

ARTICLE



Sexual desire and erotic fantasies questionnaire: development and validation of the sexual desire scale (SDEF1)

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The evolution in conceptualization of sexual desire has stimulated many attempts to measure it. However measures able to assess multiple expressions of desire in all sexual identities are still lacking. The main aim of the present study was to test the psychometric properties of the Sexual Desire and Erotic Fantasies questionnaire - Part 1 Sexual Desire (SDEF1), developed as a sex-positive measure of different sexual desire expressions. The SDEF1 was assessed in 1773 participants from the Italian general population (1105 women, 645 men, and 23 other genders; ranged between 18–78 years old, mean age 29.31 ± 10.35) on an online survey, together with the Sexual Desire Inventory – 2, the International Index of Erectile Function, the Female Sexual Function Index, and the Marlowe–Crowne Social Desirability Scale-Short Form. Results support a factorial structure of six dimensions, including 28 items and accounting for 58.11% of the total variance: sexual desire, negative feelings to sexual desire, autoerotic desire, regular partner desire, attractive person desire, and responsive desire. The confirmatory factorial analysis showed satisfactory indexes (RMSEA = 0.042 [90% CI = 0.039–0.045]; GFI = 0.97; NFI = .96; and CFI = 0.97). Regression coefficients ranged from 0.39 to 0.94 and were all statistically significant ($p < 0.001$). The SDEF1 showed good psychometric properties such as internal reliability, construct, and discriminant validity, and to differentiate women and men with and without sexual difficulties. Men reported significantly higher levels of desire than women in all areas except for desire for a regular partner, where no gender difference was detected. Desire for autoerotic activity was the factor accounting for more variance explained among genders (11.7%). The SDEF1 could be a useful measure to assess different areas of sexual desire and its use could be recommended for clinical and research purposes.

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INTRODUCTION

Desire is often defined as the subjective psychological status for initiating and maintaining human sexual behavior, triggered by internal (feelings, thoughts, erotic fantasies) and/or external (attractive partners/situations, pornography) stimuli [1–3]. It refers to feelings and thoughts that motivate individuals to approach or be receptive to sexual stimulation [4]. Over time, researchers and clinicians seemed to agree that sexual desire is a complex construct and moved away from simplistic unidimensional definitions toward multidimensional models [5]. The evolution in conceptualization of desire has stimulated all the attempts to measure desire over time, however no available measure is able to assess multiple expressions of desire in all sexual identities, an element that could be useful for further clinical assessment of sexual desire difficulties. The most used self-reported questionnaires of sexual desire in the literature will be briefly discussed in the following paragraphs, highlighting strengths and limits to give the reader an overview of the available measures. After, the development and the validation process of a new measure that attempts to overcome some of the limits and integrate some strengths will be presented.

SELF-REPORTED MEASURES OF SEXUAL DESIRE - UNIDIMENSIONAL MEASURES

Historically, early attempts to measure desire focused on desire outputs such as frequency of sexual activity and masturbation rather than the feeling of desire experienced by the individual. Moreover, single item Likert scales (e.g., How often do you feel like having sex?) were preferred, assuming that sexual desire was unidimensional and easy to describe [3, 6–8]. This bias is still common today, where desire is often measured by overemphasizing sexual behaviors rather than cognitions and feelings, underestimating that having sex does not necessarily imply desiring it (and vice versa). In this sense, Meston and Buss [9] have shown many reasons why people can be motivated to engage in sexual activities, and sexual desire fits only with some of them. In their works on sexual functioning, Rosen et al. [10, 11] focused on desire as a single dimension as reported in the International Index of Erectile Function (IIEF) and the Female Sexual Function Index (FSFI). In these questionnaires, sexual desire is measured as the level and the frequency of perceived desire to engage in sexual activity. In this sense, it is suggested a conceptualization of desire as spontaneous for the individual, in the sense that it rises

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independently from the person's will, in line with classical linear models of sexual response [12, 13]. This way of measuring desire can be simple and straightforward, much used especially in large assessments of sexual function. At the same time, it is poorly descriptive of the complexity of the desiring process.

SELF-REPORTED MEASURES OF SEXUAL DESIRE - MULTIDIMENSIONAL MEASURES: DYADIC AND SOLITARY DESIRE

In the development and validation of the Sexual Desire Inventory-2 (SDI-2), Spector et al. [4] defined sexual desire as interest in sexual activity, which could be measured by the amount and strength of thoughts directed toward sexual stimuli. Two different kinds of sexual desire based on the "object" (what the person desires) emerged in the factorial analyses of the SDI-2: desire for sexual activity with a partner (dyadic) and alone (solitary). The SDI-2 has been largely used in the literature, becoming one of the most used measures to assess desire in the last decades [14–17]. However, as Spector et al. [4] suggested, further research is needed to understand whether these two factors are meaningful in terms of clinical relevance and understanding desire. Moyano et al. [16] questioned the SDI-2's factorial structure and background theory, arguing that two factors may not be sufficient to capture the complexity of sexual desire. They stressed the importance of considering both individual and relational expressions of desire, as well as the intrinsic and the fluid components of this experience. This point may be extremely relevant from a clinical perspective, where desire often shows all its complexities. For instance, people might have low levels of desire to engage in sexual activity with their committed partners and, at the same time, experience pleasurable thoughts or fantasies about having sexual activities with others (outside the committed relationship) [18]. Moyano et al. [16] proposed a three-factor solution of the SDI-2 by splitting dyadic desire into two subdomains: partner-focused dyadic sexual desire and general dyadic sexual desire for an attractive person.

SELF-REPORTED MEASURES OF SEXUAL DESIRE - MULTIDIMENSIONAL MEASURES: SPONTANEOUS AND RESPONSIVE DESIRE

The measures presented in the previous paragraphs refer to spontaneous desire for specific objects (partners, masturbation). Next to spontaneous desire, the circular model of Basson [19] introduced the concept of responsive desire observing that a person can be moved from a state of null desire to an active one once sexual arousal has been experienced (e.g., after partner's stimulation). Although originally designed for both women and men, the literature has primarily focused on women to investigate responsive desire [8, 20–24]. Velten et al. [25] presented the 18-item Report of Behavior and Feelings–Desire (RBF-D) which tried to assess responsive desire based on five factors (sexual activity with a primary partner; sexual desire for a primary partner; sexual activity with other persons; sexual desire for other persons; and autoerotic activities). The RBF-D expanded the desire assessment, providing a good overall evaluation of female subjective experiences of desire and stimulation. At the same time, little reference was made to the openness of the person that may allow sexual stimulation by the partner and that can be interpreted as a forerunner of responsive desire, what Basson [19] referred to as "deliberate choice to experience stimulation". Moreover, the RBF-D is directed only to women, whereas an assessment of responsive desire in men is lacking in literature although largely observed in clinical practice [26, 27].

GENERAL LIMITS OF SEXUAL DESIRE MEASURES

For a more in-depth analysis of sexual desire measures that have been developed, validated, and used, we refer the reader to

Spector et al. [4] and Cartagena-Ramos et al. [28]. In this section we summarize some main elements drawn from the two literature reviews. Firstly, often questionnaires are not applied to different sociocultural contexts than those of their authors, in cross-cultural studies, with limitations regarding replicability of results and reliability. Considering that most of these measures were created more than 15 years ago, studies updating the psychometric properties are urgently needed to adapt them and avoid major cultural biases. Moreover, most of the measures are limited to desire for penetrative sexual intercourses in the heterosexual cisgender population, failing to capture other possible sexual identities, behaviors, and expressions of sexual desire [29–32].

THE CURRENT STUDY

The current study is part of a broader initiative aimed at assessing the psychometric qualities of a comprehensive tool for gauging sexual desire and fantasies known as the "Sexual Desire and Erotic Fantasies questionnaire (SDEF)." The SDEF comprises three distinct questionnaires: one focusing on Sexual Desire, another on the Use of Erotic Fantasies, and the third on the Erotic Fantasies Inventory. Developed to offer a range of instruments exploring various facets of the desire experience, the SDEF is intended for use in clinical settings to probe into desire-related disorders and associated factors [33, 34]. Consequently, clinicians can choose to flexibly utilize one or more measures from the SDEF suite to investigate the presence of criteria and manifestations indicative of challenges in desire and fantasies domains (primarily Hypoactive Sexual Desire Disorder and Female Sexual Interest/Arousal Disorder). Additionally, the SDEF questionnaires could prove beneficial in delving into issues such as sexual desire discrepancy in couples, hypersexuality, and paraphilic interests, as well as related aspects like emotional experiences and communication between partners concerning fantasies, their frequency, and contents.

This paper presents the validation of SDEF1 - Sexual Desire (SDEF1), focusing on the assessment of both spontaneous and responsive aspects of sexual desire, including its objects, contexts, and associated emotions. SDEF1 serves also to evaluate particular domains outlined in guidelines for Hypoactive Sexual Desire Disorder [35–37]. For instance, in clinical evaluations of low sexual desire concerns, it proves beneficial to distinguish between a general decline in desire across various areas such as spontaneous desire toward a regular partner, attraction toward individuals, self-stimulation, or response to partner-initiated stimulation. Additionally, assessing negative emotions stemming from desire experiences can provide valuable insights for clinicians in tailoring individual or couples' treatments [27]. Consequently, six specific domains were theorized for investigation: a general dimension encompassing perceived frequency and intensity of desire for specific sexual activities; a dimension focusing on distress and negative emotions associated with desire; the manifestation of desire in diverse contexts or toward different objects (e.g., solitary, toward a regular partner, and toward an attractive partner); and the responsiveness of desire according to the Basson model [19].

Moreover, a sex-positive perspective [38] served as the guiding framework for developing the SDEF1 as an inclusive measure accessible to individuals regardless of their gender identities, sexual orientations, relationship statuses, or sexual behaviors. This approach acknowledges the vast cultural and interpersonal diversity in sexual practices, recognizing significant variations in personal meanings and preferences across different contexts and periods. The aim of the sex-positive movement is to change the negative attitudes and rigid social norms that circulate about sexuality by promoting the recognition of multiple forms of expression of sexuality as a natural, healthy and enriching part of the human experience. An this is applied also to sex research, paying attention to the tools, research questions, interpretations

and languages used in all phases of a study. As proposed by several researchers [29–32], advancements in sexuality research and practice entail enhancing methodologies to incorporate more inclusive language and effectively depict diverse expressions of human sexuality, including gender identities and non-penetrative sexual behaviors [38–40]. This need is particularly pronounced in certain languages, such as Italian, where gendered linguistic terms (employing distinct words or designations for masculine and feminine) may lead to discomfort and pose challenges in assessing non-binary and queer identities through questionnaires. In the present study, this necessity manifested in crafting items that could encompass individuals and partners of all genders and sexual orientations across various forms of romantic relationships, encompassing the evaluation of desire for both penetrative and non-penetrative sexual activities. The same argument also applies to the use of pathologizing language on sexual desire or other expressions (such as “lack of sexual desire”).

The primary objective of this study was to validate the SDEF1 by assessing its internal reliability, construct validity, and discriminant validity. Additionally, the study aimed to investigate various characteristics of the sexual desire dimensions measured by the SDEF1, including their associations with sociodemographic variables, sexual functioning, gender, and sexual orientation differences within an Italian participant cohort.

MATERIALS AND METHODS

Participants and procedures

1819 volunteers from the Italian general population took part in the SDEF validation study, comprising 1135 women, 661 men, and 23 individuals of other genders. Participants were recruited using a snowball technique, disseminating advertisements on institutional websites and social media platforms such as Facebook, Instagram, and LinkedIn. The web survey was available in Italian via the Google Forms platform, and data collection occurred from February 2019 to December 2020. Prior to accessing the survey, participants completed an informed consent form. The questionnaire was administered anonymously, and no compensation was provided for participation. The study adhered to the principles outlined in the Declaration of Helsinki and received approval from the Institutional Ethics Committee of the Department of Dynamic and Clinical Psychology and Health Studies at Sapienza University of Rome (protocol code n.14 approved on January 9th, 2019).

The inclusion criteria consisted of: (1) being aged 18 or above, and (2) holding Italian citizenship. Forty-six responses (2.53%) were deemed ineligible for the present study due to duplication, falsification, or incompleteness. Consequently, the final cohort comprised 1773 participants (1105 women, 645 men, and 23 individuals identifying with other genders). To conduct exploratory and confirmatory factor analyses, participants were randomly allocated to two distinct groups, ensuring balance in terms of gender, age, and sexual orientation (refer to Table 1). The same participant cohort was also engaged in the validation studies of SDEF2 and SDEF3 [41, 42].

Measures

Participants completed a concise sociodemographic questionnaire aimed at gathering general information, including age, gender, sexual orientation, marital and relationship status, parental status, educational attainment, employment status, religious and political affiliations, as well as sexual activity status.

Sexual Desire and Erotic Fantasies questionnaire - Part 1 - The SDEF1 is a questionnaire intended to measure six different aspects related to sexual desire: sexual desire, negative feelings to sexual desire, autoerotic desire, regular partner desire, (self-defined) attractive person desire, and responsive desire. The SDEF1 items were constructed by authors mixing suggestions from the scientific literature and clinical experience. First, the six areas of interest were identified based on a comparison between main criteria of diagnostic classifications and clinical experience with desire-related problems [27, 43–45]. Subsequently, the main available desire measures [4, 10, 11, 16, 25] were revised, and 50 new items were developed fitting with the areas identified. In this process, the authors paid particular attention to the use of inclusive language that could refer desire

to any erotic activity, not only penetrative sex (e.g., kissing, body stimulation, oral sex, masturbation) and trying to be respectful of any gender identity and sexual orientation and variation. With regard to the response options, a 6-point Likert scale was preferred for the frequency items and a 5-point Likert scale for desire level (giving the possibility to select a midpoint answer) in order to allow participants to express themselves with a consistent variability. Higher scores indicate a higher level of sexual desires/feelings in a specific domain. Some items presented unscored solutions indicated with a hash mark to express the inability to answer the question for a specific reason (e.g., “#. I don’t have a regular partner”, or “#. I have never had desire for a regular partner”).

The initial draft of SDEF1 was distributed to 10 seasoned clinical psychosexologists for review. They provided feedback by offering individual comments and suggestions on the items, focusing on criteria such as the relevance of content to the investigated domain and the clarity of the text (both items and responses). After compiling all the expert feedback, the authors compared comments for each item and made revisions accordingly, including minor adjustments in wording and removal of items that received significant criticism. Consequently, out of the 50 items proposed in the preliminary version, 43 were retained. The 43-item version of the SDEF1 was pilot-tested with 20 volunteers from the general population to assess the general comprehension of the questionnaire and then administered in the present study to test its psychometric characteristics. The final version that emerged from the current study includes 28 items (see Supplementary Appendix A).

Sexual Desire Inventory – 2 (SDI-2) [4] - The SDI-2 comprises 14 items designed to assess two aspects of sexual desire: dyadic and solitary sexual desire. Elevated scores signify a greater level of sexual desire. This two-dimensional structure demonstrates robust psychometric properties, as evidenced by both the original version and the Italian adaptation [17], as well as in the present study ($\alpha = 0.88/0.91$).

International Index of Erectile Function (IIEF) [10] - The IIEF is a widely utilized 15-item questionnaire utilized for evaluating male erectile and sexual function. It generates a comprehensive index of sexual function along with five specific dimensions: sexual desire, erectile function, orgasmic function, satisfaction with intercourse, and overall satisfaction. Higher scores on this scale indicate better sexual functioning. The IIEF has been widely used in its Italian version, although a validation study for the Italian language of this measure has not been published yet in peer reviewed journals. Before starting this study, preliminary validation analyses on the Italian version of the IIEF used here were run by authors, reporting satisfying results which will be presented in a specific study. Psychometric studies have reported good reliability, validity, and discrimination between sexually dysfunctional and healthy people (clinical cut off score < 26) and in this study ($\alpha = 0.87/0.93$).

Female Sexual Function Index (FSFI) [11] - The FSFI is a well-established 19-item tool designed to assess overall sexual functioning and six specific domains: sexual desire, sexual arousal, lubrication, orgasm, sexual pain, and sexual satisfaction. Elevated scores on this scale indicate better sexual functioning. The FSFI demonstrates strong test-retest reliability, internal consistency, validity, and the ability to discriminate between sexually dysfunctional and healthy individuals (with a clinical cutoff score of < 26.55), as evidenced by both the original version and the Italian adaptation [46], as well as in the present study ($\alpha = 0.81–0.92$).

Marlowe–Crowne Social Desirability Scale-Short Form (MCSDS–SF) [47, 48] - The MCSDS–SF is a 13-item tool developed to measure socially desirable responses. It was utilized as a covariate in the current study to mitigate the impact of socially desirable response biases. In the current study, the Cronbach’s alpha coefficient for this scale was 0.91. Higher scores on the MCSDS–SF indicate a greater inclination to provide responses perceived as socially desirable.

Statistical analysis

The psychometric evaluation of SDEF1 proceeded through several stages. Conceptualized as a formative measure, wherein latent constructs are shaped by the operationalization of specific facets of sexual desire, construct validity was assessed at the item level using Principal Component Analysis (PCA). A direct oblimin rotation was applied, and the number of factors was determined through parallel analysis in conjunction with the Guttman-Kaiser criterion, utilizing Monte Carlo PCA for parallel analysis by Watkins [49]. Once an adequate model was established, a path diagram was constructed and evaluated using Confirmatory Factor Analysis (CFA). Fit indices used are the Goodness-of-fit (GFI), Normed fit index (NFI), Comparative fit index (CFI), and Root

Table 1. Sociodemographic variables description of the total group of participants.

Variables		Group 1 (n = 887) M ± ds (min–max)	Group 2 (n = 886) M ± ds (min–max)	Total Group (n = 1773) M ± ds (min–max)
Age		29.3 ± 10.42 (18–78)	29.32 ± 10.28 (18–65)	29.31 ± 10.35 (18–78)
		n (%)	n (%)	n (%)
Gender	Female	555 (62.57)	550 (62.08)	1105 (62.32)
	Male	320 (36.08)	325 (36.68)	645 (36.38)
	Transgender	3 (0.34)	3 (0.34)	6 (0.34)
	Non-binary	9 (1.01)	8 (0.91)	17 (0.96)
Sexual orientation	Heterosexual	705 (79.48)	703 (79.35)	1408 (79.41)
	Bisexual	80 (9.02)	82 (9.26)	162 (9.14)
	Homosexual	89 (10.03)	89 (10.05)	178 (10.04)
	Asexual	10 (1.13)	9 (1.02)	19 (1.07)
	Pansexual	3 (0.34)	3 (0.34)	6 (0.34)
Marital status	Unmarried	763 (86.02)	736 (83.07)	1499 (84.55)
	Married	96 (10.82)	125 (14.11)	221 (12.46)
	Separated	24 (2.71)	24 (2.71)	48 (2.71)
	Widowed	4 (0.45)	1 (0.11)	5 (0.28)
Relational status	Single	333 (37.54)	293 (33.07)	626 (35.31)
	Couple	532 (59.98)	576 (65.01)	1108 (62.49)
	Polyamory	22 (2.48)	17 (1.92)	39 (2.2)
Children	No	787 (88.73)	764 (86.23)	1551 (87.48)
	Yes	100 (11.27)	122 (13.77)	222 (12.52)
Education level	Middle School	19 (2.14)	21 (2.37)	40 (2.26)
	High School	286 (32.24)	333 (37.58)	619 (34.91)
	University	443 (49.94)	396 (44.7)	839 (47.32)
	PhD and Postgrads courses	139 (15.67)	136 (15.35)	275 (15.51)
Work status	Student	422 (47.58)	414 (46.73)	836 (47.15)
	Employed	241 (27.17)	274 (30.93)	515 (29.05)
	Freelance	150 (16.91)	140 (15.8)	290 (16.36)
	Unemployed	64 (7.22)	56 (6.32)	120 (6.77)
	Retired	10 (1.13)	2 (0.23)	12 (0.68)
Sexual intercourse in life	Never	45 (5.07)	54 (6.09)	99 (5.58)
	Yes	842 (94.93)	832 (93.91)	1674 (94.42)
Sexual intercourse in the last 6 months	No	138 (15.56)	110 (12.42)	248 (13.99)
	Yes	749 (84.44)	776 (87.58)	1525 (86.01)

mean square error of approximation (RMSEA). Internal consistency was evaluated through Cronbach's alpha coefficient. Additionally, Composite Reliability (CR) and Average Variance Extracted (AVE) values were examined. Pearson correlations (2-tailed), as well as one-way and two-way Multivariate Analyses of Covariance (MANCOVAs), were employed to investigate associations with sexual desire dimensions and various factors including sociodemographic variables, sexual functioning, gender, and sexual orientation differences. Age, relational status, and the effects of social desirability were controlled by incorporating them as covariates in the MANCOVAs. Principal Component Analysis (PCA), Cronbach's Alpha calculations, Pearson correlations, and MANCOVAs were conducted using IBM SPSS 27.0, while Confirmatory Factor Analysis (CFA) was executed using IBM SPSS Amos 22 (IBM Corp, Armonk, NY, USA).

RESULTS

Participants' mean age was 29.31 ± 10.35 years (range 18–78). Table 1 shows the sociodemographic variables assessed in the total group of participants reached ($n = 1773$) and the two

subgroups randomly extracted to run separately exploratory and confirmatory factorial analyses (Group 1 $n = 887$; and Group 2 $n = 886$).

Principal component analysis

Group 1 was used to test the factorial structure of the SDEF1 with PCAs. PCAs were run on the 43 items of the SDEF1 using a direct oblimin rotation. A Kaiser–Meyer–Olkin value of 0.81 supported the adequacy of the sample. The significance of the Bartlett test of sphericity ($\chi^2 = 10,060.142$; $p < 0.001$) meant that items correlations were large enough to conduct PCAs. Monte Carlo Parallel Analysis identified 6 components accounting for 58.11% of the total variance. Item selection was based on loadings higher than 0.4 on respective factors. A total of 15 items (5, 11, 22, 23, 24, 25, 30, 31, 32, 33, 38, 39, 40, 41, and 42) loaded below 0.4 in all factors or loaded higher than 0.4 in more than one factor. Thus, they were excluded from the following analyses. Table 2 presents retained 28 items' component loadings.

Table 2. Principal component analysis matrix ($n = 887$) – SDEF1 28 item extracted from the 43-pilot tested version.

	Factors extracted					
	F1. Sexual desire	F2. Negative feelings to sexual desire	F3. Autoerotic desire	F4. Regular partner desire	F5. Attractive person desire	F6. Responsive desire
SDEF1_03	0.745					
SDEF1_06	0.739					
SDEF1_01	0.733					
SDEF1_07	0.729					
SDEF1_02	0.722					
SDEF1_08	0.721					
SDEF1_04	0.699					
SDEF1_09	0.625					
SDEF1_10	0.455					
SDEF1_12		0.803				
SDEF1_13		0.789				
SDEF1_18		0.728				
SDEF1_34		0.664				
SDEF1_14		0.586				
SDEF1_26		0.521				
SDEF1_15		0.481				
SDEF1_16			0.867			
SDEF1_17			0.848			
SDEF1_19			0.575			
SDEF1_27				0.737		
SDEF1_25				0.693		
SDEF1_24				0.578		
SDEF1_33					0.831	
SDEF1_35					0.811	
SDEF1_32					0.709	
SDEF1_41						0.755
SDEF1_43						-0.713
SDEF1_42						0.711

Rotation Method: Direct Oblimin.

SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1.

Confirmatory factorial analysis

To validate the 6 factors structure identified with the PCA, a CFA was performed on Group 2 measuring model fit, comparison and parsimony's indices. Maximum Likelihood estimation method was used. To increase model fit, pathways of error variance between items inside the same factor were inserted. In the female group, the χ^2 value for the model was significant ($\chi^2 = 462.79$, $p < 0.001$), RMSEA was 0.039 (90% CI = 0.035–0.043), GFI (0.97), NFI (0.97), and CFI (0.98). In the male group, the χ^2 value for the model was significant ($\chi^2 = 349.87$, $p < 0.001$), RMSEA was 0.04 (90% CI = 0.034–0.046), and other fit indices were GFI (0.96), NFI (0.95), and CFI (0.97). A good fit was reached in all measures except for the χ^2 value due to its sensitivity to large sample. The χ^2 value for the model (Fig. 1) in the total group was significant ($\chi^2 = 721.61$, $p < 0.001$). RMSEA was 0.042 (90% CI = 0.039–0.045). Other fit indices evaluated included GFI (0.97), NFI (0.96), and CFI (0.97). sizes ($n > 200$). Regression coefficients for this model ranged from 0.39 to 0.94 and were all statistically significant ($p < 0.001$).

Internal consistency, convergent and discriminant validity

Based on the total group ($n = 1773$), intercorrelations between the 6 factors were all statistically significant (Table 3) except for F3 with F4. Internal consistency was assessed: Cronbach α coefficients were

satisfactory (F1 = 0.86; F2 = 0.72; F3 = 0.76; F4 = 0.73; F5 = 0.7; F6 = 0.94); the Composite Reliability for each construct was above the expected threshold of 0.70 (F1 = 0.89; F2 = 0.84; F3 = 0.81; F4 = 0.71; F5 = 0.83; F6 = 0.77); the Average Variance Extracted value for each factor was close the expected threshold of 0.50 (F1 = 0.48; F2 = 0.44; F3 = 0.6; F4 = 0.45; F5 = 0.62; F6 = 0.53). Table 3 also reports Pearson's correlations with SDI-2, FSFI and IIEF scores to verify convergent and discriminant validity.

Validity evidence based on the relationship with other variables

Focusing on SDEF1 description, associations with sociodemographic variables were explored. Table 4 reports Pearson's correlations with age, being in a relationship, education level, political and religious attitudes, sexual intercourses, and social desirability. Different dimensions of sexual desire showed to be significantly related to sociodemographic data such as age, relationship status and having children, but also with political and religious attitudes. Due to the importance highlighted in the current results and similar constructs in literature, age, relationship status, and social desirability were considered as covariates in the following analyses aiming to explore differences in sexual desire among genders and sexual orientations.

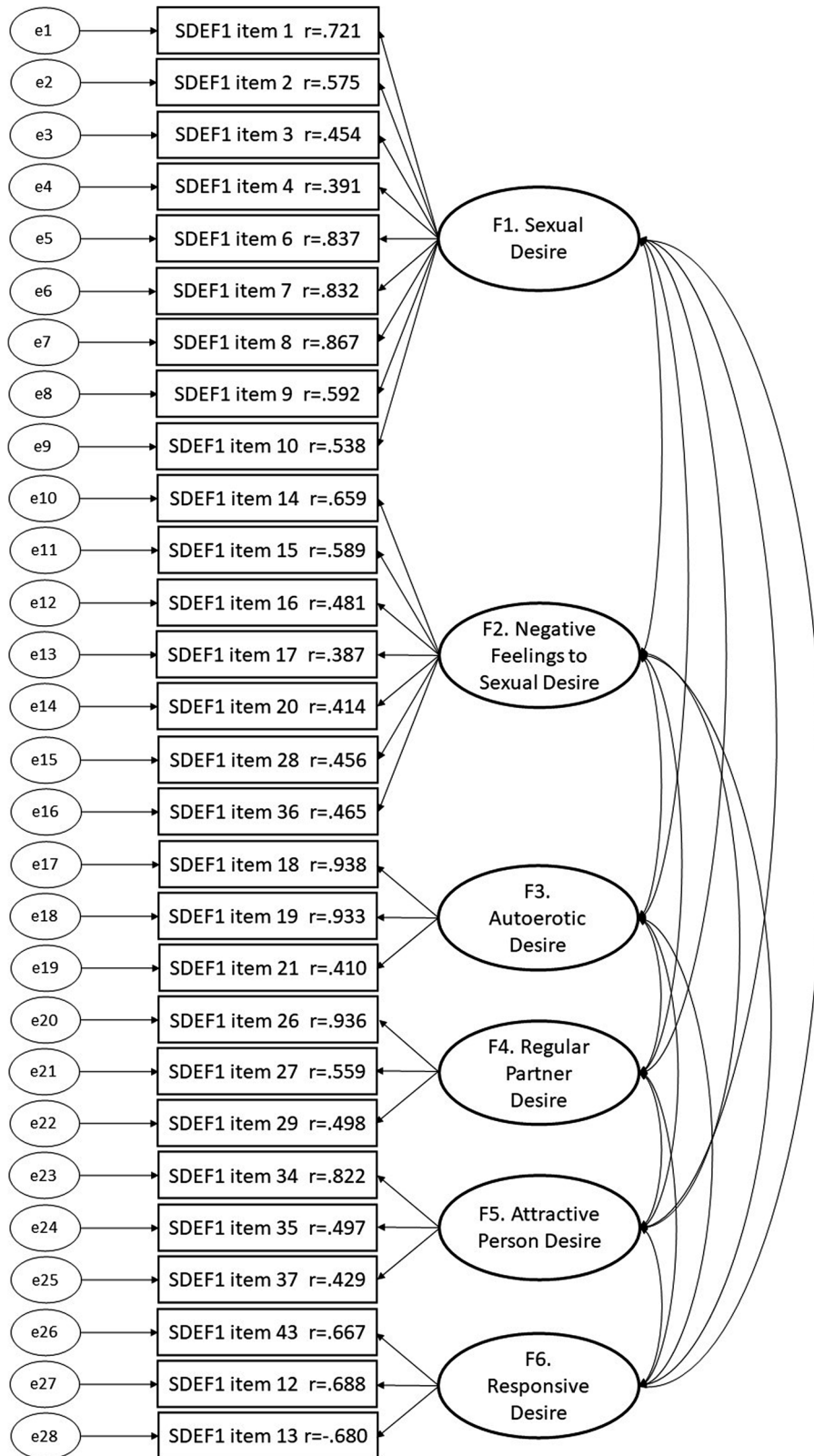


Fig. 1 Path diagram of the confirmatory factorial analysis SDEF1 ($n = 886$). SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1.

Due to the limited number of transgender/gender-nonconforming, asexual, and pansexual participants, authors decided to focus on people declaring themselves as women and men (gender) and heterosexual, bisexual, or homosexual (sexual orientation), resulting in a total subgroup of 1729 participants, to be able to make

comparisons of averages with statistically consistent groups. A two-way MANCOVA with variables of age, being in a relationship and social desirability as covariates was run to explore gender and sexual orientation differences on SDEF1 factors. Gender and sexual orientation were considered as independent variables,

Table 3. Person's correlation matrix between SDEF1 factors, SDI-2, FSFI and IIEF ($n = 1773$).

	SDEF1 F1	SDEF1 F2	SDEF1 F3	SDEF1 F4	SDEF1 F5	SDEF1 F6
SDEF1 - F1. Sexual Desire	1	0.153**	0.366**	0.349**	0.229**	0.398**
SDEF1 - F2. Negative Feelings to Sexual Desire	0.153**	1	0.183**	-0.128**	0.155**	-0.127**
SDEF1 - F3. Autoerotic Desire	0.366**	0.183**	1	-0.023	0.33**	0.103**
SDEF1 - F4. Regular Partner Desire	0.349**	-0.128**	-0.023	1	-0.157**	0.555**
SDEF1 - F5. Attractive Person Desire	0.229**	-0.155**	0.33**	-0.157**	1	0.069*
SDEF1 - F6. Responsive Desire	0.398**	-0.127**	0.103**	0.555**	0.069*	1
SDI-2 - Solitary Desire	0.330**	0.262**	0.854**	-0.058 [†]	0.292**	0.089**
SDI-2 - Dyadic Desire	0.598**	0.186**	0.382**	0.216**	0.408**	0.373**
FSFI - Sexual Desire	0.605**	0.139**	0.348**	0.328**	0.255**	0.447**
FSFI - Arousal	0.394**	-0.04	0.117**	0.559**	-0.037	0.507**
FSFI - Lubrication	0.332**	-0.039	0.093*	0.514**	-0.048	0.452**
FSFI - Orgasm	0.312**	-0.092*	0.093*	0.472**	-0.102*	0.369**
FSFI - Satisfaction	0.308**	-0.151**	-0.022	0.691**	-0.14**	0.535**
FSFI - Pain	0.263**	-0.079*	0.06 [†]	0.527**	-0.051	0.462**
FSFI - Total Score	0.409**	-0.069 [†]	0.113**	0.622**	-0.07 [†]	0.544**
IIEF - Sexual Desire	0.464**	-0.023	0.204**	0.326**	0.235**	0.339**
IIEF - Erectile Function	0.238**	-0.154**	0.006	0.595**	0.039	0.567**
IIEF - Orgasmic Function	0.146**	-0.136**	0.071	0.38**	0.043	0.367**
IIEF - Intercourse Satisfaction	0.229**	-0.182**	-0.007	0.65**	0.019	0.547**
IIEF - General Satisfaction	0.156**	-0.23**	-0.066	0.717**	-0.02	0.534**
IIEF - Total Score	0.261**	-0.181**	0.021	0.657**	0.047	0.588**

SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1, SDI-2 Sexual Desire Inventory – 2, FSFI Female Sexual Function Index, IIEF International Index of Erectile Function, F1 Sexual Desire, F2 Negative Feelings to Sexual Desire, F3 Autoerotic Desire, F4 Regular Partner Desire, F5 Attractive Person Desire, F6 Responsive Desire.

[†] $p < 0.05$; * $p < 0.01$; ** $p < 0.001$.

while SDEF1 dimensions were inserted as dependent ones. Results are reported in Table 5, showing significant results for gender, sexual orientation, and gender X sexual orientation (See Fig. 2).

To explore if SDEF1 dimensions were able to differentiate between clinical scores of FSFI and IIEF, two one-way MANCOVAs with age, being in a relationship and social desirability as covariates were run to highlight sexual functioning differences on SDEF1 factors. Having or not having a clinical score of FSFI for women and IIEF for men were considered as independent variables, while SDEF1 dimensions were put as dependent ones. Only participants who responded to the IIEF and FSFI were included in this analysis (total subgroup of 1455 people). Results are reported in Table 6, showing significantly higher scores in F1, F3 (only for women), F4, and F6 for functional score participants than clinical ones. F2 and F5 presented significantly higher scores in clinical score participants than functional ones. Effect size ranged from small to large (0.004–0.241).

DISCUSSION

The purpose of the present study was to test some psychometric properties of the SDEF1, a self-administered questionnaire to measure sexual desire expressions (see Supplementary Appendix A for the questionnaire). PCAs and Monte Carlo Parallel Analyses were performed confirming the hypothesized 6-factor structure. CFAs corroborated the good fit of SDEF1, and internal consistency showed satisfactory results. The final version included 28 items explaining 58.11% of the variance. Factors highlighted were:

- F1. Sexual Desire (9 items) – A general dimension describing the self-perceived level of sexual desire, exploring specific activities such as kissing, manual/oral stimulations, and penetrative

intercourses. Higher scores indicate a higher level of self-reported sexual desire.

- F2. Negative Feelings to Sexual Desire (7 items) – A general dimension gathering distressing and negative feelings related to sexual desire, attempts to reduce, or control desire and related negative consequences. Higher scores indicate a higher level of distress related to sexual desire.
- F3. Autoerotic Desire (3 items) – A dimension describing desire for and satisfaction with solitary sexual activities such as masturbation. Higher scores indicate a higher level of self-reported autoerotic desire.
- F4. Regular Partner Desire (3 items) – A dimension describing desire for and satisfaction with sexual activities with a regular partner. This dimension includes not only committed relationships with steady partners, but also other durable relationships such as friends-with-benefits. Higher scores indicate a higher level of self-reported sexual desire towards regular partners.
- F5. Attractive Person Desire (3 items) – A dimension describing desire for and satisfaction with sexual activities with an attractive person. It is specified that the attractive person should be someone other than the present regular partner (if any) since F5 is intended to measure desire of a liked stimulus. Higher scores indicate a higher level of self-reported sexual desire towards an attractive person.
- F6. Responsive Desire (3 items) – A dimension describing desire as the receptivity to a partner's sexual approach and seduction. This dimension refers to the concept of "responsive sexual desire" proposed by Basson [19], which occurs when people are willing to engage in sexual activity, although they do not initially feel desire or arousal. With sufficient sexual stimuli and in appropriate contexts, a person can move from neutrality to feelings of arousal and desire. Item 28 is

Table 4. Person's correlation matrix between SDEF1 factors, social desirability (MC-SDS) and sociodemographic variables ($n = 1773$).

	SDEF1 F1	SDEF1 F2	SDEF1 F3	SDEF1 F4	SDEF1 F5	SDEF1 F6
Age	-0.039	-0.072*	0.008	0.027	-0.004	0.057 [†]
Being in a relationship	0.131**	-0.088**	-0.135**	0.643**	-0.320**	0.297**
Having children	-0.034	-0.063*	-0.053 [†]	0.066*	-0.025	0.067*
Education level	-0.014	-0.087**	0.019	0.038	-0.041	0.055 [†]
Political conservativisms (right winged)	0.39	0.007	-0.109**	0.074*	0.042	0.051 [†]
Political involvement	0.057 [†]	0.045	0.193**	-0.032	0.093**	0.012
Religious education	-0.017	0.038	-0.072*	0.001	-0.026	0.006
Religiousness	-0.096**	0.104**	-0.157**	-0.007	-0.065*	-0.06 [†]
Religious involvement	-0.108**	0.065*	-0.187**	-0.032	-0.09**	-0.064*
Sexual intercourse in life	0.220**	-0.064*	0.009	0.292**	0.061 [†]	0.34**
Sexual intercourse in the last 6 months	0.247**	-0.069*	-0.003	0.510**	0.031	0.601**
Social desirability (MC-SDS)	-0.041	-0.193**	-0.112**	0.067*	-0.105**	0.042

SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1, MC-SDS Marlowe–Crowne Social Desirability Scale, F1 Sexual Desire, F2 Negative Feelings to Sexual Desire, F3 Autoerotic Desire, F4 Regular Partner Desire, F5 Attractive Person Desire, F6 Responsive Desire.

[†] $p < 0.05$; * $p < 0.01$; ** $p < 0.001$.

reverse scored. Higher scores indicate a higher level of self-reported responsive desire.

Differentiating among components of desire is useful for both clinical practice and research purposes. Current knowledge underlines a complex view of dyadic and individual sexual desire, and, in clinical practice, it is often evident that desire problems may affect specific areas rather than the whole desire experience (e.g., low sexual desire towards the committed partner, but not towards other possible partners or solitary activities such as porn use) [27, 44]. The presented factorial structure provides a general measure of desire (F1) that is often used in research and clinical practice as expression of sexual desire function [50, 51]. It showed to be consistent with the IIEF/FSFI desire domains adding the assessment of desire for specific sexual activities. In addition, SDEF1 offers a measure of distress and negative emotions related to the experience of sexual desire (F2). This element is not often present in questionnaires and tools available in the literature, but it may highlight the distress for difficulties in the desire area during the clinical screening according to the DSM and the ICD criteria for the Hypoactive Sexual Desire Disorder and the Female Sexual Interest/Arousal Disorders [33, 34] and for those proposed for Hypersexual disorder [52]. In this sense, assessing distress is central for advances in both studies on general and clinical populations.

The thematic domains (F3, F4, F5, and F6) allow to differentiate between specific contexts and objects of desire. The scales F3, F4 and F5 can be associated with the areas investigated by the SDI-2 [4, 16] although correlations in Table 3 seem to suggest that the two questionnaires are not totally superimposable: F3 (SDEF1) and Solitary Desire domain (SDI-2) seems to overlap (measuring the same underlying construct), while the SDI-2 Dyadic Desire does not fully overlap with neither F4 nor F5. A possible explanation is that SDI-2 Dyadic Desire refers to desire towards a generic partner, without expressing the degree/kind of relationship, while the SDEF1 differentiate between regular and attractive partners. This hypothesis could be further supported by the fact that SDI-2 Dyadic Desire showed higher correlations with a general dimension such as F1. The differentiation between desire for a regular partner and an attractive person was made during the development of the measure to explore possible desire patterns related to relational dynamics within primary relationships and desire experience [16]. In this sense, having two separate areas can help to better understand the dyadic and individual

components of sexual desire experience. Furthermore, this differentiation allows to have a more sex-positive tool [38], able to capture various relational and sexual expressions that can be woven in life. This element helps to overcome a significant bias present in most of the tools used so far in literature: the theoretical focus on married and monogamous heterosexual couples, excluding all those sexual and relational identities that move away from this heteronormative and dyadic vision of human sexuality [29–32].

Lastly, F6 is an innovative domain that allows to measure responsive desire, which is yet understudied in literature, but widely observed in clinical practice [26]. Responsive desire seems to be central not only for women, as firstly stated by Basson [19], but also for men, who showed in the present study to report higher scores on responsive desire than women. Moreover, these results may favor a fervent discussion on the circularity of the sexual response in men [5, 8, 24, 50, 51].

Regarding association with sociodemographic variables, older age, being in a relationship, having children, and higher levels of education seem to be protective factors towards negative emotions related to sexual desire. In this sense, it should be recognized that personal experience and the partners' support may improve the coping strategies to face stressful events in sex [53, 54]. People with more conservative political and religious attitudes seem to report a lower level of general (F1) and autoerotic (F3) desire. On the other side, more liberal and less religious participants reported higher F1 and F3 desire scores. These results are in line with Lehmler [55], although these relationships may be influenced by adherence to stereotypes and/or social desirability, which may significantly affect self-reported measures in sexuality research.

In addition, an interesting feature emerged in Table 3: higher levels of desire for an attractive person (outside the primary relationship) appear to be negatively correlated with female sexual function, particularly with orgasm and satisfaction. This element could be related to the value given to relationship and intimacy in sexuality for some women, where the desire for a partner outside the primary relationship could be experienced as a betrayal and a source of distress, causing frustration, and impairing sexual functioning and satisfaction [56]. Once again, we may observe the indication that the role of adherence to sexual stereotypes and social desirability cannot be excluded [55].

Regarding gender, controlling age, relational status, and social desirability's effects, men reported significantly higher levels of

Table 5. Multivariate analysis of covariance (MANCOVA) having gender and sexual orientation as independent variables and SDEF1 factors as dependent ones (n = 1729).

	Women (n = 1088) M ± DS	Men (n = 641) M ± DS	Δ	F _(1,1724)	P	95% CI		Partial Eta ²	
						Lower bound	Upper bound		
SDEF1 - F1. Sexual Desire	22.71 ± 7.65	26.42 ± 8.92	3.71	114.97	<0.001	-5.095	-3.519	0.063	
SDEF1 - F2. Negative Feelings to Sexual Desire	4.92 ± 3.76	6.64 ± 4.54	1.72	75.18	<0.001	-2.159	-1.363	0.042	
SDEF1 - F3. Autoerotic Desire	6.09 ± 3.53	8.68 ± 3.02	2.59	229.14	<0.001	-2.886	-2.224	0.117	
SDEF1 - F4. Regular Partner Desire	6.75 ± 4.12	6.16 ± 4.54	0.59	-	0.42	-0.44	0.212	-	
SDEF1 - F5. Attractive Person Desire	3.62 ± 3.19	5.46 ± 3.19	1.84	111.21	<0.001	-1.915	-1.314	0.061	
SDEF1 - F6. Responsive Desire	9.67 ± 2.59	10.35 ± 2.73	0.68	45.18	<0.001	-1.108	-0.607	0.026	
	Heterosexual (n = 1404) M ± DS	Bisexual (n = 152) M ± DS	Homosexual (n = 173) M ± DS	Post hoc Bonferroni	F _(1,1724)	P	95% CI Lower bound	95% CI Upper bound	Partial Eta ²
SDEF1 - F1. Sexual Desire	23.98 ± 8.29	25.13 ± 7.96	25.5 ± 7.13	He<Ho	4.53	0.011	-3.046	-0.477	0.005
SDEF1 - F2. Negative Feelings to Sexual Desire	5.35 ± 4.06	6.68 ± 4.6	6.36 ± 4.22	He<Bi He<Ho	7.36	0.001	-1.506	-0.223	0.008
SDEF1 - F3. Autoerotic Desire	6.68 ± 3.56	8.54 ± 3.05	8.79 ± 3.22	He<Bi He<Ho	37.69	<0.001	-2.489	-1.396	0.042
SDEF1 - F4. Regular Partner Desire	6.77 ± 4.19	6.14 ± 4.67	5.46 ± 4.33	He>Ho	3.64	0.026	0.175	1.205	0.004
SDEF1 - F5. Attractive Person Desire	4.15 ± 3.35	5.07 ± 2.89	5.05 ± 3.04	He<Bi He<Ho	5.93	0.003	-1.095	-0.117	0.007
SDEF1 - F6. Responsive Desire	10 ± 2.59	9.39 ± 2.95	10.16 ± 2.68	He>Bi Ho>Bi	4.14	0.016	-1.351	-0.248	0.005
	Gender	Sexual orientation	M	SD	F _(1,1724)	P			Partial Eta ²
SDEF1 - F1. Sexual Desire	Women	Heterosexual	22.35	0.26	3.96	0.019			0.005
	Men	Bisexual	25.03	0.73					
SDEF1 - F2. Negative Feelings to Sexual Desire	Women	Heterosexual	4.76	0.13	-	0.490			-
	Men	Bisexual	5.93	0.37					
SDEF1 - F3. Autoerotic Desire	Women	Heterosexual	5.82	0.11	6.08	0.002			0.007
	Men	Bisexual	8.29	0.3					
SDEF1 - F4. Regular Partner Desire	Women	Heterosexual	6.59	0.11	-	0.861			-
	Men	Bisexual	6.43	0.3					
SDEF1 - F5. Attractive Person Desire	Women	Heterosexual	5.97	0.47	-	-			-
	Men	Bisexual	5.97	0.47					
SDEF1 - F6. Responsive Desire	Women	Heterosexual	6.84	0.15	-	-			-
	Men	Bisexual	6.84	0.15					

Table 5. continued

	Gender	Sexual orientation	M	SD	F _(1,1724)	p	Partial Eta ²
SDEF1 - F5. Attractive Person Desire	Bisexual	Heterosexual	6.4	0.56	4.75	0.009	0.005
	Homosexual	Homosexual	6	0.29			
	Women	Heterosexual	3.6	0.1			
	Men	Bisexual	4.89	0.28			
		Homosexual	3.22	0.43			
		Heterosexual	5.33	0.14			
SDEF1 - F6. Responsive Desire	Bisexual	Heterosexual	4.91	0.52	-	0.081	-
	Homosexual	Homosexual	5.47	0.27			
	Women	Heterosexual	9.66	0.08			
	Men	Bisexual	9.52	0.23			
		Homosexual	9.91	0.36			
		Heterosexual	10.59	0.11			
	Bisexual	9.37	0.43				
	Homosexual	10.46	0.23				

Age, Relational Status, and Social Desirability were put as covariates
 SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1, CI Confidence Interval.

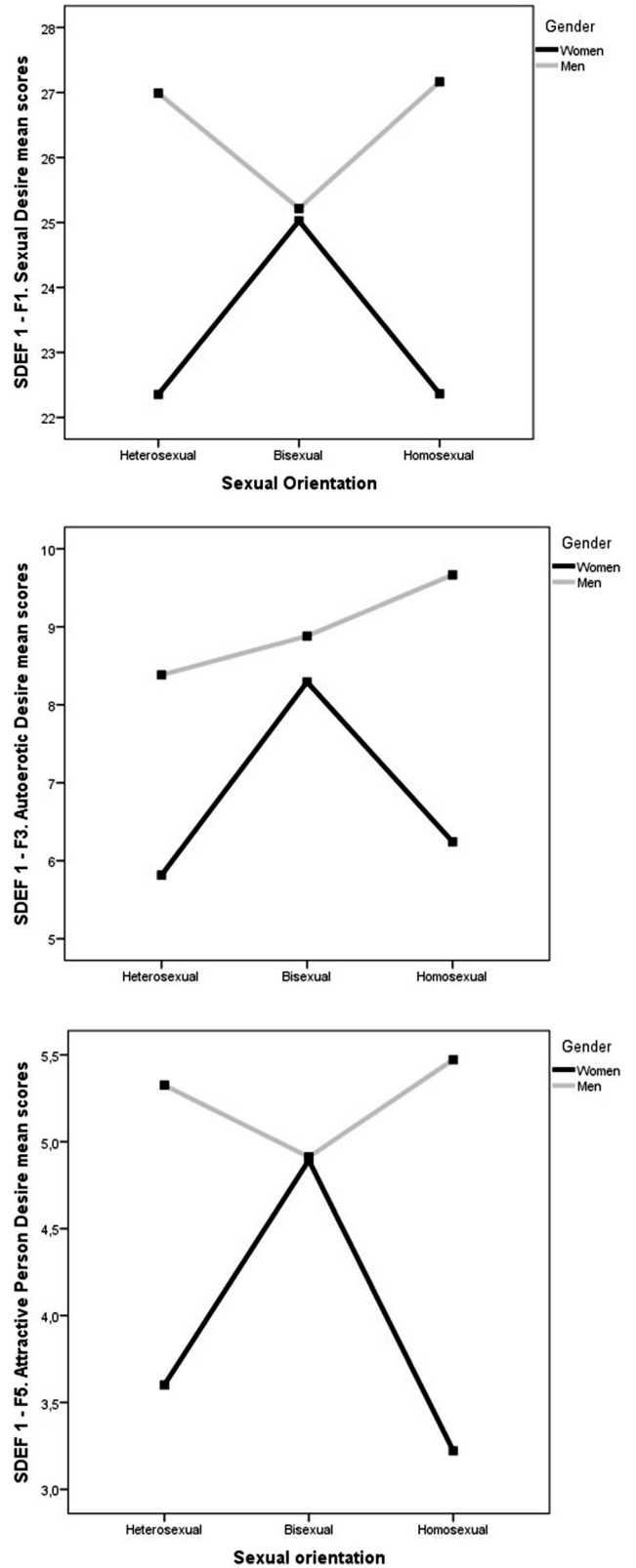


Fig. 2 Diagrams of gender and sexual orientation on SDEF1 factors (multivariate analysis of covariance) (n = 1729). SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1.

Table 6. Multivariate analysis of covariance (MANCOVA) having FSFI and IIEF Clinical scores as independent variables and SDEF1 factors as dependent ones (*n* = 1455).

Women	FSFI Functional Score (<i>n</i> = 647)		Δ	F _(1,1083)	P	95% CI		Partial Eta ²
	M ± DS	M ± DS				Lower bound	Upper bound	
SDEF1 - F1. Sexual Desire	25.12 ± 6.61	19.52 ± 7.5	5.6	143.9	<0.001	-6.477	-4.656	0.117
SDEF1 - F2. Negative Feelings to Sexual Desire	4.62 ± 3.53	5.37 ± 4.03	0.75	4.76	0.029	0.054	1.01	0.004
SDEF1 - F3. Autoerotic Desire	6.39 ± 3.35	5.63 ± 3.7	0.76	34.14	<0.001	-1.798	-0.894	0.031
SDEF1 - F4. Regular Partner Desire	8.8 ± 3.05	3.89 ± 3.64	4.91	326.36	<0.001	-3.72	-2.99	0.232
SDEF1 - F5. Attractive Person Desire	3.43 ± 3.29	3.93 ± 2.96	0.5	8.61	0.003	-0.955	-0.19	0.008
SDEF1 - F6. Responsive Desire	10.85 ± 1.81	8.05 ± 2.58	2.8	343.67	<0.001	-2.97	-2.4	0.241
Men	IIEF Functional Score (<i>n</i> = 430)		Δ	F _(1,636)	P	95% CI		Partial Eta ²
	M ± DS	M ± DS				Lower bound	Upper bound	
SDEF1 - F1. Sexual Desire	27.97 ± 8.16	24.64 ± 9.06	3.33	16.05	<0.001	1.556	4.547	0.025
SDEF1 - F2. Negative Feelings to Sexual Desire	6.01 ± 4.13	7.58 ± 4.91	1.57	16.03	<0.001	-2.334	-0.798	0.025
SDEF1 - F3. Autoerotic Desire	8.65 ± 3.13	8.77 ± 2.84	0.12	-	0.488	-0.333	0.697	-
SDEF1 - F4. Regular Partner Desire	8.16 ± 3.79	3.45 ± 4.02	4.71	77.23	<0.001	1.954	3.079	0.108
SDEF1 - F5. Attractive Person Desire	5.45 ± 3.47	5.55 ± 2.72	0.1	6.94	0.009	0.183	1.256	0.011
SDEF1 - F6. Responsive Desire	11.49 ± 1.67	8.84 ± 3.1	2.65	109.87	<0.001	1.773	2.59	0.147

Age, Relational Status, and Social Desirability were put as covariates.

CI Confidence Interval, SDEF1 Sexual Desire and Erotic Fantasies Questionnaire – Part 1, FSFI Female Sexual Function Index, IIEF International Index of Erectile Function.

desire than women in all areas except for desire for a regular partner (F4). Desire for autoerotic activity (F3) was the factor most able to differentiate among genders, accounting a variance explained of 11.7%, in line with previous data present in literature [3]. Trying to give a broader biopsychosocial reading of these differences, we could assert that gender differences can partially be attributed to the role of biological factors such as hormonal levels [14], without limiting to them. A more complex and sex-positive understanding should necessarily take into consideration the role of many factors such as the constitution of male and female identity, stereotypes and gender roles and the resulting social and relational expectations, which direct women and men towards a different expression of sexuality (and in this case, in reporting different levels of desire to answers in a self-report) [3].

Considering sexual orientation, heterosexual women and men seem to report significantly lower scores on sexual desire in various domains than bisexual and homosexual women and men, especially for autoerotic desire. An exception is represented by the desire for a regular partner, in which the heterosexual group scores significantly higher than the homosexual one. At this stage, it is important to clarify that it is not possible to justify these differences based only on sexual orientation. Sexual scripts related to relationships and sexuality should also be taken into consideration. For example, non-heterosexual people usually face a broader discussion of sexual identities and relationships where monogamy is not given as the only valid form of relationship [41, 42]. Moreover, the role played by minority stress [57] and the use of sexual behavior as a strategy to cope with its negative effects could be hypothesized as a factor influencing level of sexual desire in lesbian, gay and bisexual people and should be further investigated in future studies. Intersecting gender and sexual orientation, bisexual women reported higher levels of sexual desire in general, for masturbation and towards an attractive person than other women, while bisexual men showed lower levels of sexual desire in general and towards an attractive person than other men. These results are in line with studies on bisexuality [58, 59] depicting a specific pattern of desire and arousal for bisexual women and men that differentiates them from their heterosexual and lesbian and gay counterparts.

Another important element to discuss is that the SDEF1 seems to be able to differentiate between women and men with and without sexual dysfunctions/problems. Table 6 shows how groups of women and men, respectively differentiated by FSFI and IIEF clinical cut off scores [10, 11], were significantly different in all the areas investigated by the SDEF1, with the clinical population reporting lower levels of sexual desire and higher level of distress/negative emotions. An exception is represented by the desire for autoerotic activity in the male group, in which no significant difference emerges between clinical and functional score groups. These results could be explained by the fact that the IIEF (like the FSFI) evaluates penetrative intercourses with a committed partner rather than other possible sexual activities, and masturbatory activity in men is often preserved in case of sexual difficulties. Another exception is represented by the desire for an attractive person, in which the clinical group scored higher than the functional one, suggesting the idea that in the presence of sexual difficulties, the desire outside the regular relationship may increase as a sort of compensation or distraction from the sexual problem [60, 61]. Therefore, the SDEF1 represents a suggested measure to assess and give directions to clinicians for sexual desire difficulties. For example, the SDEF1 could be used in the assessment phase for difficulties related to sexual desire. The clinician can use each item or each factor to delve deeper with the user into their experience with sexual desire, helping them in the process of disclosing this issue. Furthermore, the effectiveness of SDEF1 as a tool for evaluating the outcome of therapy targeting difficulties in this area should be studied in the future. Sexual

therapists should be able to discuss specific expressions of sexual desire and educate their patients to acknowledge the motivational role that sexual desire may have for sexual response, relational intimacy, and satisfaction [27].

The present research has many limitations that should be discussed. (i) Participants were selected with a “snowball” technique; therefore, it is impossible to generalize the results to the Italian population despite the large number of participants involved in the present study. In fact, the results could be more predictive of a portion of the population, younger and with a higher socio-educational level. (ii) SDEF1 was created as a tool that measures the individual perception of sexual desire. In this sense, the responses can be easily falsified by respondents. Therefore, any assertion on people’s real desire must be done with extreme caution. To limit this bias, the study used a large group of participants, and a social desirability measure was considered in the group comparisons. (iii) Test-retest reliability was not assessed in this study. For that reason, further studies should be conducted to replicate the present findings and extend the psychometric understanding of the SDEF1. (iv) Invariance of the measure should be further explored in dedicated studies to confirm that gender, sexual orientation, and other differences based on population characteristics are centered on group differences rather than measurement biases. Thus, group comparison should be interpreted with caution. In this sense, future studies should consider extending the evaluation of sexual desire to different sexual identities and orientations, behind binarism as was done in a group of participants identified in the ACE spectrum [62]. (v) It should be specified again that although the IIEF has been widely used in Italian studies, at our knowledge an Italian validation study has not been published yet. Thus, also IIEF results reported here should be interpreted with caution.

A separate consideration deserves the fact that recruitment of this study took place at the height of the COVID-19 lockdown in Italy. We know that the COVID-19 and the related distance measures adopted have created a biopsychosocial change never seen before in anyone’s life, also influencing the sexual experience [63]. In the specifics of the current study, the type of analyses performed are based on covariance, assessing the content of the items, their internal consistency with respect to the factors identified, as well as associations with other factors. These types of associations are little affected by possible changes in sexual experiences during the COVID-19 lockdown, which may have further influenced other types of analyses based on differences between averages. In any case, further in-depth studies are suggested, such as multicultural studies on the SDEF1 psychometric properties and, more in general, on sexual desire to explore differences and similarities between countries and culture.

CONCLUSIONS

Sexual desire remains a complex and largely unknown area of investigation, but studies like the current one may help to take a small step forward. Specifically, the present study extends the current knowledge about specific areas of sexual desire and their connections with sexual functioning among genders and sexual orientations. Collectively, the results and analyses of this study indicate that SDEF1 is a measurement that is valid and reliable, also comparatively with other common questionnaires used in the literature. For this purpose, our results validate the idea that the SDEF1 is a useful measure to assess different areas of sexual desire, and its use is recommended for clinical and research purposes.

DATA AVAILABILITY

Data are available on request to the corresponding author.

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AUTHOR CONTRIBUTIONS

Conceptualization, FMN, EAJ, CS, and, RT; methodology, FMN; software, FMN; validation, EAJ, CS, and RT; formal analysis, FMN; investigation, FMN, RG, GC, and ABZ; resources, RG, GC, and ABZ; data curation, RG, GC, and ABZ; writing—original draft preparation, FMN; writing—review and editing, RG, GC, and ABZ; visualization, FMN; supervision, EAJ, CS, and RT. All authors have read and agreed to the published version of the manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethics Committee of the Dept. of Dynamic and Clinical Psychology and Health Studies, Sapienza University of Rome. (protocol code n.14 approved on January 9th, 2019). Informed consent was obtained from all subjects involved in the study.

ADDITIONAL INFORMATION

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