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"Doing it" for the right reasons: Validation of a measurement of intrinsic motivation, extrinsic motivation, and amotivation for sexual relationships

Emilie Eve Gravel *, Luc G. Pelletier, Elke Doris Reissing

School of Psychology, University of Ottawa, Ottawa, Ontario, Canada

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ABSTRACT

This investigation examined the psychometric properties of the Sexual Motivation Scale (SexMS), a scale measuring the different types of self-regulation proposed by SDT in the context of sexual relationships: Intrinsic motivation, extrinsic motivation, and amotivation. We analyzed the construct validity of the SexMS in two studies (Study 1: $N = 1070$, Study 2: $N = 575$). Results from a confirmatory factor analysis indicated that the SexMS can adequately reproduce the correlated six-factor structure posited by SDT. Findings from measurement invariance analyses as a function of gender and relationship type (i.e., casual and committed), tests for internal consistency, and correlational analyses all provided support for the reliability and the validity of the SexMS. Importantly, self-determined sexual regulation was associated to positive sexual health and well-being outcomes, whereas the inverse was found for non-self-determined sexual regulation. Additionally, participants who scored within the problematic range of sexual function showed a greater endorsement of non-self-determined sexual regulation and a lower endorsement of self-determined sexual regulation than those who scored in the non-problematic range. Overall, the SexMS provides a valuable tool to investigate sexuality within a SDT framework and a fine-grained measurement for the examination of the motivational processes associated with sexual health and well-being.

1. A new measurement of intrinsic motivation, extrinsic motivation, and amotivation for sexual relationships

Human sexuality is a core dimension of the self and a driving force in our lives that has the potential to both promote and undermine well-being (e.g., Byers & Rehman, 2014; Diamond & Huebner, 2012; Impett, Muise, & Peragine, 2014). One crucial factor to our understanding of how sexuality leads to either positive or negative consequences for our well-being is sexual motivation, or the reasons why we engage in sexual relationships (Byers & Rehman, 2014; Impett et al., 2014). In the present article, we propose that self-determination theory (SDT; Deci & Ryan, 2000) can be used as a lens to examine how sexual motivation is associated to positive or negative outcomes. SDT is a meta-theory of motivation that defines six motivational orientations posited to differ in their quality, thus bearing different consequences for psychological functioning. As SDT research is expanding its breadth to the domain of intimate relationships (see Knee, Hadden, Porter, & Rodriguez, 2013; LaGuardia & Patrick, 2008), we feel that motivational processes related to sexuality can meaningfully contribute to this emerging body of literature given the mounting evidence on the key role of sexuality in the determination of well-being (for reviews, see Byers & Rehman, 2014; Diamond & Huebner, 2012; Impett et al., 2014). Yet, there are currently few instruments available to measure the six types of motivation posited by SDT (see Jenkins, 2003, for a 5-factor measure of sexual motivation and Vrangalova, 2014, for a 3-factor measure of motivation for casual sexual relationships). In this paper, we introduce the Sexual Motivation Scale (SexMS), a new tool designed to measure the different types of motivation proposed by SDT and their associations to positive and negative sexual outcomes.

1.1. Self-determination theory

According to SDT, optimal functioning depends on the extent to which a person's behavior is self-determined or, in other words, autonomous (Deci & Ryan, 2000). Specifically, autonomy in the context of SDT is experienced when one's behavior is genuinely coherent with one's self (de Charms, 1968). It is contrasted to heteronomy, which is experienced when one's behavior is controlled by internal or external pressures (Ryan, 1993). SDT explains how people regulate their behavior by positioning these two experiences as poles on a continuum of relative self-determination.

* Corresponding author at: 136 Jean-Jacques Lussier, Room 4009, Ottawa, Ontario, Canada. Tel.: +1 613 562 5800x2220.
E-mail address: egrav037@uottawa.ca (E.E. Gravel).

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Intrinsic regulation is the most autonomous type of motivation and involves engaging in activities for their own sake and because of the inherent pleasure they provide. These behaviors are fully volitional and genuinely endorsed by the self. Engaging in sexual activities because they are fun or because they provide pleasant sensations, for instance, denotes intrinsic motivation. We also engage in activities not because they are inherently pleasurable, but because they represent a means to an end. To account for this experience, SDT proposes four types of extrinsic motivation varying in the extent to which they are experienced as autonomous (Deci & Ryan, 1985, 2000). From the most to the least autonomous, these are integrated, identified, introjected, and external regulations. *Integrated regulation* is the most autonomous form of extrinsic motivation; the behavior is fully internalized and endorsed by the self, meaning that it is coherently and harmoniously integrated to other aspects of the self. With respect to sexuality, this would be exemplified by engaging in sexual activities because they express an integral and meaningful part of one's identity. *Identified regulation* is also experienced as autonomous, yet to a lesser extent than integrated regulation as the behavior is perceived as personally significant, but it is not integrated to one's values and identity. Engaging in regular sexual activities because they are a normal and healthy part of life is an example of an identified sexual motive. With *introjected regulation*, behaviors are regulated by internal pressures, such as to maintain or enhance one's self-worth, or to avoid anxiety, guilt or shame. As such, they are not experienced as autonomous. These motives are typically exemplified by engaging in sex to validate certain aspects of the self, such as to prove that one is a good lover. The least autonomous type of extrinsic motivation, *external regulation*, characterizes behaviors controlled by external pressures, namely receiving rewards or avoiding punishments imposed by others. Having sex to avoid conflicts with a partner is an example of an externally regulated sexual activity. The least self-determined regulation is *amotivation*, which designates a complete absence of motivation due to either a lack of control or efficacy over the behavior. Amotivation is referred to as an *impersonal* form of motivation due to this absence of intention in the regulation of behavior. It is thus highly distinct from the other types of motivation, all of which involve some degree of intention.

The existence of the continuum of relative self-determination is usually demonstrated by determining whether a simplex pattern of correlations underlies the six types of regulation (Ryan & Connell, 1989). A simplex pattern is an ordered arrangement of correlations in which the variables that are more conceptually similar display stronger correlations than the variables that are less conceptually similar (Guttman, 1954). In the context of SDT, this means that motivations that are hypothesized to be adjacent on the continuum of self-determination should correlate more strongly and more positively than those that are further apart. Evidence for simplex patterns has been found for several SDT-based instruments measuring motivation in different life domains (e.g., Blais, Sabourin, Boucher, & Vallerand, 1990; Gagné et al., 2010, Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013; Ryan & Connell, 1989; Vallerand et al., 1992).

As a theory of optimal functioning, a central axiom of SDT is that the quality of our motivation matters to our well-being. Specifically, greater self-determined motivation (i.e., intrinsic motivation, integrated, and identified motivation) relative to non-self-determined motivation (i.e., introjected and external regulation and amotivation) tends to be associated with more positive outcomes and less negative outcomes (Deci & Ryan, 2000; Vallerand, 1997). The opposite is true for experiencing greater non-self-determined motivation relative to greater self-determined motivation. These associations have been demonstrated using a variety of methodologies and in multiple domains (for reviews see Guay, Ratelle, & Chanal, 2008; Knee et al., 2013; Mahoney, Ntoumanis, Mallett, & Gucciardi, 2014; Ng et al., 2012; Standage & Ryan, 2012). Accordingly, framing sexual motivation in terms of self-determination can provide important insights on the factors associated to either positive or negative sexual outcomes. SDT-based sexuality research is scant, but the results of available studies lend support to the notion that self-determination matters to sexual well-being. Specifically, self-determined sexual motivation is positively associated to sexual self-schemas, sexual self-esteem, sexual vitality, orgasm frequency, positive sexual affects, sexual pleasure, sexual satisfaction, and experiencing feelings of autonomy, competence, and relatedness during sex (Boislard-Pépin, Green-Demers, Pelletier, Chartrand, & Séguin Lévesque (2002); Brunell & Webster, 2013; Jenkins, 2003; Vrangalova, 2014). The correlates of sexual self-determination also span beyond the domain of sexuality as greater self-determined sexual motivation is associated to general functioning outcomes, such as less physical symptoms, more positive affect and less negative affect, lower symptoms of depression and anxiety, greater life satisfaction and vitality, and to positive relational outcomes such as greater intimacy, commitment, passion and satisfaction (Brunell & Webster, 2013; Jenkins, 2003; Vrangalova, 2014).

From a theoretical perspective, more specifically from the vantage point of the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 1997), motivation exists at the global level, at the contextual level, and at the situational level. Sexual motivation can be measured both at the contextual level (i.e., a dispositional motivation that is specific to the context of sexuality) and at the situational level (i.e., motivation for sexual activities on a day-to-day basis). The HMIEM predicts that sexual motivation at the contextual level can be a predictor of the ways people approach their sexual activities in general and a predictor of one's motivation on a day-to-day basis (Vallerand, 1997). It would also predict that situational sexual motivation can be influenced by both sexual motivation at the contextual level and by other characteristics of the situation that could be salient at a specific moment in time (Vallerand, 1997).

Importantly, the HMIEM posits that motivation at a given level will be associated with well-being outcomes at that same level (Vallerand, 1997). Sexual motivation at the contextual level should therefore be the best predictor of contextual sexual outcomes while situational sexual motivation should be the best predictor of sexual outcomes experienced at a specific point in time. Therefore, measuring sexual motivation at the contextual level is likely to be better suited for medium- and long-term longitudinal investigation of sexual health and well-being than sexual motivation at the situational level. Overall, examining sexual motivation from a situational perspective is an important component of the motivational underpinnings of sexual behavior as the nature of the reasons to engage in sexual activities are modulated by a host of contextual factors (e.g., current mood, health status and quality of the interaction with the sexual partner on that day). However, investigating sexual motivation as an individual difference in the context of sexuality is important as well given its potential to explain both between-person variations in sexual health and well-being and within-person variations in sexual motivation.

1.2. Development of the Sexual Motivation Scale

The SexMS is a measurement of sexual motivation that assesses the reasons for which a person engages in sexual relationships in general (Green-Demers, Séguin, Chartrand, & Pelletier, 2002). The items of the SexMS were initially developed through focus groups in which men and women were asked to list the reasons for which they engaged in sexual relationships. Eighty-seven items were retained and adapted to correspond to the six types of motivation posited by SDT. This initial version showed good psychometric properties: Exploratory factor analyses suggested a six-factor structure, the correlations among the subscales formed a quasi-simplex pattern, and an adequate reliability coefficient for each subscale was found (Green-Demers et al., 2002). Additionally, good predictive validity was demonstrated as the self-determined subscales were positively associated to positive sexual outcomes (i.e., sexual competence, importance of sexuality, and sexual satisfaction), whereas the non-self-determined subscales were positively

associated to negative sexual outcomes (i.e., sexual anxiety and sexual depression).

This initial version of the SexMS was eventually reduced to 24 items in order to increase its validity and brevity by selecting the items with the strongest factor loadings and best face validity. Namely, many items were removed because they encapsulated goals rather than motives (e.g., increasing the intimacy of a relationship). The goal of this investigation was to validate the 24-item version of the SexMS as there was a need to formally examine its psychometric properties. In Study 1, we focused on establishing the factorial validity, measurement invariance, convergent validity within the subscales, and the reliability of the SexMS. In Study 2, we replicated the findings pertaining to the factorial validity of the SexMS with a separate sample and we further examined its construct validity by testing its discriminant and concurrent validities.

2. Study 1

The main objective of Study 1 was to establish the factorial validity of the SexMS through a confirmatory factor analysis (CFA). As SDT posits six types of motivation defined by incremental degrees of autonomy and correlated to each other (Deci & Ryan, 2000), we expected a correlated six-factor model to present a good fit to the data. Factorial structure as a function of gender and relationship type (i.e., casual versus committed) was also examined to determine whether the measure performed similarly across these groups given their relevance in sexuality research. In addition, we provided evidence for convergent validity of the SexMS by examining correlational patterns between the subscales. We expected to find a simplex pattern among the six subscales, such that those representing motivations that are adjacent to each other on the continuum of self-determination would show stronger correlations than those that are not adjacent to each other. We also conducted a reliability analysis for each subscale. Finally, we explored similarities and differences for gender and relationship type in SexMS subscale scores as previous studies have found differences between these groups (e.g. Armstrong & Reissing, 2015; Brunell & Webster, 2013; Hatfield, Luckhurst, & Rapson, 2010). It is important to note that these analyses were exploratory as SDT makes no prediction regarding differences in the structure of motivation as a function of gender and relationship type.

2.1. Method

2.1.1. Participants and procedure

Participants were recruited through a participant pool at a Canadian university and were compensated with one credit toward the course they were taking. Participants were required to be at least 17 years of age, currently sexually active with a casual or committed partner, and fluent in English. The sample consisted of 1133 university students (895 females and 238 males). The mean age of participants was 19.91 years ($SD = 4.00$, range = 17–50). The ethnic heritage composition of the sample was as follows: 74% European, 8% Asian, 6% African, 3% Middle Eastern, 1% Hispanic, 4% mixed ethnic heritage, less than 1% participants reported being aboriginal, and 3% did not report their ethnic heritage. Most participants identified as heterosexual (93%), a minority identified as gay (2%), lesbian (>1%), or bisexual (4%), and less than 1% reported "other" for sexual orientation. The majority of participants were in a committed relationship at the time of the study (82%). Average relationship length was 20.11 months ($SD = 26.24$) for participants who were in a committed relationship. The procedures of study involved completing an online questionnaire hosted by Fluidsurveys at a time and place of the students' choice. Informed consent was obtained from all participants. The Ethics Review Board of the researchers' university approved all the procedures of this study.

2.1.2. Measure

The SexMS as it is presented in this study is the most recent version of an instrument that was designed to measure the six types of sexual motivation outlined by SDT (Green-Demers et al., 2002). Each subscale is composed of four items (see Table 1) rated on a 7-point Likert scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds completely*). The following instructions were given with the measure: "There are many reasons why people have sexual relationships. Please indicate to what extent each of the statements below corresponds to your motives for having sexual relationships in general by checking the appropriate number".

Table 1
Standardized factor loadings.

Subscale	Factor loadings Study 1	Factor loadings Study 2
Intrinsic		
Because sex is fun	.78(.75, .81)	.72(.65, .78)
Because I enjoy sex	.87(.84, .89)	.86(.81, .89)
For the pleasure I feel when my partner stimulates me sexually	.77(.73, .80)	.74(.68, .79)
Because sex is exciting	.86(.84, .89)	.87(.83, .91)
Integrated		
Because sexuality brings so much to my life	.80(.77, .83)	.79(.74, .83)
Because sexuality is a key part of who I am	.77(.74, .80)	.78(.74, .82)
Because sexuality is a meaningful part of my life	.84(.81, .87)	.84(.80, .87)
Because sexuality fulfills an essential aspect of my life	.87(.85, .89)	.85(.81, .88)
Identified		
Because sexuality is a normal and important aspect of human development	.64(.58, .68)	.58(.50, .66)
Because I feel it's important to experiment sexually	.80(.76, .83)	.79(.74, .83)
Because I think it's important to learn to know my body better	.68(.64, .73)	.68(.72, .83)
Because I feel it's important to be open to new experiences	.79(.75, .82)	.78(.62, .73)
Introjected		
To prove to myself that I am sexually attractive	.81(.78, .84)	.87(.77, .55)
To show myself that I am sexually competent	.82(.79, .85)	.83(.78, .87)
To prove to myself that I am a good lover	.82(.79, .85)	.83(.79, .87)
To prove to myself that I have sex-appeal	.88(.85, .90)	.81(.82, .91)
External		
Because my partner demands it of me	.68(.63, .73)	.75(.68, .80)
To avoid conflicts with my partner	.81(.77, .84)	.80(.75, .84)
Because I don't want to be criticized by my partner	.82(.78, .85)	.82(.76, .87)
To live up to my partner's expectations	.70(.66, .75)	.67(.60, .73)
Amotivation		
I don't know; I feel it's not worth it	.75(.69, .80)	.76(.56, .78)
I don't know; it feels like a waste of time	.86(.82, .89)	.86(.69, 87)
I don't know; actually, I find it boring	.88(.85, .92)	.80(.79, .91)
I don't know; sex is a disappointment to me	.84(.80, .87)	.68(.67, .83)

Note. Study 1: $N = 1070$, Study 2: $N = 575$; numbers in parentheses are 95% bias-corrected percentile confidence interval.

2.2. Results and discussion

2.2.1. Data preparation

Data were screened and prepared following the guidelines recommended by Tabachnick and Fidell (2001) for multivariate analyses and by Kline (2010) for structural equation modelling (SEM). We first dealt with missing values and outliers. Multivariate outliers were removed from the database ($n = 63$) and the final analyses were performed on data from 1070 participants. We then screened the data for normality. As the data did not meet the assumption of multivariate normality, we used a bootstrap procedure based on 5000 samples with replacements to provide less biased p values (i.e., Bollen–Stine p values; Bollen & Stine, 1990) and standard errors (Nevitt & Hancock, 2001).

2.2.2. Confirmatory factor analysis

Results suggested that the correlated six-factor model performed adequately (see Table 2). Although fit indices were slightly below the

Table 2
Model fit statistics for the SexMS.

Model	χ^2	*df*	RMSEA	CFI	TLI	NFI	$\Delta\chi^2$
Hypothesized model Study 1	1238.36	237	.063	.94	.93	.93	–
Hypothesized model Study 2	671.43	237	.057	.95	.94	.92	–
Uncorrelated six-factor model	3649.63	252	.112	.80	.78	.79	2411.27
Five-factor model	1601.22	342	.072	.92	.92	.92	362.86
Second order factor model Study 1	1705.51	247	.074	.91	.90	.90	–
Second order factor model Study 2	933.37	242	.070	.92	.91	.89	–

Note. Study 1: $N = 1070$; Study 2: $N = 575$. χ^2 = Model Chi-Square Test; *df* = Degrees of freedom for Model Chi-Square Test; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; NFI = Normed Fit Index; $\Delta\chi^2$ = Likelihood ratio test. *p* values for model chi-square were estimated using the Bollen–Stine bootstrap procedure. All chi-square tests and likelihood ratio tests are significant at $p < .001$.

optimal cut-off of ≥.95 (Hu & Bentler, 1999), we did not attempt to improve the model's fit through re-specification in order to avoid creating a good-fitting, but data-driven model at the expense of generalizability (see Kline, 2010). All factor loadings were significant and performed well (see Table 1). Average extracted variance ranged between .53 and .70, suggesting good convergent validity among the items composing each subscales.

To provide a more stringent test of the theorized model underlying the SexMS, we compared our hypothesized model to two alternative models: an uncorrelated six-factor model to provide a test of the associations among the factors and a model in which integrated and identified items loaded on the same factor given that obtaining a solution in which these factors are distinct has been problematic in some validation studies of SDT-based measures (e.g., Jenkins, 2003). Both models showed a poorer fit in comparison to the correlated six-factor model (see Table 2). We also tested the validity of a model in which the three forms of self-determined sexual motivation and the three forms of non-self-determined sexual motivation each loaded on a second-order factor given that the six forms of regulation are often modeled as aggregates. The fit of this model was passable, albeit the fit indices were below the recommended optimal values (see Table 2). As was the case with the hypothesized model, we refrained from re-specifying this model in order to preserve its generalizability. Overall, these results suggest that items of the SexMS could be used to form aggregates representing self-determined and non-self-determined sexual motivations.

2.2.3. Measurement invariance

Next, the model was tested for measurement invariance as a function of gender and relationship type (see Table 3). We focused on CFI differences (ΔCFI) to establish measurement invariance given that the conventionally used likelihood ratio test based on chi-square differences between models tends to be excessively stringent with larger samples (Kline, 2010). The results from a simulation study suggested that if the value of a ΔCFI indicates a group invariance when sample sizes exceed 200 cases per group, it is likely that any differences that exist between the groups are negligible, even when the likelihood ratio test is significant (Meade, Johnson, & Braddy, 2008). The researchers recommended reporting both likelihood ratio tests and ΔCFI values and to use ΔCFI ≤ .002 to establish measurement invariance. For gender, the configural model had a good fit in women and in men, χ^2 (474) = 1518.78, $p < .001$, RMSEA = .045 (90% CI [.043–.048]), CFI = .937, TLI = .93, NFI = .91. Measurement invariance was also found for factor loadings and structural covariances, but not for measurement errors. These results suggest that the SexMS functions similarly, though not identically in men and women.

Regarding relationship type, the results for the configural model showed a good fit for committed relationships and for causal relationships, χ^2 (474) = 1522.37, $p < .001$, RMSEA = .046 (90% CI [.043–.048]), CFI = .936, TLI = .93, NFI = .91. However, measurement invariance was not found for factor loadings, structural covariances, and measurement errors. Taken together, these results suggest that although the factor structure of the SexMS is similar for those in a committed relationship and those in a casual relationship, the factor loadings, associations between the factors, and measurement errors likely differ in those two groups.

2.2.4. Correlations, reliabilities, and mean comparisons

We determined whether the associations between the subscales of the SexMS followed a simplex pattern by performing a correlational analysis using both subscale composite scores and factorial scores obtained from the CFA (Table 4). The results revealed a simplex pattern as types of sexual regulations hypothesized to be adjacent on the continuum of self-determination were more strongly and positively associated to each other that to those hypothesized to be non-adjacent.

Reliability was analyzed by computing Cronbach's alpha coefficients for each subscale (see Table 5). Overall, the subscales of the SexMS demonstrated good to excellent reliability. Next, the scores for the SexMS as a function of gender and relationship type were compared using a MANOVA (see Table 3). For gender, men endorsed the integrated, introjected, external, and amotivation items more strongly than women. With the exception of external regulation, which showed a medium effect size, gender differences were small in magnitude. For relationship type, participants involved in a casual relationship endorsed the introjected, external, and amotivated items more strongly than those in a committed relationship; these differences were small in magnitude, though differences for introjected regulation and amotivation approached the medium range. In sum, there were some differences as a function of gender and relationship type in this sample and they pertained mainly to non-self-determined types of sexual regulation.

3. Study 2

The objective of Study 2 was to further investigate the construct validity of the SexMS by examining its discriminant validity and its concurrent validity. To establish discriminant validity, we sought to demonstrate that the construct measured by the SexMS was distinct

Table 3
Measurement invariance for gender and relationship type.

	Gender				Relationship type			
	$\chi^2(df)$	$\Delta\chi^2(df)$	CFI	ΔCFI	$\chi^2(df)$	$\Delta\chi^2(df)$	CFI	ΔCFI
Configural model	1518.78(474)	–	.937	–	1522.37(474)	–	.936	–
Factor loadings	1561.70(498)	42.91(24)	.936	.001	1607.01(498)	84.65(24)	.933	.003
Structural covariances	1598.47(513)	79.69(39)	.935	.002	1618.90(513)	96.52(39)	.933	.003
Measurement errors	1658.77(537)	139.98(63)	.932	.005	1725.41(537)	203.04(63)	.928	.005

Note. All chi-square tests and likelihood ratio tests are significant at $p < .001$. Gender: Men $n = 223$, women $n = 847$; relationship type: Committed $n = 878$, casual $n = 192$.

Table 4
Correlations between the SexMS subscales.

Scale	1.	2.	3.	4.	5.	6.
Study 1						
1. Intrinsic		.62***	.59***	.24***	.05	−.35***
2. Integrated	.69***	–	.68***	.36***	.20***	−.14***
3. Identified	.68***	.79***	–	.41***	.18***	−.13***
4. Introjected	.25***	.40***	.47***	–	.58***	.25***
5. External	−.01	.20***	.18***	.64***	–	.46***
6. Amotivated	−.40***	−.16***	−.14***	.26***	.57***	
Study 2						
1. Intrinsic	–	.59***	.60***	.17*	−.05	−.39***
2. Integrated		–	.70***	.34***	.15**	−.16***
3. Identified			–	.40***	.14***	−.14**
4. Introjected				–	.61**	.24***
5. External					–	.45***
6. Amotivated						–

Note. Study 1: $N = 1070$; Study 2: $N = 575$. For Study 1, values above the diagonal represent correlations between subscale composite scores and values below the diagonal represent inter-factor correlations.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

from other motivational constructs. Accordingly, we examined correlational patterns between the SexMS and measures of global and relational motivation. Global motivation refers to a person's motivation for performing everyday activities in general (Deci & Ryan, 2000; Vallerand, 1997). Theoretically, domain-specific types of motivation should be associated to global motivation. According to the HMIEM, motivation is organized following a hierarchical structure wherein domain-specific motivation, or motivation at the contextual level, is embedded within motivation at the global level (Vallerand, 1997). Furthermore, global motivation and contextual motivations are posited to influence each other through top-down and bottom-up effects (Vallerand, 1997). We therefore expected that sexual motivation would be related to, yet distinct from global motivation and this would be shown by small to medium-ranged correlations ($r \leq |.50|$). Relational motivation refers to the reasons for which a person maintains a relationship with their partner (Blais et al., 1990). As sexual activities are influenced by the relational context of the sexual partners (e.g., Impett et al., 2014), it is not surprising to find congruence between one's relational motivation and one's sexual motivation. For instance, research using the approach–avoidance framework of motivation showed that stronger approach relational motives are associated with stronger approach sexual motives (Impett, Strachman, Finkel, & Gable, 2008). We therefore expected that sexual motivation would be related to, yet distinct from relational motivation and this would also be demonstrated by small to medium-ranged correlations ($r \leq |.50|$).

To provide evidence for the concurrent validity of the SexMS, correlations between the SexMS and three sexual health and well-being outcomes were examined: Sexual function, sexual satisfaction, and sexual distress. As SDT posits that more self-determined types of motivation should be associated with better functioning compared to non-self-determined types of motivation (Deci & Ryan, 2000), we expected that self-determined types of sexual regulation would be positively correlated with healthier sexual function and sexual satisfaction, and negatively correlated with sexual distress. In contrast, we expected that non-self-determined types of sexual regulation would be negatively correlated with healthier sexual function and sexual satisfaction, and positively correlated with sexual distress. We also explored the interplay between sexual motivation and sexual problems by comparing means for each type of sexual regulation for those who scored above versus below the established cut-offs for the presence of sexual dysfunctions on the sexual function measures used in this study. We expected that those who scored in the non-problematic range of sexual function would report stronger endorsement of self-determined types of sexual regulation compared to those who scored in the problematic range. Alternatively, we expected that those who scored in the problematic range of sexual function would report stronger endorsement of non-self-determined types of sexual regulation than those who scored in the non-problematic range.

3.1. Method

3.1.1. Participants and procedures

The participants in Study 2 were a separate sample of 590 students (449 females and 141 males; mean age = 20.58, $SD = 4.11$, range = 17–58) recruited using the procedure described in Study 1, in addition to class presentations and posters placed in various campus locations. The composition of the sample in terms of ethnic heritage was as follows: 73% European, 8% African, 6% Asian, 2% Hispanic, 4% Middle Eastern, 5% mixed ethnic heritage, 1% aboriginal, and 1% did not report their ethnic heritage. For sexual orientation, most participants identified as heterosexual (93%), and a minority identified as gay (1%), lesbian (>1%) or bisexual (5%), and 1% reported "other" as their sexual

Table 5
Mean comparisons and reliabilities for SexMS subscales.

Scale	Men		Women				Committed		Casual				
	M	*SD*	*M*	*SD*	*F*	*d*	*M*	*SD*	*M*	*SD*	*F*	*d*	α
Study 1													
Intrinsic	5.98	1.03	5.84	1.09	.40	.13	5.87	1.11	6.04	.91	2.07	−.16	.89
Integrated	4.47	1.37	4.16	1.48	4.48*	.22	4.23	1.48	4.31	1.36	.27	−.06	.89
Identified	4.90	1.25	4.97	1.28	1.41	−.06	4.91	.1.30	5.15	1.16	2.50	−.19	.81
Introjected	3.56	1.61	3.04	1.54	13.53***	.33	3.03	1.54	3.69	1.61	22.16***	−.41	.90
External	2.73	1.31	2.11	1.18	35.70***	.50	2.19	1.21	2.44	1.35	5.69*	−.19	.83
Amotivated	1.48	.76	1.33	.64	12.74***	.21	1.30	.60	1.64	.86	47.02***	−.46	.89
Study 2													
Intrinsic	5.98	1.05	5.81	1.08	1.39	.16	5.80	1.11	6.08	.84	4.34*	−.28	.87
Integrated	4.34	1.44	4.20	1.50	.71	.09	4.22	1.46	4.30	1.52	.02	−.05	.89
Identified	4.83	1.20	4.92	1.28	1.12	−.07	4.85	1.27	5.12	1.21	2.20	−.21	.80
Introjected	3.44	1.71	3.04	1.59	6.08**	.24	3.05	1.60	3.50	1.68	6.98**	−.27	.90
External	2.58	1.37	2.09	1.19	14.08***	.38	2.20	1.28	2.27	1.16	.85	−.06	.84
Amotivated	1.48	.81	1.38	.67	2.58	.13	1.35	.67	1.62	.81	2.58**	−.36	.85

Note. M = mean, SD = standard deviation, F = Fisher's ratio, d = Cohen's d, α = Cronbach's alpha. Study 1: Men $n = 223$, women $n = 847$; casual relationship $n = 192$, committed relationship $n = 878$. Study 2: Men $n = 138$, women $n = 437$ casual $n = 113$, committed $n = 462$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

orientation. The majority of participants were in a committed relationship at the time of the study (80%). Average relationship length for those in a committed relationship was 21.66 months ($SD = 27.23$).

3.1.2. Measures

3.1.2.1. Global motivation. The *Global Motivation Scale* (GMS; Pelletier et al., 2013; Sharp, Pelletier, Blanchard, & Lévesque, 2003) measures global motivation from a SDT perspective by asking the respondent why they perform activities and behaviors in general (i.e., "In general, I do things…"). This instrument contains six subscales (intrinsic, integrated, identified, introjected, external, and amotivation) and 18 self-report items that are rated using a 7-point Likert-scale ranging from 1 (*not at all*) to 7 (*completely agree*). In this study, the reliability coefficients for the GMS subscales ranged between .60 and .85.

3.1.2.2. Relational motivation. The *Couple Motivation Questionnaire* (CMQ; Blais et al., 1990; Knee, Lonsbary, Canevello, & Patrick, 2005) is a 21-item self-report instrument that measures the extent to which motives for being in a relationship are self-determined using six subscales, one for each type of regulation posited by SDT. Participants were instructed to think about the reasons for which they were in a relationship with their current sexual partner and rated the items using a Likert scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds completely*). In this study, the reliability coefficients for the CMQ subscales ranged from .58 to .84.

3.1.2.3. Sexual satisfaction. Sexual satisfaction was measured using the *New Sexual Satisfaction Scale* (NSSS; Štulhofer, Buško, & Brouillard, 2010). This 20-item self-report scale evaluates the degree of sexual satisfaction with respect to five dimensions of sexuality: (a) Sexual sensations, (b) sexual presence, (c) sexual exchange, (d) emotional connection/closeness, and (e) sexual activity. Items are answered using a 5-point Likert scale ranging from 1 (*not at all satisfied*) to 5 (*extremely satisfied*). In this study, the reliability coefficient for the NSSS was .93.

3.1.2.4. Sexual distress. Sexual distress was measured using the seven gender-neutral items of the *Female Sexual Distress Scale* (FSDS; Derogatis, Rosen, Leiblum, Burnett, & Heiman, 2002). This scale measures the extent to which a person experiences distress about their sexuality in general and/or regarding their sexual functioning, for example, feeling "embarrassed about sexual problems". Items are rated with a Likert scale ranging from 0 (*never*) to 4 (*always*). In this study, the reliability coefficient for this adaptation of the FSDS was .86.

3.1.2.5. Sexual function. Female sexual function was measured using the *Female Sexual Function Index* (FSFI; Rosen et al., 2000), a 19-item self-report questionnaire that measures six domains of sexual function (i.e., desire, orgasm, lubrication, arousal, satisfaction, and pain). A higher score on the FSFI denotes better sexual function, with a clinical cut-off score of ≤26.55 suggesting the presence of a female sexual dysfunction (Wiegel, Meston, & Rosen, 2005). The satisfaction subscale was not used as we used the NSSS instead (Štulhofer et al., 2010). Following the guidelines provided by the authors of the FSFI (Rosen et al., 2000), data from women who reported no sexual activity (arousal, lubrication, and orgasm subscales: $n = 7$) or no intercourse (pain subscale: $n = 14$) in the last four weeks were excluded from these analyses as these response categories do not convey the reasons for which these women were not engaging in sexual activities, hence providing limited information on their sexual functioning. Reliability coefficients for the FSFI in this study ranged between .80 and .96.

Male sexual function was assessed using the abridged version of the *International Index of Erectile Function* (IIEF-5; Rosen, Cappelleri, Smith, Lipsky, & Peña, 1999), a 5-item scale designed to measure the presence and severity of erectile dysfunction, with a cut-off score of ≤21 to suggest the presence of erectile dysfunction. In this study, the reliability coefficient for the IIEF-5 was .94.

3.2. Results and discussion

3.2.1. Data preparation

Data were prepared using the same procedure described in Study 1. We first dealt with missing values and outliers. Fifteen cases were identified as multivariate outliers and removed from the database; the remaining analyses were thus performed on 575 participants. Screening for normality revealed the presence of skew and kurtosis on several variables and as such, we used a bootstrap procedure to obtain less biased p values and standard errors; 5000 samples with replacements were used for the bootstrap procedure.

3.2.2. Preliminary analyses

We first conducted a CFA using the correlated six-factor model and the second-order factor model to replicate the results from Study 1. Both models showed a good fit in this sample, providing further support for the factorial validity of the SexMS (see Table 1). We then computed descriptive statistics and reliabilities for each subscale (see Table 5). Reliabilities in this sample ranged from good to excellent. Results from a MANOVA suggested that the men in this sample endorsed identified, introjected, and external sexual regulations to a greater extent than women. Participants in a casual relationships also endorsed intrinsic, introjected, and amotivated sexual regulations to a greater extent than participants in a committed relationship. Next, we examined the correlations between the subscales. For the most part, the subscales replicated a simplex pattern, providing additional evidence for a continuum of relative self-determination underlying the subscales.

3.2.3. Main analyses

As predicted, most correlations between the subscales of the SexMS and their counterparts on the GMS and on the CMQ were significant, in the expected direction, and within the expected magnitude (Table 6). The correlations between the SexMS subscales and the CMQ subscales were also stronger than the correlations between the SexMS and the GMS. Contrary to our expectations however, identified sexual regulation was not related to identified global motivation and integrated sexual regulation was not associated to integrated global

Table 6
Correlations between the SexMS, the GMS, and the CMQ.

	Global motivation						Relational motivation					
Subscales	IM	IN	ID	INT	EX	AM	IM	IN	ID	INT	EX	AM
Intrinsic	.10*	−.01	−.03	.00	.02	−.05	.29***	.05	.17***	−01	−.01	.00
Integrated	.09*	.08	.01	.07	.04	.04	.23***	.11**	.30***	.15***	.14**	.07
Identified	.13**	.09*	−.00	.11*	.11*	.01	.22***	.08	.30***	.13**	.09*	.10*
Introjected	.06	.03	−.09*	.28***	.23***	.21***	−.07	−.11*	.10*	.40***	.32***	.27***
External	−.04	.05	−.08	.23***	.19***	.27***	−.14**	−.06	.09*	.49***	.45***	.33***
Amotivation	−.02	.00	−.08	.15***	.09*	.26***	−.34***	−.21***	−.07	.25***	.26***	.41***

Note. $N = 575$; IM = intrinsic; IN = integrated; ID = identified; INT = introjected; EX = external; AM = amotivation.

Table 7
Correlations between the SexMS and sexual outcomes in women.

SexMS subscale	SD	SS	DS	AR	LB	OR	PA
Intrinsic	−.24***	.42***	.38***	.36***	.24***	.26***	.29***
Integrated	−.09	.35***	.37***	.22***	.15**	.17***	.22***
Identified	−.06	.27***	.28***	.16**	.06	.08	.16**
Introjected	.30***	−.11*	.06	−.11	−.17***	−.13**	−.06
External	.32***	−.16**	−.14**	−.27***	−.23***	−.15**	−.17***
Amotivated	.40***	−.39***	−.26***	−.37***	−.34***	−.26***	−.31***

Note. SD = sexual distress $n = 437$; SS = sexual satisfaction, $n = 437$; DS = sexual desire, $n = 437$; AR = sexual arousal, $n = 430$; LB = lubrication, $n = 4430$; OR = orgasm, $n = 430$; PA = sexual pain, $n = 423$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 8
Correlations between the SexMS and sexual outcomes in men.

SexMS subscale	Sexual distress	Sexual satisfaction	Sexual function
Intrinsic	−.14	.34***	.20*
Integrated	.09	.27**	.04
Identified	.13	.21**	−.06
Introjected	.31***	.04	−.12
External	.29***	.03	−.19*
Amotivated	.40***	−.27**	−.40***

Note. $n = 138$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

motivation. Collectively, these results suggest that the SexMS measures a construct that is distinct, yet related to global and relational motivation.

With respect to concurrent validity, correlational patterns between the different types of sexual-regulation and sexual health and well-being outcomes were for the most part significant and in the expected directions in women (see Table 7). Correlations with positive sexual health and well-being outcomes increased in magnitude as sexual motives became more self-determined. Conversely, correlations with poorer sexual health and well-being outcomes increased in magnitude as sexual motives became less self-determined.

In men, a different pattern emerged as self-determined types of sexual regulation were mainly correlated with positive sexual health and well-being outcomes, whereas non-self-determined types of sexual regulation showed an opposite pattern as they mainly correlated with negative sexual health and well-being outcomes (see Table 8). However, correlations did show a pattern of incremental change in magnitude as a function of self-determination, such that sexual outcomes became increasingly positive as sexual regulation became more self-determined and increasingly negative as sexual regulation became less self-determined. However, the association between introjected sexual regulation and sexual distress was similar in magnitude to the correlation between external sexual regulation and sexual distress.

Finally, mean comparisons between those who scored above versus below the cut-offs for sexual function problems revealed that the SexMS can detect differential associations between sexual motivation and sexual functioning (see Table 9). Specifically, there was a stronger endorsement of self-determined sexual regulations and weaker endorsement of non-self-determined sexual regulations in women who scored within the non-problematic ranges of sexual function in comparison to those who scored within the problematic range. These differences ranged from small–to large and increased in magnitude moving toward the poles of the self-determination continuum. In men, a similar pattern was found, although no significant differences were found for integrated, identified, and introjected sexual motives. Taken together, these results provide initial evidence for the concurrent validity of the SexMS, namely that it can detect both quantitative and qualitative differences in sexual outcomes related to sexual motivation.

4. General discussion

The aim of the current research was to investigate the psychometric properties of the 24-item version of the SexMS. In Studies 1 and 2, findings from the CFA suggest that the SexMS is a measurement of all six types of sexual regulation posited by SDT. The results also suggest that the subscales can be aggregated into two broad types of sexual regulation in studies seeking to provide a molar analysis of sexual motivation. In addition, findings from the analysis of measurement invariance indicate that the SexMS measures the same factors as a function of gender and relationship type. However, differences in measurement errors were found for gender and differences for factor loadings, factor covariances, and measurement errors were found for relationship type. As most of these differences were small, comparisons of SexMS scores among these groups may be done, albeit with some caution.

We also investigated the convergent, discriminant, and concurrent validities of the SexMS. We found evidence for a quasi-simplex pattern, providing general support for a continuum of self-determination underlying the subscales of the SexMS and thus for convergent validity. Discriminant validity was examined by determining the extent to which the SexMS measured a construct that is different from other types of motivation, namely global and relational motivations. As expected, most correlations between the subscales of the SexMS and their counterparts on the GMS and the CMQ were significant and their magnitude suggested that the SexMS measures a concept that is distinct yet related to global and relational motivations. Interestingly, integrated and identified sexual

Table 9
Mean comparison of SexMS subscale scores for problematic versus non-problematic ranges of sexual function.

Subscale	Women						Men					
	Problematic		Non-problematic				Problematic		Non-problematic			
	M	*SD*	*M*	*SD*	*F*	*d*	*M*	*SD*	*M*	*SD*	*F*	*d*
Intrinsic	5.15	1.17	6.00	.98	49.02***	.84	5.30	1.29	6.09	.94	10.36**	.79
Integrated	3.47	1.31	4.43	1.49		.66	3.89	1.35	4.41	1.40	2.25	.37
Identified	4.58	1.21	5.02	1.28	8.59**	−.35	4.76	1.08	4.84	1.23	.06	−.07
Introjected	3.45	1.53	2.94	1.60	7.03**	−.32	3.54	1.47	3.43	1.72	.07	−.07
External	2.55	1.36	1.97	1.12	16.86***	−.49	3.22	1.67	2.48	1.33	4.81*	−.54
Amotivated	1.89	.95	1.23	.50	78.95***	−1.07	2.32	1.23	1.35	.63	27.78***	−1.30

Note. Women: Problematic range $n = 87$, non-problematic range $n = 338$; men: Problematic range $n = 19$, non-problematic range $n = 119$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

regulations were not related to their respective counterparts on the GMS. This may be a reflection of the fact that one's sexuality, given its very private nature, can be less salient than other aspect of the self (Garcia & Carrigan, 1998). This may be especially true for those who do not belong to sexual minorities as the legitimacy of their sexual self is rarely contested. Perhaps many do not reflect about the importance of their sexuality and its contribution to their identity to the same extent their general sense of self and this might have translated into the absence of correlations that we observed. Clearly, further research is needed to clarify this question.

Another interesting finding was the magnitude of the correlations of the SexMS with the CMQ being greater than those with the GMS. According to the HMIEM, motivation at the global level is associated to domain-specific motivation, such as sexual motivation (Vallerand, 1997). However, because sexuality is inextricably tied to the broader relational context of the sexual partners (e.g., Impett et al., 2014), it is not surprising that sexual motivation showed stronger association to relational motivation than to global motivation. Sexual motivation may thus be more proximal to relational motivation than to global motivation within the self. Overall, these patterns of findings suggest that sexual motivation is not isolated from other domains and levels of motivation within the self and as such, it will be important to better understand the interplays between sexual, relational, and global motivations.

Concurrent validity was investigated by examining correlational patterns between the subscales of the SexMS, sexual function, sexual satisfaction, and sexual distress. We found intriguing patterns of results that suggest that gender moderates the associations between sexual motivation and sexual well-being. In women, it appears that the different types of sexual regulation are fully integrated to sexual well-being as self-determined types of sexual-regulation were positively associated to positive indicators of sexual well-being and negatively associated to negative ones, and the inverse was observed for non self-determined types of sexual regulation. In contrast, the associations between sexual motivation and sexual well-being appear more compartmentalized in men as self-determined types of sexual regulation were mainly associated to positive sexual well-being outcomes, whereas non-self-determined types of sexual regulation were mainly associated to negative ones.

Importantly, mean comparisons of sexual motivation for those who scored above and below the cut-offs for clinical problems in sexual function suggest that the SexMS can detect differences in sexual health. It is likely that sexual motivation and sexual function, and other health and well-being outcome for that matter, are tied together through a reciprocal relationship. On one hand, problems with sexual function may be experienced as a loss of autonomy given that the body is not responding as one would want it to. Heteronomy may also increase as sexual function problems may lead to greater perceived or actual pressures to perform "normally" imposed by oneself and/or others. On the other hand, a greater endorsement of non-self-determined sexual motives necessarily involves a management of internal and external pressures. These pressures may lead to cognitive distractions during sex, such as concerns about adequate sexual performance, which ultimately could impair sexual function. Overall, these results indicate that SexMS' has the capacity to detect incremental changes in the magnitude of associations between sexual motivation and sexual well-being as these associations became stronger moving to either pole of the self-determination continuum. The SexMS therefore provides a fine-grained measurement of the magnitude and direction of the associations between sexual motivation and sexual outcomes.

Internal consistency coefficients for all six SexMS subscales were within acceptable ranges in both studies. Differences in SexMS scores between genders and relationship types also emerged. Compared to women, men showed a stronger endorsement of integrated, introjected, external, and amotivated sexual regulations. A gender difference pertaining to integrated sexual regulation is particularly interesting as it may be a reflection of a sexual double standard that still prevails in North American society in which women can be stigmatized for being sexually permissive (Bordini & Sperb, 2012). Viewing sexuality as an integral part of one's self may be more difficult for some women, especially if they perceive that certain aspects of their sexuality are socially reprehensible (e.g., engaging in casual sex, masturbating).

With respect to gender differences in non-self-determined sexual regulations, studies conducted thus far have found mixed results. Brunell and Webster (2013) found higher scores for non-self-determined types of sexual regulations in men, whereas Vrangalova (2014) and Jenkins (2003) did not find any gender differences. Interestingly, non-SDT studies have found that men are more likely to endorse motivations that could be qualified as non-self-determined, such as status enhancement, recognition, and peer conformity (for a review, see Hatfield et al., 2010). A possible explanation for these findings is that sexual motivation in some men may be influenced by a hegemonic masculinity ideology that equates being a "real man" with sexual performance and sexuality with status (Levant, 1997). This ideology may be experience as pressuring, thus leading men to endorse non-self-determined sexual regulations to a greater extent than women, who in contrast are not held to the same expectations regarding their sexuality.

This is also the first SDT study to document differences in sexual motivation as a function of relationship type. Participants in a causal sexual relationship reported a slightly higher endorsement of intrinsic, introjected, external, and amotivated sexual regulations. That intrinsic sexual regulation was more strongly endorsed by those in a casual sexual relationship is not surprising giving that previous studies using other frameworks of sexual motivation have found that pleasure tends to be the most important motive for casual sex (e.g., Armstrong & Reissing, 2015; Garcia & Reiber, 2008; Li & Kenrick, 2006).

However, it is less clear why non-self-determined motives were more strongly endorsed by those involved in a casual relationship. One possible explanation is that casual and committed sexual relationships serve different purposes and this may foster more non-self-determined sexual motivation. For instance, casual sexual relationships is viewed by some as a means to evaluate or enhance one's self-worth as a sexual partner (Li & Kenrick, 2006), therefore fostering more introjected sexual regulation. Further, the fact that casual sexual relationships are commonly viewed as a pathway to initiate a committed relationship (e.g., Garcia & Reiber, 2008; Li & Kenrick, 2006) may contribute to a greater endorsement of external sexual motives in a casual sexual relationship. Finally, the association between casual relationships and substance use (Claxton, DeLuca, & van Dulmen, 2015) may foster a context where sexual amotivation is more likely to occur. Indeed, a substantial proportion of people report that their casual sexual encounters were unintentional due to alcohol or drug use (Garcia & Reiber, 2008) and behaviors that are unintentional are amotivated by definition because there is no motivation to perform the behavior in the first place.

Overall, given the paucity of theoretical explanations and research within SDT regarding gender and relationship type differences in sexual motivation, our conclusions about the meaning of these differences are speculative and must therefore be interpreted with caution. Additional theoretical developments and empirical evidence are critical to clarify the question of similarities and differences in sexual motivation as a function of gender and relationship type. It is also important to note that as these differences were small in magnitude for the most part, we cannot know whether they are actually meaningful or if they are a statistical artifact.

4.1. Limitations and future directions

Although the results of the present studies suggest that the SexMS has good psychometric properties, the validity of the scale could benefit from more research. First, future studies conducted with other

ethnicities, age groups, socioeconomic classes, and with sexual minorities would provide important information on the validity of the SexMS in those populations. Second, this study validated the SexMS at the contextual level, but it could easily be adapted to situational-level investigation of sexual motivation. Validation of the SexMS for the measurement of situational sexual motivation is therefore an important next step. Third, the SexMS is meant to be a theory-driven instrument for research on the roles that intrinsic motivation, extrinsic motivation, and amotivation play in sexual well-being. Therefore, it would be important to determine if these types of sexual motivation can provide insight into sexual well-being over and above other types of sexual motivations that are based on different conceptual frameworks, such approach and avoidance motivation or motives that focus on the biological aspects of sexual relationships. Fourth, as the findings from the convergent validity analysis are correlational, longitudinal studies are necessary to better understand the direction of the associations between sexual motivation and well-being outcomes. Finally, temporal reliability for the SexMS needs to be established. In conclusion, the SexMS provides a valuable instrument for the measurement of sexual motivation and we hope that it will contribute to both a better understanding of motivational processes related to sexuality and a much needed expansion of SDT-based research on the interplay between close-relationships and human sexuality.

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