

**Sociosexuality in Brazil: Validation of the SOI-R and its Correlates with Personality,  
Self-perceived Mate Value, and Ideal Partner Preferences**

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**Abstract.** Sociosexuality describes the willingness to engage in sexual activities outside of committed relationships. Across two studies, we tested the factorial structure and reliability of the Revised Sociosexual Orientation Inventory (SOI-R) in Brazil. Study 1 explored the factor structure of the instrument within a sample of 178 individuals from the general population, supporting the proposed three-factorial structure of the SOI-R and showing good internal consistencies. Study 2 corroborated the three-factorial structure through a Confirmatory Factor Analysis (ML) within a sample composed of 225 undergraduate students. Correlations between the SOI-R and other psychological variables (e.g. dark triad, mate value) replicated and extended previous studies from other countries. For example, among men, psychopathy and Machiavellianism correlated with the behavioral component of the SOI-R. Multi-group CFA indicated that the SOI-R is mainly invariant across gender. Thus, overall, our results demonstrate that the SOI-R is psychometrically suitable to evaluate sociosexuality in Brazil. The current studies show that the SOI-R is also reliable and valid in a non-Western country, providing further support for its theoretically driven three-factor structure across human cultures.

Keywords: Sociosexuality; sexual behaviour; measure; validity; reliability.

## **1. Introduction**

Sexual interactions between individuals without any prospect of a long-term commitment are common, especially among adolescents and young adults (Fielder & Carey, 2010). Despite the frequency and potentially positive experiences associated with short-term sexual activities, such as sexual and emotional satisfaction (Mark, Garcia, & Fisher, 2015), casual sex poses several risks to individuals, such as the possibility of acquiring infectious diseases (e.g., HIV/AIDS), unwanted pregnancy, or even loss of spousal commitment in the case of infidelity (Barber, 2008; Schmitt, 2005).

Individual differences in the willingness to engage in uncommitted sexual relationships were termed *sociosexuality* by Kinsey, Pomeroy and Martin (1948) in a pioneer study on human normative sexuality. It was shown that promiscuity is a frequent phenomenon among humans. A large amount of subsequent research in this area was facilitated through the creation of the Sociosexual Orientation Inventory (SOI) that measures sociosexuality (Simpson & Gangstead, 1991). This instrument has been widely applied, demonstrating the SOI's role as a valuable tool to evaluate sociosexuality (Penke, 2011) and contributing to the study of preferences for short-term versus long-term mating, becoming the standard operationalization of individual differences in this domain (Penke & Asendorpf, 2008).

Notwithstanding the popularity of this instrument and its application to the study of human sexuality, some authors have questioned its psychometric adequacy, especially its unidimensionality, arguing that sociosexuality encompasses multiple components (attitude, behaviour, and desire; Asendorpf & Penke, 2005; Jackson & Kirkpatrick, 2007; Voraeck, 2005; Webster & Bryan, 2007). Further issues of the SOI are low internal consistency, open response items (e.g. *how many times have you had sex in the past month?*) which can lead to overrated responses, incoherent results because of multiple alternative scoring methods, and the fact that one item (“how often they fantasize about having sex with someone other than their current [or most recent] romantic partner”) is inappropriate for singles (Penke, 2011). To address the issues around the SOI, Penke and Asendorpf (2008) created a revised version of this questionnaire and tested whether data supports a theoretically coherent multidimensional structure of sociosexuality.

### **1.1. The SOI – Revised version**

The SOI – R assesses three dimensions of sociosexuality (behaviour, attitudes, and desire) with three items each. The behavioural component measures past sociosexual

behaviour by asking how available resources such as time, effort, and money were invested in short-term relationships versus long-term relationships. This facet is also useful because an individual's past sociosexual behaviour might predict future behaviour (Roff, 1992). The attitudinal facet refers to a cognitive-affective evaluation of uncommitted sexual behaviour, reflecting the extent in which one requires emotional closeness prior to a sexual intercourse and the moral feelings associated with promiscuity (Simpson, Wilson, & Winterheld, 2004). Sociosexual desire measures sexual arousal and sexual fantasies, which are characterized by a motivational state of sexual interest (Simpson & Gangestad, 1991).

The three psychological components of the SOI-R offer a broader understanding of the global sociosexual orientation (Penke & Asendorpf, 2008). Although Jackson and Kirkpatrick (2007) proposed a three-dimensional factor structure before Penke and Asendorpf, the model of the latter authors is derived from a theoretically coherent approach. To represent each of these dimensions, in the SOI-R, Penke and Asendorpf (2008) retained four items of the original instrument, from which two are designed to measure behaviour (1. *With how many different partners have you had sex within the past 12 months?* 2. *With how many different partners have you had sexual intercourse on one and only one occasion?*), whereas the other two evaluate attitudes (4. *Sex without love is OK.*; 5. *I can imagine myself being comfortable and enjoying "casual" sex with different partners.*). The third item of the behavioural dimension assesses the number of one's sexual partners in the past year in the absence of any emotional involvement or a long-term relationship prospect. A third item of the attitudinal dimension, which replaced an ambiguous item of the original scale, assesses the need of a long-term relationship prospect before consenting to sex. To assess desire, based on previous literature, three items were created, because this dimension was not well represented in the original version of the SOI (Simpson & Gangestad, 1991). The items assess with which frequency an individual experiences sexual arousal or spontaneous sexual

fantasies in everyday life in the presence of people with whom no committed relationship exists (Penke & Asendorpf, 2008).

For the development and validation of the SOI-R, Penke and Asendorpf (2008) used a large sample of German speaking internet users. They confirmed the adequacy of the expected three-factor structure through a confirmatory factor analysis (CFI = .98, NFI = .98, SRMR = .03). The three-factor structure was found to better fit the data than a one-factor [ $\Delta\chi^2(3) = 2,119.32, p < .001$ ] or a two-factor structure [ $\Delta\chi^2(2) = 1,620.47, p < .001$ ]. In addition, each of the dimensions showed good internal consistency ( $\alpha_{\text{behavioural}} = .83$ ;  $\alpha_{\text{attitudinal}} = .83$ ;  $\alpha_{\text{desire}} = .85$ ), as did the total scale ( $\alpha = .83$ ). The total scale demonstrated over 12 months a test-retest reliability of .80 (Pearson's  $r$ ) and the three dimensions of .85, .76, and .83 for the behavioural, attitudinal, and desire components, respectively. In comparison to the original version of the SOI ( $\alpha = .75$ ; test-retest reliability = .76), the revised instrument also presented better indicators of internal consistency and test-retest reliability.

The SOI-Rs has been judged to be an important instrument, as indicated by a high citation rate (507 citations in Google Scholar on October 30, 2017) and has been adapted to distinct cultural contexts. For example, in Hungary, Mesko, Lang, and Kocsor (2014) found support for the three-factor model (TLI = .96; CFI = .97; RMSEA = .07), and a good internal consistency ( $\alpha = .80$ ). In Portugal, Neto (2016) also confirmed the three-factor structure and found evidence for the reliability of the full scale ( $\alpha = .80$ ). More recently, the three-factor structure (RMSEA  $\leq .045$ , TLI  $\geq .983$ , CFI  $\geq .994$ ) was also confirmed within a Spanish sample, with good to very good internal consistencies ( $\alpha_{\text{Behaviour}} = .93$ ,  $\alpha_{\text{Attitude}} = .82$ , and  $\alpha_{\text{Desire}} = .84$ ; Barrada, Castro, Correa, & Ruiz-Gomez, 2017).

Together, the SOI-R enables a multidimensional approach to human sociosexuality, which allows the measurement of overall sociosexuality as well as three theoretically meaningful dimensions: behaviour, attitudes and desire. Compared to the SOI, the SOI-R

shows better psychometric indices, is also appropriate for singles, and is a brief measure composed of only nine items. These advantages of the SOI-R have lead researchers to use this instrument to evaluate sociosexual orientation and estimate its correlations with other constructs.

Taken together, the three factors of the SOI-R identify two distinct sociosexual orientation profiles: *unrestricted* versus *restricted sociosexual orientation*. Low global scores reflect a “restricted” sociosexual orientation, describing individuals that require emotional involvement before engaging in sexual intercourse. Higher scores reveal an “unrestricted” sociosexual orientation, describing individuals who are prone to engage in casual sex without any commitment prospects.

Sociosexuality has been found to be correlated with various other variables. For example, more sexually unrestricted individuals are more likely to commit infidelity (Barta & Kiene, 2005), to be males (Barrada et al., 2017; Schmitt, 2005; Sevi, Aral, & Eskenazi, 2017), have a higher self-perceived mate value (Penk & Asendorf, 2008), score higher on the dark traits (psychopathy, narcissism, and Machiavellianism; Jonason & Webster, 2010), attribute more importance to physical attractiveness (Simpson & Gangstead, 2003), engage more frequently in sexual risk behaviours, and are also more likely to acquire sexually infectious diseases (Seal & Agostinelli, 1994). An unrestricted sociosexual profile is also positively associated with extroversion and negatively with agreeableness and conscientiousness (Schmitt & Shackelford, 2008). In turn, a restricted profile is more associated with commitment (Hackathorn & Brantley, 2014), perception of faithfulness (Delece, Polheber, & Matchock, 2014), lower likelihood of cheating (Mattingly, Clark, Weidler, Bullock, Hackathorn, & Blankmeyer, 2011), and lower sex drive (Ostovich & Sabini, 2004). In addition, sexually restricted individuals give more importance to attributes

that demonstrate good parenting abilities when selecting a partner (Simpson & Gangstead, 2003).

Although the SOI-R holds international popularity and the literature has reported an increasing number of studies regarding sociosexuality, little scientific attention has been given to sociosexual orientation in Brazil. Measuring sociosexuality in Brazil seems to be especially important because negative outcomes of unsafe sexual behaviours are highly prevalent in this country. For example, in 2011, 38,776 cases of AIDS were reported (Brazil, 2012). Also, a study including 23,894 mothers revealed that 55.4% had an unintended pregnancy (Theme-Filha, 2016).

A potential explanation for the small number of studies focusing on sociosexuality in Brazil may lie in the lack of robust psychometric evidence for the SOI-R in this context. Although some studies have used the SOI-R to measure sociosexuality in Brazil (e.g. Smith, 2005; Shiramizu, Natividade, & Lopes, 2013), no research was found which assessed and evaluated the factor structure in Brazil. As mentioned before, a Portuguese version of the SOI-R is available, however due to some specific particularities of Brazilian Portuguese and certain cultural differences, especially regarding sexual behaviour between both countries (Schmitt, 2005), efforts to adapt this instrument specifically to Brazil are required. We therefore aim in this article to examine the reliability and validity of the SOI-R in Brazil.

The current study is important for several reasons. First, given the high prevalence of casual sex among Brazilians, valid instruments to evaluate this behaviour are important. Second, studies validating measuring instruments of sociosexuality and exploring its correlates outside Western countries are rare. Studies in Western cultures may not be representative of all human populations and so generalising the conclusions based on these countries to other cultures may be problematic (Henrich, Heine, & Norenzayan, 2010). In the particular case of the SOI-R, assuming that the structure found in other countries is suitable

for Brazil can lead to a bias in the assessment of sociosexuality in this country. We therefore aimed to validate the SOI-R in a non-Western country and also test whether the correlates and predictors of sociosexuality are similar to those found in Western countries. As Penke and Asendorpf (2008) proposed, sociosexuality may be better understood as multidimensional (attitude, behaviour, and desire), which has been corroborated in other cross-cultural studies (Barrada et al., 2017, Neto, 2016), we then expect to replicate the same three-factor structure in Brazil.

Additionally, because men and women report different levels of sociosexuality (Barrada et al., 2017; Sevi et al., 2017) and it is still more socially acceptable for men than women to admit involvement in casual relationships in Brazil, we went beyond previous studies and tested whether the SOI-R is invariant across gender. If the scale is not invariant, men and women cannot be meaningfully compared because they might understand items differently (e.g., Chen, 2008; Davidov, Meuleman, Cieciuch, Schmidt, & Billiet, 2014). Finally, to assess convergent validity, we correlated sociosexuality with personality traits (Big-5 and dark triad), mate value, and ideal partner preferences. This is important because it allows us to gain a better understanding of the predictors of sociosexuality in Brazil. Specifically, based on the literature cited above, we expected extroversion to be positively correlated with sociosexuality, whereas agreeableness and conscientiousness will do it negatively. We also predicted that sociosexuality would be positively correlated with the dark traits and with mate value and that individuals high in sociosexuality will attribute more importance to physical attractiveness in a potential partner.

## **2. Study 1. Exploring the factor structure of the SOI-R in Brazil**



This study tested the factor structure of the SOI-R (Penke & Asendorpf, 2008) in Brazil by conducting an Exploratory Factor Analysis to provide evidence for the SOI-R's internal structure and reliability.

## **2.1. Method**

### *2.1.1. Participants and procedure*

We aimed to recruit at least 100 participants, because this sample size was recommended by Crocker and Algina (1986) for exploratory factor analysis. Participants were 178 individuals from the general population with an age range from 17 to 49 years ( $M = 26.2$ ;  $SD = 6.38$ ; 83.4% women), who took part in the study voluntarily. Before participants started to complete the online survey, they were informed that their responses would be treated anonymously and confidentially, and gave their consent by clicking a button.

### *2.1.2. Materials*

Participants answered demographics questions (e.g., age, sex) and the Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008). The SOI-R is a nine-item questionnaire that assesses three components of the sociosexuality: Behaviour (e.g., *With how many different partners have you had sex within the past 12 months?*), attitudes (e.g., *Sex without love is OK*), and desire (e.g., *How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?*). For the behavioural items, participants responded on a 9-point scale ranging from 1 (zero partner) to 9 (20 partners or more). Participants responded to the attitudinal dimension on a 9-point scale, ranging from 1 (strongly disagree) to 9 (strongly agree). The three items of the desire dimension were also answered on a 9-point scale, ranging from 1 (never) to 9 (at least once a day). All nine items are aggregated to form a total score of global sociosexual orientation.

### 2.1.3. Data analysis

Data were analysed with the statistical program R (R Development Core Team, 2017). First, using the Kayser-Meyer-Olkin (KMO) criterion and the Bartlett Sphericity Test ( $\chi^2$ ), we tested whether it is adequate to conduct a Principal Component Analysis (PCA), which was then used to identify the factor structure of the instrument. Finally, internal consistencies were computed. Components extraction was determined considering four different criteria: Kayser, (eigenvalue-greater-than-one rule) Cattell (distributions of eigenvalues), Horn (parallel analysis) (Courtney & Gordon, 2013), Optimal Coordinates, and Acceleration Factor. The last two are non-graphical alternatives for Cattell's scree test. The Optimal Coordinates approach compares estimates with observed eigenvalues, defining the number of components to extract when the last observed eigenvalue is greater than or equal to the estimated eigenvalue. In turn, the Acceleration Factor estimates the number of factors to retain by identifying the point at which the gradient of the curve has an abrupt and meaningful change (Raiche, Walls, Magis, Riopel, & Blais, 2013).

## 2.2. Results

First, the suitability of the data for principal component analysis was confirmed by satisfactory pertinent indicators [KMO = .79 and Bartlett's Test of Sphericity,  $\chi^2(36) = 928.28$ ,  $p < .001$ ]. Kayser, Cattell, Horn, and Optimal Coordinates criteria supported the adequacy of the expected three-factor structure, whereas the Acceleration Factor criteria suggested a one-factor structure. Although this last criterion seems to outperform Kayser and Cattell criteria (Raiche et al., 2013), it tends to underestimate the number of factors. Because Horn and Optimal Coordinates criteria seem to be more robust criteria in comparison to the other three (Courtney & Gordon, 2013), and both agreed on the extraction of three factors, a three-component solution seemed more suitable. Based on these findings and on the theoretical model that sustains this measure, we conducted a PCA to test the factor structure

of the SOI-R, fixing the extraction to three factors (promax rotation; varimax rotation led to similar findings). The results are summarized in Table 1.

[Insert Table 1 here]

As can be seen in Table 1, the three components explain together 78.22% of the variance with all the items of each component presenting factor loading above .60. The overall internal consistency of the scale was good ( $\alpha = .84$ ). The first factor, the behavioural component of sociosexuality, explained 13.04% of the variance, with factor loadings ranging from .63 to .94, and an eigenvalue of 1.17 ( $\alpha = .89$ ). The second factor, the attitudinal component, explained 18.31% of the variance, with factor loadings between .87 and .89, and an eigenvalue of 1.64 ( $\alpha = .85$ ). Finally, the desire component explained 46.9% of the variance, with factor loadings between .88 and .92, and an eigenvalue of 4.21 ( $\alpha = .79$ ).

The results support a three-factor structure of the SOI-R in Brazil. However, most participants were women, which might have affected the findings, because on average women score lower on sociosexuality than men (Barrada et al., 2017; Schmitt, 2005; Sevi, Aral, & Eskenazi, 2017). We investigated this possibility in Study 2, by testing whether the SOI-R is invariant across gender. Additionally, we aimed to provide further evidence of the SOI-R's psychometric suitability and validity to Brazilians.

### **3. Study 2. Confirmatory factor analysis and factorial invariance of the SOI-R**

This study sought to confirm the three-factor structure found in Study 1, using an independent sample, and to test if such a factor structure is invariant across gender. Specifically, we conducted a confirmatory factor analysis (CFA) and multi-group CFA to corroborate the structure found in the previous study and to test for measurement invariance, respectively. As indicated above, testing for measurement invariance is important because

otherwise it would not be clear if participants from both gender respond to the items in the same way (Chen, 2008; Davidov et al., 2014; Vandenberg & Lance, 2000). Importantly, this issue cannot be addressed by performing a CFA or computing the internal consistency for each group, because measurement invariance also tests whether the items have the same intercept and loadings across groups.

Additionally, we tested whether the SOI-R correlates positively with the dark triad, XX, and XX. With this, we aimed to replicate and extend previous research found in Western countries (cf Henrich et al., 2010).

### **3.1.Method**

#### *3.1.1. Participants and procedure*

Two hundred and twenty-five Brazilian undergraduate students with an age range from 18 to 45 years ( $M_{\text{age}} = 21.8$ ;  $SD = 4.79$ , 58.2% women), mostly single (76.9%), and from the middle-class (44.9%), took part in this study. Prior to taking part in the study, participants were informed about the procedures involved in the study and the anonymity of their answers, formalizing their participation by signing an informed consent form.

#### *3.1.2. Materials*

*SOI-R* (Penke & Asendorf, 2008). We applied the same instruments described in Study 1 to measure sociosexuality.

The *Self-Perceived Mating Success Scale* (Landold, Lalumiere, & Quinsey, 1995) was used to evaluate mate value through eight items (e.g., “Members of the opposite sex notice me”; “Members of the opposite sex are attracted to me”) answered in a seven-point scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). The items were averaged into an index of mate value ( $\alpha=.84$ ).

The Big-5 personality factors were measured with the *Ten-Item Personality Inventory* (TIPI; Gosling, Rentfrow, & Swann, 2003). The TIPI measures extraversion (e.g., Extraverted,

enthusiastic), agreeableness (e.g., Critical, quarrelsome), conscientiousness (e.g. Dependable, self-disciplined), emotional stability (e.g. Anxious, easily upset), and openness to experience (e.g. Open to new experiences, complex), using a 7-point scale, ranging from 1 (Disagree strongly) to 7 (Agree strongly).

The dark triad of personality was assessed with *The Dirty Dozen* (Jonason & Webster, 2010). This scale comprises 12 items evaluating narcissism (e.g., “I tend to want others to admire me”; “I tend to seek prestige or status”), psychopathy (e.g., “I tend to be cynical”; “I tend to lack remorse”) and Machiavellianism (e.g. “I have used flattery to get my way”; “I have used deceit or lied to get my way”), using a five-point response scale (1= Strongly disagree; 5 = Strongly agree). Cronbach’s alpha varied between .65 and .82.

Finally, we evaluated ideal partner preferences using the *Attributes of Ideal Partner Scale* (Gouveia, Gonçalves, Gomes, Freires, & Coelho, 2014). This scale is composed of 20 items, which describe attributes that may be desirable in a romantic partner (e.g., beautiful, powerful, and responsible). Participants rate the importance of each attribute for a potential partner using a 5-point response scale (1= Not important at all; 5 = Totally important). The items cluster in five broad categories: athletic, traditional, hardworking, sociable, and affectionate. Cronbach’s alpha ranged from .65 to .81.

### 3.1.3. *Data analysis*

Data analyses were performed with the software packages SPSS, AMOS and R (R Development Core Team, 2017). SPSS was used to compute descriptive statistics and Cronbach’s alpha, whilst AMOS was used for CFA with Maximum Likelihood estimation. To evaluate the model fit, the following adjustment indices were used: GFI, values above .90 are recommended; CFI, values near or higher than .90 are acceptable; TLI, values close to

1.00 are recommended; and RMSEA, values between .05 and .08 are considered satisfactory (Byrne, 2010; Tabachnick & Fidell, 2013).

To estimate whether the SOI-R is invariant across gender and, therefore, test whether men and women understand the SOI-R items in the same way, we conducted a multi-group CFA with the R package lavaan (Rosseel, 2012). We tested three levels of invariance which are necessary for comparisons across groups (Davidov et al., 2014): (1) configural invariance, which tests whether the basic factor structure is invariant across groups, indicating if participants from different groups conceptualise the constructs similarly; (2) metric invariance, which tests if the loadings of the items are the same across groups; and (3) scalar invariance, which tests if the intercepts are the same to allow the comparison of latent means (Milfont & Fischer, 2011). Following Chen (2007), we assume that measurement invariance has been established, if the CFI did not decrease by more than .010 and the RMSEA did not increase by more than .015 when the loadings or intercepts were constraint, compared to the previous model without those constraints.

### **3.2. Results**

A confirmatory factor analysis was carried out to test the adjustment of the model to the data (Figure 1). Adjustment indices supported the three-factor model [GFI = .96; CFI = .98; TLI = .98; RMSEA = .05 (IC90% = .02 – .08)]. Factor loadings showed a mean value of .80 (SD = .08), varying between .66 (Item 6) and .93 (Item 3). The internal consistencies ( $\alpha$ ) and inter-item correlations were again good: Behaviour ( $\alpha = .87$ ;  $r_{i,i} = .70$ ), Attitudes ( $\alpha = .83$ ;  $r_{i,i} = .62$ ), and Desire ( $\alpha = .83$ ;  $r_{i,i} = .61$ ).

[Insert Figure 1 here]

Next, to test whether the factor structure of the SOI-R is invariant across gender, we conducted a multi-group CFA testing configural, metric, and scalar invariance. Scalar equivalence was not satisfied. However, after unconstraining item 8 (*How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?*), (partial) scalar invariance was established. In other words, when the intercepts of this item were free to vary across the groups, the fit indexes improved (see Table 2). However, given that the deviation from invariance was minor and only affected one out of nine items (11%), gender comparisons are still meaningful (e.g., comparisons of means or slopes).

[Insert Table 2 here]

Finally, we tested for sex differences in the three dimensions of sociosexuality via MANOVA, observing a significant overall interaction effect [ $F(3,201) = 27.16; p < .001$ ; Wilks Lambda = .71;  $\eta_p^2 = .28$ ]. Specifically, men scored higher than women on behaviour [ $F(1,203) = 43.74; p < .001; \eta_p^2 = .17$ ; ( $M_{male} = 3.57; SD_{male} = 2.07; M_{female} = 2.02; SD_{female} = 1.28$ )], attitude [ $F(1,203) = 46.20; p < .001; \eta_p^2 = .19$ ; ( $M_{male} = 6.47; SD_{male} = 2.35; M_{female} = 4.09; SD_{female} = 2.52$ )], and desire [ $F(1,203) = 57.52; p < .001; \eta_p^2 = .22$ ; ( $M_{male} = 5.07; SD_{male} = 2.12; M_{female} = 2.95; SD_{female} = 1.83$ )]. Thus, in comparison to Brazilian women, Brazilian men are more sexually unrestricted.

### 3.2.1. Correlations of Sociosexuality: Mate's Desirable Attributes to Personality Traits

Next, we examined the association of sociosexuality with variables that have been shown to be linked to sociosexuality (see Table 3). We found positive correlations between the score for the *mate value* questionnaire and the *behavioural* ( $r = .26; p < .001$ ) and *attitudinal* ( $r = .22; p < .001$ ) component of the SOI-R. Further, for the ideal partner traits questionnaire, positive correlations of the attribute *athletic* with the *behavioural* ( $r = .21; p < .001$ ) and the *attitudinal* ( $r = .17; p < .05$ ) component were observed. In turn, the attribute *traditional* correlated negatively with *sexual unrestricted attitudes* ( $r = -.28; p < .001$ ) and *desire* ( $r = -.22; p < .001$ ). Of the Big-5 personality factors, only *extraversion* correlated with sociosexuality. It was positively associated with *unrestricted behaviour* ( $r = .20; p < .001$ ), *attitude* ( $r = .22; p < .001$ ), and *desire* ( $r = .15; p < .05$ ).

[Insert Table 3 here]

Because the dark personality traits are more prevalent among men (Jonason & Webster, 2010) and that sex has been found to be a moderator between these traits and several variables, we performed separated correlational analyses for women and men (Table 4). Among women (inferior diagonal), only *narcissism* positively correlated with *desire* ( $r = .31; p < .001$ ), whilst in men (superior diagonal) *psychopathy* and *Machiavellianism* correlated with *behaviour* ( $r = .23$  and  $r = .21; p < .001$ , respectively).

[Insert Table 4 here]



#### 4. Discussion

We performed two studies to test the factorial structure of the SOI-R in Brazil. Study 1 had an exploratory focus. Three criteria supported the three-factor structure found in previous studies (Penke & Asendorpf, 2008; Mesko et al., 2014; Neto, 2016), whereas only one did not. All the items that compose the instrument saturated into the factors they were expected to represent, presenting satisfactory factor loadings (Hair, Black, Babin, Anderson, & Tatham 2009). Additionally, the reliability of the SOI-R was good, above the usual thresholds recommended in the literature (Hair et al., 2009). These findings provide preliminary evidence that the SOI-R is an adequate measure to evaluate sociosexual orientation in Brazil.

Study 2 confirmed the structure found in Study 1 with an independent sample. Goodness of fit indices in a maximum likelihood confirmatory factor analysis provided additional support for the three-factor structure, consistent with the findings of Penke and Asendorpf (2008) and of other studies adapting the instrument in other countries (Barbaro et al., 2017; Mesko et al., 2014; Neto, 2016). The reliability was again good, providing additional support for the psychometric adequacy of the SOI-R with another sample. Furthermore, a multi-group CFA demonstrated that this three-factor structure is partially invariant across gender, which means that men and women responded to the items similarly. Specifically, item 8 (*How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?*) of the desire component was not invariant across sexes. This may reflect that women differ in their experience or definition of sexual arousal towards someone they are not committed to. Thus, this item may not accurately represent sexual desire similarly in men and women. However, according to Milfont and Fischer (2010), given that full invariance is unlikely to be obtained

in practice, partial invariance still allows comparisons across groups even if full measurement invariance is not reached.

In Study 2, we further compared the sociosexuality of women and men. As expected, Brazilian men scored higher than women in all the dimension of sociosexuality (attitudes, behaviour, and desire), corroborating previous research that men are sexually more unrestricted than women (Schmitt, 2005; Sprecher, Treger, & Sakaluk, 2013). Differences in the gender roles in Brazil may also help to explain these findings, given that Brazil is labelled a “culture of honour” (Cohen, Nisbett, Bowdle, & Schwarz, 1996; Gouveia, Guerra, Araújo, Galvão, & Silva, 2013), with high levels of sexism (Glick, Sakalli-Ugurlu, Ferreira, & Souza, 2002). Thus, the casual engagement in relationships is not socially acceptable for women, however, in men promiscuity is encouraged on certain levels. These aspects may inhibit or discourage women from engaging in casual relationships or at least from admitting they have engaged in them, whilst the opposite effect would be observed for men.

We further corroborated previous findings that the SOI-R dimensions are meaningfully correlated with other psychosocial variables. Individuals who perceive themselves as more valuable partners and that attribute more importance to physical attributes in a potential partner, reported a higher number of sexual partners in the past year, and hold more positive attitudes toward casual sex (cf. Barrada et al., 2017). On the other hand, unrestricted individuals found traditional partners less desirable. Indeed, physical attractiveness is the main attribute desired for short-term relationships (March, Grieve, & Marx, 2015), while individuals perceived as traditional may be less relevant for casual relationships because they would be less willing to engage in casual relationships.

Further corroborating previous studies, extraverted individuals reported that they had a higher number of sexual partners, more positive attitudes towards casual sex, and reported to fantasise more often about casual sex (cf. Jonason et al., 2011; Schmitt & Shackelford,

2008). We also expected sociosexuality to be negatively associated with agreeableness and conscientiousness, however, even though the correlations were overall in the expected direction, they did not reach statistical significance. Previous findings suggest that the Dark Triad of personality facilitates casual relationships in men (cf. Jonason et al., 2009).

Supporting these previous results, Machiavellianism and psychopathy were linked to a higher number of casual partners in the past year, confirming the hypothesis that Dark Triad traits carry a reproductive function for males (cf. McHoskey, 2001, Paulhus & Williams, 2002).

For women, on the other hand, only narcissism was correlated with the desire component.

Considering that men score remarkably higher on measurements of the Dark Triad than women (Jonason & Webster, 2010) and that these traits facilitate short-term relationships, which in turn are more advantageous for males, it is, perhaps, not a surprise that women do not show an association between these traits and short-term mating patterns.

Although we provided evidence of the adequacy of the SOI-R in Brazil, potential limitations of this research should also be addressed. First, because the reported findings were obtained from a non-probabilistic sample, the results should be interpreted within the limits of the studies' boundaries of generalizability. Second, the sample of Study 1 was mostly composed by women, which could have affected the results, because there are substantial gender differences in sociosexuality (see Study 2). However, since the factor structure was supported in an independent sex-balanced sample and was found to be mainly invariant across gender, we consider that this bias was addressed. In addition, hormonal birth control usage among women was not measured, which, as suggested by previous research, may have affected some of the findings, especially regarding sex differences in sociosexuality (Welling, Puts, Roberts, Little, & Burris, 2012). However, while it would be interesting to study the impact of hormonal birth control on sociosexuality, we do not believe that this reduces the generalisability of our findings to Western countries. The percentage of Brazilian women

who are taking the pill is around 34% (as in 2013), which is typical for Western countries (United Nations, 2017). An additional contribution of the present research was to identify how psychosocial variables are related to sociosexual orientation in Brazil. We found, despite some differences, that the correlational pattern was broadly the same as reported by previous studies (Jonason et al., 2011; Schmitt, 2005; Schmitt & Shackelford, 2008).

Future research could further investigate potential correlates of sociosexuality in Brazil, such as self-esteem, that may influence engagement in short-term relationships and explore variables that may potentially affect sex differences in sociosexuality (e.g. hormonal birth control usage). Additionally, human values (e.g., Gouveia, 2013) may also help to understand what drives people to perform promiscuous behaviours and therefore, define a profile more willing to engage in unsafe sexual practices in this country.

Overall, our findings demonstrate that the SOI-R administered in Brazil has three distinct dimensions, namely attitudes, behaviour, and desire. Thus, as claimed by previous authors (e.g. Penke & Asendorpf, 2008; Jackson & Kirkpatrick, 2007), sociosexuality is not a unitary construct, but it is multidimensional with a cognitive (attitudes), an emotional (desire), and a behavioural dimension, which leads to a more comprehensive understanding of sociosexual orientation. Moreover, we found convergent validity for the dimensions of sociosexuality. These dimensions correlated with other psychosocial variables broadly as expected and congruent with previous studies. Together, our data provides evidence of convergent validity of the SOI-R and the psychometrical suitability of the instrument in Brazil.

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Table 1

*Factor structure of the SOI-R*

Item	Description of content	Component		
		III	II	I
8	How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?	<b>.92</b>	.12	.12
7	How often do you have fantasies about having sex with someone you are not in a committed romantic relationship with?	<b>.92</b>	-.07	-.11
9	In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?	<b>.88</b>	-.05	.02
4	Sex without love is OK.	.01	<b>.89</b>	0
5	I can imagine myself being comfortable and enjoying "casual" sex with different partners.	-.12	<b>.87</b>	.04
6	I do not want to have sex with a person until I am sure that we will have a long-term, serious relationship.	.09	<b>.87</b>	-.05
2	With how many different partners have you had sexual intercourse on one and only one occasion?	-.10	.02	<b>.94</b>
3	With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?	.02	-.10	<b>.88</b>
1	With how many different partners have you had sex within the past 12 months?	.13	.04	<b>.63</b>
Number of Items		3	3	3
Eigenvalue		4.21	1.64	1.17
% Total variance explained		46.9	18.31	13.04
Cronbach's alpha		.79	.85	.89

Notes. Components: I – Behaviour; II – Attitude; III – Desire.

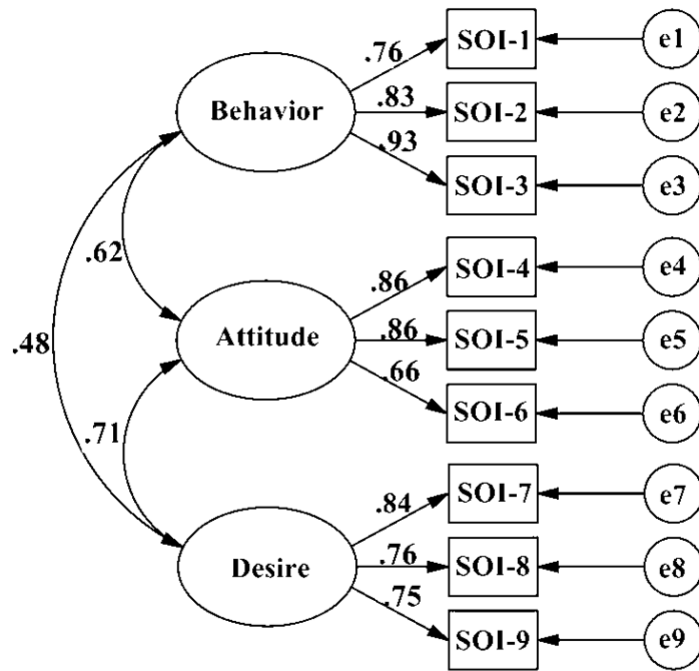


Figure 1. Factor structure of the SOI-R.

Table 2

*Measurement invariance of the SOI-R across gender*

	CFI	RMSEA	$\Delta$ CFI	$\Delta$ RMSEA
Configural Invariance	.964	.078		
Metric Invariance	.955	.082	.009	.004
Scalar Invariance	.951	.082	.004	0

Table 3

*Correlations of the SOI-R components with self-perceived mate value, big five, and ideal partner preferences*

	Mate Valu e	Affectionat e	Athleti c	Sociabl e	Traditiona l	Successfu l	Extroverte d	Agreeablenes s	Consciousnes s	Neuroticis m	Opennes s
SOI behaviour	.26**	.02	.21**	-.07	-.12	-.01	.20**	-.06	-.02	.03	.10
SOI attitude	.22**	.09	.17*	-.05	-.28**	-.09	.222**	-.13	.01	.02	.09
SOI desire	.10	-.07	.11	-.12	-.22**	-.11	.15*	-.08	-.05	.13	.11

*Notes.* \*\* $p < .01$ ; \* $p < .05$ .

Table 4

*Correlations of the SOI-R components with dark traits split by sex*

	SOI behaviour	SOI attitude	SOI desire	Machiavellianism	Psychopathy	Narcissism
SOI behaviour		.49**	.31**	.21*	.23**	.05
SOI attitude	.48**		.55**	.13	.16	-.01
SOI desire	.29**	.45**		.08	-.03	.14
Machiavellianism	-.18	.03	.11		.39**	.44**
Psychopathy	-.12	.04	.04	.54**		.13
Narcissism	-.02	.14	.31**	.46**	.32**	

*Notes. \*\*p < .01; \*p < .05. Correlations for women are displayed in the inferior diagonal and for me in the superior diagonal.*