

Sexual Myths Scale (SMS): Development, Validity and Reliability in Turkey

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Abstract This study aims at developing a measurement tool that determines the sexual myths and testing its validity and reliability. The draft scale consisted of 74 items, and it was applied to 746 university students. Cronbach Alpha coefficient was found 0.91, and the test–retest reliability coefficient was 0.814. Eight factors consisting of 28 items, explaining 65 % of total variability were obtained in the factor analysis done with varimax rotation for the construction of validity. The factorial model of scale was found theoretically and statistically convenient after the confirmatory factor analysis. The results indicated that Sexual Myths Scale (SMS) is a valid and reliable instrument in Turkey.

Keywords Sexual myths · Sexual health · Measurement tool · Turkey

Introduction

Sexuality is defined as a dynamic part of human life and an important indicator of health status [1]. Sexual health is considered as an important indicator of both physical and mental health [2, 3]. This aspect of sexual health is not only limited to a person's being

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sexually active, but also is dealt with as a concept including quite a complex and long period of life ranging from childhood to old age [4, 5]. The meaning attributed to the concept of sexuality and sexual health is significantly affected by religious rules, prejudices, taboos, traditions and customs. Beliefs which are exaggerated, incorrect, not based on scientific foundation, shaped by the aforementioned factors, or considered as true but in fact not in terms of sexuality are defined as sexual myths [6].

Sexuality-related myths can lead to sexual dysfunction, the development of adversely affected gender identity and decrease in the quality of sexual intercourse [7–9]. In order to prevent these myths from affecting sexual health of individuals adversely, there is a need for reliable, adequate, information-based training programs [6, 10, 11]. Therefore, measurement tools which will make it possible to identify target groups to be included in the training process and to reveal sexual myths believed in by people should be used.

The review of the literature revealed that while measurement tools which separately assess sexuality by gender, gender identity, sexual orientation, eroticism, sexual pleasure and reproduction dimensions were available [12–18], there were no measurement tools dealing with sexuality within a holistic conceptual framework. However, beliefs, attitudes and behaviors regarding sexual issues may vary from one culture to another. Hence, in order to demonstrate the perception of sexuality of our society objectively and comprehensively, a new measurement tool should be developed instead of adapting the present tools which do not deal with the issue holistically or which have been developed in line with the requirements of different cultures into our society. This assessment tool is expected to contribute to the development of action plans in the future targeting the groups with sexual myths.

Methods

Objectives and Research Type

This study is a methodological type study. The study was conducted in two stages. The first phase included the development of the draft form of the Sexual Myths Scale whereas the second phase included the assessment of the psychometric properties of the draft scale.

Phase 1: Development of Sexual Myths Scale (SMS)

Development of the Draft Form of the Sexual Myths Scale

In order to develop the draft form of the Sexual Myths Scale, we reviewed literature about sexuality and created 158 sexual myths item. Subsequently, we reevaluated those sexual myths items and included the most common 74 myths items about sexuality in the draft scale.

Submission of the Draft Form of the Sexual Myths Scale to Expert Opinion

In order to determine whether the myths in the draft form of the scale would measure the desired area and whether it held concepts other than the desired ones, an expert opinion was requested. The items included in the draft scale were submitted to 3 Psychiatrists, 1 Faculty Member in the Guidance and Psychological Counseling Department, 1 Faculty Member in the Mental Health Nursing Department, 1 Faculty Member in the Public Health

Nursing Department, 7 Faculty Members in the Obstetrics and Gynecology Department to obtain their opinions. The experts were requested to evaluate the content, meaning and comprehensibility of the statements presented to them and whether they would be considered as sex myth, and then to rate them as 1 = should be removed, 2 = needs revision and 3 = appropriate. In line with the recommendations from the experts, 5 myths associated with gender and 4 myths associated with sexual behavior were revised, and 7 myths associated with sexual behavior were removed from the draft scale, and one myth associated with sexual orientation, one myth related to family planning and five myths regarding sexually transmitted infections were added to the draft scale. Consequently, the 74-item scale comprising all the myths related to all the dimensions of sexuality took its final form.

Participants and Sample

The study was carried out with volunteer college students attending Cumhuriyet University, Sivas Turkey. In the 2013–2014 academic year, there were 16 faculties in Cumhuriyet University. Four of these faculties which newly opened and had no graduate students yet were excluded from the study. Therefore, the students studying in the other 12 faculties comprised the study population.

Although in the literature, there is no consensus on how to determine the sample size in the development of a scale, it is recommended that the number of the participants should be tenfold of the number of the variables in the scale according to the rule expressed as the 1/10 rule [19–21]. Therefore, since the draft scale had 74 items in this study, the sample size was calculated as 740. Before the implementation of the scale, the number of the students to be included in the sample from each faculty was calculated. Then the students to be included from each faculty were selected by the simple random sampling method and finally they were administered the draft scale. In order to avoid the possibility that the number of the participants in the sample would be fewer than the planned due to inappropriately filled in questionnaires, it was decided to include more students in the sample and the questionnaires were administered to 780 students. Of the questionnaires, 746 which were filled in appropriately were evaluated.

Data Collection

The scale was implemented between May 2014 and June 2014. In order to evaluate the comprehensibility of the items in the scale, it was administered to 20 students not included in the study but having characteristics similar to those of the participating students. Then they were asked to state their views on the comprehensibility and applicability of the questionnaire. They stated that the topic was interesting, that they had no difficulty answering the questions and that none of the items were incomprehensible. These 20 students were not included in the actual implementation of the scale. In order to avoid interactions likely to occur between the participants during the actual implementation of the scale, necessary arrangements were made in the classrooms, and the scale was not administered to students who did not volunteer to participate in the study.

Each item on the Sexual Myths Scale was rated using a 5-point Likert type scale: “I totally agree (5 points)”, “I somewhat agree (4 points)”, “I am undecided (3 points)”, “I

disagree (2 points),” “I totally disagree (1 point)”. The choice “I totally agree” referred to the status of having the myth whereas the choice “I totally disagree” referred to the status of not having the myth. In order to assess the compatibility between the responses given to the items on the scale in other words in order to assess the reliability of the scale, the test–retest method was used. Within the framework of the test–retest implementation, 20 students who were administered the draft scale during the actual implementation and who accepted to participate in the test–retest implementation were re-administered the scale 2 weeks later.

Phase 2: Psychometric Evaluation of the Sexual Myths Scale (SMS)

The data obtained after the implementation of the Sexual Myths Scale to the participants were loaded on a computer using the LISREL 8.54 and SPSS 14.0 software packages, and it was tested whether the scale was a valid and reliable instrument. The following tests were used to analyze the data:

Statistical Analysis

1. *Reliability*: To test the reliability of the Sexual Myths Scale, the item—total correlation test was performed and the internal consistency analysis was conducted. The test–retest reliability of the scale was assessed with the paired *t* test.
2. *Validity*: In order to determine whether the content validity of the Sexual Myths Scale was established, Kendall’s coefficient of concordance (*W*) was calculated. In order to test the construct validity of the Sexual Myths Scale, the exploratory factor analysis was performed. In order to determine the relationship between the variables and the factors, and to test whether the relationship between the factors identified with the exploratory factor analysis was adequate, and whether the model was sufficient to describe the factors, the confirmatory factor analysis was performed.

Ethics Approval

In order to administer the draft scale, written permissions were obtained from the Non-interventional Clinical Research Ethics Committee of Cumhuriyet University (2014-05/04) and Cumhuriyet University Presidency. Before the draft scale was administered, the volunteer information form was read to the students who were to fill out the form, their verbal permissions were obtained, and they were told that the data obtained would only be used for scientific purposes and that the participants’ names would be kept confidential.

Results

The mean age of the students was 20.9 ± 1.4 , 48.9 % were female, 82.4 % had a large family and 33.4 % lived with their parents. Almost all of the students were single (Table 1).

While 41.4 % of the students considered that their knowledge on sexuality was sufficient, only 3.4 % of them considered that their knowledge on sexuality was very inadequate. All the students reported their sexual identity as heterosexual.

Table 1 Descriptive characteristics of students (N = 746)

Descriptive characteristics	n	%
Age Mean: 20.9 ± 1.4		
<i>Classroom</i>		
Class 1	193	25.9
Class 2	212	28.4
Class 3	177	23.7
Class 4	164	22.0
<i>Sex</i>		
Female	365	48.9
Male	381	51.1
<i>Marital status</i>		
Married	4	0.5
Single	742	99.5
<i>Where people live together</i>		
Alone	29	3.9
Family and home	249	33.4
Dormitory	244	32.7
Friends and home	224	30.0
Total	746	100.0

Reliability

Item: Total Score Correlation

In our study, 28 items whose correlation coefficient (r) was below 0.25 were removed from the draft scale (4, 6, 7, 8, 12, 15, 17, 18, 19, 23, 25, 29, 33, 34, 35, 39, 40, 41, 42, 45, 46, 48, 68, 69, 70, 71, 72, 73). Therefore, the number of items in the scale dropped to 46. The correlation coefficient of the remaining items was determined to range between 0.29 and 0.52 (Table 2).

Internal Consistency

Cronbach's alpha coefficient of the 46 items in the study was calculated as 0.91. The internal consistency of the scale was highly reliable.

Test–Retest Reliability

In the study, the paired t test was carried out between the two related groups. The t value for the paired t test administered at a 2-week interval was 0.238. The significance level was 0.814, and there was no significant difference between the two groups, in terms of their pre- and post-test averages ($p > 0.05$) (Table 3).

Table 2 Item-total score correlations of sexual myths scale (N = 746)

Items	Mean	Std. deviation	Corrected item-total correlation	Cronbach's alpha if item deleted
1	3.5670	1.26127	.434	.909
2	3.1890	1.42572	.517	.908
3	3.0885	1.43969	.406	.909
5	3.3244	1.20262	.321	.910
9	3.2507	1.35117	.352	.910
10	2.6233	1.39950	.420	.909
11	2.3070	1.46489	.507	.908
13	1.5737	1.07719	.323	.910
14	1.5724	1.02098	.465	.909
16	2.3164	1.30324	.480	.908
20	2.9102	1.23971	.421	.909
21	2.3646	1.11297	.491	.908
22	3.4826	1.28610	.415	.909
24	2.8244	1.26703	.480	.908
26	2.7802	1.25743	.399	.909
27	3.0308	1.42758	.437	.909
28	2.0107	1.04523	.305	.910
30	3.8271	.99711	.332	.910
31	2.8083	1.05014	.343	.910
32	2.7091	1.10026	.353	.910
36	3.0094	1.04460	.318	.910
37	2.9343	1.02701	.343	.910
38	2.6796	1.17149	.296	.910
43	2.7895	1.37863	.482	.908
44	2.7426	1.26203	.421	.909
47	2.7426	1.34243	.357	.910
49	2.8137	1.20463	.444	.909
50	2.9786	1.23030	.452	.909
51	2.7440	1.21738	.436	.909
52	3.1448	1.26828	.501	.908
53	3.1340	1.27263	.520	.908
54	2.6220	1.33984	.524	.908
55	3.0979	1.31988	.452	.909
56	3.7399	1.20377	.375	.910
57	3.7668	1.22141	.373	.910
58	3.4343	1.38219	.400	.909
59	3.7413	1.04469	.465	.909
60	3.6515	1.11210	.384	.909
61	3.7989	1.09043	.357	.910
62	2.8633	1.34616	.407	.909
63	2.6796	1.30071	.425	.909
64	1.9960	1.15101	.351	.910

Table 2 continued

Items	Mean	Std. deviation	Corrected item-total correlation	Cronbach's alpha if item deleted
65	2.4464	1.14479	.341	.910
66	3.6247	1.33054	.437	.909
67	3.5349	1.12899	.305	.910
74	2.5898	1.26729	.314	.910

Table 3 Test–retest analysis of sexual myths scale (N = 20)

Sexual Myths Scale	X ± SD	t/p
Test	116.74±26.9	0.238/p = 0.814
Retest	121.75±39.3	

Validity

Content Validity

According to the results of Kendall's coefficient of concordance (W) test administered to determine the content validity of the Scale, the value for the Kendall's coefficient of concordance (W) was calculated as 0.122, and the significance level was determined as 0.249. There were no differences between the scores given by the experts (Table 4).

Construct Validity

In order to determine whether the sample size was adequate and whether the data were appropriate for factor analysis, the Kaiser–Meyer–Olkin (KMO) coefficient was calculated and the Bartlett Sphericity test was implemented. The KMO = 0.836 coefficient and the results of the Bartlett test ($\chi^2 = 1.412\text{E}4$, SD = 1035, $p = 0.000$) for the Sexual Myths Scale were considered significant and it was decided that the data were suitable for the factor analysis (Table 4).

Exploratory Factor Analysis

For the construct validity of the draft scale, exploratory factor analysis was conducted. As a result of the analysis, the 46-item scale was found to have a 12-factor structure. Then the items' loads on the factors were examined. Some items which adversely affected factor

Table 4 Evaluation of the factor model of sexual myths scale

Kaiser–Meyer–Olkin measure of sampling adequacy	0.836
Bartlett's test of sphericity	
Chi Square	1.412E4
SD	1035
p	.000

loadings and accounted for the variance, or did not accumulate under any factor were removed from the scale (5, 13, 14, 16, 21, 28, 32, 38, 43, 44, 48, 53, 54, 55, 61, 62, 67, 74). Factor analysis re-performed with the remaining 28 items revealed an 8-factor structure which accounted for the 65.185 % of the total variance and had a factor load higher than 0.40. After factor rotation, the first factor of the scale consisting of five items was named sexual orientation, the second factor with six items was named gender role, the third factor including four items was named age and sexuality, the fourth factor consisting of three items was named sexual behavior, the fifth factor including two items was named masturbation, the sixth factor with four items was named sexual violence, the seventh factor consisting of two items was named sexual intercourse and the eighth factor with two items was named sexual satisfaction (Table 5).

Confirmatory Factor Analysis

After the 8-factor structure consisting of 28 items based on the theoretical foundations was developed, the 8-dimensional structure model of the scale was tested with the Confirmatory factor analysis (CFA) based on the exploratory factor analysis (EFA). Fit indices obtained after the CFA were examined, and it was considered that the Chi square value was significant and that the model fit the data adequately ($\chi^2 = 1466.03$, $N = 746$, $df = 322$, $p = 0.000$, $\chi^2/sd = 4.55$). The values for the fit indices were as follows: Root Mean Square Error of Approximation (RMSEA) = 0.069, Goodness of Fit Index (GFI) = 0.88, Comparative Fit Index (CFI) = 0.86, Adjusted Goodness of Fit Index AGFI = 0.84, Normed Fit Index (NFI) = 0.82, Non-normed Fit Index NNFI = 0.86, Standardized Root Mean Square Residual S-RMR = 0.059. In fit indices, the criterion for GFI CFI, AGFI, the NFI, and NNFI was $>.80$, and for RMSEA and SRMR was $<.08$. It is understood that the model fit the observed data in terms of these fit index values, and the proposed model showed a satisfactory level of fit (Fig. 1).

Discussion

“Reliability” and “validity” are prerequisites for the development of a scale. Reliability is the capability of a measurement instrument to measure what is to be measured in a consistent and stable manner. A reliable test or scale should produce similar results if used again in similar circumstances [22, 23]. In our study, the reliability of the Sexual Myths Scale was established with the item analysis, internal consistency analysis and test–retest.

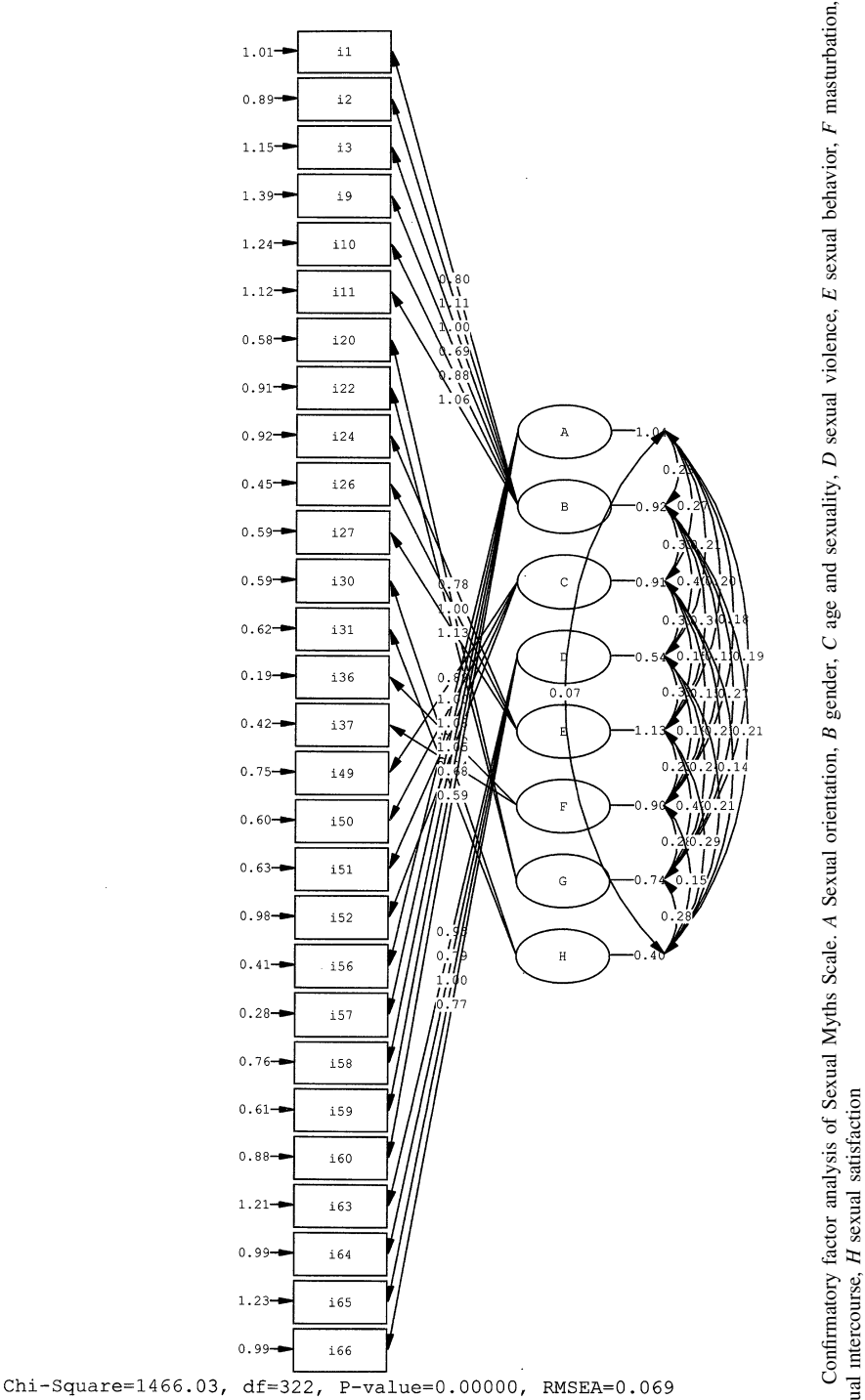
In order to determine the contribution of the items of the scale to the scale’s total score and to find out to what extent they are related to the whole scale, the item analysis was carried out. Item-total correlation accounts for the relationship between the scores obtained from the items and the total score of the test. There are different views on what the lowest limit of correlation should be. According to Buyukozturk [24], the value of $r = 0.25$ should be considered as the lowest limit. In our study, 28 items whose correlation coefficient was lower than 0.25 were removed; therefore, the draft scale included the remaining 46 items whose correlation coefficient was higher than 0.25.

In order to assess the internal consistency of a Likert-type scale, reliability criteria known as the Cronbach’s alpha coefficient are used. The Cronbach’s alpha coefficient is the measure of the internal consistency and homogeneity of the items in the scale. Alpha coefficient of a Likert-type scale is expected to be close to 1 as much as possible. The

Table 5 Explanatory factor analysis results of the sexual myths scale

Factors	Items	Load factor	Eigen values	% Of the variance
Sexual orientation	57 Homosexuality should be treated	.889	6.172	22.043
	56 Homosexuality is a disease	.853		
	58 Homosexuals are harmful to society	.794		
	59 Homosexual men act like women	.738		
	60 An individual's sexual orientation is recognized from his/her external image (clothing, speech, and behavior)	.649		
Gender	3 Men's decisions are more realistic/logical than those of women	.753	2.744	9.8
	2 Housework is a women's task	.731		
	11 Being male is more valuable than being female	.730		
	10 Women are in need of help	.655		
	1 Men are more successful than are women in performing tasks like mathematics that require intelligence	.634		
Age and sexuality	9 Men are more competitive than are women	.595	2.211	7.897
	50 Sex life ends with aging	.824		
	51 Menopause (climacterium) ends a woman's sex life	.765		
	49 Older people's having sexual intercourse is not acceptable	.764		
	52 To have satisfactory sex life, one must be young	.673		
Sexual behavior	26 While having sexual intercourse, a woman should comply with her husband's wishes	.887	1.955	6.981
	27 It is the woman's duty to give pleasure to her husband during sexual intercourse	.831		
	24 Every stage of the sexual intercourse must be in the man's control	.713		
Masturbation	37 Masturbation leads to psychological problems	.864	1.636	5.844
	36 Masturbation leads to the development of physical diseases	.864		
Sexual violence	65 Raped boys turn out to be a gay when they grow up	.734	1.247	4.453
	64 Boys would not be rape victims	.710		
	66 Women with their external appearance/clothing may cause the emergence of sexual violence	.531		
	63 Nonconsensual sexual intercourse between husbands and wives cannot be regarded as rape	.479		
Sexual intercourse	22 Sexual intercourse is essential if the spouses (partners) are to receive sexual pleasure	.842	1.201	4.290
	20 Sexuality means sexual intercourse	.771		
Sexual satisfaction	30 Sexual intercourse should result in orgasm	.778	1.086	3.878
	31 Women can reach orgasm only through sexual intercourse (coitus)	.762		

coefficient below 0.40 indicates that the scale is “not reliable”, between 0.40 and 0.59 indicates that the scale's reliability is low, between 0.6 and 0.79 indicates that the scale is “reliable”, and between 0.80 and 1.00 indicates that the scale is “very reliable” [25, 26]. In our study, after the items whose correlation coefficient was low were removed from the



scale, the Cronbach's alpha coefficient of the remaining 46 items was calculated as 0.91. Thus, it was decided that the internal consistency of the scale was very reliable.

The test–retest reliability is the ability of a measurement tool to produce consistent results each time it is administered to the same group of people and the ability to show time-invariance. The test–retest technique is the most commonly used and recommended reliability indicator. The time interval between the test and retest is noted to be 2 weeks at least and 4 weeks at most [26, 27]. In this study, in order to determine the test–retest reliability of the scale, the draft scale was re-administered 20 students 2 weeks after the first administration. No significant difference was determined between the two dependent groups in terms of the mean pre- and post-test scores.

Validity of a measurement tool refers to its ability to measure a variable intended to be measured. In our study, the validity of the draft scale was established with the Kendall's coefficient of concordance (W) test and exploratory and confirmatory factor analyses. The Kendall's coefficient of concordance test is aimed at determining the content validity [24]. In our study, there were no significant differences between the experts' opinions.

In order to determine the construct validity of a scale, factor analysis is performed. Factor analysis is performed to determine whether the correlations between the items measure a single structure of the tool [27]. Factor analysis is not suitable for all data structures. Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett's Sphericity test are important since they show that the sample is adequate and whether the data are suitable for factor analysis. Kaiser–Meyer–Olkin (KMO) coefficient higher than 0.60 and significant Bartlett's test results indicate that the data are suitable for factor analysis [24]. In our study, KMO coefficient for Sexual Myths Scale was 0.836, and Bartlett's test results were significant. Therefore, it was decided that the data were suitable for factor analysis.

To test the construct validity, exploratory factor analysis (EFA) was performed. To determine the items to be included in the scale with the exploratory factor analysis, the eigenvalues of the items should be 1, factor loadings of the items should be at least 0.30, all the items should be under one factor, and the difference between the items under two factors should be at least 0.10 [24, 27]. When this 12-factor structure was examined, it was noticed that some items adversely affected the factor loadings and the variance explained; thus, these items were removed from the scale. At the end of the factor analysis performed with the remaining 28 items, an 8-factor structure with a 0.40 factor loading emerged, which accounted for the 65 % of the factor loading.

CFA is used to determine whether there is significant level of relationship between these factors, which variable is associated with which factors, that the factors are independent of each other, and whether the factors are adequate to describe the model. To assess whether the model established with confirmatory factor analysis fits the data, fit indices are taken into consideration (Root-Mean-Square Error of Approximation = RMSEA, Standardized Root Mean Square Residual = S-RMR, Goodness of Fit Index = GFI, Adjusted Goodness of Fit Index = AGFI, Comparative Fit Index = CFI, Non-normed Fit Index = NNFI). RMSEA refers to the root mean square error of approximation. If the model is expected to be significant, RMSEA should be 0.05 or less. However, if the model's RMSEA value is between 0.05 and 0.08, it is assumed to be in acceptable fit [28–30].

SRMR stands for Standardized Root Mean Residual. The closer to zero SRMR values are, the higher the model's goodness of fit is. If the model's SRMS value is lower than 0.05, it is considered good fit. If it is between 0.05 and 0.10, it is considered acceptable fit [29–31]. Chi square values of five or less depending on the degree of independence suggests that the proposed model fits the data adequately.

In the literature, CFI and AGFI above 0.90 suggest that the fit of the model to data is perfect. A CFI value of 0.85 or higher and an AGFI value of 0.80 or higher are considered adequate model fit [28, 30, 32]. The analysis of fit index values in our study suggests that the fit of the model to data was acceptable. Based on these findings, it can be said that the structural validity of the scale was established. The lowest and highest possible scores to be obtained from the scale were 28 and 140 respectively. It is considered that the higher the score is, the higher the possibility of having sexual myths is.

Conclusion

Sexual Myths Scale is a reliable and valid measurement tool to evaluate the sexual myths in Turkey. Because sexuality is a comprehensive concept, it is an important feature that Sexual Myths Scale includes many aspects of sexuality. Sexual Myths Scale is useful tool to reveal whether a person's knowledge is based in sexual myths, as well as providing a direction for future educational services.

Compliance with Ethical Standards

Conflict of interest All authors declare that there is no conflict of interest.

Ethical Approval This study was approved by Non-interventional Clinical Research Ethics Committee of Cumhuriyet University (2014-05/04). 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.

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

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