

Development and Initial Validation of the Beliefs About Sexual Functioning Scale: A Gender Invariant Measure

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ABSTRACT

Background: Past research on cognitive models of sexual functioning has focused on sexual beliefs as an important vulnerability factor for sexual dysfunction. However, the existing measurements of sexual beliefs are lengthy and entangle beliefs about sexual functioning with moral beliefs and ideas about sexuality. Furthermore, they have female and male versions, which does not allow for sex comparisons or dyadic research with heterosexual couples.

Aim: To describe the development and validation of the Beliefs About Sexual Functioning Scale (BASEF), which assesses beliefs about sexual functioning in men and women.

Methods: This study included two cross-sectional online studies with adults in heterosexual dyadic committed and exclusive relationships. In study 1 (sample A, $n = 274$, mean age = 32.27 years; sample B, $n = 114$, mean age = 30.6 years), the factorial validity of the BASEF was analyzed through an exploratory factor analysis with an initial pool of 51 items, followed by a test of its structure in a confirmatory factor analysis. In study 2 ($n = 426$, mean age = 31.5 years), the factorial equivalence of the BASEF was tested across sexes and its association with total scores of sexual functioning was analyzed.

Outcome: The main outcome was a new instrument for measurement of beliefs about sexual functioning.

Results: In study 1, 15 items indicating 5 factors were retained. The structure was confirmed by confirmatory factor analysis, establishing its factorial validity with the five factors aggregated in a second-order latent variable. In study 2, the equivalence of the BASEF was demonstrated across sexes and its association with theoretically related measurements, the International Index of Erectile Function and the Female Sexual Function Index, was supported.

Clinical Implications: This new measurement could be useful to evaluate clients and design interventions that take into account similarity and discrepancy in sexual beliefs in couples, such as those interventions framed in cognitive and systemic clinical models.

Strengths and Limitations: This study presents a new measurement of beliefs about sexual functioning suited to address an equivalent set of beliefs for men and women. In future studies, the scale will be useful to compare the unique role of these same beliefs in the sexual outcomes of men and women. One major limitation is the lack of examination of the BASEF criterion validity with a clinical sample.

Conclusions: Results are indicative of a brief, valid, and reliable sex-invariant measurement of beliefs about sexual functioning that enables testing of cognitive models of sexual functioning in men and women in clinical and research settings. **Pascoal PM, Alvarez M-J, Pereira CR, Nobre P. Development and Initial Validation of the Beliefs About Sexual Functioning Scale: A Gender Invariant Measure. J Sex Med 2017;XX:XXX–XXX.**

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INTRODUCTION

The role played by beliefs in psychopathology has received special attention since the development of Beck's¹ cognitive model of depression. According to Beck,² beliefs are conceptualized as stable underlying assumptions about the self, the environment, and the future that guide the meaning individuals assign to events, determining automatic thoughts and emotions. Beck proposed that each psychological problem has a set of specific dysfunctional beliefs, whose content is unique to that disorder. These beliefs take the form of unrealistic, dogmatic, or

inflexible assumptions (eg, I need to be loved by another person or I will not be worthwhile) and work as vulnerability factors for the development and maintenance of a specific disorder.² Beck's cognitive model of vulnerability, development, and maintenance of psychopathology has been applied to diverse clinical disorders including sexual dysfunctions.^{3–5}

Based on Beck's model, Nobre et al⁶ developed a series of studies to investigate the role of beliefs in sexual disorders.^{3–8} Nobre et al⁶ developed two distinct measurements to assess beliefs that supposedly work as vulnerability factors for the development of sexual dysfunctions: the male and female versions of the Sexual Dysfunctional Beliefs Questionnaire (SDBQ). Research using the SDBQ has found that individuals with sexual dysfunction tend to report more unrealistic and inflexible sexual beliefs compared with controls. In men, Nobre et al found beliefs about performance demands, namely macho beliefs (eg, a real man is always ready for sex) and women's sexual satisfaction (eg, a woman can have doubts about a man's virility if he fails to have an erection), to be related to lower levels of sexual functioning. Research using the SDBQ female version has found that beliefs about the role of age (eg, after menopause, women lose their sexual desire), body image (eg, women who are not physically attractive cannot be sexually satisfied), and sexually conservative beliefs (eg, the best gift a woman could bring to marriage is her virginity) are related to lower levels of sexual functioning.^{7,8}

Moreover, studies conducted in samples of men and women with specific sexual dysfunctions have shown that women with low sexual desire, arousal difficulties, and vaginismus report having significantly more conservative sexual beliefs,^{9–12} whereas "macho" beliefs in men predict lower levels of erectile function through negative schemas and erection concerns during sexual activity.⁵

The Need for a New Scale

Based on the premise that human development and outcomes occur in interpersonal contexts and are influenced by the human context in which they occur, different investigators have highlighted the need for taking a dyadic approach, whenever applicable, that considers the two members of a couple in health-related research.¹³ This assumption and this premise have special interest in sex research, where most studies are developed with people involved in an ongoing dyadic relationship (exclusive or not). Recently, Mustanski et al¹⁴ emphasized the need to take a dyadic approach to sex research by drawing attention to the theoretical influence of interpersonal relationships in individual outcomes and the fact that researchers cannot assume the empirical independence of measurements that are not independent, because most research is developed with people who are in a relationship. However, research developed using the male and female versions of the SDBQ has been conducted without taking a perspective that acknowledges the possible interdependence of data, limiting existing research to analysis of data from a single

informant. Furthermore, only a few items in the SDBQ refer to sexual functioning. Moreover, current scales such as the SDBQ are rather lengthy (40 items), which can contribute to lower response rates and higher response dropouts especially in web research.^{15,16}

Aims of the Study

Despite the existence of the SDBQ,⁶ its focus on general beliefs about sexuality, not delimitating beliefs about sexual functioning, with a male version and a female version, presents limitations previously mentioned.

The present study was developed in two Portuguese samples and aimed at elaborating and analyzing the reliability and validity parameters of a new measurement on beliefs about sexual functioning that can underpin individuals' vulnerability for or maintenance of sexual problems. The Beliefs About Sexual Functioning Scale (BASEF) was built on existing measurements to enable the assessment of dysfunctional (ie, inflexible, dogmatic) beliefs specifically related to sexual functioning in men and women, which allows for multivariate analysis of this construct across sexes, expanding the cognitive emotional model of sexual functioning and allowing dyadic studies within cognitive models.

Therefore, the new scale was based on theoretical domains derived from current sexual response models, namely global sexual functioning, satisfaction and pleasure, desire and interest, subjective arousal and lubrication, erection, orgasm, ejaculation, and pain.^{17–20}

The present study set out to (i) create a measurement to assess beliefs about sexual functioning that is suitable for men and women; (ii) evaluate the factor structure of the scale; (iii) confirm its factor structure; (iv) test its factorial invariance across sexes; and (v) assess its criterion concurrent validity. Two studies were developed; study 1 concerned goals i to iii and study 2 concerned goals iv and v.

METHODS

Procedure

For study 1, after approval by the ethical committees of the institutions involved, three distinct strategies from three different sources were followed to create the initial pool of items for the BASEF: (i) a selection of items from the SDBQ⁶; (ii) a focus group developed with five experienced colleagues in clinical sexology and sexual medicine aimed at generating examples of beliefs about sexual functioning considered to play a role as vulnerability factors in sexual dysfunction; and (iii) in line with recent research methods for content elicitation,²¹ an open-ended web-based question designed to elicit examples of beliefs about sexual functioning was sent by the five experienced colleagues to lay people from their social network. A total of 221 statements were generated using all these sources. The first author and two

psychology undergraduate students checked all items independently, aggregated similar or redundant formulations into more comprehensive items, and analyzed the results until reaching an agreement about a set of distinct items.

After checking for redundancy, 80 items were retained and aggregated according to the initial theoretical proposal: 10 items considered global functioning (eg, If one loves one's partner, sexual activity will present no problems); 14 items considered satisfaction and pleasure (eg, Pleasure diminishes across the life span); 13 items considered desire and interest (eg, Men always have sexual desire); 10 items considered subjective arousal and lubrication (eg, If a woman is not lubricated, she is not feeling aroused); 9 items considered erection (eg, If there is a problem with a man's erection, the woman will not be satisfied); 10 items considered orgasm (eg, Women with multiple orgasms have great lovers); 5 items considered ejaculation (eg, Delayed ejaculation is a sign of a lack of subjective arousal); and 9 items considered pain (eg, Pain worsens during vaginal intercourse). To establish content validity, the 80 items were available online and the link was sent to five experienced certified sex therapists who were invited to rate each item's relevance on a scale of 1 ("highly irrelevant") to 4 ("extremely relevant").²² For a belief to be considered relevant, it had to be an accurate description of a common belief about sexual functioning and classified into the correct theoretical sexual functioning domain. Experts could propose rephrasing the items and including new ones. The expert evaluation took place once. Fifty-one items were considered for further analysis (the retention of items was based on the higher content validity of the items, defined as those that received a total average score of relevance ≥ 3).

We tested the 51-item version of the questionnaire with a group of nine undergraduate students to explore whether the items were easy to understand. We asked them to identify ambiguous words, terms, or expressions or any difficulty they had in interpreting the question or in finding a proper answer to the questions posed when using the proposed scale of responses. The participants did not refer to any difficulty in understanding or answering the items. Next, a pilot test on the sociodemographic questionnaire and the 51 items took place through a web platform (Qualtrics, Provo, UT, USA), where 12 people appraised and remarked on the length and appearance of the protocol. After the subsequent final adjustments, the study's URL was launched online and advertised through social networks and newsletters (mainly Facebook pages and newsletters of the institutions involved), resulting in chain sampling as respondents and people with an interest in the research shared the link of the study. Data were collected for a period of 4 months. Informed consent included information about aims, anonymity, and researchers' contact information. Those who agreed to participate were presented with a sociodemographic questionnaire. Then, they were asked to answer the final 51 items of the BASEF, stressing that participants' answers should reflect their level of agreement with the statement presented, using a scale from 1 ("totally disagree") to 5 ("totally agree") and were informed that there

were no correct or incorrect answers. Higher values indicated stronger concordance with the sexual beliefs.

For study 2, after approval by the ethics committee of the Faculty of Psychology at the University of Lisbon, an online survey presenting the BASEF, the International Index of Erectile Function (IIEF), and the Female Sexual Function Index (FSFI) was tested and launched using Qualtrics software. All the procedures concerning anonymity and informed consent were equivalent to those followed in study 1.

Data Analysis

The sample from study 1 was randomly divided using SPSS 22 (SPSS Inc, Chicago, IL, USA), and a subsample of 70% of the total participants was extracted (sample A, $n = 274$) for an exploratory factor analysis (EFA), and the remaining 30% (sample B, $n = 114$) were used for subsequent confirmatory factor analysis (CFA).

For determination of sample size, we followed the ratio of participants proposed by Fabrigar et al,²³ according to which, under some circumstances, three to five participants per item are sufficient to estimate reliable parameters.

Using sample A, an EFA using principal axis factoring with no rotation was run, followed by an analysis with oblique rotation. Principal axis factoring was used, rather than principal components analysis, given the focus on latent constructs,^{23,24} which, in the present study, were beliefs about sexual functioning. An oblique rotation, direct oblimin, was used because the factors were expected to be correlated. Because our aim was to elaborate a belief scale that was as parsimonious as possible but had good indicators of validity and reliability, we followed Bollen's²⁵ criteria in which three items per factor are considered enough to have a good estimate of a latent variable. Criteria for factor retention were eigenvalues higher than 1, scree plot analysis, and percentage of explained variance to identify the optimal solution. For item retention, a factor loading above 0.40 was used as a cutoff point, and items that presented a factor loading above 0.40 in one factor and above 0.30 in any other factor were excluded.²⁶ After eliminating the items that proved not to meet these assumptions, the procedure of running principal axis factoring with oblique rotation was repeated in an iterative process until a solution in line with the aforementioned criteria was reached, that is, until we had obtained the best three items for each factor measured by the BASEF.²⁷ Therefore, we found a final version with a fixed number of factors, each with three items.

A CFA was conducted to investigate the fit of the final structure of the BASEF and to compare it with an alternative factorial structure that considered a second-level latent variable aggregating all the factors found.

CFA is a multivariate statistical analysis used for different purposes and in the present study it was used to confirm the factor structure of BASEF by estimating its goodness of fit to data and comparing it with a different factorial structures aiming to

have a more rigorous procedure to assess the quality of the proposed scale to measure beliefs about sexual function.

To assess the goodness of fit for the proposed factor structure, we used the χ^2 test, Tucker-Lewis Index, comparative fit index, and root mean square error of approximation using AMOS 22 (SPSS, Inc). A χ^2/df less than 2 is indicative of a good overall fit,²⁸ Tucker-Lewis Index and comparative fit index values over 0.90 indicate an acceptable model fit and values over 0.95 are considered a very good fit,²⁹ and root mean square error of approximation values lower than 0.08 indicate an adequate model fit.³⁰ The simple structure was modeled so that errors were independent given that each item loaded only on the hypothesized factor. Models were compared using the χ^2 difference ($\Delta\chi^2$) test.

The internal consistency of each subscale was assessed with the Cronbach α ; coefficients from 0.60 to 0.70 are considered moderate and values higher than 0.70 are considered strong.^{31–33}

Considering that beliefs are a stable personal psychological construct, the test-retest reliability of the scale and subscales was assessed 8 months after initial data collection using the Pearson correlation. The retest was conducted with a total of 143 self-selected participants from study 1 whose sociodemographic characteristics were equivalent to those of the initial sample.

In study 2, to test the factorial invariance across sexes of the structure found in study 1, we used a multi-group dataset and followed Byrne's³⁴ steps to test the factorial equivalence of scores. A freely estimated structure in which no equality constraints were imposed on any of the parameters (configured model) was compared with a constrained structure in which the factor loadings and structural loadings (measurement model) were estimated to be equal between groups. The models were compared using the scaled $\Delta\chi^2$ test.³⁵ The invariance of the scale between groups is supported if the $\Delta\chi^2$ test result is non-significant. The Student *t*-test was used to compare the total means of the BASEF between men and women.

The concurrent validity as assessed by the association of the BASEF with important related constructs, such as sexual function, was evaluated by assessing its correlation with the total scores of the FSFI and the IIEF.

Participants

In study 1, 388 sexually active heterosexual adults (185 men; 60%) involved in a committed relationship participated in the study. Sample A had 138 men (50%) and 136 women (50%). Participants' age ranged from 18 to 88 years (mean = 32.27 years, SD = 10.81). Participants lived mainly in an urban area ($n = 254$; 92.6%). There were 156 participants (57%) in a non-cohabiting relationship, 60 (22%) were married, and 57 (21%) were living in common-law relationships. The mean duration of the relationship was 6.13 years (SD = 6.9). The sample was highly educated, with 200 participants (73%) in ongoing or completed university studies. Sample B had 47 men (41%) and

67 women (59%) with a mean age of 30.6 years (SD = 9.33; range = 18–64). The participants lived mainly in an urban area ($n = 102$; 91%) and most were non-cohabiting with their partner ($n = 66$; 58%). There were 21 married participants (21%) and 24 (21%) were living in common-law relationships, and this sample was mainly highly educated, with 86 participants (76%) having frequented university courses. In study 2, there were 407 participants (mean age = 31.5 years, SD = 10.9) who self-identified as heterosexual (men, $n = 129$) and were involved in a dyadic relationship in which, according to the participant's self-perception, the two partners agreed to be exclusive. Participants in study 2 were sexually active in the past 4 weeks.

Measurements

General Questionnaire

A sociodemographic questionnaire with questions about the respondent's characteristics such as age, duration of the current relationship, and years of education was completed.

International Index of Erectile Function

The IIEF³⁶ is a 15-item scale that assesses 5 domains of male sexual function (erectile function, orgasmic function, sexual desire, satisfaction with intercourse, and overall satisfaction). The total scale can be used as a measurement of global functioning. Using the six-point response option (range = 0–5), participants rate their answers to questions about their sexual function. Higher scores indicate greater levels of sexual functioning (range = 5–75). The Portuguese version of the IIEF has good reliability (Cronbach $\alpha > 0.70$).³⁷ In the present study, the IIEF total scale had a Cronbach α value of 0.85.

Female Sexual Function Index

The FSFI³⁸ is a questionnaire with 19 items that assesses six dimensions of female sexual functioning (sexual interest and desire, lubrication, arousal, sexual satisfaction, orgasm, and sexual pain) using a six-point response option (range = 0–5 or 1–5). It can be used as a unidimensional scale summing all the mean values of each dimension and therefore with total values ranging from 2 to 36 points and higher values corresponding to higher levels of sexual functioning. The Portuguese version of the FSFI demonstrated good internal consistency for each of its dimensions ($\alpha > 0.88$) and for the total scale ($\alpha = 0.93$).³⁹ In the present study, the FSFI total scale had a Cronbach α value of 0.90.

RESULTS

Study 1

Exploratory Factor Analysis

The results of the EFA indicated an optimal five-factor solution. The three items with the highest factor loading in each factor were included and the remaining items were excluded.

The five factors' initial eigenvalues ranged from 0.98 to 4.39 and a cumulative 50% of variance was explained. The factors extracted were considered beliefs about anal sex, male performance, aging, sexual pain, and primacy of the relationship. The final 15-item version of the scale with descriptive statistics for item level and rotated factor loadings from the EFA conducted is presented in [Table 1](#).

Confirmatory Factor Analysis

A CFA was conducted and confirmed the structure found in the EFA (model 1; [Figure 1](#)). An alternative structural model (model 2; [Figure 2](#)) with a second-level latent variable was tested to ascertain whether it had a better fit. Goodness-of-fit statistics for models 1 and 2 were good and are presented in [Table 2](#). We found a non-significant χ^2 test result for the difference between models; however, the alternative model fit better to the data because it was more parsimonious (ie, had more degrees of freedom). Thus, the results support the use of the scale to assess a second-order general factor.

Reliabilities and Intercorrelations

Mean values, SDs, and Cronbach α values for each subscale and for the total scale are presented in [Table 3](#). Most subscales were moderately correlated with each other and strongly related with the total scale, and all subscales showed acceptable internal consistency values. Test-retest reliability after an 8-month period showed an r value higher than 0.70 for the total scale and all subscales, which confirmed the good reliability of the BASEF.

Study 2

Gender Factorial Invariance

To test the measurement's factorial invariance across the sexes, we used the alternative model, that is, the model that included the subscales found in study 1 and that considered a common second-order latent factor ([Figure 2](#)). The model comparison between groups showed that the BASEF had factorial invariance across the sexes ([Table 4](#)).

The comparison of the total mean of the BASEF showed significant differences between men (mean = 32.53; SD = 7.81) and women (mean = 29.34; SD = 7.46) in the total range of cognitive distraction ($t_{405} = 3.931$; $P < .001$).

Concurrent Validity

The results demonstrated that the BASEF was significantly correlated with men's sexual functioning as measured by the IIEF ($r = -0.24$; $P = .011$) and with women's sexual functioning as measured by the FSFI ($r = -0.20$; $P = .001$).

DISCUSSION

In two studies we developed the BASEF and found evidence for its reliability and factorial and concurrent validity. The results show a five-factor solution in which some of the factors have

some overlaps with the existing SDBQ, a measurement that does not specifically address beliefs about sexual functioning but that includes a few items on sexual functioning.

The first factor, anal sex, focuses on beliefs about anal sex as a practice that has only positive outcomes for gay men and is not pleasurable for women. There is a small overlap with the content of "sexual conservatism," a factor found on the female version of the SDBQ, characterized by the idea that coitus is the central aspect of human sexuality and that masturbation, oral sex, and anal sex are deviant and sinful activities. The focus of the anal sex factor found in the present study is similar because it negates any possible positive significance of anal sex in heterosexual people. There also is a slight overlap between this factor and the "restricted attitude toward sexual activity" in the male version of the SDBQ, in which sexual fantasies and oral and anal sex are considered unhealthy or incorrect experiences. There are few research studies on heterosexual anal sex⁴⁰ compared with research developed with gay samples, which seems to indicate that anal sex is mostly considered a gay practice. In a review of the literature on the topic of heterosexual anal sex, McBride and Fortenberry⁴⁰ found that heterosexual anal sex is a marginal stigmatized sexual practice. This could explain why, in the present study, the anal sex factor emerges as a clear construct in a scale on sexual beliefs for women and men.

The second factor, male performance, is constituted by items that highlight the intersection between male erection and female orgasm. This result corroborates existing research about sexual performance demands being associated with erection in men^{41,42} and with orgasm competency in women.^{43,44} This factor partly replicates the existing factor in the male version of the SDBQ of "beliefs about women's sexual satisfaction," a dimension characterized by the importance of satisfying female partners and by the idea that penile erection is necessary to sexually satisfy a woman. Previous research with a related set of beliefs has demonstrated that performance demands are related to good sexual functioning in community samples without sexual difficulties but have a negative impact on sexual functioning in men with sexual problems.^{44,45} This finding suggested that excessive performance demand beliefs, although not negatively associated to sexual functioning in healthy men, could work as vulnerability factors predisposing men to catastrophize the consequences of negative sexual events (eg, not performing according to the highly demanding beliefs) and maintaining and magnifying the difficulties once they are established.⁵

The third factor, aging, aggregates items associated with the belief that functional sexuality is the domain of the young, which could be explained by implicit negative attitudes about older people's sexuality among young adults⁴⁶ within a similar age bracket to that of the present sample. In the original SDBQ, this factor was studied only in the female sample and found to be more prevalent in women without sexual dysfunction compared with women with a diagnosis of sexual dysfunction.^{7,8} Our

Table 1. Factor loadings of the Beliefs About Sexual Function Scale (exploratory factor analysis; sample A, n = 274)

	Range	Mean	SD	Corrected item total (r)	h ²	Standardized factor loadings					
						Anal sex beliefs	Male performance beliefs	Aging beliefs	Sexual pain beliefs	Primacy of relationship beliefs	
Anal sex beliefs											
1. Only gay men feel pleasure through anal stimulation	1–5	1.57	0.91	0.53	0.53	0.92	–0.03	0.01	–0.03	–0.04	
14. Only gay men feel aroused by anal stimulation	1–5	1.73	0.98	0.57	0.57	0.83	–0.01	0.02	0.04	0.03	
7. Women do not feel pleasure from anal sex	1–5	1.98	1.01	0.52	0.52	0.53	0.08	0.02	0.02	0.13	
Anal sex beliefs total score	3–15	5.30	2.5								
Male performance beliefs											
13. Men should maintain an erection for the time a woman requires to have multiple orgasms	1–5	2.12	1.23	0.44	0.52	0.02	0.75	0.00	–0.07	0.1	
5. Women are more satisfied if they have several orgasms in a sexual encounter	1–5	2.99	1.4	0.27	0.39	0.00	0.63	0.09	–0.01	–0.13	
3. A sexually competent man can make his partner have orgasms through vaginal penetration	1–5	2.68	1.34	0.35	0.35	0.00	0.54	–0.09	0.12	0.08	
Male performance beliefs total score	3–15	7.79	3.08								
Aging beliefs											
8. Sexual pleasure decreases with age	1–5	2.40	1.08	0.41	0.62	0.06	–0.09	0.74	–0.03	0.12	
2. As women age, their sexual desire decreases	1–5	2.86	1.09	0.31	0.46	–0.03	0.03	0.70	0.04	–0.08	
11. Young people have more satisfying sex than older people	1–5	2.03	1.12	0.51	0.36	0.07	0.17	0.40	0.03	0.2	
Aging beliefs total score	3–15	7.28	2.58								
Sexual pain beliefs											
6. Pain during sexual activity indicates a lack of desire	1–5	1.75	0.90	0.40	0.59	–0.12	0.04	0.00	0.75	0.12	
4. Pain during vaginal penetration indicates a lack of arousal	1–5	2.24	1.13	0.32	0.53	0.03	–0.03	0.05	0.75	–0.1	
15. Feeling pain in early penetration indicates that intercourse will go wrong	1–5	2.00	1.07	0.34	0.22	0.16	0.04	–0.02	0.35	0.03	
Sexual pain beliefs total score	3–15	5.98	2.37								
Primacy of relationship beliefs											
9. People who masturbate do so because they do not have satisfactory sex with their partners	1–5	1.44	0.82	0.49	0.55	0.00	0.05	0.00	–0.032	0.74	
10. If one uses sex toys, it is because one is sexually dissatisfied with one's partner	1–5	1.37	0.74	0.51	0.52	0.08	–0.04	0.03	0.105	0.63	
12. If one feels sexual desire for other people, it is because one is sexually dissatisfied with one's partner	1–5	1.96	1.07	0.40	0.35	0.05	–0.01	0.05	–0.004	0.55	
Primacy of relationship beliefs total score	3–15	4.78	2.09								
Total scale	15–75	31.11	8.28								

h² = communality coefficient.

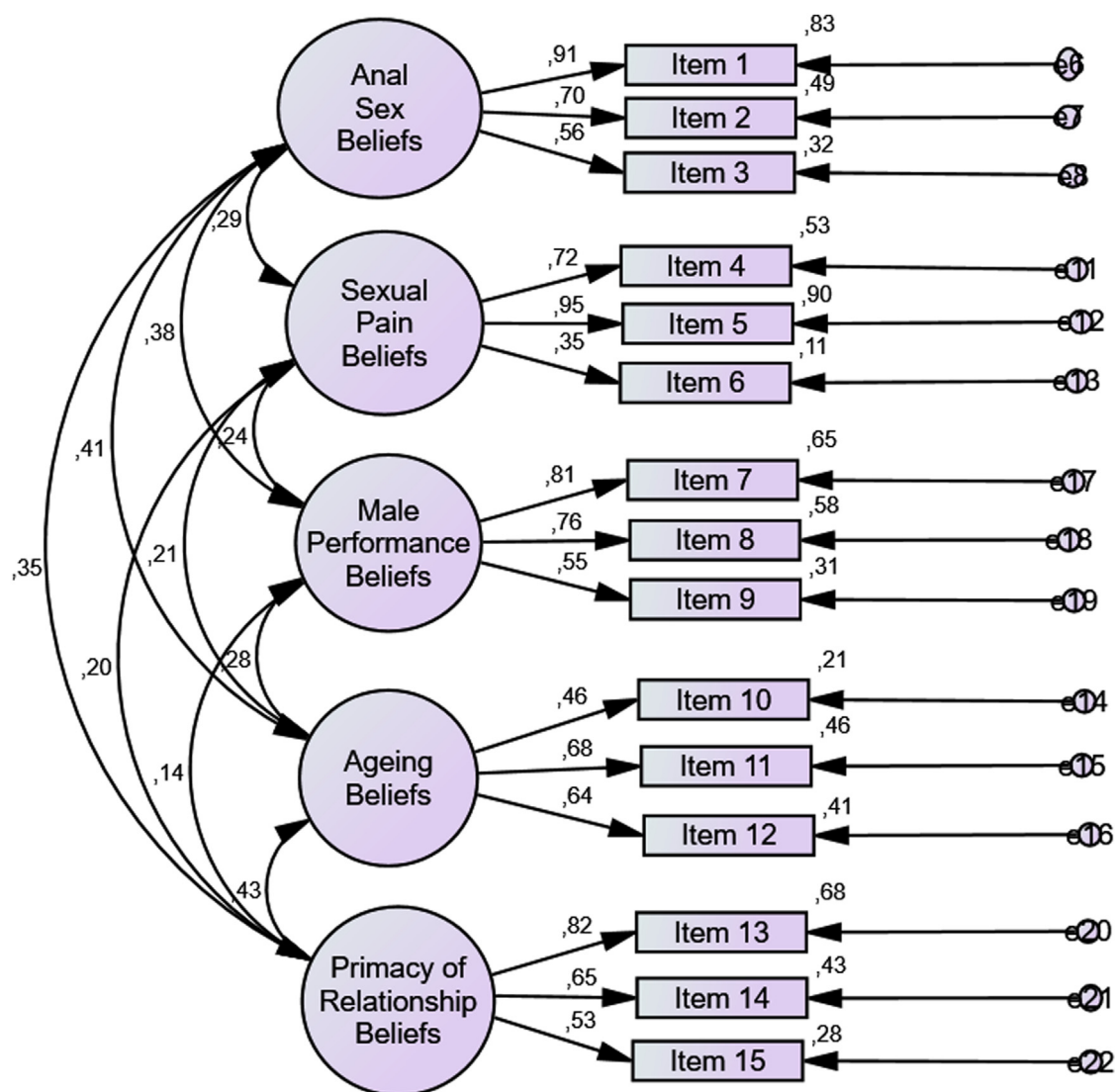


Figure 1. Confirmatory factor analysis of model 1 based on the five-factor structure found in the exploratory factor analysis with sample A.

results seem to indicate this set of beliefs is shared by men and women with no diagnosis of sexual dysfunction.

The fourth factor, sexual pain, was part of the initial theoretical frame and integrates items dealing with the idea that pain is a symptom of sexual dysfunction and cannot be controlled. This set of beliefs seems to be consistent with existing research associating maladaptive penetration-related beliefs with fear avoidance of penetration, which in turn could contribute to the maintenance of sexual pain-related disorders.⁴⁷ Further research with a clinical sample of women and partners of women with sexual pain could help to clarify whether the set of sexual pain beliefs found in the present study promotes or minimizes sexual pain behavior.

The fifth factor, primacy of the relationship, is a composite of items that refer to non-coital practices as an indicator of non-functional or non-satisfying couple sexuality and to the exclusive nature of sexual desire. In keeping with the anal sex factor, primacy of the relationship partly overlaps with the factors of

“sexual conservatism” of the female version and the “restricted attitude toward sexual activity” of the male version of the SDBQ. This relation is consistent with the strong correlation found between these two factors, stressing that these two scales are related to the practice of non-coital activities.

The five-factor structure found in the EFA was confirmed through CFA, but an alternative model with a second-order latent variable accounting for a one-factor solution where the other subscales are aggregated proved to have a good fit with some indicators (eg, χ^2/df and root mean square error of approximation), presenting better values in this second-order solution. This result supports the use of the scale with five factors organized in a second-order general latent factor. The latent construct can be accounted for by an underlying belief in good sexual function in relation to young, heterosexual, and vaginal sex, which in turn can be related to a sexual double standard. A measurement model formatted by this general factor organizing five first-order latent factors is useful for further research that needs to use the

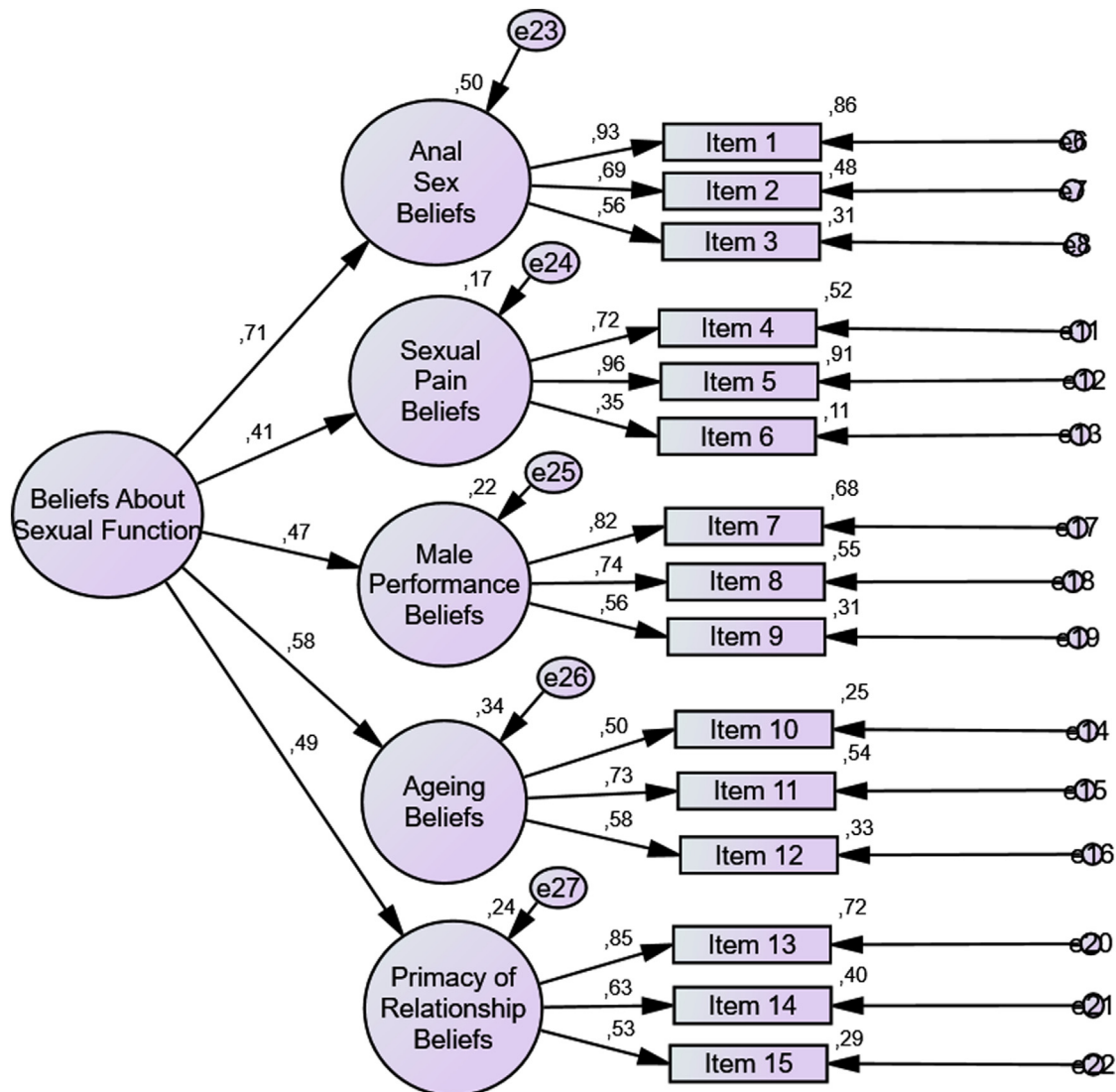


Figure 2. Confirmatory factor analysis of alternative model 2 with a second-level one-factor solution.

Table 2. Confirmatory analysis fit statistics (sample B, n = 114)

	Model 1*	Model 2†
χ^2	114.072	116.390
df	80	85
χ^2/df	1.43	1.37
P value	0.007	0.013
TLI	0.895	0.909
CFI	0.920	0.923
RMSEA	0.062	0.057

CFI = comparative fit index; df = degrees of freedom; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis Index.

*Model based on the five-factor structure found in the exploratory factor analysis with sample A.

†Alternative model with a second-level one-factor solution.

measurement as a global score and for those aiming at estimating the impact of each subscale on sexual behavior.

Overall, the reliability estimates (Cronbach α and temporal stability) demonstrate that the factors and the total of the scale are all reliable and stable. Some subscales have Cronbach α values below the usual threshold of 0.70, which is acceptable because the Cronbach α is influenced by the number of items. When a factor has a smaller number of items, as in the present study, lower values are acceptable and do not compromise the reliability of the subscales.³¹ The total scale has a good Cronbach α value, which further supports the use of the total scale as a reliable measurement of sexual beliefs about sexual function over the use of the subscales.

The study of the BASEF's factorial invariance across sexes demonstrates a good fit of the scale in another distinct sample

Table 3. BASEF total scale and subscale descriptive terms, reliabilities, and intercorrelations (sample A, n = 274)

	Mean	SD	Cronbach α	Anal beliefs	Male performance	Aging	Sexual pain	Primacy of the relationship	Total BASEF score
Anal sex beliefs	5.30	2.51	0.83	—	0.21*	0.38 [†]	0.29 [†]	0.54 [†]	0.72 [†]
Male performance beliefs	7.79	3.08	0.67		1	0.22 [†]	0.26 [†]	0.20 [†]	0.63 [†]
Aging beliefs	7.28	2.59	0.69			1	0.18 [†]	0.36 [†]	0.66 [†]
Sexual pain beliefs	5.98	2.37	0.65				1	0.26 [†]	0.60 [†]
Primacy of relationship beliefs	4.78	2.10	0.69					1	0.68 [†]
Total BASEF score	31.11	8.26	0.90						1

BASEF = Beliefs About Sexual Function Scale.

* $P < .01$; [†] $P < .001$.

and establishes it as factorial invariant across sexes, sustaining its adequacy for use with male and female heterosexual samples. This means that all items designed to assess beliefs about anal sex, male performance, age sexual pain, and primacy of the relationship are operating equally across groups in relation to a second-level latent variable. The comparison of the total means across sexes showed that women have higher levels of accordance with sexual beliefs about functioning. However, a close inspection of the results shows that the total mean scores of men and women are within the same scope of agreement with the beliefs and therefore do not translate into qualitatively meaningful differences of the total scores across sexes. In summary, our results indicate that the total scale can be used in multivariate research using samples of men and women for comparisons across sexes and dyadic studies, among others.

The association of the BASEF with male and female sexual functioning (IIEF and FSFI, respectively) demonstrates that the measurement is useful for understanding the sexual functioning of healthy men and women. This result clearly supports the view that dysfunctional beliefs about sexual function are negatively related to sexual functioning and is consistent with cognitive explanatory models of sexual functioning.^{5,12} The small amount of variance explained is consistent with multifactorial explanatory models of vulnerability for sexual dysfunction in which sexual beliefs play a small but significant role.⁶

Despite the overall initial support for the validity and reliability of the BASEF, and the demonstration of its factorial invariance and similarity of total score across sexes, the present study has some limitations that cannot be overlooked. First, although we tested the items comprehensively with a sample of undergraduate students, we did not develop detailed in-depth, semistructured interviews with a small number of respondents with different educational backgrounds to understand and test

respondents' cognitive processes when answering the questions. Second, the generalizability of the measurement is compromised because only beliefs from a heterosexual perspective were assessed. Third, we restricted our sample to people who were involved in an ongoing dyadic exclusive relationship. Fourth, we did not use a clinical sample that might better clarify the associations between beliefs about sexual functioning and the existence of sexual dysfunction. Fifth, in the present study, we only studied the concurrent validity of the total scale, which gives a narrower perspective. Sixth, the narrow age range can be explanatory of some of the results found and is a limitation that needs to be overcome in future studies.

Despite these limitations, the present study set out to overcome the shortcomings of existing measurements of sexual beliefs by creating a shorter measurement restricted to beliefs about sexual functioning and applicable to men and women.

Future Directions

To better explain and understand the role that beliefs about sexual functioning have in the explanation of sexual dysfunction, future studies should consider the specific role of each subscale in relation to different human sexual experiences (eg, subjective arousal, disgust) and behaviors (eg, practice of anal sex). Also, further studies are needed with distinct samples to test generational differences and the clinical utility and adequacy of the measurement for samples of people involved in different relationship structures. We also consider that it might be helpful to study the scale's behavior longitudinally to better assess its ability to predict future sexual behaviors and sexual functioning and to test changes after interventions aimed at challenging sexual beliefs (eg, cognitive restructuring). Areas of future research on the BASEF include responsiveness to a beneficial intervention

Table 4. Goodness-of-fit statistics for tests of multi-group invariance: a summary

Model description	Comparative model	χ^2	df	$\Delta\chi^2$	Δ df	Statistical significance
1. Configured model; no equality constraints imposed		323.05	171	—	—	
2. Measurement model; all factor loadings constrained equal	2 vs 1	339.49	181	16.44	10	0.085
3. Measurement model; latent loadings constrained equal	3 vs 1	340.41	185	17.36	14	0.237

df = degrees of freedom.

(within-group change) and sensitivity between different interventions (between-group difference).

Future research also might study important moderators of the relation between sexual beliefs and sexual functioning, such as age, relationship satisfaction⁴⁸ or sexual communication, and sexual self-disclosure^{49–51} and important mediators, such as cognitive distraction during sexual activity.⁵²

CONCLUSION

The present study succeeded in developing and validating a measurement of sexual beliefs about sexual functioning that is suitable and invariant for men and women. This initial study showed this measurement has the potential of being used in research linked to theory building and testing, namely in sex comparison and heterosexual dyadic studies and in clinical studies. The measurement requires a more detailed and systematic study with clinical and diverse samples; nevertheless, the present results suggest it has an advantage over existing measurements because it allows for sex comparisons and an assessment of discrepancy and convergence between partners.

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