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ORIGINAL PAPER

Validation of the Sexual Inhibition and Sexual Excitation Scales (SIS/SES) in Portugal: Assessing Gender Differences and Predictors of Sexual Functioning

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Abstract The Sexual Inhibition and Sexual Excitation Scales (SIS/SES) were developed to assess individual propensities for sexual excitation and sexual inhibition in men and women. The objective of the present study was to validate the Portuguese version of the SIS/SES and to investigate the degree to which SIS/SES scores predict different dimensions of Portuguese men's and women's sexual functioning. Gender differences were also examined. A community sample of 370 Portuguese men and 373 women completed self-report measures of sexual function (IIEF, Rosen et al., 1997; FSFI, Rosen et al., 2000) and of the propensity for sexual inhibition and sexual excitation (SIS/SES, Janssen et al., 2002a). Exploratory factor analysis revealed a three-factor solution further supported by confirmatory factor analysis. The three factors identified resemble the original ones, and reliability analyses indicated they have both satisfactory internal consistency and stability over time. Age and Sexual Inhibition Due to the Threat of Performance Failure (SIS1) were both significant negative predictors of men's sexual desire, erectile function, and orgasm. Sexual Excitation (SES) was a positive predictor of sexual desire in both men and women and of men's erectile function and of women's lubrication and orgasm. Age was also a significant and negative predictor of women's sexual desire. Significant gender differences were found for all three SIS/SES scales with men having significantly higher excitation and lower inhibition scores as compared to women. The Portuguese version of the SIS/SES was shown to be suitable for use within the Portuguese population in both clinical and basic research. Our findings provide further cross-cultural validation of the Dual Control Model of Sexual Response and underscore the importance of the role of excitatory and inhibitory processes in women's and men's sexual functioning and response.

Keywords Sexual inhibition · Sexual excitation · SIS/SES · Dual Control Model · Sexual functioning · Sexual arousal

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Introduction

The Sexual Inhibition and Sexual Excitation Scales (SIS/SES), which assess the propensity for sexual excitation and inhibition, have been used in a growing number of studies on the role of individual differences in sexual response and behavior over the past decade (for a review see Bancroft, Graham, Janssen, & Sanders, 2009; Janssen & Bancroft, 2007). The underlying theoretical model, the Dual Control Model of Sexual Response, postulates that sexual arousal and associated processes result from a balance between inhibitory and excitatory neurophysiological mechanisms in the central nervous system (Bancroft, 1999; Bancroft & Janssen, 2000).

Generally considered to be adaptive and functional, more extreme variations in sexual excitation and inhibition may be associated with problematic sexual response and behavior. According to the model, a propensity for high inhibition, particularly if it is associated with low excitation, increases the vulnerability to develop sexual problems, and low levels of sexual inhibition may increase the likelihood of risky sexual behavior (Bancroft & Janssen, 2000, 2001; Janssen & Bancroft, 2007).

Consistent with the basic premises of the Dual Control Model, the SIS/SES questionnaire was developed to assess the tendency to respond with sexual excitation or inhibition to a range of sexual situations and stimuli (Janssen, Vorst, Finn, & Bancroft, 2002a, b). Initial exploratory factor analyses in a sample of 408 male undergraduate students resulted in ten lower-level factors, and a subsequent factor analysis revealed three higher-order factors, one single sexual excitation factor (SES) and two sexual inhibition factors (SIS1 and SIS2; Janssen et al., 2002a). The ten lower-level and three higher-level factor structures were further supported by confirmatory factor analyses in a sample of 459 undergraduate students and 313 men from the general population (Janssen et al., 2002a). SIS1, or sexual inhibition "due to threat of performance failure," has been proposed to reflect an inhibitory trait related to the threat or anticipated failure of sexual response (e.g., concerns about losing arousal or worrying about pleasing the partner). SIS2, or sexual inhibition "due to the threat of performance consequences," is more relevant to inhibition in response to external threats or anticipated negative consequences of sex (e.g., unwanted pregnancy, sexually transmitted disease, risk of being caught; Janssen & Bancroft, 2007). Of the two inhibitory systems, SIS1 has been found to be more relevant to sexual dysfunctions, with high scores associated with higher vulnerability, and SIS2 more relevant to sexual risk taking (Bancroft et al., 2003, 2004, Janssen & Bancroft, 2007; Janssen et al., 2002a). A similar factor solution was found using exploratory factor analyses in a sample of 307 undergraduate female students (mean age = 20 years), although item-level differences suggested that some themes included in the questionnaire might have different relevance to men and women (Carpenter, Janssen, Graham, Vorst, & Wicherts, 2008). Although the female version of the SIS/SES is applicable to the study of women's sexual functioning and response, a new measure, more directly addressing specific aspects of women's sexuality was later developed as well (Sexual Excitation/Sexual Inhibition Inventory for Women, SESII-W; Graham, Sanders, & Milhausen, 2006) and has been used in several studies (Milhausen, Graham, Sanders, Yarber, & Maitland, 2010; Sanders, Graham, & Milhausen, 2008).

Studies on the relevance of the Dual Control Model to our understanding of male sexual functioning have contributed to a wider understanding of the mechanisms involved in sexual response. Findings have shown a positive association of both inhibition dimensions, particularly SIS1, and a negative association of SES with erectile difficulties in non-clinical samples (Bancroft & Janssen, 2001; Janssen et al., 2002a; Janssen & Bancroft, 2007). In a sample of 313 men (university staff, M age = 46 years), Janssen et al. (2002a) found that both inhibition dimensions and age were significant positive predictors of ever sexual difficulties, and SIS1 and age were strong positive predictors of sexual difficulties in the previous 3 months. SES was only a marginal, negative predictor of men's sexual difficulties in the previous 3 months. These findings are consistent with the idea that SIS1 may reflect a trait vulnerability for erectile difficulties (that could be amplified by aging; Janssen et al., 2002a; Janssen & Bancroft, 2007). As for women, preliminary findings on a sample of 922 undergraduate students indicated a positive relationship between self-reported arousal difficulties and both inhibition dimensions and age (Janssen & Bancroft, 2007). These findings are consistent with those of Sanders et al. (2008), showing inhibition factors to be the strongest predictors of both current and lifetime sexual problems in women from the general population.

Gender differences in SIS/SES scores have also been a topic of interest. Carpenter et al. (2008) compared the SIS/SES scores of 970 men and 1038 women and found different patterns among male and female scale scores. Findings indicated that women typically scored higher on the two inhibition factors and lower on the sexual excitation factor when compared to men, although both women and men showed substantial variability in SIS/SES scores. Milhausen et al. (2010), using the Sexual Excitation/Sexual Inhibition Inventory for Women and Men (SESII-W/M), found a similar pattern on a sample of 112 men and 369 women, with women scoring significantly higher on overall inhibitory scales and lower on the arousability scale than men. More recently, a study using data from a representative survey on sexual health in Flanders also found that women scored significantly lower on sexual excitation and higher on both inhibition subscales than men (Pinxten & Lievens, 2015).

Studies have also provided initial support for the cross-cultural adequacy of the instrument. Varjonen et al. (2007) tested the factor structure of SIS/SES using exploratory and confirmatory factorial analyses in a large population-based sample of 1289 Finnish men and replicated the original three-factor structure of the questionnaire. In another study designed to validate an Italian version of SIS/SES, Panzeri et al. (2008) conducted a second-order CFA in a sample of 947 men and 1083 women and found support for the original factor structure of the questionnaire. The SIS/SES has also been translated in several South Asian languages (Hindi, Urdu, Panjabi, Tamil, and Sinhalese), and its use in these languages is currently being tested (Malavige et al., 2013).

Given the potential relevance of the Dual Control Model of Sexual Response to our understanding of human sexuality

Table 1 Sociodemographic characteristics of the community sample ($N = 743$)

	Men ($n = 370$)	Women ($n = 373$)
Age (in years)		
M	38.8	34.1
SD	15.8	14.1
Range	18–86	18–75
Marital status	%	%
Single	38.9	47.4
Married/cohabiting	54.6	45.3
Divorced/widowed	6.5	7.3
Educational level	%	%
0–9 years	47.9	37.8
10–12 years	30.5	31.8
More than 13 years	21.6	30.4

in different countries and cultures, the objective of the current study was to develop and test the psychometric properties of a Portuguese version of the SIS/SES. An additional goal of this study was to compare Portuguese men's and women's SIS/SES scores and to assess the degree to which SIS/SES scores predict various dimensions of sexual functioning.

Method

Participants

A community sample of 370 Portuguese men (M age = 38.8, SD = 15.8) and 373 women (M age = 34.1, SD = 14.1) aged 18–86 years was recruited for the current study. The majority of men were married or living with a partner at the time of the study (55%), and most women were single (47%) or married (45%; see Table 1). As for educational level, most participants reported at least 10 years of education (men: 52%, women: 62%).

Participants were recruited at university campuses and from the general population through advertisements. Students and university staff made up 28.5% of the male sample and 33.5% of the female sample. The remaining 71.5% of the male sample and 66.5% of the female sample were recruited from the general population. Participants were not paid for their participation. Eligibility criteria consisted of being 18 years of age or older and being fluent in Portuguese.

Procedure

The SIS/SES was translated into Portuguese through two independent forward and backward translations involving the assistance of several researchers. The cross-cultural equivalence of the Portuguese and original SIS/SES was discussed by a local panel of sex researchers (focusing on most appropriate choice of words), and a final version of the instrument was tested for interpretability and comprehensibility in a small group of research assistants.

Participants attended group sessions during which they completed a set of questionnaires that included the translated SIS/SES. Information regarding the purpose of the study was provided, and a consent form was signed. Completed questionnaires were returned to the researchers in a sealed envelope. The study protocol was approved by the university's institutional review board.

Measures

Demographics Questionnaire

A basic questionnaire was used to assess demographic and sexuality-related information and included questions about age, gender, religion, relationship status, educational level, sexual behavior, sexual orientation, and medical history.

The Sexual Inhibition and Sexual Excitation Scales (SIS/SES)

Consistent with the English version, the Portuguese SIS/SES questionnaire contains 45 items describing different types of hypothetical situations leading to sexual arousal, or loss of sexual arousal, due to intrapersonal or interpersonal threat (e.g., negative consequences of having sex, unable to perform sexually) or non-threatening potentially sexually exciting situations (e.g., sexually exciting social interactions, visual, tactile, or imaginary stimulus). Using a 4-point Likert scale ranging from 1 ("strongly agree") to 4 ("strongly disagree"), participants indicate their typical response to the types of situations or stimuli described. The original version of the questionnaire has adequate levels of internal consistency for the sexual excitation (SES, first sample: Cronbach's *alpha* = .89) and the two inhibition subscales (first sample: Cronbach's *alpha* = .81 for SIS1 and .73 for SIS2), and test–retest reliability ($r_{SES} = .76$; $r_{SIS1} = .67$; $r_{SIS2} = .74$). The analysis of the scale's discriminant and convergent validity showed little overlap with measures of global traits, suggesting that SIS/SES questionnaires measure propensities that are specific to sexual responsivity (Janssen et al., 2002a). The original female version of the SIS/SES also has adequate psychometric properties (Carpenter et al., 2008).

The International Index of Erectile Function (IIEF)

The IIEF (Rosen et al., 1997) is a brief, multidimensional, and self-administered questionnaire developed to assess several dimensions of male sexual functioning. The scale comprises 15 items assessing five domains of male sexual

function: erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction. The scale allows the calculation of specific indexes for each dimension as well as a total score of sexual functioning, with higher scores reflecting higher levels of sexual functioning. Possible scores range from 2 to 10 for the sexual desire domain, from 1 to 30 for erectile function, from 0 to 10 for orgasm, from 0 to 15 for sexual satisfaction, from 2 to 10 for overall satisfaction, and from 5 to 75 for the total score. Given the well-documented psychometric validity and reliability of the scale (Cronbach's alpha values of .73 and higher and test–retest from $r = .64$ to $r = .84$), the IIEF is considered a standard instrument for assessing male sexual function (Cappelleri & Rosen, 2005; Rosen, Cappelleri, & Gendrano, 2002). The Portuguese version of the IIEF has demonstrated acceptable internal consistency (Cronbach's alpha values ranging from .72 to .86) and test–retest reliability ($r = .14$ to $r = .90$). Discriminant validity also confirmed the capacity of the Portuguese version to differentiate between men with and without erectile dysfunction (Quinta Gomes & Nobre, 2012a). The internal consistency of the different domains of the IIEF ranged from $\alpha = .81$ to $\alpha = .94$ in the present sample.

The Female Sexual Function Index (FSFI)

The FSFI (Rosen et al., 2000) is a 19-item self-report measure developed to assess six key dimensions of sexual function in women: sexual desire, sexual arousal, lubrication, orgasm, sexual satisfaction, and sexual pain. Specific indexes for each dimension and a total score for sexual functioning can be calculated, with higher scores reflecting higher levels of sexual functioning. The possible scores range from 1.2 to 6 for the sexual desire domain, from 0 to 6 for sexual arousal, lubrication, orgasm, and sexual pain, from .8 to 6 for sexual satisfaction, and from 2 to 36 for the total score. Psychometric studies have revealed acceptable internal consistency (Cronbach's alpha values superior to .82) and test–retest reliability ($r = .79$ to $r = .86$) of the instrument (Rosen et al., 2000). Discriminant validity was also supported as the ability of FSFI to significantly discriminate between women with and without sexual problems (Rosen et al., 2000). A Portuguese version of the FSFI (Pechorro, Diniz, Almeida, & Vieira, 2009) has been found to have excellent internal consistency (Cronbach's alpha values ranging from .88 to .93) and to successfully discriminate between clinical and non-clinical groups. The internal consistency of the different domains of the FSFI ranged from $\alpha = .87$ to $\alpha = .97$ in the present sample.

Data Analysis

Exploratory factor analysis (EFA) was conducted on the 45 items in order to determine the factor structure of the Portuguese version of the SIS/SES. Men and women's data were analyzed together in order to maximize variability and to obtain a single factor structure.[1] Principal axis factor extraction followed by orthogonal rotation (varimax) was conducted on the 45 items for factor extraction. Item selection for each factor was based on statistical and interpretability criteria, and inclusion was based on loadings higher than .4 on a respective factor (Tabachnick & Fidell, 2007). A further EFA using principal component analysis and varimax rotation was carried out on the first-order factors.

Confirmatory factor analysis (CFA) was performed to test the adequacy of the three-factor model of Portuguese's men and women SIS/SES scores. Analyses were performed with the package lavaan in R Studio (Rosseel, 2012). Because of the ordinal nature of the items, we used polychoric correlations with a WLSMV estimator. Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) $\geq .95$; root-mean-square error of approximation (RMSEA) $\leq .06$ indicated a good fit (Browne & Cudeck, 1993; Hu & Bentler, 1999); however, less stringent criteria of a reasonable fit (e.g., RMSEA $\leq .08$, CFI $\geq .90$, and TLI $\geq .90$) were also considered (Marsh, Hau, & Wen, 2004).

Test–retest reliability of the subscales was assessed using Pearson correlations on the SIS/SES scores obtained by 24 participants on two different occasions with a 2-week interval. Internal consistency was assessed by computing Cronbach's alphas for the subscales of the questionnaire.

Multiple regression analyses (enter method) were performed separately for men and women using SIS/SES scores and age as independent variables and the subscales of the IIEF (i.e., sexual desire, erectile function, and orgasm) and FSFI (i.e., sexual desire, arousal, lubrication, and orgasm) as dependent variables. Multivariate analysis of variance (MANOVA) and univariate analysis of variance (ANOVAs) followed by follow-up tests were conducted to compare men's and women's scores on the three higher-level SIS/SES scales.

Results

Exploratory Factor Analysis

The Kaiser–Meyer–Olkin measure confirmed the sampling adequacy for the analysis, KMO = . 9 and Bartlett's test of sphericity, $\chi^2 = 11{,}889$, $p < .001$, indicated that correlations between items were appropriately sized for the analysis. Six lower-level factors with eigenvalues higher than 1 were identified, accounting for approximately 55% of the total variance. Eight items from the original SIS/SES loaded below

[1] Similar three higher-level factor structures were found when conducting separate second-order EFAs for men and women, explaining 68 and 60% of the total variance, respectively.

.4 and were excluded (four items of the SIS1 and four of the SIS2). Component loadings after rotation are presented in Table 2.

The first factor extracted was termed sexual excitation-general arousability (SES-GA) and consisted of eighteen items of the original SES reflecting situations where sexual arousal occurs as a result of social interactions with sexually attractive people (e.g., "when an attractive person flirts with me, I easily become sexually aroused"), as a result of visual stimuli (e.g., "when I look at erotic pictures, I easily become sexually aroused") or non-specific stimuli (e.g., "when I am taking a shower or a bath, I easily become sexually aroused"), and as a result of fantasizing or thinking about sex (e.g., "when I start fantasizing about sex, I quickly become sexually aroused").

The second factor, sexual excitation-genital response (SES-GR), consisted of two items focusing on the genital component of sexual arousal (e.g., "when I feel interested in sex, I usually get an erection/have a genital response" or "when I feel sexually aroused, I usually have an erection/a genital response").

The third factor was termed sexual inhibition due to the threat of performance failure-distraction and performance (SIS1-DP) and comprised eight items related to sexual inhibition as a result of concerns about pleasing the partner (e.g., "if I am concerned about pleasing my partner sexually, I easily lose my erection/it interferes with my arousal") or as a result of external sources of distraction (e.g., "when I have a distracting thought, I easily lose my erection/arousal").

The fourth factor, sexual inhibition due to the threat of performance consequences-social consequences (SIS2-SC), consisted of four items concerning the risk of being seen, heard, or caught during sexual activities (e.g., "if I can be seen by others while having sex, I am unlikely to stay sexually aroused").

The fifth factor was labeled sexual inhibition due to the threat of performance failure-partner's pleasure and arousal (SIS1-PPA) and comprised two reversed items regarding inhibition contingent to partner's sexual response during sexual interaction ("during sex, pleasing my partner sexually makes me more aroused" and "when I notice that my partner is sexually aroused, my own arousal becomes stronger").

Finally, sexual inhibition due to the threat of performance consequences-negative outcomes (SIS2-NO) comprised three items concerning negative consequences of sexual activities (e.g., "if there is a risk of unwanted pregnancy, I am unlikely to get sexually aroused" or "if I realize there is a risk of catching a sexually transmitted disease, I am unlikely to stay sexually aroused").

Second-order EFA was carried out on the six factors and resulted in three higher-level factors, two factors relevant to sexual inhibition and one to sexual excitation, explaining 67% of the variance (KMO = . 52 and Bartlett's test of sphericity, $\chi^2 = 410, p < .001$).

As illustrated in Table 3, the first higher-order factor included all items of SIS2-SC and SIS2-NO, containing 7 items of the original SIS2 (eigenvalue = 1.7, proportion of explained variance = 28%). The second domain also consisted of two first-order factors (SES-GA and SES-GR) and comprised all of the 20 items of the original SES (eigenvalue = 1.4, proportion of explained variance = 23%). The final higher-order factor consisted of one single scale (SIS1-DP) composed by 8 items (eigenvalue = 1, proportion of explained variance = 17%). SIS1-PPA first-order factor loaded below .4 and was excluded. As the Portuguese version of SIS/SES, consisting of a total of 35 items, replicated the original factor structure of the questionnaire, original higher-order scale labels were maintained[2] (see Table 3).

The magnitude of the inter-correlations among the excitation and the two inhibition dimensions were low ($r_{\text{SES-SIS1}} = .04$, ns and $r_{\text{SES-SIS2}} = -.06$, ns) and moderate for the two inhibition factors ($r_{\text{SIS1-SIS2}} = .35, p < .001$).

Confirmatory Factor Analysis

Results showed an overall good fit of the three-factor model, $\chi^2 = 2303.16, p < .001$, CFI = .91; TLI = .90, RMSEA = .06 (Hu & Bentler, 1999). The modification indices suggested an improvement in model fit if the errors of items 11 and 43 (MI = 292.50; both items had similar wording and referred to having genital response when sexually excited), and 1 and 3 (MI = 195.98; aside from similar wording they both refer to becoming sexually aroused after watching erotic materials) were allowed to covary. Including these two error covariances improved fit significantly, $\chi^2 = 1983.35, p < .001$, CFI = .92, TLI = .92, RMSEA = .06. Additionally, discriminant validity criteria (Ping, 2004) of the three factors were met as indicated by low to modest inter-correlations among domains in the path diagrams (Fig. 1), indicating that the three dimensions are relatively independent.

Reliability

Test–Retest Reliability

Moderately high correlations were found for all SIS/SES subscales (for SES and SIS1, $r = .65, p < .05$, for SIS2 $r = .72$, $p < .01$), showing satisfactory stability of the scales over time.

[2] Correlations between SIS/SES scales when scores were based on the original and the Portuguese factor structure were high, $r_{\text{SES.ORIGINAL-SES.PORTUGUESE}} = 1, p < .001$, for SES; $r_{\text{SIS1.ORIGINAL-SIS1.PORTUGUESE}} = .89$, $p < .001$, for SIS1; and $r_{\text{SIS2.ORIGINAL-SIS2.PORTUGUESE}} = .95, p < .001$, for SIS2.

Table 2 Exploratory factor analysis with varimax rotation of the Portuguese Sexual Inhibition Sexual Excitation Scales ($N = 743$)

Scale		Factor loadings
Sexual excitation-general arousability (SES-GA)		
14.	When I think someone sexually attractive wants to have sex with me, I quickly become sexually aroused	.75
13.	When I see someone I find attractive dressed in a sexy way, I easily become sexually aroused	.73
35.	When I think of a very attractive person, I easily become sexually aroused	.73
39.	When I see an attractive person, I start fantasizing about having sex with him/her	.72
44.	When an attractive person flirts with me, I easily become sexually aroused	.72
30.	When a sexually attractive stranger makes eye-contact with me, I become aroused	.68
6.	When a sexually attractive stranger accidentally touches me, I easily become aroused.	.66
37.	When I start fantasizing about sex, I quickly become sexually aroused	.63
1.	When I look at erotic pictures, I easily become sexually aroused	.60
3.	If I am on my own watching a sexual scene in a film, I quickly become sexually aroused	.59
38.	When I see others engaged in sexual activities, I feel like having sex myself	.59
29.	If I am with a group of people watching an X-rated film, I quickly become sexually aroused	.58
7.	When I have a quiet candlelight dinner with someone I find sexually attractive, I get aroused	.56
25.	Just thinking about a sexual encounter I have had is enough to turn me on sexually	.56
16.	When I talk to someone on the telephone who has a sexy voice, I become sexually aroused	.55
26.	When I am taking a shower or a bath, I easily become sexually aroused	.54
4.	Sometimes I become sexually aroused just by lying in the sun	.54
32.	When I wear something I feel attractive in, I am likely to become sexually aroused	.42
Sexual excitation-genital response (SES-GR)		
43.	When I feel interested in sex, I usually get an erection/have a genital response (e.g., vaginal lubrication, being wet)	.61
11.	When I feel sexually aroused, I usually have an erection/a genital response (e.g., vaginal lubrication, being wet)	.53
Sexual inhibition due to the threat of performance failure-distraction and performance (SIS1-DP)		
19.	I cannot get aroused unless I focus exclusively on sexual stimulation	.69
10.	When I am having sex, I have to focus on my own sexual feelings in order to keep my erection/stay aroused	.66
9.	I need my penis/clitoris to be touched/stimulated to maintain an erection/continue feeling aroused	.63
21.	If I am concerned about pleasing my partner sexually, I easily lose my erection/it interferes with my arousal	.52
36.	Once I have an erection/am sexually aroused, I want to start intercourse right away before I lose my erection/arousal	.51
20.	If I feel that I'm expected to respond sexually, I have difficulty getting aroused	.49
23.	It is difficult to become sexually aroused unless I fantasize about a very arousing situation	.48
40.	When I have a distracting thought, I easily lose my erection/arousal	.48
Sexual inhibition due to the threat of performance consequences-social consequences (SIS2-SC)		
28.	If I can be seen by others while having sex, I am unlikely to stay sexually aroused	.64
24.	If I can be heard by others while having sex, I am unlikely to stay sexually aroused	.60
12.	If I am having sex in a secluded, outdoor place and I think that someone is nearby, I am not likely to get very aroused	.55
22.	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/sexual arousal	.53
Sexual inhibition due to the threat of performance failure-partner's pleasure and arousal (SIS1-PPA)		
45.	During sex, pleasing my partner sexually makes me more aroused (reversed)	.87
17.	When I notice that my partner is sexually aroused, my own arousal becomes stronger (reversed)	.87
Sexual inhibition due to the threat of performance consequences-negative outcomes (SIS2-NO)		
8.	If there is a risk of unwanted pregnancy, I am unlikely to get sexually aroused	.58
27.	If I realize there is a risk of catching a sexually transmitted disease, I am unlikely to stay sexually aroused	.51
18.	If my new sexual partner does not want to use a condom/safe-sex product, I am unlikely to stay aroused	.45
Excluded items		
42.	If I am distracted by hearing music, television, or a conversation, I am unlikely to stay aroused	.38
34.	If having sex will cause my partner pain, I am unlikely to stay sexually aroused	.37

Table 2 continued

Scale		Factor loadings
15.	If I discovered that someone I find sexually attractive is too young, I would have difficulty getting sexually aroused with him/her	.36
41.	I often rely on fantasies to help me maintain my erection/sexual arousal	.35
31.	If I think that having sex will cause me pain, I will lose my erection/arousal	.34
5.	Putting on a condom (or other safe-sex products) can cause me to lose my erection/arousal	.31
33.	If I think that I might not get an erection, then I am less likely to get one/If I am worried about being too dry, I am less likely to get lubricated	.28
2.	If I feel that I am being rushed, I am unlikely to get very aroused	.27

Items of male and female versions of the SIS/SES

Internal Consistency

The internal consistency was high for both SES (20 items: $\alpha = .92$) and SIS1 (8 items: $\alpha = .80$) and moderate for SIS2 (7 items: $\alpha = .74$), showing adequate internal consistency of the questionnaire.

SIS/SES and Men's Sexual Functioning

Regarding sexual function, men scored on average 8.1 (SD = 1.6) for sexual desire, 7.9 (SD = 2.9) for orgasm, and 23.5 (SD = 7.5) on the erectile function domain of the IIEF (see Table 4). Multiple regression analysis revealed a significant model for sexual desire, $F(4, 347) = 33.7$, $p < .001$, adjusted $R^2 = .27$; erectile function, $F(4, 349) = 13.01$, $p < .001$, adjusted $R^2 = .12$; and orgasm, $F(4, 350) = 8.63$, $p < .001$, adjusted $R^2 = .08$. Age and SIS1 were both significant and negative predictors of men's sexual desire [age, $\beta = -.31$, $t(347) = -6.1$, $p < .001$; SIS1, $\beta = -.21$, $t(347) = -3.96$, $p < .001$], erectile function [age, $\beta = -.21$, $t(349) = -3.83$, $p < .001$; SIS1, $\beta = -.21$, $t(349) = -3.6$, $p < .001$], and orgasm [age, $\beta = -.16$, $t(350) = -2.8$, $p < .05$; SIS1, $\beta = -.18$, $t(350) = -3.08$, $p < .01$]. SES constituted a positive predictor of sexual desire, $\beta = .31$, $t(347) = 6.6$, $p < .00$, and of erectile function, $\beta = .13$, $t(349) = 2.59$, $p < .05$ (see Tables 4, 5, 6, 7).

SIS/SES and Women's Sexual Functioning

On average, women scored 3.9 (SD = 1.3) for sexual desire, 3.8 (SD = 1.9) for orgasm, 3.8 (SD = 1.9) in the sexual arousal dimension, and 4.1 (SD = 2) in the lubrication dimension of the FSFI (see Table 4). Multiple regression analyses revealed a significant model for sexual desire, $F(4, 366) = 26.19$, $p < .001$, adjusted $R^2 = .22$; sexual arousal, $F(4, 364) = 6.02$, $p < .001$, adjusted $R^2 = .05$; lubrication, $F(4, 354) = 4.68$, $p \leq .001$, adjusted $R^2 = .04$; and orgasm, $F(4, 363) = 4.52$, $p \leq .001$, adjusted $R^2 = .05$. SES was a positive predictor of women's sexual desire, $\beta = .35$, $t(366) = 7.42$, $p < .001$, arousal, $\beta = .18$, $t(364) = 3.47$, $p < .001$, lubrication, $\beta = .16$, $t(354) = 2.96$, $p < .05$, and orgasm, $\beta = .17$, $t(363) = 3.18$, $p < .01$. Age was also a significant and negative predictor of women's sexual desire, $\beta = -.25$, $t(366) = -5.01$, $p < .001$ (see Tables 8, 9, 10, 11).

Gender Differences on SIS/SES Scores

The multivariate test revealed a statistically significant group effect, Wilks' $\Lambda = .82$, $F(3, 739) = 54.41$, $p < .001$, $\acute{\eta}_p^2 = .18$ (see Table 12). Univariate analysis of variance (ANOVAs) revealed significant gender differences on the sexual excitation (SES), $F(1, 742) = 114.21$, $p < .001$, $\acute{\eta}_p^2 = .13$ and both sexual inhibition scales, SIS1: $F(1, 742) = 28.07$, $p < .001$, $\acute{\eta}_p^2 = .04$; SIS2: $F(1, 742) = 18.73$, $p < .001$, $\acute{\eta}_p^2 = .03$. Follow-up tests indicated that men's SES scores ($M = 49.6$, SD = 8.5) were significantly higher than those of women ($M = 42.4$, SD = 9.9), and a reverse pattern was shown for the inhibition scales, with women's scores, on average, being higher for both SIS1 ($M = 18.2$, SD = 3.9) and SIS2 ($M = 19.3$, SD = 4.2), as compared to men's (SIS1: $M = 16.7$, SD = 3.9; SIS2: $M = 18.1$, SD = 3.5; see Table 12).

Discussion

Based on the theoretical assumptions of the Dual Control Model of Sexual Response, the SIS/SES questionnaire was developed to measure individual propensities for sexual excitation and inhibition in men and women (Carpenter et al., 2008; Janssen et al., 2002a). The current study presented the findings on the validation of the Portuguese version of the SIS/SES in a community sample of men and women. Exploratory and confirmatory factor analyses identified three

Table 3 Second-order exploratory factor analysis of the Portuguese Sexual Inhibition Sexual Excitation Scales ($N = 743$)

Subscales	Sexual excitation	Sexual inhibition 1	Sexual inhibition 2
SIS2-social consequences	− .13	− .13	.81
SIS2-negative outcomes	.10	.14	.55
SES-general arousability	.70	.05	− .07
SES-genital response	.44	.33	.20
SIS1-distraction and performance	.14	− .46	.42
SIS-partner's pleasure and arousal	.03	.08	.01

higher-level solutions which resembles the original factor structure, and reliability analyses showed that internal consistency and stability of the scales over time were both acceptable (Janssen et al., 2002a). Therefore, the Portuguese version of the SIS/SES was shown to be suitable for its use within the Portuguese population.

A second objective of this study was to test the relevance of sexual inhibition and sexual excitation processes in predicting different dimensions of men's and women's sexual functioning. Findings indicated a positive effect of SES in all dimensions of men's and women's sexual functioning, except for male orgasm which was marginally significant. These findings suggest that men and women who are more sensitive to and process external and internal stimuli more efficiently in sexual situations are less likely to experience sexual functioning problems. Directing the focus of attention toward sexual stimuli facilitates its efficient cognitive processing and activates the physiological and subjective sexual responses necessary for a positive sexual response and experience of sexual pleasure.

In line with previous studies (e.g., Bancroft et al., 2009), our findings indicate that concerns about sexual performance have an adverse effect on men's sexual functioning. The propensity for reduced responsivity due to the threat of an inadequate performance, as expressed in SIS1, not only interferes with erectile function but also may play a role in suppressing sexual desire and orgasm. SIS1 reflects an inbuilt tendency for response failure and such propensity may be amplified as a consequence of learning or individual's anticipation of response failure over time (Janssen et al., 2002a). Given the multidetermined nature of sexual response, a great variety of other cognitive and contextual-related variables may also play an important role in mediating the negative effect of SIS1 and male sexual response. There is a significant amount of data showing, for example, the existence of a set of erroneous sexual beliefs and sexual myths about sexuality and sexual functioning that are typically held by men and reflect an excessive emphasis on sexual performance and on women's sexual pleasure (e.g., "a real man must be always ready for sex and capable to wait the necessary amount of time to sexually satisfy a woman," "penile erection is essential for a woman's sexual satisfaction"; Nobre & Pinto-Gouveia, 2006; Wincze & Barlow, 1997). Such dysfunctional sexual beliefs may act as facilitators in triggering, simultaneously, specific negative cognitive schemas (Nobre, 2010; Quinta Gomes & Nobre, 2012b) and sexual inhibition and intensify performance anxiety in already high inhibition prone individuals, resulting in a poor sexual performance. At the same time, the possibility should be considered that relatively high propensities for sexual inhibition precede and facilitate the development of negative cognitive schemas and sexual beliefs. Age may also play an important role in the expression of sexual inhibition in men's sexual functioning. Previous studies have found positive associations between age and SIS1, indicating that age has an adverse effect on sexual function and augment underlying inhibitory mechanisms (Janssen et al., 2002a; Pinxten & Lievens, 2015). This exacerbation is possibly associated with impaired peripheral mechanisms and an age-related decrease in sexual arousability at a central level (Bancroft et al., 2009; Janssen et al., 2002a) which place men at a greater risk of developing sexual problems (Quinta Gomes & Nobre, 2014). The recurrent experience of variable and inconsistent sexual response may increase the anticipatory perception of threat in sexual situations and possible increase efforts to prevent sexual failure (e.g., monitoring of one's sexual response) which paradoxically could increase anxiety performance and promote further occurrence of negative sexual experiences (Barlow, 1986; Quinta Gomes & Nobre, 2012b).

Even though no significant effects were found for SIS1 in women, the threat of not "performing" well sexually (e.g., not feeling sexually aroused or experiencing an absence of lubrication) clearly is also important dimensions for understanding women's sexual functioning, particularly for those who already experience sexual difficulties, as shown by previous studies indicating the role of inhibition in predicting women's self-reported sexual problems (Janssen & Bancroft, 2007; Sanders et al., 2008). However, we can speculate that the absence of an association between SIS1 and sexual function in women may point at the relevance of processes not captured by this factor. For example, the role of relational and emotional processes has been recognized as important dimensions to women's sexuality and sexual function (Basson, 2000, 2002, Byers, 2001). Future research could explore this possibility by including dyadic variables and measures of relationship quality.

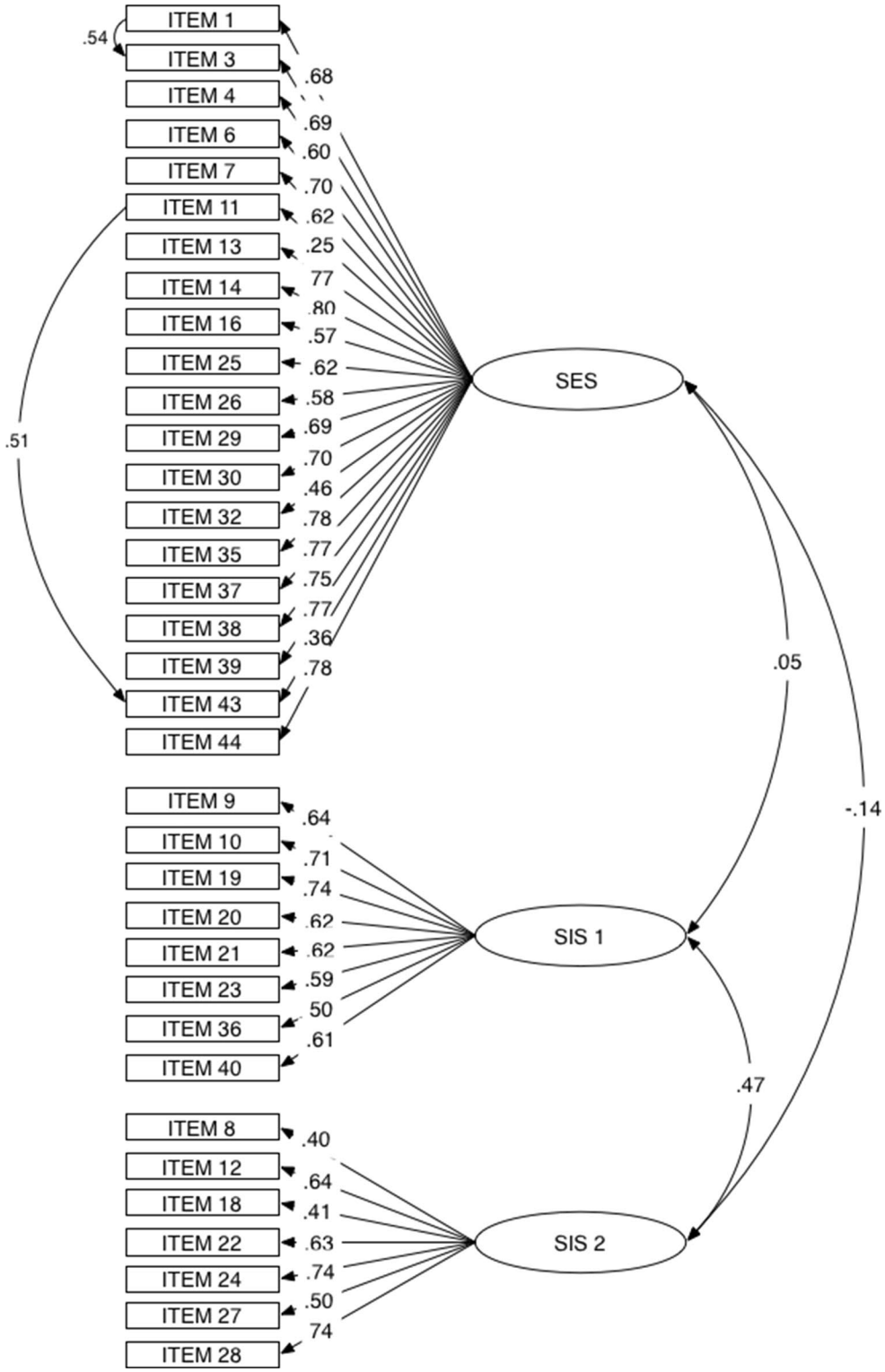

Fig. 1 Three-factor model of the Portuguese SIS/SES

In this study, SIS2 appeared to be little involved in women's and men's overall sexual functioning, suggesting that the threat implicit in this dimension (e.g., unwanted pregnancy or catching a sexually transmitted infection) may be not as relevant for sexual functioning in sexually healthy individuals as SIS1, as has been suggested before (Bancroft et al., 2003, 2004).

Previous studies have found that levels of sexual excitation and sexual inhibition differ between men and women (Carpenter et al., 2008; Milhausen et al., 2010; Pinxten &

Table 4 Sexual function in men and women ($N = 743$)

Sexual function	Men ($N = 370$)		Women ($N = 373$)	
	M	SD	*M*	SD
Sexual desire	8.07	1.66	3.93	1.29
Erectile function	23.52	7.59	–	–
Sexual arousal	–	–	3.84	1.88
Orgasm	7.89	2.89	3.83	1.99
Lubrication	–	–	4.14	2.00
IIEF/FSFI total score	58.42	15.77	28.23	5.11

Men's and women's sexual functioning was assessed using the *IIEF* and the *FSFI*, respectively. The scores on the same scale of the *IIEF* and *FSFI* are not directly comparable

Table 5 Multiple regression analysis for sexual desire in men ($N = 370$)

Predictors	*B*	SE	β	*t*	*p*
SES	.06	.01	.31	6.61*	.001
SIS1	− .09	.02	− .21	− 3.96*	.001
SIS2	− .004	.02	− .01	− .17	.87
Age	− .03	.01	− .31	− 6.10*	.001

Statistical significance using Bonferroni corrected alpha level: $p = .001/4 = .0003$

* $p < .001$

Table 6 Multiple regression analysis for erectile functioning in men ($N = 370$)

Predictors	*B*	SE	β	*t*	*p*
SES	.12	.05	.13	2.59*	.010
SIS1	− .40	.11	− .21	− 3.60**	.001
SIS2	.14	.11	.06	1.22	.223
Age	− .10	.03	− .21	− 3.83**	.001

Statistical significance using Bonferroni corrected alpha level: $p = .05/4 = .013$, $p = .001/4 = .0003$

* $p \leq .05$; ** $p < .001$

Table 7 Multiple regression analysis for orgasm in men ($N = 370$)

Predictors	*B*	SE	β	*t*	*p*
SES	.04	.02	.12	2.29	.022
SIS1	− .13	.04	− .18	− 3.08**	.002
SIS2	.02	.04	.03	.53	.596
Age	− .03	.01	− .16	− 2.79*	.005

Statistical significance using Bonferroni corrected alpha level: $p = .05/4 = .013$, $p = .01/4 = .003$

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

Table 8 Multiple regression analysis for sexual desire in women ($N = 373$)

Predictors	*B*	SE	β	*t*	*p*
SES	.05	.01	.35	7.42*	.001
SIS1	− .03	.02	− .09	− 1.75	.081
SIS2	− .02	.02	− .07	− 1.46	.144
Age	− .02	.01	− .25	− 5.01*	.001

Statistical significance using Bonferroni corrected alpha level: $p = .001/4 = .0003$

* $p < .001$

Table 9 Multiple regression analysis for sexual arousal in women ($N = 373$)

Predictors	*B*	SE	β	*t*	*p*
SES	.03	.01	.18	3.47*	.001
SIS1	− .01	.03	− .01	− .17	.869
SIS2	− .06	.03	− .13	− 2.33	.020
Age	− .01	.01	− .11	− 1.92	.055

Statistical significance using Bonferroni corrected alpha level: $p = .001/4 = .0003$

* $p < .001$

Table 10 Multiple regression analysis for lubrication in women ($N = 373$)

Predictors	*B*	SE	β	*t*	*p*
SES	.03	.01	.16	2.96*	.003
SIS1	.01	.03	.01	.06	.952
SIS2	− .05	.03	− .09	− 1.64	.102
Age	− .02	.01	− .12	− 2.07	.039

Statistical significance using Bonferroni corrected alpha level: $p = .05/4 = .013$

* $p < .05$

Table 11 Multiple regression analysis for orgasm in women ($N = 373$)

Predictors	*B*	SE	β	*t*	*p*
SES	.03	.01	.17	3.18*	.002
SIS1	.01	.03	.01	.09	.929
SIS2	− .06	.03	− .13	− 2.36	.019
Age	− .01	.01	− .04	− .81	.420

Statistical significance using Bonferroni corrected alpha level: $p = .01/4 = .003$

* $p < .01$

Table 12 Gender differences in SIS/SES scores ($N = 673$)

SIS/SES	Men ($N = 370$)		Women ($N = 373$)		$F(1, 742)$	p	η_p^2
	M	SD	M	SD			
SES	49.62	8.45	42.36	9.99	114.21*	.001	.134
SIS1	16.71	3.92	18.23	3.87	28.07*	.001	.037
SIS2	18.07	3.54	19.29	4.22	18.73*	.001	.025

Statistical significance using Bonferroni corrected alpha level: $p = .001/3 = .0003$

* $p < .001$

Lievens, 2015). Our results are in line with those earlier studies and support the existence of significant gender differences in SIS/SES scores, with men scoring higher in sexual excitation and lower in sexual inhibition than women. These results may be interpreted in the light of both evolutionary and sociocultural perspectives of sexual response and behavior (Carpenter et al., 2008). Sexual inhibition may have been of particular importance for women's survival in the past (and still in modern society) given the possible negative consequences of not controlling sexual desire/arousal (e.g., pregnancy) or of a permissive sexual conduct (e.g., reputation), contrasting with men to whom higher levels of sexual excitation may have been more advantageous in the past while increasing the reproductive potential and continues to be more culturally accepted (e.g., double sexual standard; see Carpenter et al., 2008).

Overall, the findings of the present study suggest the importance of sexual inhibition and sexual excitation in women's and men's sexual functioning and offer additional empirical support to the Dual Control Model of Sexual Response. However, some limitations of the study need to be addressed. For example, the current study did not focus on convergent and discriminant validity of the Portuguese version of SIS/SES and we did not compare different factor structures using CFA. Also, ideally, the assessment of test–retest reliability would have been based on a larger sample. Another important issue, which is relevant to the use of the SIS/SES questionnaire to assess sexual propensities in both men and women, is the question of whether it captures all dimensions that may be relevant to women's sexuality (e.g., relationship aspects, emotional intimacy; Basson, 2000, 2002, Byers, 2001). The Sexual Excitation/Sexual Inhibition Inventory for Women (SESII-W; Graham et al., 2006), which has also been developed to measure sexual inhibition and excitation propensities, provides a possible alternative to the SIS/SES. Finally, given that all data collected for this study relied on self-report level, we cannot draw any firm conclusions on the underlying cognitive and affective mechanisms that are involved in the regulation of sexual function and behavior. Nonetheless, our findings indicate that the SIS/SES questionnaire provides an important measure for assessing individual differences in sexual responsivity and is appropriate for use in both clinical and non-clinical populations of Portuguese men and women.

Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Human and Animal Rights This article does not contain any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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