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Title: Psychometric Properties of Sex Addiction Screening Test-Revised (SAST-R) for Persian Population

Authors: Sina Shafiezhadeh¹, Hossein Mohajeri², Atiyeh MohammadShirazi³, Peyman Hassani-Abharian^{1,4,*}

1. *Institute for Cognitive Science Studies, Tehran, Iran.*
2. *Faculty of Humanities, Tarbiat Modares University, Tehran, Iran.*
3. *Department of Brain and Cognitive Science, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran.*
4. *Institute for Cognitive Science Studies (ICSS), Department of Cognitive Rehabilitation, Brain and Cognition Clinic (BCC), Tehran, Iran.*

***Corresponding author:** Peyman Hassani-Abharian, Institute for Cognitive Science Studies (ICSS), Department of Cognitive Rehabilitation, Brain and Cognition Clinic (BCC), Tehran, Iran. Email: abharian@iricss.org

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Abstract:

Background and Objectives: Sexual addiction is known as a disorder that afflicts a person with difficulty in controlling or delaying sexual behaviors. In order to prevent social, physical, and psychological consequences, validated screening tests are needed to diagnose this disorder. One of these tests is established by Carnes with the name of “Sexual Addiction Screening Test-Revised” (SAST-R). In this study, Sexual Addiction Screening Test-Revised has been translated and verified in the Persian language.

Methods: To this purpose, the original screening test was translated to the Persian language and also back translated for matching by two different expert teams. Data was collected through online survey from 1268 participants who were between 18 to 65 years old ($M=29.44$ and $SD=6.90$) that 56.1% and 43.9% of them were women and men respectively. Three questionnaires including sexual addiction screening test-revised (SAST-R), hypersexual behavior consequences scale, and Connor-Davidson Resilience Scale as the principal, convergent and divergent tests were administered to the participants.

Results: The reliability of the test's internal consistency (Cronbach's $\alpha = 0.883$), Split-Half (Cronbach's $\alpha = 0.779$), and Guttman (lambda coefficients were between 0.773 to 0.883) tests were used. In addition, four methods of content validity (sexual hyperactivity specialist approved), convergent structure validity ($P<0.001$, $R = 0.731$), the validity of divergent structure ($P<0.09$, $R = -0.132$), and factor validity (CFI=0.884, GFI=0.873, RMSEA=0.047) were measured and confirmed the validity of the test.

Conclusion: The Persian version of the sexual addiction screening test-revised (SAST-R) seems to be a reliable pre-clinical tool to assess the severity of sexual desire of patients.

Keywords: Sexual addiction, Sexual hyperactivity, Sexual Addiction Screening Test (SAST), Hypersexuality

Introduction:

There are several names for sexual addiction, such as hypersexual disorder and sexual impulsivity (Karila et al., 2014; Mick & Hollander, 2006). A person who is sexually addicted has trouble controlling their sexual fantasies, desires, and behaviors. (Carnes, 2013; Rosenberg & Feder, 2014).

Rush (Karila et al., 2014) reported the first case of extreme sexual behavior. Then Krafft described some patients who showed a sign he called "Sexual Hyperesthesia", which he believed to be the first indications of an unnatural sexual desire (Krafft-Ebing & Von, 1965). Sexual affiliation or excessive nonparaphilic behavior was first introduced by Orford in 1978 (Orford, 1978), who found out-of-control sexual behavior to be similar to alcohol addiction (Orford, 1978).

An appreciable amount of sex desire increases high-risk sexual behavior, which can also provide a vector for sexually transmitted infections (STIs) like HIV. It may influence social relations, work and family ties, and affect the addicts themselves quality of life (Kalichman & Cain, 2004). People with forced sexual behaviors often have sexual fantasies and have an overwhelming desire for sexual relations, which can influence and control their lives. They face social and legal pressures because some of their behaviors are repetitive and they cannot control their sexual desires (Coleman et al., 2001). Additionally, they have problems with interpersonal and job-related communication, as well as putting their health at risk (Coleman et al., 2001). There are a number of problems associated with sexual addiction, including low self-esteem, anxiety, loneliness, impairment of social skills, job difficulties, and shame and guilt feelings (Ballester-Arnal et al., 2013).

There are a few studies regarding the prevalence of this disorder, for example Langstrom and Hanson estimated that 12% of men and 6.8% of women in a sample of 2450 had sexual addiction (Langstrom & Hanson, 2006), on the basis of multiple unnatural sexual behaviors or long-term unnatural behaviors (Karila et al., 2014). In the study, Laumann and his colleagues analyzed a sample of 1320 people aged 18 to 59 from the USA and found 7.6% had four or more sexual relationships weekly and 1.2% masturbated at least once daily a year (Laumann et al., 1994). In most studies, sexual addiction is found in between 3 and 6% of adults, but it is higher in some special groups, such as HIV-positive people and criminals (Karila et al., 2014).

There has been an increase in studies about sexual addiction, and screening tests. One such test is Hypersexual Behaviour Consequences Scale (HBCS), in which the respondent chooses one of five Likert options from 22 phrases. It describes the different effects that behavior and sexual activities can stimulate a person or make them enjoy a sexual experiences or to have orgasm. These behaviours could be done in interaction with a partner, or alone while masturbating or watching pornography (Reid et al., 2012). This questionnaire has a limitation about screening homosexual people like gays and lesbians, so another screening test can identify hypersexuality in homosexual because it can also detect other types of sexual orientation (Reid et al., 2012). The Sexual Addiction Screening Test (SAST) has been developed by Carnes, who is one of the scientists to develop the sexual addiction assessment test (Carnes, 2001). The second edition of the sexual addiction screening test, the "Sexual Addiction Screening Test-Revised" (SAST-R) can be used to measure sexual addiction by answering 45 yes-no questions. Based on the original questionnaire, earning 6 or more scores could be a sign of hypersexuality, and the original reference questionnaire also had four sub-scales that were used to identify hypersexuality in certain attributes, which include men, women, gays, and the internet (Carnes, 2013). Using these sub-scales, the score of homosexuality in men could be measured and the use of the Internet for accessing pornographic content could be assessed as a kind of sexual activity (Carnes, 2013).

Methods:

Participants:

Data was collected through online survey from 1268 participants who were between 18 to 65 years old ($M=29.44$ and $SD=6.90$) that 56.1% and 43.9% of them were women and men respectively. Among them, 65.9% were single, 28.9% married, and 5.2% were divorced, widow, or widower. Additionally, their educational level was 3.2% under diploma, 31.8% diploma, 42.9% bachelor, 15.5% masters, and 6.6% Ph.D for collecting data, a telegram bot was used. First with screening tests published in the telegram bot, and then submitting a request for convenience samples and then asking them to refer other people to complete the questionnaire based on their own self-motivation. By asking repeating questions, the quality of the collected data was evaluated so that a person who answered the same question differently was excluded from the data set.

Questionnaires:

In this study, the original SAST-R questioner has been translated into Persian and translated back into English by an expert academic translator to provide an ecological sexual addiction screening test in Iran. A version of this questionnaire was presented to the authors of the original questionnaire, Carnes et al, for verification, and then the final version of the test was used in the validation study (Carnes, 2013).

The HBCS was used for the convergent questionnaire in this study, as it works well over time in terms of measuring hypersexual involvement (Reid et al., 2012). In addition, the Connor-Davidson Resilience Scale (CD-RISC) was used for the divergent questionnaire because it is a concise and self-assessing measure of resilience that is not necessarily associated with hypersexuality. In addition, about this test, it has 25 questions, with responses based on a 5-part spectrum and a score of 0 to 4, respectively. At last, the questionnaire gave a total score of 100. A closer score to zero will have less resilient participant. And a closer score to 100 will show a more resilient participant. In this test, the threshold between high and low resilience is 50 points.

Reliability methods:

Internal consistency of the test was assessed using Split-Half and Guttman methods. In the internal consistency method, Cronbach's alpha is calculated for the questionnaire and its coefficients are used to determine the total score. In order to compute reliable coefficients, questions of the questionnaire were divided in half, and the scores of the first half and the second half were computed. For reliable evaluation of the whole test, the correlation coefficient was used. Finally, six Guttman validity coefficients were used to determine the reliability.

Validity methods:

To check the validity of the test, four methods were used including: content validity, convergent structure validity, divergent structure validity, and factor validity. To ensure content validity, the translated and edited questionnaires were checked by an expert to ensure they matched the characteristics of the original questionnaire with the domestic culture.

For the convergent structure validity method, the HBSC points were compared with the SAST-R scores. (Reid et al., 2012). Both questionnaires measure the same factor, and the

correlation of the results was expected. Accordingly, the validity test for divergent structure method should not be correlated with Connor-Davidson resilience scale (CD-RISC) simultaneously (Connor & Davidson, 2003) during the test.

A factor validity test considered three indicators: the eigenvalue, the variance ratio of each factor, and the eigenvalue chart. After exploratory factor analysis, confirmatory factor analysis was used to validate the new factor model. Chi-square indices, adequacy fit index (CFI), root mean square error of approximation (RMSEA), goodness fitness index (GFI), and adjusted fitness goodness (AGFI) are considered for this purpose. SPSS (version 19) and Lisrel (version 8) were used to test the validity and reliability of the questionnaire.

Results:

Reliability:

In order to test the reliability of the questionnaire, the Cronbach's alpha coefficient of 0.883 was obtained in internal consistency methods, which is the first step toward reliability. In the Split-Half test, Cronbach's alpha coefficient for the first half was 0.837, for the second half was 0.761, and for the total questionnaire, was 0.779. In Guttman's third test, the lambda coefficients were 0.773, 0.864, 0.883, 0.779, 0.791, and 0.888, respectively.

Validity:

The sexual hyperactivity specialist confirmed the translated questionnaire was adapted to all SAST-R attributes and its content validity was verified. The Pearson correlation coefficient between the two questionnaires was 0.731 ($P < 0.001$) for the convergent structure validity test. The Pearson correlation coefficient between the two questionnaires was -0.132 ($P < 0.09$) in the validity of divergent structure. Table 1 demonstrates that 11 factors had eigenvalues more than one which show 48.9% of the total variance of all questions.. Table 2 presents the results of the confirmatory factor analysis.

Discussion:

The analysis of the data collected in this study shows that the verified SAST-R questionnaire in Persian language can be used as a screening tool for the Iranian population using different methods of measuring reliability and validity. Moreover, in order to verify this claim, the obtained results in this study have been compared with the values of similar studies. Following confirmation that the Persian version of the questionnaire was adaptable by experts, calculating Cronbach's alpha was used as one of the most common methods to measure the reliability of various questionnaires. The alpha value of more than 0.7 indicates that the questionnaire is reliable (Karila et al., 2014). Using Cronbach's alpha, the value obtained for alpha in this study was 0.883, indicating that the Persian version of the questionnaire is reliable. This value is also close to the alpha value of the original article, which ranged from 0.821 to 0.892, with different subscales for heterosexual men, women, and homosexual men (Carnes et al., 2010). Additionally, comparing test scores by gender reveals two points. First, the proximity of mean values and standard deviations of men and women in this study (men, $M=15.43$, $SD=7.894$; women, $M=10.42$, and $SD=6.511$) and for the original test (men, $M=18.02$, $SD=4.835$; women, $M=14.40$, $SD=4.220$). Secondly, the men's mean of scores in both studies is higher than the women's. However, the difference between the mean of scores in the men and women groups, in this study is 5.01 and in the original study was 3.62 (Carnes et al., 2010). Another study on the validation of the same questionnaire in the Polish language shows Cronbach's alpha to be 0.904 (Kołodziej et al., 2017). In addition to Cronbach's alpha, other validation methods were used, such as Split-Half (first half=0.837, second half=0.761, and total questionnaire=0.779) are all above 0.7, and based on Lambda Gutmann coefficients (highest=0.888 and lowest=0.772), the questionnaire appears to be reliable.

Persian validated version of the SAST-R has a significant correlation with both the original SAST-R and HBSC. Conversely, the original SAST-R (Ballester-Arnal et al., 2013) and the Persian validated version of this questionnaire had no significant correlation with the used divergent instruments. Using these two methods, the results obtained in this study show a significant correlation with convergent validation questionnaire ($P<0.001$, $R=0.731$) and no correlation with the divergent tool ($P<0.09$, $R=-0.132$).

Adaptive fitness indexes close to the standard (0.95) and the root of the mean square error ranging from 0.0 to 0.5 indicates the validity of the questionnaire (Kołodziej et al., 2017). Accordingly, the values obtained by the root of the mean square error approximation (0.047) and adaptive fitness index (0.884) in this study indicate that the questionnaire based on the factor validity method is valid. As in another study involving the same questionnaire, the root of the mean square error approximation was 0.07 (Kołodziej et al., 2017).

As a limitation of this study, only the Iranian Persian language speaking took part in this study. Evaluation the validity of SAST-R for other Persian language speaking countries is also suggestible. Furthermore, the whole population of the Iranian Persian Language speaking were considered in this study. So, it could be suggested that evaluate validity of this instrument among special societies such as drug addicted subjects or the sex-worker populations.

Conclusion:

Using the verified SAST-R Persian questionnaire in this study, therapists and specialists can screen sex addict patients. Clinical diagnosis, however, is required to approve the addiction. Along with this tool for screening sexual addiction, there are several sub-scales in the original test and scores for cutoff that can be used according to its table in supplementary data.

Tables:

Table 1

Questions	Eigenvalue	Percentage of variance	Concentration of variance percentage
1	8/04	17/88	17/88
2	2/56	5/7	23/58
3	1/78	3/97	27/55
4	1/5	3/34	30/90
5	1/3	3/08	33/98
6	1/20	2/27	63/71
7	1/19	2/64	39/35
8	1/12	2/50	41/89
9	1/09	2/42	44/29
10	1/06	2/35	46/65
11	1/01	2/25	48/9

Exploratory Factor Analysis: The 11 factors had eigenvalues more than one which show 48.9% of the total variance of all questions.

Table 2

Chi-square	CFI	RMSEA	GFI	AGFI
603/923	0/884	0/047	0/873	0/825

Confirmatory Factor Analysis Indicators are showed in this table.

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Conflict of interest:

All authors claim that there is no conflict of interests.

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