# ITALIAN VALIDATION OF THE SEXUAL DESIRE INVENTORY (SDI-2): PSYCHOMETRIC PROPERTIES AND FACTORIAL STRUCTURE

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## Abstract

*Objective*: Sexual desire is a psychological state that prompts individuals to engage in sexual activity. Although interest about this topic is constantly increasing, there are no validated instruments to measure sexual desire in Italy, making scientific studies difficult. This paper aims to provide a contribution to validation of the Sexual Desire Inventory-2 (SDI-2) for the Italian population, investigating factorial structure, invariance, reliability and validity.

*Method*: The sample was composed of 389 Italian participants from a nonclinical population. The thirteen-item SDI-2 and the Barratt Impulsiveness Scale (BIS-11) for measuring impulsiveness were administered.

*Results*: The results supported two dimensions, i.e. dyadic and solitary desire, and partially measurement invariance across gender. Furthermore, good validity and reliability indicators have been gained.

*Conclusions*: the Italian version of the SDI-2 supports good psychometrics properties. It may be considered a valid and reliable measure for assessing dyadic and solitary sexual desire. Therefore, the present inventory may be used, in the research and clinical field, as an innovative instrument in order to investigate sexual desire and its relationship with clinical disorders

Key words: sexual desire, psychometrics properties, Italian validation, structural equation modelling, factor analysis

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#### Sexual desire: Definitions and assessment

In recent years, scientific interest in sexual desire has greatly increased (e.g., Moyano et al., 2017; Vallejo-Medina et al., 2020). Sexual desire has been associated with terms such as libido, sexual interest and sexual appetite. The variety of approaches to this topic makes its definition very complex (Spector et al., 1996). Sexual desire has been broadly described as "the sum of the forces that lean us toward and push us away from sexual behavior" (Levine, 2003, p. 285). Regan and Berscheid (1999) proposed that sexual desire is "a psychological state subjectively experienced by the individual as an awareness that he or she wants or wishes to attain a (presumably pleasurable) sexual goal that is currently unattainable" (p. 15). In other words, sexual desire may be considered a driving component of sexual fantasy life and activity (Levine, 2003; Pfaus, 2009). Furthermore, sexual desire and sexual arousal are widely acknowledged as complex constructs and the relation between them as intricate (Ågmo, 2011; Janssen, 2011; Meana, 2010). In fact, people with higher sexual desire may be mostly attended to sexual cues, increasing own sexual arousal, i.e. the momentary level of sexual excitement (Moholy et al., 2015; Whalen, 1966). However, sexual desire is a different construct than sexual activity or behavior,



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although "Sexual desire is an important drive for sexual behavior and is positively associated with emotional intimacy" (Stulhofer et al., 2014, p. 2). According to previous literature, sexual desire, activated by internal and external signals (Leiblum & Rosen, 1988), can be considered as motivation to engage in sexual activity (Diamond, 2004), alone or with a partner (Regan, 2013). In other words, high sexual drive may not coincide with sexual activities because social skills, opportunity, and social factors may stop sexual desire. However, sexual behaviors are unlikely to occur in the absence of desire or arousal (Moholy et al., 2015).

The lack of a unique definition also leads to difficulty in operationalizing and measuring sexual desire (Beck, 1995). In fact, a research in EBSCO with keywords "sexual desire" combined to "instrument"/ "inventory" / "scale" showed a scarcity of instruments that measures sexual desire. The instruments mostly used in scientific literature are the Sexual Interest and Desire Inventory– Female (SIDI-F), the Female Sexual Function Index (FSFI), and the Sexual Desire Inventory-2 (SDI-2).

SIDI-F assesses severity of female hypoactive sexual desire disorder (Clayton et al., 2006), is composed of thirteen domains, including a single item for measuring desire-frequency, desire-satisfaction, and desire-distress. The inventory provides a global score of the thirteen domains. The FSFI (Rosen et al., 2000)

is composed of 19-item assessing sexual function in women diagnosed with female sexual arousal disorder and hypoactive sexual desire disorder (Meston, 2003; Turna et al., 2005). The FSFI measures six domains, including desire, arousal, lubrication, orgasm, satisfaction, and pain. SIDI-F and FSFI showed good indices of reliability and validity, but both may be administrated specifically to women with sexual desire disorders. SDI-2 (Spector et al., 1996) consists of 14 items that measure two dimensions: dyadic sexual desire (items 1-9) and solitary sexual desire (items 10-13); item 14 does not fall within these two dimensions because it is a measure of how long the subject can resist having sex. Dyadic sexual desire was defined as "the interest or desire to engage in sexual activity with another person" (Spector et al., 1996, p. 186), which can result also in a desire for intimacy and sharing with a partner. Solitary desire was defined as "an interest in engaging in sexual behavior on its own, and may involve the desire to refrain from intimacy and sharing with others" (Spector et al., 1996, p. 186). In Italy, although some questionnaires have been

In Italy, although some questionnaires have been validated for investigating sexual dysfunction (e.g., the Sexual Dysfunction Questionnaire, Infrasca, 2011; the Sexual Interaction Inventory, LoPiccolo & Steger, 1974) and hypersexuality (e.g., the Hypersexual Behavior Inventory by Ciocca et al., 2020), there are no validated questionnaires for measuring sexual desire. This is very disadvantageous as studying this construct could lead to new knowledge, especially in the clinical field and in associations to other disorders.

Therefore, the present paper aimed to fill this gap providing a validation of the SDI-2 for the Italian population, through investigating its factorial structure, exploring the psychometric properties of the items and studying measurement invariance across gender. The Italian validation of SDI-2 may offer the measurement of two-dimensions of sexual desire, also in absence to previous diagnosis, both for men and women.

Furthermore, the present study aimed to explore the positive relationship between sexual desire and impulsiveness, providing new insights for future research and clinical practices. Previous studies have well documented the positive relationship between impulsiveness and sexual behavior. As a matter of fact, a meta-analysis (Dir et al., 2014) revealed that impulsivity may be more important predictor of risky sexual behavior. However, the relationship between sexual desire and impulsiveness has been less investigated. In previous literature, just a study (Varfi el al., 2019) measured both sexual desire and impulsiveness as predictors of addictive cybersex, but the correlation between sexual desire and impulsiveness was not reported. Impulsiveness domain has been distinguished (Barratt, 1985) in three specific dimensions: attentive, motor, and nonplanning impulsiveness. Attentive impulsiveness concerns making quick decisions, motor impulsiveness involves acting without thinking and non-planning impulsiveness involved a lack of orientation toward the future (Barratt, 1985). As previously described, sexual desire may not coincide to sexual behavior. Therefore whether sexual behaviors are generally predicted by impulsiveness, sexual desire dimensions may not be related to impulsiveness dimensions. In other words, in order to test discriminant validity the correlations between the SDI-2 dimensions and three factors of impulsivity was tested.

## Method

#### Procedure

The study protocol complied fully with the Ethical Principles of Psychologists and Code of Conduct (American Psychological Association, 2010). Data was collected through an internet website survey, via a snowball procedure. As matter of fact, a link was sent via e-mail to a sample of about one-hundred respondents beginning with people known to the researchers; after completion of the questionnaire, each participant was asked to invite other people to fill the questionnaire, and so on. On the first online page, a detailed explanation of the study objectives was reported. Participation in the study was voluntary and no incentive was offered. In order to ensure complete anonymity, no email was requested in questionnaires filling. Therefore, researchers were not able to understand who, among own contacts, has really complete the online questionnaire.

## *Translation and adaptation process of the SD-2*

The Italian version of the SDI-2 was developed following the International Test Commission (ITC) guidelines (Byrne, 2016) involving forward and back translation procedures (Brislin, 1970; Gudmundsson, 2009). As a first step, the SDI-2 was independently translated, on an item-by-item basis, from English into Italian by two bilingual science experts (a psychotherapist and a methodology expert) in the field of psychology. The two initial versions of the translation were reviewed and discussed in order to arrive at an unanimously accepted version. Reviewed version was proposed to five native Italian psychologists and psychiatrists; they worked individually through a semistructured questionnaire to consider the clarity and cultural meaning of the items and then discussed their comments together in order to solve any inconsistencies. The final Italian version was then back-translated into English by different bilingual science experts from those who had done the translations in the initial phase. Finally, the accordance between the original English version of the SDI-2 and the back-translation was tested.

## **Participants**

The sample consisted of 389 participants, equally divided by gender (48% men and 52% women), aged from 18 to 74 years (M = 29.70, SD = 12.86). Regarding education, 39% of participants had a university degree, 57.3% had a high school degree and the remaining 3.6% had completed compulsory schooling. In relation to marital status, 75.8% of participants were single, 19.5% were married or cohabiting, 3.9% were separated or divorced and 0.8% were widowers. As regards relationship status, 49.4% were involved in a relationship, 8.7% were dating; 3.9% were in an open relationship and 38% were not involved in any relationship.

## Instruments

A sociodemographic questionnaire was given to the participants, with questions on gender, age, nationality, educational level and marital status, plus a question about being involved in a relationship for at least 6 months.

The SDI-2 (Spector et al., 1996) was used to evaluate two dimensions of sexual desire: dyadic sexual desire (SD-D) and solitary sexual desire (SD-S). This two-dimensional structure presents good psychometric properties, with Cronbach's alpha coefficient equal to .86 for SD-D and .96 for SD-S.

The Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995) is a 30-item self-report questionnaire that was used for assessing the participants' impulsivity on a Likert-type scale. Specifically, the BIS-11 measures three second-order factors of impulsivity: attentive impulsiveness, motor impulsiveness and non-planning impulsiveness. Further, the model of impulsivity of the BIS-11 is considered a theory-neutral model (Moeller et al., 2001). The good psychometric properties, reliability and validity of the original version of the BIS-11 (Patton et al., 1995) have been supported in the Italian adaptation (Fossati et al., 2001). Higher scores indicate high impulsiveness.

#### Data Analysis

First, an exploratory factor analysis (EFA), with

Figure 1. Parallel Analysis

validity were carried out on total sample composed of 389 participants. The invariance test was conducted to investigate whether the factor model derived from EFA showed measurement invariance across gender. Following the recommendations and guidelines (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000), configural invariance (i.e., no constraints), metric invariance (i.e., factor loadings constrained equal) and scalar invariance (factor loadings and intercepts constrained equal) were tested in order.

The invariance models were evaluated using the following fit indices:  $\chi^2$ , comparative fit index (CFI), Tucker-Lewis index (TLI) and root mean square error of approximation (RMSEA). When CFI and TLI are > .90 and RMSEA is < .08, these fit indices can be considered adequate (Hu & Bentler, 1999).

Results

The appropriateness for a factor-analytic study was supported by EFA results: the KMO index is equal to .78 and Bartlett's test is significant [ $\chi^2$  (78) = 1037.02; p < .001]. The parallel analysis, graphically reported in **figure 1**, suggested that two factors should be extracted. In fact, just two factor showed eingevalues higher than parallel eingevalues. The two factors explained 50.94% of the total variance.



principal axis factoring method, was carried out on thirteen-items of the SDI-2 using IBM's SPSS Statistics 24 software. EFA was performed on a random subsample, composed of 180 participants, from total sample. The sampling adequacy was investigated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. A sample can be considered numerically adequate when the KMO index is close to 1 and Bartlett's test is significant. Parallel analysis was used for assessing the number of factors to be extracted (Horn, 1965). Parallel analysis suggests that only factors which have higher eigenvalues than parallel eigenvalues should be extracted (Turner, 1998).

After the number of factors was selected, the factor loading matrix was explored to ascertain the items in each latent factor. According to Tabachnick and Fidel (2007), an item represents a pure measure of the factor when its factor loading is > .32, and items with lower factor loadings should be deleted.

Psychometrics properties, reliability, invariance and

**Table 1** reported the component loading matrix,with the oblimin rotation, eigenvalues and percentagevariance for each dimension.

The results of AFE showed that the items load on just one factor with a correlation of at least .32. Specifically, the first dimension explained 35.30% of the total variance and was composed of nine items referring to sexual desire toward a partner (SD-D). The second dimension explained 15.64% of the total variance and was composed of four items measuring the solitary facet of sexual desire (SD-S). The dimensions were positively correlated (r = .47; p < .01).

**Table 2** reported the psychometric properties of the items and the reliabilities of the dimensions.

The results indicated that the items showed good psychometrics properties, thus contributing to measure the latent variables. Furthermore, both SD-S and SD-D had good internal consistency, with Cronbach's alpha coefficient equal to .87 and .84, respectively.

First, power analyses were carried out in order to establish the recommended minimum sample size for

Table	1. Factor	loading	matrix,	eigenvalues	s and the	<i>percentages</i>	of variance
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	PC1	PC2
SDI1 Durante l'ultimo mese, quanto spesso ti sarebbe piaciuto intrattenerti nell'attività sessuale con un partner? (During this last month, how often would you have liked to engage in sexual activity with a partner?)	.54	09
SDI2 Durante l'ultimo mese, quanto spesso hai avuto fantasie sessuali che coinvolgono un partner? (During this last month, how often have you had sexual thoughts involving a partner?)	.48	01
SDI3 Quando hai delle fantasie sessuali, quanto è forte il tuo desiderio di intraprendere un'attività sessuale con un partner? (When you have sexual thoughts how strong is your desire to engage in sexual behavior with a partner?)	.76	.01
SDI4 Quando vedi per la prima volta una persona attraente, quanto è forte la tua attrazione sessuale? (When you first see an attractive person, how strong is your sexual desire?)	.59	.19
SDI5 Quando passi del tempo con una persona attraente, quanto è forte il tuo desiderio sessuale? (When you spend time with an attractive person, how strong is your sexual desire?)	.53	.26
SDI6 Quando sei in una situazione romantica, quanto è forte il tuo desiderio sessuale? (When you are in romantic situations how strong is your sexual desire?)	.48	.07
SDI7 Generalmente, quanto è forte il tuo desiderio di intraprendere l'attività sessuale con un partner? (How important is it for you to fulfill your sexual desire though activity with a partner?)	.85	06
SDI8 Quanto è importante per te soddisfare il tuo desiderio sessuale attraverso l'attività con un partner? (Compare to other people of your age and sex, how would you rate your desire to behave sexually with a partner?)	.80	21
SDI9 In confronto ad altre persone della tua età e del tuo stesso genere, come valuti il tuo desiderio di avere rapporti sessuali? (During this last month, how often would you have liked to behave sexually by yourself?)	.62	.18
SDI10 Durante l'ultimo mese, quanto spesso ti sarebbe piaciuto intraprendere l'autoerotismo? (How strong is your desire to engage in sexual behavior by yourself?)	07	.72
SDI11 Quanto è forte il tuo desiderio di autoerotismo? (How important is it for you to fulfill your desires to behave sexually by yourself?)	.20	.78
SDI12 Quanto è importante per te soddisfare il tuo desiderio di autoerotismo? (Compared to other people your age and sex, how would you rate your desire to behave sexually by yourself?)	10	.85
SDI13 In confronto ad altre persone della tua età e del tuo stesso genere, come valuti il tuo desiderio verso l'autoerotismo? (How long could you go comfortably without having sexual activity of some kind?)	.14	.81
Eingevalue	4.59	2.03
% of variance	35.30%	15.64%

Table 2. Psychometric	properties	of SDI-2	items and	l reliability
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Dimensions	Item	M(SD)	Skewness	Kurtosis	$C_{it}^{c}$	α-i	α total	Total M(SD)
SD-D	SDI1	5.49(1.86)	-0.64	-0.18	.58	.86		
	SDI2	5.40(2.09)	-0.63	-0.63	.60	.86		
	SDI3	6.33(1.56)	-1.06	0.96	.67	.85		
	SDI4	4.78(1.97)	-0.16	-0.86	.61	.86		
	SDI5	4.85(2.05)	-0.25	-0.85	.61	.86	.87	50.52(11.35)
	SDI6	5.63(1.67)	-0.46	-0.45	.48	.87		
	SDI7	6.30(1.50)	-0.94	0.64	.75	.85		
	SDI8	6.31(1.68)	-1.09	0.76	.61	.86		
	SDI9	5.44(1.71)	-0.58	0.23	.62	.86		
SD-S	SDI10	4.47(1.51)	0.01	-0.09	.56	.85		
	SDI11	4.37(2.12)	-0.08	-1.05	.80	.74	0.4	17.00(6.04)
	SDI12	4.85(1.38)	-0.26	1.36	.65	.82	.84	17.90(6.04)
	SDI13	4.21(2.19)	0.00	-1.09	.78	.75		

Note: SD-D = dyadic sexual desire; SD-S = solitary sexual desire.

conducting a CFA with structural equation model (SEM; Cohen, 1988). We set very conservative parameters in the perspective of a worse-case scenario. A small effect size of r = .20 was expected, with a power level set at .80 and a significant alpha level set at .05. The results of the software developed by Soper (2020) suggested that the minimum sample size necessary for SEM, with two latent variables and thirteen observed variables, was N = 288. Therefore, our sample size appeared adequate in terms of statistical power.

With respect to measurement invariance across gender, the unconstrained baseline model adequately fitted to the data on both groups, thus supporting the configural invariance hypothesis. Constraining the loadings between two groups shows a significant increase of  $\chi^2$ . However, the CFI decreased only slightly, therefore the observed decrease in fit can be attributable to sampling error rather than to a lack of equivalence (Cheung & Rensvold, 2002). Metric invariance was therefore supported, suggesting that men and women attributed the same meaning to the latent variables.

When the intercepts between men and women were constrained,  $\Delta \chi^2$  was significant and CFI considerably decreased. **Table 3** showed the fit indices and comparisons among models. Scalar invariance was not supported, suggesting that different criteria should be chosen to evaluate sexual desire for men and women (table 4).

Finally, in order to test convergent and discriminant validity, correlations were carried out between the SDI-2 dimensions and the three factors of impulsivity. **Table 5** reported the correlation coefficients among the variables for men and women.

#### Discussion

The importance of proposing evaluation tools in order to evaluate specific constructs whose scores can

be accurately compared has been well highlighted in the literature (Muniz & Fonseca-Pedrero, 2019). This is even more relevant when the instrument measure a bit investigated construct and when does not exist other validated scales for specific countries. Therefore, the present study aimed to fill a literature gap, providing a contribution to validation of the SDI-2 in the Italian population.

First, we explored the factorial structure of thirteen items of the SDI-2 through EFA on a subsample of 180 participants. Previous studies about dimensions of sexual desire were ambiguous. Original English validation study (Spector et al., 1996) proposed a twofactor model, distinguishing in solitary and dyadic sexual desire. However, the results of Spanish (Moyano et al., 2017) and Colombian (Vallejo-Medina et al., 2020) validation of SDI-2 suggested a three-factor model; besides solitary desire (SD-S), dyadic sexual desire was distinguished referring to a partner (SD-P) and referring to attractive person (SD-A).

**Table 3.** Tests of the measurement invariance across gender (Men = 187 vs. Women = 202)

Model	χ <sup>2</sup>	df	CFI	TLI	RMSEA	$\Delta \chi^2$	∆df	Δ CFI
M0. Configural Invariance	721.47	128	.879	.731	.154	-	-	-
M1. Metric Invariance	763.25	139	.870	.739	.152	41.78**	11	.009
M2. Scalar Invariance	1743.72	143	.685	.350	.240	980.47**	4	.185

 Table 4. Standard scores of the two-factor structure of the SDI-2 in men and women

	Males (N=187)		Females (N=202)	
	SD-D	SD-S	SD-D	SD-S
М	54.41	20.24	46.92	15.73
SD	9.36	5.44	11.86	5.75
Skewness	-0.69	-0.34	-0.44	0.22
Kurtosis	0.56	0.17	0.05	-0.52
α	.84	.84	.87	.81
Percent				
1	26	6	14	4
5	35	10	26	7
15	45	15	34	10
25	49	17	38	11
35	51	19	43	12
50	55	21	49	16
65	59	23	52	18
75	61	24	55	20
85	64	26	59	22
95	68	29	65	24
99	72	32	69	30

Note: SD-D = dyadic sexual desire; SD-S = solitary sexual desire.

 Table 5. Correlations between the SDI-2 dimensions and three factors of impulsivity

					•
	SD-D	SD-S	AI	MI	NPI
SD-D	-	.37**	00	.11	09
SD-S	.57**	-	.14	.22*	13
AI	.09	.09	-	.52**	.39**
MI	.13	.17*	.46**	-	.31**
NPI	07	.00	.24**	.32**	-

Note – SD-D = dyadic sexual desire; SD-S = solitary sexual desire.AI = attentional impulsiveness. MI = motor impulsiveness. NPI = non-planning impulsiveness.

Values above the diagonal are based on men's scores. Values below the diagonal are based on women's scores. \* p< .05; \*\* p < .01.

Our results of parallel analysis suggested that two factors can be extracted with factor loadings very similar to two-factor structure described by Spector at al. (1996): SD-D concerns the desire to engage in sexual activity with a partner; SD-S concerns an interest in engaging in sexual behavior on its own. Therefore, our results supported the factor structure of original English validation study (Spector et al., 1996).

Second, the thirteen-items were found to have good psychometric properties. Furthermore, Cronbach's alpha and total item correlation suggested that all items contribute well to the measurement of their own factor. Therefore, the internal consistency values observed in this study are fully adequate for both the dyadic and solitary dimensions. These results indicated that SDI-2 factors reached good level of reliability.

Third, we investigated the measurement invariance across gender and found that metric invariance was supported; this result suggested that men and women attributed the same meaning to the latent variables. In other words, items were able to measure adequately sexual desire factors' both men and women. However, scalar invariance was not supported, suggesting that different standard scores should be used to measure sexual desire men and women (e.g., Petersen & Hyde, 2011). In fact, men showed higher scores than women for both the dyadic and solitary dimensions.

Finally, concerning external validation, we calculated the correlation between the SD-D and SD-S dimensions of the SDI-2 and the attentional, motor and non-planning impulsiveness of the BIS-11 for men and women. The results showed that SD-D is not related to any BIS-11 factors, supporting the divergence between SD-D and impulsivity. In other words, this result supported the theory that sexual desire and behavior are two different constructs. In contrast, SD-S is positively and significantly related to motor impulsiveness in both men and women. As motor impulsiveness also refers to immediate gratification of personal needs satisfaction, this result indicated that men and women with high SD-S tend to lose self-control. Furthermore, the different correlation paths between the two dimensions of the SDI-2 and the BIS-11 factors suggested that SD-D and SD-S are empirically different.

To summarize, the present studies may theoretically and practically contribute to previous studies. From theoretical point of view, the present study emphasized the good psychometric properties of SDI-2, also for Italian version. Furthermore, it filled the absence of a validated instrument to measure sexual desire in Italian context. Finally, the present study shad light that Italian version was composed of two factors as original version, rather than three factors as Spanish and Columbian versions. From practical point of view, the identified two-factor structure could have useful practical implications: dyadic and solitary domains are two well distinguished manifestations of sexual desire. They may be differently related to psychopathological and clinical scales. For example, results of external validation seems suggesting the importance to investigate motor impulsiveness as precursor of solitary sexual desire.

## Limitations and Further Studies

There are some limitations of the present study that is useful to mention and address. First, the sample size (N= 389), although sufficient for validation (Worthington & Whittaker, 2006) and balanced for gender, may be increased to obtain greater representativeness and allow further analyses in order to test comparisons by age and marital status. Furthermore, it is important to highlight that 38% of the sample is not involved in a relationship; future research should also focus on the sentimental situation of the sample.

Furthermore, the absence of a clinical sample did not allow us to administer psychopathological tests, which would be interesting to investigate. Further studies should consider clinical samples, including patients with bipolar disorder (BD) characterized by an increase of libido and sexual activity, as mentioned in the DSM-5 (APA, 2013), rather than patients with unipolar depression (UD; Reynaert et al., 2010). As a matter of fact, "patients with BD also reported more frequently periods of increase in sexual activities such as increased interest in sex and having multiple partners, compared with patients with UD and control subjects" (Dell'Osso et al., 2009, p. 5).

In addition, the SDI-2 could help to investigate sexual desire in men and women with borderline personality disorder (BPD); in fact, previous research by Hurlbert et al. (1992) found that those with BPD demonstrate hypersexuality and/or promiscuity in their adult relationships. Therefore, the SDI-2 could be useful to assess the variability of sexual desire in BPD and its changes in different phases (Nisenbaum et al., 2010).

Thus, future use of the SDI-2 should compare clinical groups with a control group, in order to show the difference in psychopathology.

#### Conclusions

In conclusion, the present study showed empirical evidences about the reliability, external validity,

and good psychometric properties of the Italian version of the SDI-2. The scale allows for the evaluation of sexual desire also in Italian population, filling a literature gap. Furthermore, the study supported the two factors of sexual desire: dyadic sexual desire and solitary sexual desire. The validation of the Italian version of the SDI-2 could open new ideas for research and clinical practice, in a field, that of sexual desire, which still needs further investigation. Practically speaking, the SDI-2 may be administrated in Italian patients with sexual disorders in order to provide new empirical information about the difference between sexual activity and sexual desire. Furthermore, it can be used in clinical practice to analyze and highlight the early signals related to changes of sexual desire in clinical patients.

#### References

- Agmo, A. (2010). On the intricate relationship between sexual motivation and arousal. *Hormones and Behavior*, *59*, 681–688. https://doi.org/10.1016/j.yhbeh.2010.08.013
- American Psychological Association (2010). *Ethical Principles of Psychologists and Code of Conduct*. http:// www.apa.org/ethics/code/principles.pdf.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5<sup>th</sup> ed.). American Psychiatric Association.
- Barratt, E. S. (1985). Impulsiveness subtraits: Arousal and information processing. In J. T. Spence & C. E. Izard (Eds.), *Motivation, emotion and personality* (pp. 137– 146). Elsevier Science Publishers.
- Beck, J. G. (1995). Hypoactive sexual desire disorder: An overview. Journal of Consulting and Clinical Psychology, 63(6), 919–927. https://doi.org/10.1037/0022-006X.63.6.919

- Byrne, B. M. (2016). Adaptation of assessment scales in cross-national research: Issues, guidelines, and caveats. *International Perspectives in Psychology: Research, Practice, Consultation, 5*(1), 51–65. https://doi. org/10.1037/ipp0000042
- Brislin, R. W. (1970). Back-Translation for Cross-Cultural Research. Journal of Cross-Cultural Psychology, 1, 185– 216. https://doi.org/10.1177/135910457000100301
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902\_5
- Ciocca, M., Nimbi, F. M., Limoncin, E., Mollaioli, D., Marchetti, D., Verrocchio, M. C., Simonelli, C., Jannini, E. A., & Fontanesi, L. (2020). *Journal of Psychopathology*, 26, 169–175. https://doi.org/10.36148/2284-0249-392
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Erlbaum.
- Dell'Osso, L., Carmassi, C., Carlini, M., Rucci, P., Stat, D., Torri, P., Cesari, Landi, P., Ciapparelli, A., & Maggi, M. (2009). Sexual Dysfunctions and Suicidality in Patients with Bipolar Disorder and Unipolar Depression. *The Journal of Sexual Medicine*, 6(11), 3063–3070. https:// doi.org/10.1111/j.1743-6109.2009.01455.x
- Diamond, L. M. (2004). Emerging perspectives on distinctions between romantic love and sexual desire. *Current Directions in Psychological Science*, 13(3), 116–119. https://doi.org/10.1111%2Fj.0963-7214.2004.00287.x
- Dir, A.L., Coskunpinar, A., & Cyders, M.A. (2014). A metaanalytic review of the relationship between adolescent risky sexual behavior and impulsivity across gender, age, and race. *Clinical Psychology Review*, 34(7), 551–562. https://doi.org/10.1016/j.cpr.2014.08.004
- Fossati, A., Di Ceglie, A., Acquarini, E., & Barratt, E. S. (2001). Psychometric properties of an Italian version of the Barratt Impulsiveness Scale-11 (BIS-11) in nonclinical subjects. *Journal of Clinical Psychology*, 57(6), 815–828. https://doi.org/10.1002/jclp.1051
- Gudmundsson, E. (2009). Guidelines for translating and adapting psychological instruments. *Nordic Psychology*, 61(2), 29–45. https://doi.org/10.1027/1901-2276.61.2.29
- Horn, J.L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30, 179–185.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives. *Structural Equation Modeling*, 6(1), 1–55. http://dx.doi. org/10.1080/10705519909540118
- Hurlbert, D. F., Apt, C., & White, C. L. (1992). An empirical examination into the sexuality of women with borderline personality disorder. *Journal of Sex & Marital Therapy*, 18(3), 231–242. https://doi.org/10.1016/0005-7916(93)90003-F
- Infrasca, R. (2011). Sexual Dysfunction Questionnaire: scale development and psychometric validation. *Giornale Italiano di Psicopatologia*, *17*, 253–260.
- Janssen, E. (2011). Sexual arousal in men: A review and conceptual analysis. *Hormones and Behavior*, 59, 708– 716. https://doi.org/10.1016/j.yhbeh.2011.03.004
- Leiblum, S. R., & Rosen, R. C. (Eds.). (1988). Sexual desire disorders. Guilford Press.
- Levine, S. B. (2003). The nature of sexual desire: A clinician's perspective. *Archives of Sexual Behavior*, *32*, 279–285. https://doi.org/10.1023/A:1023421819465
- LoPiccolo, J., & Steger, J., C. (1974). The Sexual Interaction Inventory: A new instrument for assessment of sexual dysfunction. Archives of Sexual Behavior, 3, 585–595.
- Meana, M. (2010). Elucidating women's (hetero)sexual desire: Definitional challenges and content expansion. *Journal of Sex Research*, 47(2-3), 104–122. https://doi. org/10.1080/00224490903402546

- Meston, C. M. (2003). Validation of the Female Sexual Function Index (FSFI) in women with female orgasmic disorder and in women with hypoactive sexual desire disorder. *Journal of Sex & Marital Therapy*, 29, 39–46. https://doi.org/10.1080/713847100
- Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry*, 158(11), 1783–1793. https://doi.org/10.1176/appi.ajp.158.11.1783
- Moholy, M., Prause, N., Proudfit, G.H., Rahman, S.A., Fong, T. (2015). Sexual desire, not hypersexuality, predicts selfregulation of sexual arousal. *Cognition & Emotion*, 29(8), 1505–1516.
- Moyano, N. P., Vallejo-Medina, P., & Sierra. J. C. (2017). Sexual desire inventory: two or three dimensions? *Journal* of Sex Research, 54(1), 105–116. https://doi.org/10.1080/ 00224499.2015.1109581
- Muniz, J., & Fonseca-Pedrero, E. (2019). Ten steps for test development. *Psicothema*, 31, 7–16. https://doi. org/10.7334/psicothema2018.291
- Nisenbaum, R., Links, P. S., Eynan, R., & Heisel, M. J. (2010). Variability and predictors of negative mood intensity in patients with borderline personality disorder and recurrent suicidal behavior: Multilevel analyses applied to experience sampling methodology. *Journal* of Abnormal Psychology, 119(2), 433–439. https://doi. org/10.1037/a0018696
- Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt impulsiveness scale. *Journal of Clinical Psychology*, *51*(6), 768–774. https:// doi.org/10.1002/1097-4679(199511)51:6<768::AID-JCLP2270510607>3.0.CO;2-1
- Petersen, J. & Hyde, J. (2011). Gender differences in sexual attitudes and behaviors: A review of meta-analytic results and large datasets. *Journal of Sex Research*, 48, 149–165. https://doi.org/10.1080/00224499.2011.551851
- Pfaus, J. G. (2009). Reviews: Pathways of sexual desire. The Journal of Sexual Medicine, 6(6), 1506–1533. https:// doi:10.1111/j.1743-6109.2009.01309.x
- Regan, P. C. (2013). Sexual desire in women. In D. Castañeda (Ed.), *The essential handbook of women's sexuality* (pp. 3–24). Praeger.
- Regan, P. C. & Berscheid, E. (1999). Lust: What we know about human sexual desire. Sage.
- Reynaert, C., Zdanowicz, N., Janne P., & Jacques, D. (2010). Depression and sexuality. Psychiatria Danubina, 22(1), 111–113.
- Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsigh, R., Ferguson, D., & D'Agostino, R., Jr. (2000). The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex & Marital Therapy*, 6, 191–208. http://dx.doi.org/10.1080/009262300278597
- Soper, D. S. (2020). *A-priori Sample Size Calculator for Structural Equation Models* [software]. Retrieved from http://www.danielsoper.com/statcalc
- Spector, I. P., Carey, M. P., & Steinberg, L. (1996). The Sexual Desire Inventory: Development, factor structure, and evidence of reliability. *Journal of Sex* and Marital Therapy, 22(3), 175–190. https://doi. org/10.1080/00926239608414655
- Štulhofer, A., Ferreira, L. C., & Landripet, I. (2014). Emotional intimacy, sexual desire, and sexual satisfaction among partnered heterosexual men. *Sexual and Relationship Therapy*, 29(2), 229–244. https://doi.org/10.1080/14681 994.2013.870335
- Tabachnick, B. G., & Fidell, L. S. (2007). Using Multivariate Statistics (5th Ed.). Allyn and Bacon.
- Turna, B., Apaydin, E., Semerci, B., Cikili, N., & Nazli, O. (2005). Women with low libido: Correlation of decreased

androgen levels with female sexual function index. International Journal of Impotence Research, 17, 148–153. https://doi.org/10.1038/sj.ijir.3901294

- Turner, N. E. (1998). The effect of common variance and structure pattern on random data eigenvalues: Implications for the accuracy of parallel analysis. *Educational and Psychological Measurement*, 58(4), 541–568. https://doi. org/10.1177/0013164498058004001
- Vallejo-Medina, P., Rojas-Paoli, I., & Álvarez-Muelas, A. (2020). Validation of the Sexual Desire Inventory in Colombia. *Journal of Sex & Marital Therapy*, 46(4), 385– 398. https://doi.org/10.1080/0092623X.2020.1739181
- Varfi, N., Rothen, S., Jasiowka, K., Lepers, T., Bianchi-Demicheli, F., & Khazaal, Y. (2019). Sexual Desire, Mood, Attachment Style, Impulsivity, and Self-Esteem as

Predictive Factors for Addictive Cybersex. JMIR Mental Health, 6(1), e9978. https://doi.org/10.2196/mental.9978

- Vandenberg, R. J., & Lance, C. E. (2000). Areview and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. Organizational Research Methods, 3(1), 4–69. https://doi.org/10.1177/109442810031002
- Whalen, R. (1966). Sexual motivation. Psychological Review, 73, 151–163. https://psycnet.apa.org/doi/10.1037/ h0023026
- Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: a content analysis and recommendations for best practices. *The Counseling Psychologist 34*(6), 806–838. https://doi. org/10.1177%2F0011000006288127