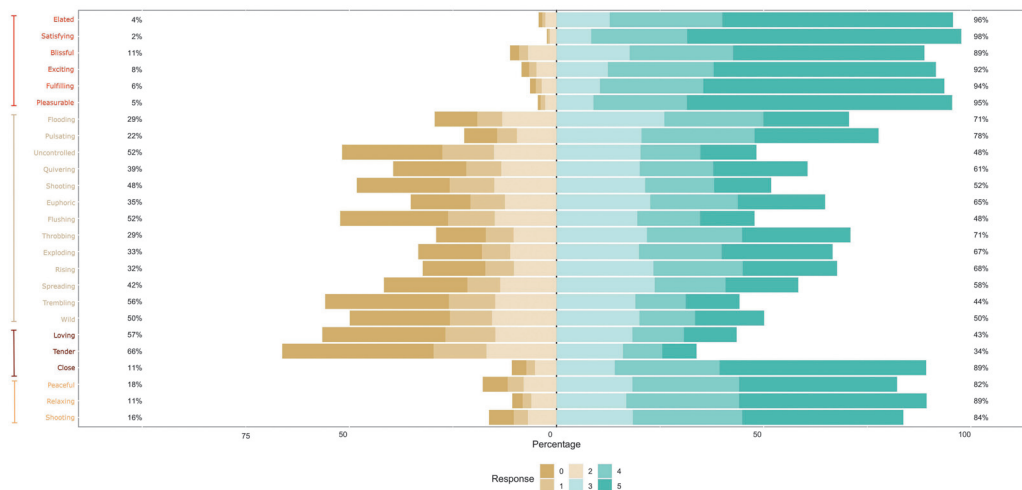

Figure 1. Distribution of responses regarding the representativeness of the 25 adjectives of orgasm in the context of solitary masturbation organized by dimensions in descending order: Affective (red), Sensorial (brown), Intimacy (garnet) and Rewards (yellow). On the left, in three shades of yellow, the percentage of answers from 0 to 2 are shown, on the right, in three shades of green, the percentage of answers corresponding to 3, 4 or 5 on the Likert-type scale

Validity evidence of relation with other variables

In the expected direction, moderated significant correlations were obtained between the scores for the four ORS dimensions and those of sexual attitudes and solitary sexual desire; furthermore, weak correlations were observed with the sexual excitement/inhibition tendency and the two orgasm-related items (Table 5). Moreover, the comparison made of the ORS scores between those with/without orgasm difficulties indicated significant differences for the Affective dimension $t_{Welch}(248.59) = 3.42$, $p = .001$, $d_{Cohen} = 0.42$, $\log_e(BF_{01}) = -3.41$; Intimacy dimension $t_{Welch}(262.96) = 3.42$, $p < .001$, $d_{Cohen} = 0.45$, $\log_e(BF_{01}) = -1.44$; and Rewards dimension $t_{Welch}(258.61) = 2.01$, $p < .001$, $d_{Cohen} = 0.25$, $\log_e(BF_{01}) = 0.09$; except Sensory ($p = .225$), which showed a clear tendency to manifest much greater orgasm intensity by solitary masturbation for all the groups without orgasm difficulties (Fig. 2).

Discussion

The study aimed to validate the ORS in the solitary masturbation context. With the same structure as the validated homologous version in the sexual relationships context, the ORS presents suitable psychometric properties and is a useful scale to evaluate subjective orgasm experiences as a result of solitary masturbation.

In the solitary masturbation context, the ORS maintains a good fit of the previously validated structure in the sexual relationships context (Arcos-Romero et al., 2018) with 25 items distributed into four factors: Affective, Sensory, Intimacy and Rewards. Their measures were strictly invariant in sex and age terms, as well as for the sexual relationships context (Arcos-Romero & Sierra, 2019), which is relevant in the clinical domain because it allows a comparison to be made of the subjective orgasm experience between both couple members when the couple is heterosexual. Having the same structure for both contexts facilitates its use and confirms the multidimensionality of the orgasmic experience (Arcos-Romero et al., 2019) regardless of the context in which it was obtained (sexual relationships or solitary masturbation). Regarding reliability, the ORS subscales in the solitary masturbation context obtained suitable ordinal alpha values, which were similar to those reported

Table 5
Correlations among ORS dimensions, sexual attitudes, solitary sexual desire, excitation/inhibition sexual and orgasmic functioning

Variable	Affective	Sensory	Intimacy	Rewards
Negative attitudes toward masturbation	-.31**	-.10**	-.10**	-.14**
Erotophilia	.34**	.21**	.15**	.21**
Attitude positive toward sexual fantasy	.31**	.25**	.21**	.23**
Solitary sexual desire	.40**	.35**	.25**	.28**
Excitation	.18**	.28**	.18**	.19**
Inhibition to the threat of performance failure	-.11**	.04	.03	.03
Inhibition to the threat of performance consequences	-.07**	-.08**	-.00	-.01
Orgasm	-.17**	-.09**	-.11**	-.07**
Satisfaction from orgasm	-.29**	-.17**	-.15**	-.13**

Note: High scores in Orgasm and Satisfaction from orgasm reflect worse capacity to reach orgasm and insatisfaction from orgasm, respectively.
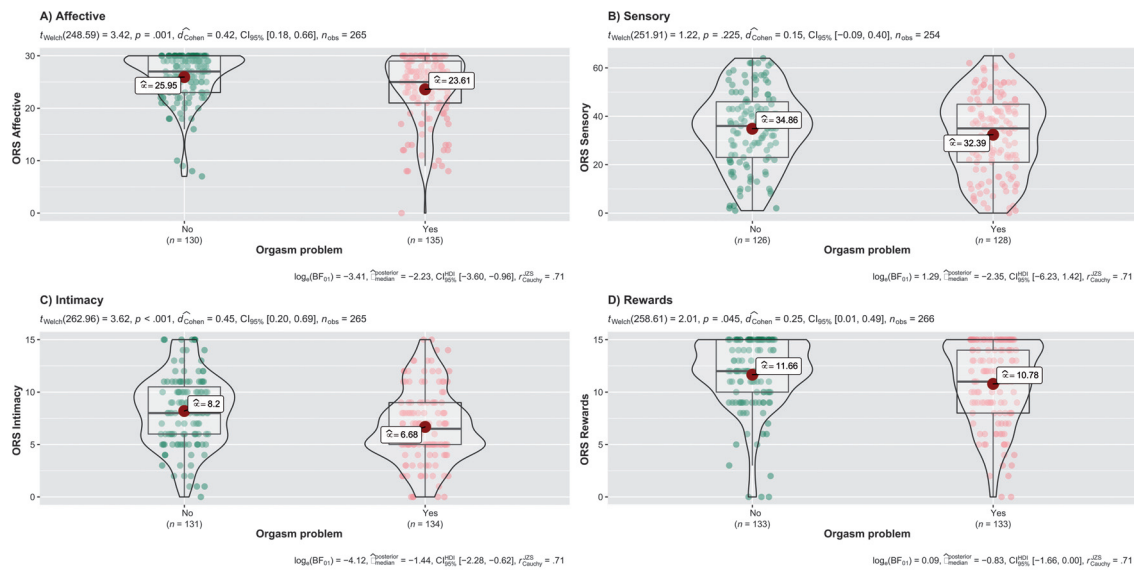* $p < .05$; ** $p < .01$

Figure 2. Distribution of data, for each of the four dimensions of the ORS, in the group with and without orgasmic problems.
Note: Red dot indicates the population mean (μ) of that group. Bayesian results for the differences are shown below each figure

by Arcos-Romero et al. (2018) in the sexual relationships context. The Intimacy dimension presented the lowest internal consistency in both contexts.

With the relations between the ORS scores and the external variables, despite that only weak and moderate statistically significant correlations were found in the expected direction with the evaluated sexual attitudes, the correlation magnitude is similar to previous studies in the sexual relationships context (Arcos-Romero et al., 2018; Arcos-Romero & Sierra, 2020). The negative association with a negative attitude toward masturbation is logical because this attitude has been related to worse orgasmic capacity and less orgasm satisfaction (Cervilla et al., 2021; Kelly et al., 1990). Subjective orgasmic experience intensity in the solitary masturbation context was positively related to erotophilia as being predisposed to positively react to sexual stimuli would favor orgasm intensity, especially in women, as previously reported (Arcos-Romero et al., 2018). In the same direction, orgasm intensity was positively associated with positive attitude toward sexual fantasies, which agrees with other works as sexual fantasies are a relevant predictor of masturbation frequency, whereas a negative attitude toward fantasies has been related to orgasm difficulties (Carvalheira & Leal, 2013; Sierra et al., 2020).

The highest correlations appeared with solitary sexual desire. This was expected because of the reports by Arcos-Romero et al. (2020) about correlations with partner-focused dyadic sexual desire in the sexual relationships context. This relation is interesting because it backs the relevance of masturbation as a therapeutic tool to increase sexual desire/excitation (Zamboni & Crawford, 2003), and is one of the main reasons for women practicing masturbation (Burri & Carvalheira, 2019). The ORS scores also positively related to the sexual excitation tendency or trait, which agrees with previous works that report this trait being associated with orgasmic experience intensity in the sexual relationships context (Arcos-Romero et al., 2019; Arcos-Romero & Sierra, 2020). Nevertheless, no correlations between the two types of sexual inhibition (SIS1 and SIS2) and the subjective orgasmic experience practically existed. Quinta Gomes et al. (2018) informed about a relation between SIS1 and orgasm only in men. This lack of relation in the present study suggests that inhibition due to threats to sexual performance would be relevant in sexual relationships, but not in the solitary masturbation context. Moreover, SIS2 did not seem very important for sexual functioning in both men and women (Quinta Gomes et al., 2018), which was also reflected for masturbation where it would be more difficult to fear consequences of such sexual activity.

Both the capacity of having an orgasm while maintaining sexual relationships and being satisfied with it have been associated with subjective orgasmic experience (Arcos-Romero et al., 2018; Hevesi et al., 2020; Paterson et al., 2014). Our results point out that this association not only occurs for subjective orgasmic experience in sexual relationships, but a relation also exists between orgasmic capacity and orgasmic satisfaction during relationships and subjective orgasmic intensity induced by solitary masturbation. This relation backs the association with orgasms among different sexual activities, like masturbation and sexual relationships, as recently described (Rowland, Hevesi et al., 2020). This relation also backs practicing masturbation as a therapeutic tool in orgasmic dysfunctions (Clayton & Hamilton, 2009; Ma et al., 2019; Waldinger, 2009). Along these lines, people with no orgasm difficulties in their sexual relationships report higher orgasm intensity in the solitary masturbation context than those with difficulties, except for the Sensory dimension. For example, it is known that those women who tend to approach sexual relationships negatively are expected to do the same in self-erotic conducts (Mollaioli et al., 2018), which would explain these differences in the ORS dimensions, as observed for the sexual relationships context (Arcos-Romero et al., 2018). No differences in the Sensory component were found, probably due to no diagnosis being made in this general population sample. Hence the dysfunctionality identified with the ASEX could be more related to psychosocial circumstances than to physiological ones, which would explain why the Sensory component was less affected (Mah & Binik, 2002).

This study has a limitation because the sample was formed incidentally by means of a given type of social networks, which limits the generalization of the results. Nonetheless, the sample's socio-demographic size and diversity allowed a conclusion to be reached with the confirmation of the ORS' multidimensional structure in the solitary masturbation context, and its good psychometric properties were confirmed. All this further establishes it as an adequate instrument for evaluating and investigating subjective orgasm experience in the solitary masturbation context.

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References

Álvarez-Muelas, A., Gómez-Berrocal, C., & Sierra, J. C. (2021). Study of sexual satisfaction in different typologies of adherence to the sexual double standard. *Frontiers in Psychology, 11*, Article 609571. https://doi.org/10.3389/fpsyg.2020.609571

Arcos-Romero, A. I., Expósito-Guerra, D., & Sierra, J. C. (2020). Sexual desire and its relationship with subjective orgasm experience. *International Journal of Impotence Research*. Advance online publication. https://doi.org/10.1038/s41443-020-00375-7

Arcos-Romero, A. I., Granados, R., & Sierra, J. C. (2019). Relationship between orgasm experience and sexual excitation: Validation of the Model of the Subjective Orgasm Experience. *International Journal of Impotence Research, 31*(4), 282-287. https://doi.org/10.1038/s41443-018-0095-6

Arcos-Romero, A. I., Moyano, N., & Sierra, J. C. (2018). Psychometric properties of the Orgasm Rating Scale in context of sexual relationship in a Spanish sample. *Journal of Sexual Medicine, 15*(5), 741-749. https://doi.org/10.1016/j.jsxm.2018.03.005016/j.androl.2018.03.003

Arcos-Romero, A. I., & Sierra, J. C. (2018). Systematic review of the subjective experience of orgasm. *Revista Internacional de Andrología, 16*(2), 75-81. https://doi.org/10.1016/j.androl.2017.09.003

Arcos-Romero, A. I., & Sierra, J. C. (2019). Factorial invariance, differential item functioning, and norms of the Orgasm Rating Scale. *International Journal of Clinical and Health Psychology, 19*(1), 57-66. https://doi.org/10.1016/j.ijchp.2018.11.001

Arcos-Romero, A. I., & Sierra, J. C. (2020). Factors associated with subjective orgasm experience in heterosexual relationships. *Journal of Sex & Marital Therapy, 46*(4), 314-329. https://doi.org/10.1080/0092623X.2019.1711273

Bensman, L. (2011). *Two People Just Make It Better: The psychological differences between partnered orgasms and solitary orgasms* [Doctoral dissertation, Universidad de Hawaii at Manoa].

Burri, A., & Carvalheira, A. (2019). Masturbatory behavior in a population sample of German women. *The Journal of Sexual Medicine*, *16*(7), 963-974. https://doi.org/10.1016/j.jsxm.2019.04.015

Calvillo, C., Sánchez-Fuentes, M. M., Parrón-Carreño, T., & Sierra, J. C. (2020). Validation of the Interpersonal Exchange Model of Sexual Satisfaction Questionnaire in adults with a same-sex partner. *International Journal of Clinical and Health Psychology, 20*(2), 140-150. https://doi.org/10.1016/j.ijchp.2019.07.005

Carvalheira, A., & Leal, I. (2013). Masturbation among women: Associated factors and sexual response in a Portuguese community sample. *Journal of Sex & Marital Therapy*, *39*(4), 347-367. https://doi.org/10.1080/0092623X.2011.628440

Cervilla, O., Vallejo-Medina, P., Gómez-Berrocal, C., & Sierra, J. C. (2021). Development of the Spanish short version of Negative Attitudes Toward Masturbation Inventory. *International Journal of Clinical and Health Psychology, 21*, Article 100222. https://doi.org/10.1016/j.ijchp.2021.100222

Clayton, A. H., & Hamilton, D. V. (2009). Female orgasmic disorder. In R. Balon & R. Taylor Segraves (Eds.), *Clinical manual of sexual disorders* (pp. 251-271). American Psychiatric Publishing.

Coleman, E. (2003). Masturbation as a means of achieving sexual health. *Journal of Psychology & Human Sexuality*, *14*(2-3), 5-16. https://doi.org/10.1300/J056v14n02_02

Driemeyer, W. (2013). Masturbation und sexuelle Gesundheit–ein Forschungsüberblick [Masturbation and sexual health-a research review]. *Zeitschrift für Sexualforschung, 26*(4), 372-383. https://doi.org/10.1055/s-0033-1356159

Edard, A., & Rusinek, S. (2020). Exploratory study of erotic abilities in women's sexual practice. *Sexologies, 29*(4), 166-172. https://doi.org/10.1016/j.sexol.2020.04.001

Goldey, K. L., Posh, A. R., Bell, S. N., & Van Anders, S. M. (2016). Defining pleasure: A focus group study of solitary and partnered sexual pleasure in queer and heterosexual women. *Archives of Sexual Behavior, 45*(8), 2137-2154. https://doi.org/10.1007/s10508-016-0704-8

Hernández, A., Hidalgo, M. D., Hambleton, R. K., & Gómez-Benito, J. (2020). International Test Commission guidelines for test adaptation: A criterion checklist. *Psicothema, 32*(3), 390-398. https://doi.org/10.7334/psicothema2019.306

Hevesi, K., Gergely Hevesi, B., Kolba, T. N., & Rowland, D. L. (2020). Self-reported reasons for having difficulty reaching orgasm during partnered sex: Relation to orgasmic pleasure. *Journal of Psychosomatic Obstetrics and Gynaecology, 41*(2), 106-115. https://doi.org/10.1080/0167482X.2019.1599857

Jeffreys, H. (1961). *Theory of probability* (3rd ed.). Oxford University Press.

Kelly, M. P., Strassberg, D. S., & Kircher, J. R. (1990). Attitudinal and experiential correlates of anorgasmia. *Archives of Sexual Behavior, 19*(2), 165-177. https://doi.org/10.1007/BF01542230

Kılıç Onar, D., Armstrong, H., & Graham, C. A. (2020). What does research tell us about women's experiences, motives and perceptions of masturbation within a relationship context?: A Systematic Review of Qualitative Studies. *Journal of Sex & Marital Therapy, 46*(7), 683-716. https://doi.org/10.1080/0092623X.2020.1781722

Kingsberg, S. A., Althof, S., Simon, J. A., Bradford, A., Bitzer, J., Carvalho, J., Flynn, K. E., Nappi, R. E., Reese, J. B., Rezaee, R. L., Schover, L., & Shifrin, J. L. (2017). Female sexual dysfunction-medical and psychological treatments, committee 14. *The Journal of Sexual Medicine, 14*(12), 1463-1491. https://doi.org/10.1016/j.jsxm.2017.05.018

Levin, R. J. (2007). Sexual activity, health and well-being - The beneficial roles of coitus and masturbation. *Sexual and Relationship Therapy, 22*(1), 135-148. https://doi.org/10.1080/14681990601149197

Lüdecke, D., Ben-Shachar, M. S., & Makowski, D. (2020). *Describe and understand your model's parameters*. CRAN.

Ma, G. C., Zou, Z. J., Lai, Y. F., Zhang, X, & Zhang, Y (2019). Regular penis-root masturbation, a novel behavioral therapy in the treatment of primary premature ejaculation. *Asian Journal of Andrology, 21*(6), 631-634. https://10.4103/aja.aja_34_19

Mah, K., & Binik, Y. M. (2001). The nature of human orgasm: A critical review of major trends. *Clinical Psychology Review, 21*(6), 823-856. https://doi.org/10.1016/S0272-7358(00)00069-6

Mah, K., & Binik, Y. M. (2002). Do all orgasms feel alike? Evaluating a two-dimensional model of the orgasm experience across gender and sexual context. *Journal of Sex Research, 39*(2), 104-113. https://doi.org/10.1080/00224490209552129

Mah, K., & Binik, Y. M. (2005). Are orgasms in the mind or the body? Psychosocial versus physiological correlates of orgasmic pleasure and satisfaction. *Journal of Sex & Marital Therapy, 31*(3), 187-200. https://doi.org/10.1080/00926230590513401

Mah, K., & Binik, Y. M. (2020). Orgasm Rating Scale. In R. R. Milhausen, J. K. Sakaluk, T. D. Fisher, D. M. Davis & W. L. Yarber (Eds.), *Handbook of Sexuality-Related Measures* (4th ed., pp. 503-507). Routledge.

Matsick, J. L., Conley, T. D., & Moors, A. C. (2016). The science of female orgasms: Pleasing female partners in casual and long-term relationships. In K. Aumer (Ed.), *The Psychology of Love and Hate in Intimate Relationships* (pp. 47-63). Springer.

McGahuey, C. A., Gelenberg, A. J., Laukes, C. A., Moreno, F. A., Delgado, P. L., McKnight, K. M., & Manber, R. (2000). The Arizona Sexual Experience Scale (ASEX): Reliability and validity. *Journal of Sex & Marital Therapy, 26*(1), 25-40. https://doi.org/10.1080/009262300278623

Meston, C. M., Hull, E., Levin, R. J., & Sipski, M. (2004). Disorders of orgasm in women. *The Journal of Sexual Medicine, 1*(1), 66-68. https://doi.org/10.1111/j.1743-6109.2004.10110.x

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in crosscultural research. *International Journal of Psychological Research, 3*(1), 111-121.

Mollaioli, D., Di Sante, S., Limoncin, E., Ciocca, G., Gravina, G. L., Maseroli, E., Fanni, E., Vignozzi, L., Maggi, M., Lenzi, A., & Jannini, E. A. (2018). Validation of a Visual Analogue Scale to measure the subjective perception of orgasmic intensity in females: The Orgasmometer-F. *PloS One, 13*(8), Article e0202076. https://doi.org/10.1371/journal.pone.0202076

Moyano, N., & Sierra, J. C. (2014). Validation of the Sexual Inhibition/Sexual Excitation Scales-Short Form (SIS/SES-SF). *Terapia Psicológica, 32*(2), 87-100. https://doi.org/10.4067/S0718-48082014000200002

Moyano, N., Vallejo-Medina, P., & Sierra, J. C. (2017). Sexual Desire Inventory: Two or three dimensions? *The Journal of Sex Research, 54*(1), 105-116. https://doi.org/10.1080/00224499.2015.1109581

Muñiz, J., & Fonseca-Pedrero, E. (2019). Ten steps for test development. *Psicothema*, *31*(1), 7-16. https://doi.org/10.7334/psicothema2018.291

Paterson, L., Jin, E. S., Amsel, R., & Binik, Y. M. (2014). Gender similarities and differences in sexual arousal, desire, and orgasmic pleasure in the laboratory. *The Journal of Sex Research, 51*(7), 801-813. https://doi.org/10.1080/00224499.2013.867922

Patil, I. (2018). *ggstatsplot: 'ggplot2' Based Plots with Statistical Details*. CRAN.

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review, 41*, 71-90. https://doi.org/10.1016/j.dr.2016.06.004

Quinta Gomes, A. L., Janssen, E., Santos-Iglesias, P., Pinto-Gouveia, J., Fonseca, L. M., & Nobre, P. J. (2018). Validation of the Sexual Inhibition and Sexual Excitation Scales (SIS/SES) in Portugal: Assessing gender differences and predictors of sexual functioning. *Archives of Sexual Behavior, 47*(6), 1721-1732. https://doi.org/10.1007/s10508-017-1137-8

R Core Team (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing.

Revelle, W. (2019). *Psych: Procedures for Personality and Psychological Research, Northwestern University, Evanston, Illinois, USA*. R package version 1.9.12 [computer software].

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software, 48*(2), 1-36.

Rowland, D. L., Hevesi, K., Conway, G. R., & Kolba, T. N. (2020). Relationship between masturbation and partnered sex in women: Does the former facilitate, inhibit, or not affect the latter? *The Journal of Sexual Medicine, 17*(1), 37-47. https://doi.org/10.1016/j.jsxm.2019.10.012

Rowland, D. L., Kolba, T. N., McNabney, S. M., Uribe, D., & Hevesi, K. (2020). Why and how women masturbate, and the relationship to orgasmic response. *Journal of Sex & Marital Therapy, 46*(4), 361-376. https://doi.org/10.1080/0092623X.2020.1717700

RStudio Team. (2020). *RStudio: Integrated Development for R (Version 1.2.5042)* [Computer software]. RStudio, PBC. Boston. https://www.rstudio.com/products/rstudio/download/

Ruiz-Ruano, A. M., & López-Puga, J. L. (2018). Deciding on Null Hypotheses using P-values or Bayesian alternatives: A simulation study. *Psicothema, 30*(1), 110-115.

Ruiz-Ruano, A. M., & López-Puga, J. L. (2020). How to improve inferential statistics reporting in health sciences. *Revista Española de Comunicación en Salud, 11*(1), 139-145. https://doi.org/10.20318/recs.2020.5173

Sánchez-Fuentes, M. M., Moyano, N., Granados, M. R., & Sierra, J. C. (2019). Validation of the Spanish version of the Arizona Sexual Experience Scale (ASEX) using self-reported and psychophysiological measures. *Revista Iberoamericana de Psicología y Salud, 10*(1), 1-14. https://doi.org/10.23923/j.rips.2019.01.021

Sierra, J. C., Arcos-Romero, A. I., & Calvillo, C. (2020). Validity evidence and norms of the Spanish version of the Hurlbert Index of Sexual Fantasy. *Psicothema, 32*(3), 429-436. https://doi.org/10.7334/psicothema2020.14

Sierra, J. C., Moyano, N., Vallejo-Medina, P., & Gómez-Berrocal, C. (2018). An abridge Spanish version of Sexual Double Standard Scale: Factorial structure, reliability and validity evidence. *International Journal of Clinical and Health Psychology, 18*(1), 69-80. https://doi.org/10.1016/j.ijchp.2017.05.003

Sierra, J. C., Ortiz, A., Calvillo, C., & Arcos-Romero, A. I. (2021). Subjective orgasm experience in the context of solitary masturbation. *Revista Internacional de Andrología, 19*(2), 93-101. https://doi.org/10.1016/j.androl.2019.10.001

Stekhoven, D. J., & Bühlmann, P. (2012). MissForest-non-parametric missing value imputation for mixed-type data. *Bioinformatics, 28*(1), 112-118. https://doi.org/10.1093/bioinformatics/btr597

Tarka, P. (2017). The comparison of estimation methods on the parameter estimates and fit indices in SEM model under 7-point Likert scale. *Archives of Data Science*, *2*(1), https://doi.org/10.5445/KSP1000058749/10

Tavares, I. M., Schlagintweit, H. E., Nobre, P., & Rosen, N. O. (2019). Sexual well-being and perceived stress in couples transitioning to parenthood: A dyadic analysis. *International Journal of Clinical and Health Psychology, 19*(3), 198-208. https://doi.org/10.1016/j.ijchp.2019.07.004

Vallejo-Medina, P., Granados, M. R., & Sierra, J. C. (2014). Proposal and validation of a short version of the Sexual Opinion Survey in the Spanish population. *Revista Internacional de Andrología, 12*(2), 47-54. https://doi.org/10.1016/j.androl.2013.04.004

Waldinger, M. D. (2009). Delayed and premature ejaculation. In R. Balon & R. Taylor Segraves (Eds.), *Clinical manual of sexual disorders* (pp. 273-304). American Psychiatric Publishing.

Zamboni, B. D., & Crawford, I. (2003). Using masturbation in sex therapy: Relationships between masturbation, sexual desire, and sexual fantasy. *Journal of Psychology & Human Sexuality, 14*(2-3), 123-141. https://doi.org/10.1300/J056v14n02_08