

## Development of the Sexual Five-Facet Mindfulness Questionnaire (FFMQ-S): Validation Among a Community Sample of French-Speaking Women

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*It has been recently demonstrated that mindfulness-based intervention may be particularly suitable for addressing sexual difficulties in women. Although the Five-Facet Mindfulness Questionnaire (FFMQ) is currently one of the most widely used scales to assess mindfulness, no adaptation and validation of the FFMQ to measure female sexual functioning has been published. The main aim of this study was to develop and validate a sexual version of the Five Facets Mindfulness Questionnaire (FFMQ-S) to specifically measure mindfulness in the context of sexual encounters. A total of 251 healthy, French-speaking female volunteers were administered the FFMQ-S, the original FFMQ, and the Female Sexual Distress Scale (FSDS-R). Confirmatory factor analyses indicated that the FFMQ-S exhibits a five-factor model, as implied by the original FFMQ. Good scale reliability was observed. The FFMQ-S showed significant correlations with the FSDS-R and the usual FFMQ. Scores on the FFMQ-S correlated significantly more negatively with the total FSDS-R score than with the total score of the original version of the FFMQ. These findings clearly support the relevance of developing a version of the FFMQ tailored to sexual functioning.*

As pointed by Brotto and colleagues (2012), since the approval of sildenafil citrate (Viagra) for men's sexual dysfunction in the 1990s, there has been an intense research effort to develop sexual pharmaceuticals for women. Although there are currently no Food and Drug Administration–approved pharmaceuticals for women, several drugs specifically designed to improve female sexual arousal (and not libido) are currently under study (e.g., phosphodiesterase inhibitor; van der Made et al., 2009). However, as evidenced by Krapf and Simon (2009), to date, no treatments have been shown to significantly increase low libido. One potential explanation could be that psychological processes, such as intrusive thoughts or attentional focus, may play an important role in women's libido (e.g., for a review, see Géonet, De Sutter, & Zech, 2013). In contrast to pharmaceuticals,

it is now widely documented that psychological interventions result in increased relationship satisfaction, resumption of sexual activity, and improved control of vaginal dilatation among women suffering from hypoactive sexual desire disorder or orgasmic disorder (Berry & Berry, 2013; Frühauf, Gerger, Schmidt, Munder, & Barth, 2013).

Mindfulness-based interventions (MBIs), often combined with the sex therapy or patient education, have been demonstrated to be particularly suitable for addressing sexual difficulties in women (Brotto, Basson, & Luria, 2008; Brotto & Heiman, 2007; Brotto et al., 2012). Mindfulness is defined as the ability to bring one's attention to experiences in the present moment in a nonjudgmental way (Kabat-Zinn, 1990).

In recent years, several meta-analyses examining the efficacy of MBIs (e.g., Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004; Khoury et al., 2013) have concluded that these interventions may help alleviate a variety of mental health problems, including anxiety, depression, and stress disorders, and improve overall psychological functioning. Recent research suggests that mindfulness training might promote effective emotion

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regulation through a disengagement from intrusive thoughts and ruminations (e.g., Heeren & Philippot, 2011; Heeren, Van Broeck, & Philippot, 2009; Kingston, Dooley, Bates, Lawlor, & Malone, 2007; Ramel, Goldin, Carmona, & McQuaid, 2004).

Regarding sexual difficulties, a pilot study by Brotto and colleagues (2008) found that a structured three-session MBI (combined with patient education and sex therapy) both significantly improved self-reported sexual desire, arousal, orgasm, and satisfaction and significantly reduced sexual distress and depression among women with cervical or endometrial cancer exhibiting sexual difficulties. More recently, Brotto and colleagues (2012) reported that a three-session MBI (combined with patient education and sex therapy) led to significant improvements in all domains of sexual responses, including increased perception of genital arousal during an erotic film, as compared to a wait-list control group.

Nevertheless, uncertainty still remains regarding whether these benefits can be unambiguously attributed to a change in mindfulness resulting from the intervention. To demonstrate the successful induction of psychological change, changes in the process of interest must be established by a reliable measure (e.g., MacLeod, Koster, & Fox, 2009). This point is particularly relevant, as MBIs in the field of sex therapy often contain patient education and/or sex therapy, thus making it impossible to say with absolute certainty that the observed changes are a direct result of the mindfulness intervention.

In addition, to strengthen the conclusion that symptom change resulted directly from change in the process of interest (i.e., the mediating processes) elicited by the training, it must be demonstrated that the magnitude of symptom change is related to the magnitude of the change in the mediating processes (e.g., Heeren, Reese, McNally, & Philippot, 2012; MacLeod et al., 2009).

As a consequence, in the present case, it must be demonstrated that changes in mindfulness do indeed mediate the impact of MBIs on improvement in sexual functioning. Hence, one challenge for studies in this field will be to prove that improvement in sexual functioning after MBIs is a direct result from a change in the process of interest (i.e., mindfulness) elicited by the training. To assess these changes, measures assessing mindfulness skills applied to sexual functioning must be developed.

Recently, several questionnaires have been proposed for assessing general mindfulness skills (e.g., Baer, Smith, & Allen, 2004; Brown & Ryan, 2003; Buchheld, Grossman, & Walach, 2001). As argued by Baer, Smith, Hopkins, Krietemeyer, and Toney (2006), although all these self-reports assess a general tendency to be mindful in daily life, show potentially good psychometric properties, and are significantly correlated with one another, differences in their content and structural construct clearly indicate a lack of consensus about the conceptualization of mindfulness. Further, these differences in

content and structure suggest some disagreement about how mindfulness should be defined and operationalized. In particular, the number of facets of mindfulness varies widely across instruments.

To overcome this limitation, Baer and colleagues (2006) conducted an exploratory factor analysis on the combined item pool from all available mindfulness questionnaires. They found that a five-factor structure captures several distinct but related underlying dimensions. Items with the highest loadings on each of the five factors (and low loadings on all other factors) were combined to form a scale. This procedure resulted in a 39-item questionnaire, called the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006, 2008), which assesses five elements of mindfulness. These facets include *Observing* (attending to or noticing internal and external stimuli, such as sensations, emotions, cognitions, sights, sounds, and smells), *Describing* (noting or mentally labeling these stimuli with words), *Acting with awareness* (attending to one's current actions, as opposed to behaving automatically or absentmindedly), *Nonjudging of inner experience* (refraining from evaluation of one's sensations, cognitions, and emotions), and *Nonreactivity to inner experience* (allowing thoughts and feelings to come and go without getting caught up in them).

The FFMQ has shown good internal consistency, structural validity (i.e., using confirmatory factor analyses; Baer et al., 2008), and correlations in the expected directions with variables predicted to be related to mindfulness (e.g., well-being, experiential avoidance; Baer et al., 2006). Baer and colleagues (2006) also reported elevated FFMQ scores among long-term meditation practitioners.

In addition, the FFMQ has shown good cross-cultural reliability, corroborating the five-factored solution as a basic model of mindfulness. Indeed, the structural validity of the FFMQ remains consistent across different languages. For instance, Heeren, Douilliez, Peschard, Debrauwere, and Philippot (2011) have adapted and validated the FFMQ in French. Using confirmatory factor analyses, they found that the French version of the FFMQ has good psychometric properties and that it replicates the structural model proposed by Baer and colleagues (2006). Similar results were found in Italian (Romanelli & di Bernardino, 2010) and in Chinese (Deng, Liu, Rodriguez, & Xia, 2011) translations.

To our knowledge, no adaptation and validation of a sexual version of the FFMQ has been published. This development is critical, as clinical measurement clearly benefits from being tailored to the treatments and constructed to ensure an ideographic approach to clinical change (e.g., Christensen & Mendoza, 1986; Jacobson & Truax, 1991; Heeren, Maurage, et al., 2012). The present study was thus designed to develop and validate a sexual version of the FFMQ, called the FFMQ-S, that

can be used in future research examining the effect of mindfulness in the treatment of sexual difficulties among women. The main goal of the present study was to answer two major questions: Does the five-factor structure proposed by previous research (e.g., Baer et al., 2008) best capture items' covariance of the FFMQ-S? Do the facets of the FFMQ-S significantly correlate more negatively with sexual distress among women than the usual version of the FFMQ?

## Method

The FFMQ was adapted to measure women's sexual functioning. Next, the structural validity of the FFMQ-S was tested with confirmatory factor analyses. We then assessed the new scale's criterion validity, examining its relation with mindfulness and sexual functioning.

### Adaptation of the Scale

We followed the steps for the adaptation of psychometric instruments detailed by the International Test Commission's guidelines for test adaptation (Hambleton et al., 2004). Two experts in clinical sexuality selected and/or generated items (i.e., they combined two/three different items of a same facet) based on the original FFMQ. For each facet, they had to obtain four distinct items that they considered relevant for sexual functioning. The core criterion was that the final items had to be applicable to female sexual encounters. The French version of the scale is provided in Appendix A. Two bilingual colleagues also translated the scale into English, which is available in Appendix B.

### Structural Validation

*Participants.* A total of 251 French-speaking female volunteers were administered the FFMQ-S. Their age ranged from 18 to 67 years ( $M = 31.81$ ,  $SD = 11.60$ ). They had no prior training in mindfulness or other forms of meditation. They were recruited from the Université catholique de Louvain community (Belgium). The first step involved sending e-mails to potential participants (e.g., acquaintances and French-speaking international colleagues) requesting participation in a study on a voluntary basis. Participants were also invited to circulate this invitational e-mail to others (i.e., snowball principle e-mailing). Participants were predominantly university graduates (48%,  $n = 121$ ). Of the remaining sample, 33.3% ( $n = 84$ ) of the participants had an undergraduate degree, 10.3% ( $n = 26$ ) a high school degree, 3.2% ( $n = 8$ ) a middle school degree, and 0.4% ( $n = 1$ ) an elementary school degree. Regarding their sexual functioning, their number of sexual activities per month (alone or with their partners) ranged from 2 to 90 ( $M = 14.45$ ,  $SD = 8.81$ ). The majority

of participants had heterosexual relations (88.5%,  $n = 223$ ). Of the remaining sample, 2% ( $n = 5$ ) of the participants had homosexual relations and 9.1% ( $n = 23$ ) had bisexual relations. Only native French speakers were invited to take part in the study. The study was approved by the Ethics Committee of the Psychological Sciences Research Institute.

*Measures and procedure.* Participants completed the FFMQ-S, the FFMQ (Baer et al., 2006; Baer et al., 2008), and the Female Sexual Distress Scale-Revised (FSDS-R; Derogatis et al., 2002). As described, the FFMQ (Baer et al., 2006; Baer et al., 2008) is a validated, 39-item self-report measure assessing the level of mindfulness in daily life. It includes five facets of mindfulness: *Observing*, *Describing*, *Acting with awareness*, *Nonjudging of inner experience*, and *Nonreactivity to inner experience*. Items are rated on a 5-point scale ranging from 1 (*Never or very rarely true*) to 5 (*Very often or always true*).

Cronbach's alpha in the current sample was .88 for the global scale score, indicating good scale score reliability. Good scale score reliabilities were also observed for each of the five facets (for *Observing*, Cronbach's alpha = .80; for *Describing*, .88; for *Acting with awareness*, .87; for *Nonjudging of inner experience*, .86; for *Nonreactivity to inner experience*, .78).

The FSDS-R (DeRogatis et al., 2008) is a 13-item self-report measure assessing women's personal distress related to sex. Items are rated on a 5-point scale ranging from 0 (*Never true*) to 5 (*Always true*). This measure has shown good scale score reliability and structural validity (Derogatis et al., 2008). Cronbach's alpha in the current sample was .94, indicating good scale score reliability. In the present sample, the mean score was 10.72 ( $SD = 9.38$ ; min = 1; max = 44).

### Data Analysis

Confirmatory factor analysis, using AMOS 16 software (Arbuckle, 2007), was used to test the factorial validity of the FFMQ-S. Before performing the analysis, we conducted the Kolmogorov-Smirnov test on each item of the French version of the FFMQ-S. These analyses revealed that normality was achieved for all items (all  $ps > .05$ ).

For the confirmatory factor analyses, goodness of fit was tested with a  $\chi^2$  test. In  $\chi^2$  tests, a statistically non-significant value corresponds to an acceptable fit. However, the  $\chi^2$  test is sensitive to sample size, which may pose a problem in statistical analyses. Byrne (1994) noted that it is unusual to obtain a statistically nonsignificant  $\chi^2$  when performing confirmatory factor analyses, even if the discrepancy between the observed and the implied data is trivial. Thus, we used a derived fit statistic, the normed  $\chi^2$ , which is less dependent on sample size. The normed  $\chi^2$  is achieved by computing the ratio

of the model  $\chi^2$  and the degrees of freedom (Wheaton, Muthén, Alwin, & Summers, 1977). A normed  $\chi^2$  below 2 usually suggests good model fit and below 3 suggests acceptable fit (Bollen, 1989).

Many different fit indices proposing to solve this problem of dependency on sample size are available. As recommended by Schweizer (2010), we decided to report the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). SRMR and RMSEA are both residuals-based absolute fit measures. CFI is an incremental relative fit measure. As argued by Hu and Bentler (1998), the combination of RMSEA and SRMR is useful because the SRMR is sensitive to the misspecification of the factor covariances, and the RMSEA is sensitive to the misspecification of factor loadings. Thus, if both indices are acceptable, then the latent and the measurement models would be considered well specified. Furthermore, the RMSEA has the advantage of usually being associated with a confidence interval. RMSEA values less than .05 indicate a good model fit (Browne & Cudeck, 1993). SRMR values are expected to stay below .05 (Kline, 2005). The CFI indicates a good model fit for values between .95 and 1.0, whereas values in the range of .90 and .95 signify acceptable fit (Bentler 1990; Hu & Bentler, 1999).

We also reported goodness of fit index (GFI). Developed by Jöreskog and Sörbom (1984), the GFI is an absolute fit index analogous to  $R^2$ . The GFI performs better than any other absolute fit index regarding the absolute fit of the data (Hoyle & Panter, 1995; Marsh, Balla, & McDonald, 1988). GFI values are between 0 and 1, with 1 indicating a perfect fit. As suggested by Cole (1987), a value of .80 has usually been considered as a minimum for model acceptability.

The present context requires comparing fit across models that are not necessarily nested (i.e., one model is not simply a constrained version of the other). Therefore, we also reported the Akaike information criterion (AIC; Akaike, 1987), the Browne-Cudeck criterion (BCC; Browne & Cudeck, 1989), and the expected cross-validation index (ECVI; Browne & Cudeck, 1989), which are the most suited for comparison of nonnested

models (Blunch, 2008). AIC, BCC, and ECVI are fit measures based on information theory. These indices are not used for judging the fit of a single model but are used in situations where there are several realistic but different models from which to choose. These indices are a function of both model complexity and goodness of fit: Low scores refer to simple, well-fitting models, whereas high scores refer to complex, poor-fitting models. Therefore, in a comparison-model approach, the model with the lower score is preferred.

## Results

### Structural Validity

Based on previous research (e.g., Baer et al., 2008), three structural models were tested using confirmatory factor analyses: (a) a model including only the five facets as latent variables (Model A); (b) a model with a single principal factor (Model B); and (c) a hierarchical model with the five facets as latent variables and mindfulness as a second-order factor (Model C).

Table 1 displays the fit indices of the three models. The three models exhibited very good fit indices. However, the analyses indicated that Model A fit significantly better than both Model B ( $\Delta\chi^2 = 63.731$ ,  $\Delta df = 10$ ,  $p < .001$ ) and Model C ( $\Delta\chi^2 = 21.667$ ,  $\Delta df = 5$ ,  $p < .001$ ). In addition, the AIC, BCC, and ECVI of Model A were most favorable (i.e., lowest; see Table 1). However, because all standardized factor loadings of Model C were statistically significant ( $p < .001$ ) except for item 20 ( $p = .966$ ; factor loading =  $-.003$ ), we also reran the analyses without this item (Model A<sub>bis</sub>; Model B<sub>bis</sub>; Model C<sub>bis</sub>, respectively).

These three new models also exhibited very good fit indices (Table 1). However, the analyses indicated that Model A<sub>bis</sub> fit significantly better than both Model B<sub>bis</sub> ( $\Delta\chi^2 = 81.754$ ,  $\Delta df = 10$ ,  $p < .001$ ) and Model C<sub>bis</sub> ( $\Delta\chi^2 = 20.856$ ,  $\Delta df = 5$ ,  $p < .005$ ). Moreover, the analyses also revealed that Model A<sub>bis</sub> fit significantly better than Model A ( $\Delta\chi^2 = 35.318$ ,  $\Delta df = 18$ ,  $p < .01$ ), Model B ( $\Delta\chi^2 = 99.049$ ,  $\Delta df = 28$ ,  $p < .001$ ), and Model C ( $\Delta\chi^2 = 56.985$ ,  $\Delta df = 23$ ,  $p < .001$ ). In addition, the AIC, BCC,

**Table 1.** Fit Index Values for the Different Models Tested

Models	$\chi^2$	<i>df</i>	Normed $\chi^2$	SRMR	RMSEA	RMSEA 90% CI	GFI	CFI	AIC	BCC	ECVI
A	273.584	160	1.710	.020	.053	.042–.064	.891	.557	373.584	382.754	1.494
B	337.315	170	1.984	.026	.063	.053–.073	.865	.348	417.315	424.651	1.669
C	295.251	165	1.789	.026	.056	.046–.066	.882	.492	385.251	393.505	1.541
<b>A<sub>bis</sub></b>	<b>238.266</b>	<b>142</b>	<b>1.678</b>	<b>.020</b>	<b>.052</b>	<b>.040–.063</b>	<b>.900</b>	<b>.597</b>	<b>334.266</b>	<b>342.614</b>	<b>1.337</b>
B <sub>bis</sub>	301.020	152	1.980	.026	.063	.052–.073	.873	.334	377.020	383.629	1.508
C <sub>bis</sub>	259.122	147	1.763	.023	.055	.044–.066	.891	.531	345.122	352.600	1.380

*Note.* Model A<sub>bis</sub> (in bold) is the best-fitting model. *df* = degrees of freedom; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; GFI = goodness of fit index; CFI = comparative fit index; AIC = Akaike information criterion; BCC = Browne-Cudeck criterion; ECVI = expected cross-validation index.

SEXUAL FIVE-FACET MINDFULNESS QUESTIONNAIRE (FFMQ-S)

**Table 2.** Standardized Factor Loadings of Each Item After the Analysis of Model  $A_{bis}$

Items	Latent Facets	Loadings
1. I can easily identify when I'm sexually aroused.	Observing	.725
2. It's difficult for me to perceive physical sensations when my partner kisses me or caresses me.	Observing	.808
3. I don't pay attention to my physiological change when I'm aroused (e.g., vaginal lubrication, heat).	Observing	.340
4. I realize how the gestures of my partner impact on my emotions and my sexual arousal.	Observing	.608
5. I can easily help my partner to understand what makes me feel good or what my sexual needs are.	Describing	.750
6. It's difficult to express to my partner what I feel during intercourse.	Describing	.686
7. I easily feel my emotions during sexual intercourse.	Describing	.688
8. I'm unable to say if I like or dislike a specific sexual activity.	Describing	.637
9. I cannot reach orgasm because I'm quite often absent-minded.	Acting with awareness	.677
10. I usually feel quite available and present during sexual intercourse.	Acting with awareness	.848
11. I have the feeling I have sex in an automatic way without being able to let go.	Acting with awareness	.813
12. I have the feeling that all my sexual activities are consensual.	Acting with awareness	.635
13. I don't criticize myself when I have sexual fantasies that I consider to be "taboo."	Nonjudging of inner experience	.307
14. I think I should reach orgasm more quickly.	Nonjudging of inner experience	.559
15. I don't judge myself when I don't reach orgasm.	Nonjudging of inner experience	.569
16. I think that some of my emotions are bad and I should not feel them.	Nonjudging of inner experience	.601
17. When I don't experience enough satisfaction during sexual activities I can take some distance and get perspective on that.	Nonreactivity to inner experience	.819
18. When I have negative thoughts I feel them and let them go.	Nonreactivity to inner experience	.611
19. When I have negative emotions I let them take over.	Nonreactivity to inner experience	.482

Note. Items 2, 3, 6, 8, 9, 14, 15, and 19 should be reversed before scoring.

and ECVI of Model  $A_{bis}$  were most favorable (i.e., lowest; see Table 1). Factor loadings of Model  $A_{bis}$  are depicted in Table 2.

**Descriptive Statistics, Internal Consistency, and Reliability**

Table 3 displays the descriptive statistics and scale score reliability indices of the FFMQ-S and its subscales. In addition, we also reported the 95% confidence intervals of Cronbach's alpha coefficients. These confidence intervals were computed using the procedure of Koning and Franses (2003). Although both *Nonreactivity to inner experience* and *Nonjudging of inner experience* subscales exhibited less than ideal Cronbach's alphas, the alphas suggested overall good scale and subscale score reliabilities. Within each of the subscales, Cronbach's alpha coefficients decreased if any of the items was deleted (with the exception of item 20, as

previously noted). The correlations between the first-order and second-order factors are displayed in Table 3. These findings clearly support the relevance of measuring factors separately.

**Correlations Between the FFMQ-S and Other Constructs**

Table 4 displays the correlations between the FFMQ-S and the other scales included in the present study. Fisher's *r*-to-*z* transformation, with the formula for comparing correlations measured on the same subjects taken from Steiger (1980), was used to assess the difference in Pearson *r* values. The total FSDS-R score was significantly more negatively correlated with the total score of the FFMQ-S than with the total score of the FFMQ ( $Z = 8.97, p < .001$ ). The same pattern of results was observed for all subscales: the FSDS-R score correlated significantly more negatively with any facet of the

**Table 3.** Descriptive Statistics and Cronbach's Alphas of the Sexual FFMQ

Dimensions	Items	Minimum	Maximum	<i>M</i>	<i>SD</i>	$\alpha$	$\alpha$ 95% CI
Observing	4	7	20	16.889	2.625	.67	.65-.69
Describing	4	6	20	14.837	3.039	.71	.70-.71
Acting with awareness	4	7	20	16.064	3.291	.79	.77-.81
Nonjudging of inner experience	4	6	20	14.900	3.136	.51	.50-.53
Nonreactivity to inner experience	4	5	20	12.904	2.810	.47	.46-.48
Nonreactivity to inner experience (without item 20)	3	3	15	9.697	2.520	.63	.61-.65
Global scale	20	40	97	74.892	11.216	.86	.84-.88
Global scale (without item 20)	19	38	95	71.685	11.151	.87	.85-.89
Sexual distress	13	1	44	10.720	9.308	.94	.91-.97

**Table 4.** Correlations Between the First-Order Factors, the Second-Order Factors, and Other Psychological Constructs

Facets	Act-S	Nonjudging-S	NonReact-S	FFMQ-S	Obs	Describ	Act	Nonjudging	NonReact	FFMQ	FSDS-R
Obs-S	.59*	.37*	.64*	.73*	.21*	.24*	.35*	.31*	.13	.40*	-.47*
Describ-S	.67*	.43*	.36*	.80*	.15*	.33*	.31*	.27*	.17*	.40*	-.61*
Act-S	—	.50*	.52*	.85*	.18*	.27*	.41*	.31*	.15*	.43*	-.69*
Nonjudging-S		—	.52*	.75*	.24*	.27*	.21*	.43*	.19*	.43*	-.47
NonReact-S			—	.66*	.15*	.18*	.24*	.41*	.45*	.43*	-.47*
FFMQ-S				—	.24*	.34*	.40*	.45*	.28*	.55*	-.72*
FSDS-R					-.03*	-.21*	.34*	-.33*	-.15	-.34*	

Note. Obs-S=Observing facet of FFMQ-S; Describ-S=Describing facet of FFMQ-S; Act-S=Acting facet of FFMQ-S; Nonjudging-S=Nonjudging facet of FFMQ-S; NonReact-S=Nonreactivity facet of FFMQ-S; FFMQ-S=total score of FFMQ-S; Obs=Observing facet of original FFMQ; Describ=Describing facet of FFMQ; Act=Acting facet of FFMQ; NonReact=Nonreactivity facet of FFMQ; Nonjudging=Nonjudging facet of FFMQ; FSDS-R=Female Sexual Distress Scale-Revised.

All correlations were significant at  $p < .05$ . Correlations that were significant at  $p < .01$  are denoted with an asterisk (\*).

FFMQ-S than with any facet of the original version of the FFMQ (all  $ps < .05$ ). Moreover, to control the potential overlap in content between the two versions of the FFMQ, we also computed the correlation between each facet of the FFMQ-S and the total FSDS-R score, while controlling for the corresponding facet on the original version of the FFMQ. We found that all the correlations remained significant at  $p < .01$  [for FFMQ-S total score,  $r(251) = -.67$ ; for *Sexual observing*,  $r(251) = -.47$ ; for *Sexual describing*,  $r(251) = -.59$ ; for *Sexual acting with awareness*,  $r(251) = -.64$ ; for *Sexual nonjudging of inner experience*,  $r(251) = -.39$ ; for *Sexual nonreactivity to inner experience*,  $r(251) = -.45$ ]. All together, these findings clearly support the relevance of developing a version of the FFMQ tailored for sexual functioning.

Regarding the facets of the FFMQ-S, both the *Describing* and *Acting with awareness* facets were significantly more negatively correlated with the FSDS-R score than any other facet of the FFMQ-S (all  $ps < .05$ ). Furthermore, the *Acting with awareness* facet of the FFMQ-S correlated significantly more negatively with the FSDS-R score than with the *Describing* facet of the FFMQ-S ( $Z = 2.00$ ,  $p < .05$ ). These findings clearly support the relevance of measuring factors separately.

## Discussion

The main goal of the present study was to answer two major questions: Does the five-factor structure proposed by previous research (e.g., Baer et al., 2008) best capture the covariance of the items of the FFMQ-S? Compared to the facets of the original version of the FFMQ, are those of the FFMQ-S significantly more negatively correlated with sexual distress among women?

Regarding the factor structure, we investigated whether the five-factor structure found by previous researchers on the FFMQ could be replicated in a sexual adaptation of the scale. Confirmatory factor analyses revealed a five-factor solution including *Observing*

(attending to or noticing internal and external stimuli during sex, such as sensations, emotions, cognitions, sights, sounds, and smells), *Describing* (noting or mentally labeling these stimuli with words), *Acting with awareness* (attending to one's current sexual actions, as opposed to behaving automatically or absentmindedly), *Nonjudging of inner experience* (refraining from evaluation of one's sensations, cognitions, and emotions during sex), and *Nonreactivity to inner experience* (allowing thoughts and feelings to come and go during sex, without attention getting caught up in them). These first-order factors clearly replicate the structure found by previous studies (e.g., Baer et al., 2006; Baer et al., 2008) and extend it to mindfulness skills in sexual functioning. It should be noted that although the hierarchical model with the five facets as latent variables and mindfulness as a second-order factor also exhibited very good fit indices, the present data suggest that a model including only the five facets as latent variables—and thus with no overarching mindfulness construct—fit best. Nevertheless, although they tended to be of moderate strength, good score reliabilities were observed, especially for the global scale. Both these findings suggest that there is good reason to interpret scale and subscale scores of the FFMQ-S according to the scoring of the original FFMQ. To score the FFMQ, the items of each subscale (*Observing*, *Describing*, *Acting with awareness*, *Nonjudging of inner experience*, and *Nonreactivity to inner experience*) are summed together. These subscale scores are then added together to obtain a global mindfulness score.

Regarding the score scale and subscales reliabilities, it should be noted that both *Nonjudging of inner experience* and *Nonreactivity to inner experience* (without item 20) of the FFMQ-S exhibit less than ideal Cronbach's alphas (.51 and .63, respectively). It is possible that the wide range of and lack of specificity in the situations evoked in this measure may have negatively affected the intercorrelations of these items, resulting in a decrease in Cronbach's alphas. Future studies should examine whether the inclusion of more specific situation-based items overcomes this limitation.

With respect to convergent validity, we found that the FFMQ-S score was significantly more negatively correlated with the total sexual distress score than with the total score of the original version of the FFMQ. Similarly, each facet of the FFMQ-S was significantly more negatively correlated with sexual distress than with the corresponding facet on the original FFMQ. This suggests that the FFMQ-S taps skills that are more related to the sexual distress among women than does the FFMQ, which clearly supports the relevance of developing a version of the FFMQ tailored for sexual functioning. Moreover, at an applied level, the present findings suggest that the global score of the FFMQ-S would be more useful in clinical practice than the scores on the individual facets. Indeed, the global score showed better psychometric properties (e.g., Cronbach's alpha) and exhibited a significantly stronger correlation with sexual distress compared to the subscales.

Of the subscales of the FFMQ-S, the facets *Describing* and *Acting with awareness* were significantly more negatively correlated with sexual distress than were any of the other facets. In addition, *Acting with awareness* correlated significantly more negatively with sexual distress than *Describing*. These differential relationships with outcome measures support the relevance of measuring facets separately. The *Describing* facet's strong negative association with sexual distress suggests that noting or mentally labeling emotions, cognitions, and sensations during sexual activities might be related to decreased sexual distress. This result is consistent with neuroscience findings demonstrating that the conscious labeling of affect modulates the brain's responses to emotional stimuli (e.g., Lieberman et al., 2007), as well as with other studies that show describing the details of an emotional experience reduces general psychological distress (e.g., Vrielynck, Philippot, & Rimé, 2010).

Despite the behavioral features of the items of the *Acting with awareness* facet, the general tendency to be focused on one's bodily sensations during sex evoked by these items may explain its strong association with self-reported sexual distress. Indeed, previous research has found that a lack of focus on sensations during sex may make individuals more vulnerable to the development and maintenance of sexual dysfunctions (e.g., for a review, see Géonet et al., 2013). Previous psychological interventions aimed at reducing female sexual dysfunction target constructs that are very similar to the *Acting with awareness* facet. For instance, sensate focus, introduced by Masters and Johnson (1970), shares strong similarities with the *Acting with awareness* construct as depicted in the FFMQ-S. In this practice, patients are encouraged to focus on the sensations they experience during sex, rather than seeing orgasm as the sole goal of sex. It is thus not surprising that this facet exhibits the strongest negative association with self-reported sexual distress.

At a clinical level, by offering the first adaptation of a mindfulness scale to measure women's sexual functioning, future clinical MBI studies among women suffering from sexual difficulties will now be able to explore how such treatment may work. Indeed, recent studies have suggested that MBIs may be particularly suitable for addressing sexual difficulties in women (e.g., Brotto et al., 2012). Hence, for the mechanisms behind the efficacy of MBIs to be identified, a reliable instrument that captures the process of interest, such as the FFMQ-S, will be of great use in future studies.

Moreover, even if the present results suggest that the global score of the FFMQ-S exhibits better psychometric properties, the five facets of this measure appear to be statistically related to distinct processes underlying a more global mindfulness skill. Hence, it would be highly relevant to explore how these facets change as a result of MBIs and whether they are differentially related to treatment outcomes. Future studies should also explore whether different sexual dysfunctions differ on their facet scores, resulting in different profiles of mindfulness facets as a function of the sexual dysfunction. At the therapeutic level, this rationale underlines the need to develop treatments that are focused on the specific facets causing problems for patients. Indeed, several effective MBI programs have been recently proposed for women suffering from sexual dysfunction (e.g., Brotto et al., 2012). Nevertheless, these programs propose only a global mindfulness training intervention. In view of the present perspective, these interventions should be adapted to focus treatment on the problematic facet, as improving the preserved ones appears to be of little utility.

The present study suffers from several limitations. First, our sample comprised only nonclinical participants. Future studies should assess the structural validity of FFMQ-S among a clinical sample of women suffering from hypoactive sexual desire disorder and orgasmic disorder. Second, we assessed the construct validity only with self-report measures. Future studies should examine the correlation between this scale and behavioral as well as psychophysiological (e.g., skin conductance, vaginal dilation, hormonal release) responses to stimuli such as erotic films. Third, we did not assess the test-retest reliability of the scale, thereby limiting its use in clinical research applications. Indeed, when assessing change in pharmacological and psychotherapeutic treatments, some researchers recommend weighting each individual clinical change by the test-retest reliability (e.g., Jacobson & Truax, 1991; Heeren, Maurage, et al., 2012). This approach ensures that the clinical changes observed reflect more than the simple fluctuation of an imprecise measuring instrument. Fourth, none of the models reported in Table 1 appear to provide an optimal fit. Specifically, the CFI values were below .90. However, the CFI depends in large part on the average size of the correlations in the data. If the average correlation between variables is not high, then

the CFI will not be very high. Fifth, some of the factor loadings reported in Table 2 were very high. We cannot eliminate the possibility that overextraction may be an issue. However, as observed by Frazier and Youngstrom (2007), although CFI and  $\chi^2$  may lead to overextraction, AIC and RMSEA are more useful to derived factor structures examined with confirmatory factor analyses. To more adequately measure additional factors and thus structural validity, researchers may increase the length of the scale by including additional items. In that way, our scale development strategy was less than ideal, as we did not adapt all items of the FFMQ to sexual functioning. Instead, our scale was composed of items which were either adapted from the original FFMQ or which were a result of combining two or more items. Hence, future studies may increase the length of the scale by merely adapting all of the original FFMQ to sexual functioning. Furthermore, to best approach the construct validity of each factor, the use of multitrait-multimethod matrix strategies might be useful (Campbell & Fiske, 1959). Future studies should investigate this question.

In conclusion, this preliminary adaptation of the FFMQ to measure women's sexual functioning provides a valid measure of patients' sexual mindfulness skills for French-speaking clinicians as well for as researchers. Regarding its structural validity, confirmatory factor analyses replicated the previous model, suggesting a five-factor solution. These facets include the skills of *Observing* (attending to or noticing internal and external stimuli during sex, such as sensations, emotions, cognitions, sights, sounds, and smells), *Describing* (noting or mentally labeling these stimuli with words), *Acting with awareness* (attending to one's current sexual actions, as opposed to behaving automatically or absent-mindedly), *Nonjudging of inner experience* (refraining from evaluation of one's sensations, cognitions, and emotions during sex), and *Nonreactivity to inner experience* (allowing thoughts and feelings to come and go during sex, without attention getting caught up in them) as separate factors. Furthermore, it correlates with other constructs, such as sexual distress, in the expected directions. These findings have critical clinical consequences for the evaluation of sex-related mindfulness skills before and after the use of MBIs in the treatment of female sexual dysfunction.

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## SEXUAL FIVE-FACET MINDFULNESS QUESTIONNAIRE (FFMQ-S)

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## APPENDIX A: French Version of the FFMQ-S

Veillez évaluer chacun des énoncés suivant au moyen de l'échelle fournie. Cochez dans la zone de réponse le chiffre qui correspond le mieux à ce qui est généralement vrai pour vous lors des relations sexuelles avec votre partenaire.

	1	2	3	4	5
	jamais ou rarement vrai	rarement vrai	parfois vrai	souvent vrai	très souvent ou toujours vrai
	1	2	3	4	5
1. Je peux facilement identifier quand je suis excitée.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Quand mon/ma partenaire me caresse ou m'embrasse, il m'est difficile de percevoir les sensations corporelles que cela me procure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Je ne fais pas attention aux changements physiques quand je suis excitée (lubrification du vagin, chaleur, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Je remarque comment les gestes de mon/ma partenaire influencent mes émotions et mon excitation sexuelle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Je peux facilement faire comprendre à mon/ma partenaire ce qui me ferait du bien ou ce dont j'ai envie sexuellement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Il m'est difficile d'exprimer à mon/ma partenaire ce que je ressens lors des activités sexuelles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Je perçois facilement les émotions qui me traversent durant l'activité sexuelle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Je n'arrive pas à dire si une pratique sexuelle me plaît ou pas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Je suis incapable d'atteindre l'orgasme car je suis souvent distraite !	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. J'ai le sentiment d'être vraiment disponible et présente lors des activités sexuelles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. J'ai l'impression de faire l'amour en mode « automatique » sans vraiment « lâcher-prise » ou me « laisser aller ».	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. J'ai le sentiment de toujours avoir des activités sexuelles consenties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Je ne me critique pas quand j'ai des fantasmes que je juge trop « tabous ».	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Je me dis souvent que je devrais atteindre l'orgasme plus rapidement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Je pense que certaines de mes émotions sont mauvaises et que je ne devrais pas les ressentir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Je ne me juge pas quand je n'atteins pas l'orgasme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Quand je suis peu satisfaite de l'activité sexuelle, je peux prendre du recul et relativiser.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Quand j'ai des pensées négatives, je les remarque et les laisse passer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Quand j'ai des émotions négatives, je me laisse envahir par elles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## APPENDIX B: English Version of the FFMQ-S

Please rate each of the following statements using the scale provided. For each statement, select the number that best describes your own opinion of what is generally true for you during sexual encounters with your partner.

	1	2	3	4	5
	never or very rarely true	rarely true	sometimes true	often true	very often or always true
	1	2	3	4	5
1. I can easily identify when I'm sexually aroused.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. It's difficult for me to perceive physical sensations when my partner kisses me or caresses me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I don't pay attention to my physiological change when I'm aroused (e.g., vaginal lubrication, heat).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I realize how the gestures of my partner impact on my emotions and my sexual arousal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I can easily help my partner to understand what makes me feel good or what my sexual needs are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. It's difficult to express to my partner what I feel during intercourse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I easily feel my emotions during sexual intercourse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I'm unable to say if I like or dislike a specific sexual activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I cannot reach orgasm because I'm quite often absent-minded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I usually feel quite available and present during sexual intercourse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I have the feeling I have sex in an automatic way without being able to let go.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I have the feeling that all my sexual activities are consensual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I don't criticize myself when I have sexual fantasies that I consider to « taboo ».	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I think I should reach orgasm more quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I don't judge myself when I don't reach orgasm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I think that some of my emotions are bad and I should not feel them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. When I don't experience enough satisfaction during sexual activities I can take some distance and get perspective on that.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. When I have negative thoughts I feel them and let them go.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. When I have negative emotions I let them take over.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>