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## Validation of the French sexual mindfulness measure and its links with psychosexual well-being

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### ABSTRACT

Limited instruments are available to assess sexual mindfulness (i.e., state of mindfulness during sexual interactions) and understand its links with psychosexual well-being. The aim of this study was to examine the reliability and validity of a French version of the Sexual Mindfulness Measure (SMM) (Leavitt et al., 2019) and its relation to psychosexual outcomes (e.g., body image, sexual communication). A confirmatory factor analysis was conducted with a community sample of 541 adults ( $M$  age = 36.82,  $SD$  = 11.78). The factorial structure of the original English version of the SMM was replicated, and satisfactory internal consistency was found, suggesting that the French SMM can be considered a valid measure to capture sexual mindfulness in research and clinical settings. Results showed significant linear regressions with expected psychosexual outcomes, which suggests that increased sexual mindfulness could improve psychosexual well-being.

**Lay summary:** This study presents the validation of a questionnaire measuring sexual mindfulness - the level of awareness and non-judgment during sexual interactions. Findings support the validity of the questionnaire to measure sexual mindfulness in clinical and research settings; it also suggests that sexual mindfulness may predict sexual higher self-esteem and body image, and lower anxiety towards sexual communication.

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Sexual mindfulness; measure; French version; validation; psychosexual well-being

Interest in research on mindfulness has grown exponentially since the early 2000s (Brown et al., 2015). Mindfulness may be conceptualized as a disposition, a state, or a practice (Stevenson et al., 2017). Dispositional mindfulness is defined as the awareness that emerges when one pays attention to the present moment, in an accepting and nonjudgmental stance (Kabat-Zinn, 2003). A higher level of dispositional mindfulness has been associated with higher levels of relational (Barnes et al., 2007; Leavitt et al., 2019) and sexual satisfaction (Godbout et al., 2020), and higher sexual functioning, through better acceptance and awareness of thoughts, as well as emotions and physical sensations (Adam et al., 2015; Silverstein et al., 2011). Finally,

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links were reported between heightened dispositional mindfulness and a more constructive response to relational stress and conflicts (Barnes et al., 2007; Laurent et al., 2013), which may render sex less enjoyable (Maxwell & Meltzer, 2020) and less frequent (Tan, 2021). State mindfulness refers to the level of mindfulness present during a particular interaction in daily life (Brown & Ryan, 2003). Recent literature indicates that state mindfulness may foster psychosexual well-being, including within partnered intimate and sexual activities, satisfaction during intimate and sexual experiences, and sexual functioning (e.g., Dussault et al., 2020; Leavitt et al., 2019; 2021; Quinn-Nilas, 2020). Kozlowski (2013) found that mindfulness in sexual contexts may foster calmer thoughts, awareness, non-judgement, increased empathy, and a higher tolerance for anxiety that may interfere with sexuality.

Sexual mindfulness is defined as a subtype of state mindfulness occurring during partnered sexual activities (Leavitt et al., 2019). Being mindful during a meditation practice is quite different from being mindful during sex as it requires a much higher level of embodiment through the intensity of interoceptive sensations and perceptions, the ability to be present within oneself *and* in connection with a partner (Kleinplatz et al., 2018). Therefore, sexual mindfulness might require a more skillful navigation of an individual's mindful abilities than in other aspects of their daily activities (Leavitt et al., 2019, 2020b). However, sexual mindfulness has only been recently considered in research on psychosexual well-being; most of the research solely examined trait mindfulness in relation to psychosexual outcomes (e.g., Khaddouma et al., 2015; Pepping et al., 2018). Yet, trait mindfulness may be necessary but not sufficient to remain mindful in sexual interactions (Leavitt et al., 2019), which reinforces the need to examine sexual mindfulness. Specifically, examining interactions between sexual mindfulness and psychosexual well-being could prove useful to refine our understanding on mindfulness as well as helping individuals and couples in clinical settings.

### ***The sexual mindfulness measure***

Several measures exist to assess trait mindfulness (e.g., Baer et al., 2006; Brown & Ryan, 2003; Walach et al., 2006). However, to our knowledge, only two measures, the Sexual Five-Facet Mindfulness Questionnaire (FFMQ-S; Adam et al., 2015) and the Sexual Mindfulness Measure (SMM, Leavitt et al., 2019), assess one's level of sexual mindfulness. The FFMQ-S was adapted from the FFMQ (Baer et al., 2006) to measure female sexual functioning (e.g., "I think I should reach orgasm more quickly"; Adam et al., 2015). The FFMQ-S comprises 19 items based on the 5 dimensions of the FFMQ (observing, describing, acting with awareness, nonjudging, nonreactivity) and includes items that specifically mention intercourse and orgasm deemed to capture sexual functioning in women. The SMM was developed to measure the level of sexual mindfulness of individuals with any gender identity and sexual orientation, in the context of partnered sexuality, regardless of the sexual preferences and behaviors. The SMM was also adapted from the FFMQ, by translating the different items to sexual contexts. It offers a briefer measure (7 items) to evaluate an individual's level of sexual mindfulness through awareness and

nonjudgement during sexual interactions (Leavitt et al., 2019). Using brief scales in research and clinical settings for rapid screening purposes is highly recommended, notably to maintain motivation when data collection involves multiple scales (Bóthe et al., 2020). The original English version of the SMM has been validated in both adult and adolescent samples (Leavitt et al., 2019, 2020a). The English version of the SMM showed a two-factor solution and satisfactory internal consistency for both awareness ( $\alpha$  .71-.82) and nonjudgement ( $\alpha$  =.70-.76) subscales. Construct validity of the SMM was supported through positive correlations with sexual satisfaction, self-esteem, self-efficacy, and body esteem among adult and adolescent samples (Leavitt et al., 2019, 2020a). However, the reliability and validity of the French version has yet to be examined, as previous studies have only presented a validated version of the SMM in English, and in US-based samples (e.g., Leavitt et al., 2019; 2020a, 2020b). Therefore, validated versions of the SMM in other languages and populations are required to assess the generalizability of the measure, and to encourage its applicability in non-English research and intervention contexts.

### ***Overview of mindfulness and psychosexual outcomes***

Research on sexual mindfulness, particularly in relation with other psychosexual outcomes, is relatively recent and burgeoning. Most of the research linking mindfulness to psychosexual outcomes has been done using measures of dispositional mindfulness, such as the Mindful Attention Awareness Scale (Brown & Ryan, 2003) or the Five Facets Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The validation of the FFMQ-S (Adam et al., 2015), which also assesses sexual mindfulness in the context of female sexual functioning, solely explored its correlation with sexual distress in a sample of women, and showed that a higher score on the S-FFMQ is associated with lower sexual distress. The original validation study of the SMM indicated that sexual mindfulness predicts self-esteem above and beyond mindfulness (Leavitt et al., 2019). Indeed, sexual self-esteem, defined as the confidence one feels in experiencing sexuality (Tan & Yarhouse, 2010), might be linked to sexual mindfulness by its processes of awareness and nonjudgment. Moreover, it appears likely that sexual mindfulness may be inversely associated with rumination, and in turn, harsh self-evaluations during partnered sex (Leavitt et al., 2020a). However, the specific link between higher sexual mindfulness and higher sexual self-esteem must be reinvestigated within other samples (e.g., adult, French-speaking) for further validation.

In another aspect, sexual anxiety often occurs with cognitive distractions, which weaken one's focus on intimate, erotic, and sexual stimuli, and might therefore be inversely associated with mindfulness (Newcombe & Weaver, 2016). Furthermore, anxiety may be heightened in sexual contexts (e.g., on sexual desire; Déziel et al., 2018; Godbout et al., 2020). The regulation of one's emotional and cognitive states plays an important role in the reduction of anxiety, therefore higher anxiety is linked to a lower level of dispositional mindfulness (Déziel et al., 2018). Nonetheless, investigating potential anxiogenic sexual contexts, such as communication about sexuality with one's partner, appears relevant to examine to assess the validity of the French version of the SMM.

Finally, previous research found positive correlations between sexual mindfulness and body image in an adolescent sample (Leavitt et al., 2020a). While more research must explore the possible relation between sexual mindfulness and body image, this relation should be examined to appreciate the predictive validity of the French SMM among an adult sample. In fact, research on trait mindfulness and body image found a general positive relationship between both variables, for instance through a decrease to the drive for muscularity in men, and to body comparison in women (Dijkstra & Barelds, 2011; Lavender et al., 2012). In light of past research exploring dispositional mindfulness and its correlates, validating the French-SMM would allow to examine its validity and reliability in an adult French-speaking sample. Moreover, longitudinal studies would allow to establish predictors of sexual mindfulness (e.g., sexual self-esteem, sexual communication, body image), rather than correlates.

### ***Sociodemographic characteristics and sexual mindfulness***

Gender-related patterns have been documented regarding mindfulness dispositions, with women reporting lower awareness to their physical sensations and more focus on their partners' pleasure compared to men (Chivers et al., 2010; Sanchez et al., 2006). Higher age was also found to be associated with lower sexual mindfulness, probably because of the apparition or increase of sexual problems with age (Waite et al., 2009), and with higher sexual mindfulness since awareness of sexual interactions might increase with age (Leavitt et al., 2019; Splevins et al., 2009). Relationship status also needs to be examined within a validation study as it has been linked to higher or lower sexual mindfulness, probably because single individuals might not have the same opportunities as partnered individuals to practice sexual mindfulness, at least within relational contexts (Dussault et al., 2020). Finally, a study validating a measure of sexual mindfulness needs to examine its links with participants' income as lower income has been associated with more stress, which is in turn associated with lower dispositional mindfulness (Chiesa & Serretti, 2009; Senn et al., 2014). Such sociodemographic differences make appropriate the comparison between groups (e.g., men and women, single and partnered individuals) to assess whether variations are found on sexual mindfulness. Precisely, previous studies indicate that men, older adults, individuals in a relationship and with a higher income should score higher on sexual mindfulness.

### ***Research aims and hypotheses***

This study aims to validate a French version of the SMM (Leavitt et al., 2019) through its factor structure, internal consistency, and predictive validity, within a French-Canadian sample. We hypothesized that the confirmatory factor analysis would replicate the two-factor structure of the original measure ( $H_1$ ) (Leavitt et al., 2019) and that the SMM would demonstrate acceptable internal consistency ( $H_2$ ). The study also aims to examine convergent validity through the links between the French SMM and three psychosexual outcomes (i.e., sexual self-esteem, sexual communication, and body image). We hypothesized that higher sexual SMM (i.e., higher

sexual non-judgement and awareness) will positively predict sexual self-esteem, sexual communication, and positive body image ( $H_3$ ). Finally, we aimed to compare both factors of the SMM on sociodemographic variables (i.e., gender, age, relationship status, and personal income). Based on previous research, we hypothesized that men, older adults, individuals with a higher personal income and in a relationship would present higher scores on SMM ( $H_4$ ).

## Method

### Participants

Initially, 652 individuals participated in the study. After eliminating missing data and incomplete responses (e.g., participants who had not completed the SMM scale) the final sample included 541 participants at Time 1 (baseline), representing an attrition of 17%. They were aged from 18 – 69 years, ( $M$  age= 36.21,  $SD$ = 11.63). The sample identified as women (60.2%), men (35.2%) and nonbinary (4.7%). Most participants were Canadians (84.8%) and were currently employed (59.5%) or studying (23.8%). Almost half of the sample (50.6%) reported being in a relationship, 31.6% were single, and 12.4% were married. Among participants, 70.8% self-identified as heterosexual, 8.9% as bisexual, 9.8% as homosexual, 5.4% pansexual, and 0.7% as asexual. While there are multiple recommendations regarding appropriate sample size for factor analysis (e.g., minimum of 10 participants per item; Boateng et al., 2018), larger samples provide more stable factor loadings (MacCallum et al., 1999) and 500 or more observations is considered a good sample size to conduct factor analyses (Boateng et al., 2018). Among the 541 participants, 305 completed the questionnaires at Time 2. Results of group comparison indicated that participants ( $n=305$ ) who completed the targeted questionnaires at Time 2 did not significantly differ from the Time 1 sample on sociodemographic characteristics.

### Procedure

This study was part of a larger longitudinal research project examining sexual anxiety in a community sample (Lafortune et al., 2021). Participants were recruited through social media (*Facebook*, *Instagram*) and invited to complete an online questionnaire hosted on the platform Qualtrics. To participate, individuals had to be at least 18 years of age and have a sufficient knowledge of French to complete the survey (20 to 40 minutes to complete). Email addresses were collected and stored on a password protected excel sheet, from participants who consented to be contacted to complete the survey a second time. Two months after Time 1, these participants were invited to complete the survey again by a private email containing a customized link to the questionnaire hosted on Qualtrics. Participants could subscribe to a prize draw following their participation; participants who completed the Time 2 survey doubled their chances for the prize draw (their numbers were entered twice). The study was approved by the Institutional Ethics Review Board of the Université du Québec à Montréal.

## **Instruments**

A sociodemographic questionnaire was used to gather information on participants' characteristics (e.g., age, gender, sexual orientation, relationship status).

### ***Sexual mindfulness measure***

The SMM (Leavitt et al., 2019) is a 7-item self-report questionnaire that comprises two subscales: awareness of one's sexual experience (4 items, e.g., "I pay attention to sexual sensations") and non-judgement of sexual experience (3 items, e.g., "During sex, I sometimes get distracted by evaluating myself or my partner"; reverse item). Participants respond on a 5-point scale ranging from 1 (*never or rarely true*) to 5 (*very often or always true*), where higher scores represent higher levels of sexual mindfulness. The SMM has showed satisfactory internal consistency in previous studies, with Cronbach's alphas ranging from .70 to .78 (Leavitt et al., 2019).

The translation methodology was inspired from Vallerand's model of back translation regularly used for translating from the English language to a French version (Vallerand, 1989). First, two bilingual translators, who spoke French as their first language, independently translated the SMM. Then, one independent translator and native English speaker – with no access to the original items – back-translated the French items into English. The two versions of the questionnaire were then compared to ensure their optimal similarity. The SMM was completed at Time 1 (baseline) of the study by the participants. The final French SMM is available in Appendix A.

### ***Validation questionnaires***

***Sexual self-esteem.*** The five-item self-esteem subscale from the French Multidimensional Sexuality Questionnaire (Brassard et al., 2015) was used to measure sexual self-esteem at Time 1 and Time 2 (5 items, e.g., "I am confident about myself as a sexual partner). Participants rated the items on a Likert scale ranging from 1 (*not at all characteristic of me*) to 5 (*very characteristic of me*). The measure showed satisfactory internal consistency in previous samples (e.g.,  $\alpha = .87$ ; Snell et al., 1993), and showed satisfactory to acceptable internal consistency in the present sample ( $\alpha = .93$  Time 1;  $\alpha = .92$  Time 2).

***Sexual communication.*** Sexual communication was measured at Times 1 and 2 of the study, using the sexual communication subscale of the validated French version of the Sexual Anxiety Scale – Brief Form (SAS-BF; Lafortune et al., 2021). It includes four items measuring participants' ease with sexual communication, on an 11-point Likert scale ranging from 0 (*extremely pleasurable*) to 100 (*extremely discomforting*) (e.g., "Discussing sexual fantasies with my partner"). A sum of the items is computed; a higher score represents higher anxiety regarding sexual communication. The internal consistency was good in current study ( $\alpha = .87$ ;  $\alpha = .89$  Time 2).

***Body image states scale (BISS; Cash et al., 2002).*** The French version of the BISS was included at Time 2 of the study to assess body image. The BISS consists of six items measuring how participants feel about their bodies (e.g., weight, attractiveness) in the present moment, on a 9-point Likert scale ranging from 1 (*extremely dissatisfied*)

to 9 (*extremely satisfied*). Alphas ranged from .62 to .90 in the original sample, and was acceptable in the current sample ( $\alpha = .87$ ).

### **Statistical analyses**

Internal consistency for both awareness and non-judgement factors were tested by calculating Cronbach's alphas ( $\alpha \geq .70$  for acceptable,  $\geq .80$  for good,  $\geq .90$  for excellent; Nunnally, 1978). A confirmatory Factor Analysis (CFA) was performed using Mplus v7.3 (Muthén & Muthén, 2015), to examine the factorial structure of the French SMM. The CFA model was assessed using several goodness-of-fit indices (Boateng et al., 2018; Hu & Bentler, 1999): (1) Root-Mean-Square Error of Approximation (RMSEA), which assesses the model fit ( $\leq .06$  for good,  $\leq .08$  for acceptable; Caron, 2019) with its 90% confidence intervals; (2) Comparative Fit Index (CFI) to compare the model estimated to a null model (satisfactory values are  $\geq .90$ ; Kline, 2005); and (3) Tucker–Lewis Index (TLI) to appreciate the fit of the model relative to the null model (optimal values above .95; Bentler & Bonett, 1980). Factor loadings and correlations between items were also examined according to established standards for CFA model assessment (Boateng et al., 2018). According to a review by Boateng et al. (2018), factor loadings under .40 are considered inadequate as they contribute to < 10% of the variation. Furthermore, correlations above .70 between items of different subscales (i.e., awareness and non-judgement) could indicate multicollinearity issues (Böthe et al., 2020). Items were treated as continuous indicators and the default maximum likelihood estimator was applied for missing data (Muthén & Muthén, 2015).

Multiple-group analysis (Muthén & Asparouhov, 2013) was conducted on the resulting CFA model to establish model invariance in men and women. The configural model was assessed simultaneously for both women and men, allowing all paths to be estimated freely to ensure that it is a well-fitting model across genders. This configural model also provides a comparison base to examine a more restrictive (constrained) model of gender invariance. We then tested a constrained model (Metric Invariance Model) where all paths (loadings) were constrained to be equal across genders and compared models using the chi-square difference test (Satorra–Bentler scaled chi-square; Satorra & Bentler, 2001). A non-significant chi-square difference ( $\Delta\chi^2$ ), and satisfactory fit indices (i.e., adding constraints of equality across gender does not worsen the fit) indicates gender invariance (Chen, 2007; Putnick & Bornstein, 2016).

To test the predictive validity of the French SMM, descriptive and inferential data analyses were performed on SPSS v27. Multiple regressions were performed to predict 1) sexual self-esteem (T2) from sexual awareness and non-judgement, controlling for sexual self-esteem at T1, 2) sexual communication (T2) from sexual awareness and non-judgement, controlling for sexual communication at T1, and 3) body image (T2) from sexual awareness and non-judgement (T1). Finally, sociodemographic differences in SMM levels were tested using independent samples *t*-tests, ANOVA with polynomial contrasts, and correlations. Magnitude of effect sizes for *t*-tests (Cohen's *d*: small, from .20; medium from .50; and large from .80; Cohen, 1988) and correlations with convergent and divergent constructs (*r*: small, from .10; medium from .30; and large from .50) were reported.

## Results

### **Validation of the french version of the SMM**

The French-SMM displayed satisfactory internal consistency on both the awareness ( $\alpha = .80$ ) and non-judgement ( $\alpha = .70$ ) subscales in the present sample.

### **Factorial structure of the french SMM**

The CFA of the French-SMM successfully replicated the two-factor (*awareness* and *non-judgement*) structure of the original SMM scale (Leavitt et al., 2019) with satisfactory fit indices:  $\chi^2(13) = 52.12$ ; RMSEA = .075 (90% CI .054 – .096); CFI = .965 and TLI = .943. All seven items displayed adequate factor loadings ( $> .40$ ) on their respective factors (see Figure 1), with items one through four loading on the *awareness* factor and items five through seven on the *non-judgement* factor, replicating the results of the original version of the SMM. No multicollinearity issues ( $r > .70$ ) were identified between items. Results revealed two distinct factors, with a relatively low correlation between the awareness and non-judgement subscales ( $r = .184$ ).

Results of multiple-group analysis revealed a well-fitting multigroup configural model ( $\chi^2(26) = 65.86$ ; RMSEA = .084 (90% CI (.059, .110); CFI = .957 and TLI = .931), suggesting a general equivalence of the model specifications across men and women. The model was then retested constraining all paths to be equal across men and women. Results showed that the constrained model also fit the data well ( $\chi^2(31) = 67.76$ ; RMSEA = .074 (90%CI (.505-.098); CFI = .961 and TLI = .947), without significant differences between the configural and constrained models based on chi-square values ( $\Delta\chi^2 1.897, p = .863$ ), which indicates gender invariance.

### **Predictive validity**

Regression coefficients and standard errors can be found in Table 1. Results showed that sexual awareness measured at T1 significantly predicted sexual self-esteem (Time 2), even while controlling for sexual self-esteem at T1. Similarly, sexual awareness measured at T1 significantly predicted sexual communication 2 months later (Time 2), when controlling for sexual communication at T1. Results also indicated a significant effect of sexual awareness on body image.

### **Sociodemographic differences**

Independent sample *t*-tests, correlation and ANOVA were performed on the following variables: gender, age, relationship status and socioeconomic status. Results revealed significant differences on the *non-judgement* scale. Precisely, results indicated differences between men and women  $t(473,132) = -2.19, p = .029; d = 0.20$ , with men reporting slightly higher scores ( $M = 10.55; SD = 2.52$ ) on the non-judgement scale compared to women ( $M = 9.98; SD = 3.24$ ), with a small effect size. Nonbinary individuals were not included in this gender analysis, their number in the sample being insufficient for multi-group analyses ( $n = 32$ ). The link between age and sexual non-judgment was

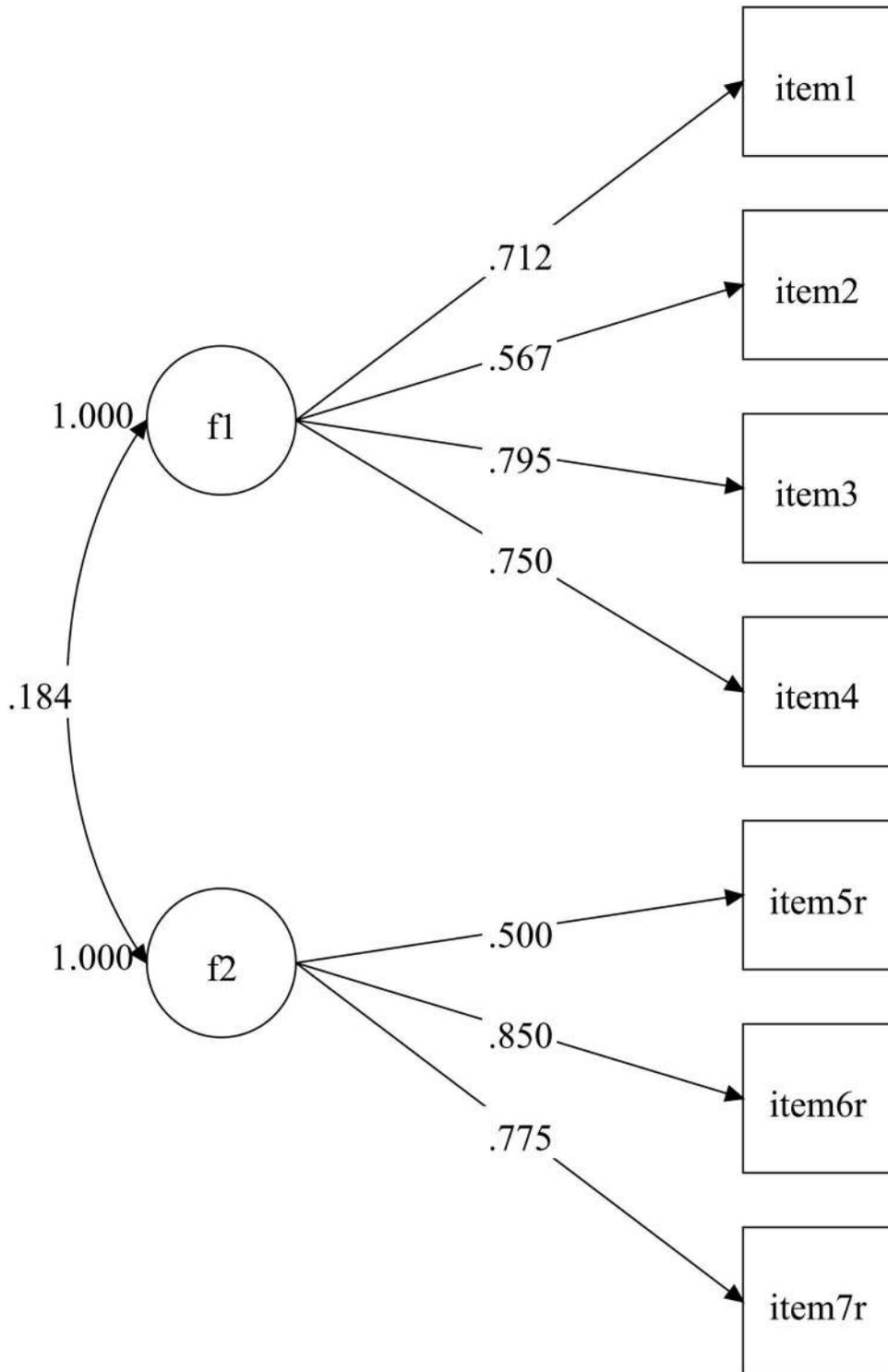


Figure 1. Confirmatory factor analysis of the French Sexual Mindfulness Measure.

**Table 1.** Multiple regression results for psychosexual outcomes.

	<i>B</i>	95% CI for <i>B</i>		<i>SE B</i>	$\beta$	$\Delta R^2$	<i>F</i> ( <i>df</i> )	<i>p</i>
		<i>LL</i>	<i>UL</i>					
Sexual self-esteem T2						.70**	5.73 (2, 258)	.040
Constant	-.361	12.32	1.60	1.00				
Sexual self-esteem T1	.742	.66	.82	.04	.75***			
SM- awareness	.214	.09	.34	.06	.14**			
SM – non-judgement	.043	-.08	.16	.06	.03			
Sexual communication T2						.22**	7.51 (2, 260)	.010
Constant	203.40	137.57	269.22	33.43				
Sexual communication T1	.097	.06	.13	.02	.34***			
SM- awareness	-5.94	-9.18	-2.70	1.65	-.21***			
SM – non-judgement	-2.65	-6.00	.71	1.70	-.09			
Body image T2						.03*	4.54 (2, 258)	.012
Constant	2.33	.73	3.93	.81				
SM- awareness	.121	.03	.21	.05	.17**			
SM – non-judgement	.06	-.035	.16	.05	.08			

Note. Model=Enter method in SPSS Statistics; *B* = unstandardized regression coefficient; CI=confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient;  $\beta$  = standardized coefficient;  $R^2$  = coefficient of determination;  $\Delta R^2$  = adjusted  $R^2$ .

\**p* < .05.

\*\**p* < .01.

\*\*\**p* < .001.

tested, and revealed a significant relationship between both variables ( $r = .11$ ,  $p = .008$ ). ANOVA with polynomial contrasts indicated there was a linear, but not quadratic, relationship between the categories of socio-economic status (personal annual income: 0-19.999 CAD, 20.000-39.999 CAD, 40.000-59.999 CAD, 60.000-79.999 CAD, 80.000-99.999 CAD, 100.000+CAD)  $F(5) = 3.01$ ,  $p = .011$ , indicating that participants with lower incomes reported lower sexual non-judgment. Analyses on relationship status contrasted individuals in any form of stable relationship (dating, cohabiting, married), to single or separated individuals. No significant differences were found between both groups. In conclusion,  $H_4$  is partly rejected.

## Discussion

Despite the increasing popularity of mindfulness research (Brown et al., 2015), including in psychosexual settings (Vilarinho, 2017), very few studies have investigated the specificities of sexual mindfulness (i.e., the awareness and nonjudgment of one's sexual experience) and its relation to psychosexual outcomes (Leavitt et al., 2019, 2020a). This study aimed to validate the French version of the SMM and to examine its potential in predicting psychosexual outcomes.

The confirmatory factor analysis of the French version of the SMM successfully replicated the two-factor structure (awareness and nonjudgment) of the original structure (Leavitt et al., 2019), with good model fit and item loading similar to previous studies that investigated the structure of the SMM (Leavitt et al., 2019). Invariance analyses indicated that the model was a good representation of the data in men and women. Relatively low correlations were found between both factors, replicating results in previous studies, and suggesting that awareness and nonjudgment represent distinct mechanisms related to the ability to remain mindful during sexual interactions (Leavitt et al., 2019, 2020a). Results also indicated satisfactory internal

consistency for each scale. Therefore, the French SMM appears to present satisfactory structural validity and internal consistency. Since the SMM is brief, it is a relevant option to minimize dropout rates or attrition within studies, and to assess sexual mindfulness within clinical contexts where resources and time might be limited.

Results indicated that higher sexual self-esteem, lower anxiety towards sexual communication, and a more positive body image were predicted by higher levels of sexual awareness, but not by sexual non-judgement ( $H_3$ ). These findings are in line with other studies that established that higher sexual mindfulness, including non-judgment, is associated with higher sexual self-esteem (Leavitt et al., 2019), lower sexual anxiety (Lafortune et al., 2021; Dunkley et al., 2015; Newcombe & Weaver, 2016) and body image (Leavitt et al., 2020a). Our findings add to the current body of literature that sexual awareness predicts some psychosexual outcomes (namely, sexual self-esteem, sexual communication and body image). Moreover, this study adopted a design allowing to examine the links between sexual mindfulness and sexual outcomes at T2 (2 months later) while controlling for each outcome at T1 of the study. The absence of significant effect for sexual non-judgement might be explained by the possibility that non-judgement (of the self, the other, sexual stimuli during partnered sex, etc.) does not predict “change” between T1 and T2 in psychosexual outcomes. However, further research is needed to confirm these assumptions. Qualitative studies could also help to better understand the mechanisms and subjective experiences linking non-judgment to sexual outcomes. In sum, results show that increasing awareness during partnered sexual activities might foster sexual self-esteem and body image, and decrease anxiety towards sexual communication 2 months later.

The levels of non-judgement within sexual mindfulness varied by gender, with men presenting higher scores. This finding is partly consistent with previous studies that found a higher awareness of sexual sensations (i.e., a component of sexual mindfulness) in men (Chivers et al., 2010; Sanchez et al., 2006). In line with our results, we could hypothesize that men are more comfortable with sexual stimuli (e.g., Bigras et al., 2017; Lafortune et al., 2021), which might lower judgmental distractions during sexual interactions. Moreover, levels of non-judgement also varied according to age groups and socioeconomic status, higher scores being found in older adults and individuals with a higher personal revenue. These results are partly consistent with previous research yielding that older individuals present higher levels of both sexual and dispositional mindfulness (Leavitt et al., 2019; Splevins et al., 2009), and that individuals with a lower socioeconomic status may experience more stress, which is related to lower disposition towards mindfulness (Chiesa & Serretti, 2009; Senn et al., 2014). This emphasizes the need, as researchers and clinicians, to remain sensitive of sociodemographic specificities (e.g., gender, age, socioeconomic status) when assessing individuals' level of sexual mindfulness. However, the small effect sizes highlight that other factors may play a more crucial role in the unfolding of SMM in adulthood (e.g., relational distress, minority status). However, no significant differences were found between single and partnered individuals, which is contrary to past literature (e.g., Dussault et al., 2020). Exploring relational contexts (e.g., level of relationship satisfaction, adjustment, security, satisfaction towards one's relational status) may provide crucial information in the way being mindful during sexual experiences unfolds and is perceived by single and partnered individuals.

## **Limitations and future studies**

Although the present study provides a significant contribution to the sexual mindfulness literature, certain limitations should be noted. Firstly, this study used self-reported data on a self-selected sample. Thus, the results may be prone to biases such as shared method variance, social desirability, and recall biases (Boislard & Poulin, 2015). Secondly, the sample was not representative of the general population (e.g., predominantly women). Although 4.3% of the sample was composed of non-binary individuals, a limitation of the current study is that this proportion was not sufficient to include them in gender invariance and multi-group comparison analyses. Regarding sexual orientation, the representativity of orientations (people identifying as homosexual, pansexual, etc.) represents a strength within the study. Future research should focus on the structure of the SMM and its psychosexual outcomes in a LGBTQ+ population in order to assess replicability of these results. Moreover, we did not control for the engagement in a formal mindfulness practice although participants with mindfulness training have been shown to be more aware and non-judgmental of their sexual sensations and interactions, with positive repercussions on psychosexual outcomes (Dussault et al., 2020). Further research should investigate potential differences between meditators and non-meditators in their levels of SMM, to capture how this scale might measure a particular form of state mindfulness rather than a trajectory related to meditative mindfulness (Leavitt et al., 2019).

## **Conclusion**

The French SMM shows satisfactory psychometric qualities, which offers a relevant contribution for research and clinical settings in French-speaking contexts. Predicting psychosexual outcomes from sexual awareness suggests that mindfulness-based interventions for individuals presenting difficulties in sexual self-esteem, anxiety towards sexual communication and low body image should be developed and tested. Sociodemographic differences in the levels of mindfulness may also help promote sexual mindfulness in tailored ways considering individuals' sociodemographics.

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## **Disclosure statement**

No conflict of interest has been declared by the authors.

## **Ethical approval**

All procedures involving human participants performed in this study were approved by the Institutional Ethics Review Board of Université du Québec à Montréal (certificate number: 4025\_e\_2020).

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## Appendix A. French version of the sexual mindfulness measure

Veillez répondre en indiquant dans quelle mesure chacun des énoncés s'applique à vous.

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### Awareness

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Je porte attention aux sensations sexuelles.

Je porte attention à la façon dont le sexe affecte mes pensées et mon comportement.

Je peux habituellement décrire ce que je ressens sexuellement dans le moment présent avec détail.

Je suis attentif/attentive à mes émotions lors des relations sexuelles.

### Non-judgement

Je suis parfois distrait/distraite par ma tendance à m'évaluer ou à évaluer mon/ma partenaire pendant les relations sexuelles.

Durant les relations sexuelles, je deviens tendu/tendue lorsque j'ai une pensée avec laquelle je ne suis pas à l'aise.

Parfois, une certaine pensée dans ma tête peut ruiner toute l'expérience sexuelle.

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