RESEARCH PAPER

CrossMark

Global, Relational, and Sexual Motivation: A Test of Hierarchical Versus Heterarchical Effects on Well-Being

Emilie E. Gravel[1] · Elke D. Reissing[1] · Luc G. Pelletier[1]

Abstract

The quality of sexual motives is an important predictor of sexual well-being. However, how sexual motives are integrated to psychological functioning beyond the sexual domain remains poorly understood. In this study, we used self-determination theory, the hierarchical model of intrinsic and extrinsic motivation, and principles of heterarchical conceptual modeling to investigate motivational antecedents and well-being consequences of autonomous and controlled sexual motivation at three levels of psychological functioning: sexual, relational, and global. University students ($N = 853$; women $= 684$, men $= 169$ men; $M_{age} = 19.93$, $SD = 4.14$) completed validated measurement of motivation and well-being at these three levels of psychological functioning. Results revealed that motives for performing everyday behaviors in general (i.e., global motivation) and motives for being in a committed relationship (i.e., relational motivation) predicted the quality of sexual motives. In turn, the quality of sexual motives predicted differences in well-being. Specifically, high autonomous and low controlled sexual motivation were associated with an overall pattern of optimal psychological functioning. Sexual motives predicted global and relational well-being beyond the contribution of global and relational motivation. These results reflect a heterarchical structure, in which sexual motives can operate independently from relational processes, as opposed to a hierarchical structure, in which sexual motives fully depend on relational processes to operate. Thus, the quality of sexual motives is associated with broad personality dispositions, relationship processes, and well-being beyond the sexual domain in complex ways. These results help illuminate for whom and when sexual experiences result in benefits or costs to well-being.

Keywords Sexual motivation · Self-determination theory · Well-being · Sexual satisfaction · Relationships

✉ Emilie E. Gravel
   egrav037@uottawa.ca

[1]   School of Psychology, University of Ottawa, Vanier Hall, room 4009, 136 Jean-Jacques Lussier, Ottawa, ON K1N 6H5, Canada

1 Introduction

Positive sexual experiences carry benefits that extend beyond the domain of sexuality. For instance, they play a critical role in the development and maintenance of strong relational bonds (e.g., Birnbaum and Finkel 2015) and may contribute to overall well-being (e.g., Laumann et al. 2006) and physical health (e.g., Diamond and Huebner 2012). In recent years, the quality of sexual motives, or the reasons for engaging in sexual activities, have been investigated as an antecedent of positive sexual experiences (for a recent review, see Muise 2017). This growing body of research demonstrates that enhancing sexual well-being is not merely a question of engaging in sexual activities more often, and thus of increasing the quantity of motivation for sex or desire/drive for sex. Rather, the quality of one's reasons to engage in sexual activities may play a central role in promoting positive sexual experiences. Indeed, different reasons for engaging in sexual activities with a partner can involve different consequences for sexual well-being (Muise 2017).

So far, much of the research on the quality of sexual motives has been devoted to understanding its associations with sexual health and well-being (for reviews, see Cooper et al. 2011; Muise 2017). Despite the rapid growth of this research area, one question that has received less attention is the integration of sexual motives to a person's broader psychological functioning. This situation reflects a trend in which sexuality tends to be neglected in overall health (Diamond and Huebner 2012) and well-being (Hooghe 2012) research despite being recognized as a core component of the human experience. Ultimately, this neglect limits both our ability to achieve a more integrative understanding of psychological functioning and to formulate comprehensive recommendations surrounding the promotion of health and well-being (Diamond and Huebner 2012; Hooghe 2012). In the present study, we used self-determination theory (SDT; Deci and Ryan 2000), the hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand 1997), and principles of heterarchical modeling (e.g., Berntson and Cacioppo 2008; Milyavskaya et al. 2013) to investigate the integration of sexual motives to psychological functioning beyond the sexual domain by examining the breadth of its motivational antecedents and well-being consequences.

1.1 Self-Determination Theory

SDT is a broad motivational framework of optimal psychological development and functioning. According to SDT, human growth and flourishing depend on the degree to which a person's behaviors are self-determined, meaning that they genuinely emanate from the self (Deci and Ryan 1985, 2000). In contrast, people experience lower well-being and non-optimal functioning when their behaviors are non-self-determined, meaning that they result from controlling pressures and expectations, or from a lack of motivation (Deci and Ryan 1985, 2000).

In SDT, the way people regulate their everyday behaviors can be captured by two broad motivational orientations: autonomous and controlled motivation (Deci and Ryan 1985, 2000). *Autonomous motivation*, which is self-determined, refers to behaviors that are genuinely endorsed and self-congruent; hence, these behaviors are well integrated in a person's overall self (Deci and Ryan 1985). Autonomous behaviors are performed because they are inherently pleasurable and interesting, congruent with deeply held values and identities, or recognized as important for achieving a desired goal. In contrast, controlled motivation, which is non-self-determined, lacks genuine ownership. Instead, controlled behaviors

are either not integrated or poorly integrated in the self because they result from pressuring demands and expectations (Deci and Ryan 1985). These pressures can be external or internal. External pressures originate in the pursuit of rewards or the avoidance of negative outcomes imposed by others, such as gaining their approval or avoiding conflicts. Internal pressures are self-imposed and concern the management of ego involvements, such as the avoidance of guilt and shame or attempting to validate one's self-worth. Finally, a core axiom of SDT is that autonomous motivation is optimal as it enhances well-being and functioning, whereas controlled motivation is non-optimal form as it is detrimental to well-being and functioning (Deci and Ryan 1985). This proposition has been extensively validated for more than four decades using a variety of methodologies in multiple life domains, such as education, health, work, sports, and close relationships (for a recent review, see Ryan and Deci 2017).

1.2 The Structure of Motivation in the Self

Autonomous and controlled motivation operate at different levels of psychological functioning that vary in their degree of specificity. The most common approach to represent associations between different levels of functioning in personality and social psychology has been *hierarchical modeling*. In hierarchical models, a psychological process is organized such that the bottom of the hierarchy represents the most specific and concrete level of operation, whereas the top of the hierarchy represents the most global and abstract level of operation (e.g., Vallerand 1997). An important characteristic of hierarchical models is that the more specific levels are fully nested within the more global levels, much like a babushka Russian doll. Furthermore, each level within a hierarchical model influences the other levels through either bottom–up (i.e., from specific to global) or top–down associations (i.e., from global to specific). Because lower levels are fully nested within higher levels, adjacent levels share a direct association with each other, whereas non-adjacent levels can only share an indirect association. That is, associations between non-adjacent levels can only be mediated through associations involving more proximal levels.

Within SDT research, most studies investigating motivation from a multilevel perspective have been grounded in the HMIEM (Vallerand 1997). The first premise of the HMIEM is that motivation exists at three levels of generality. *Global motivation* is located at the broadest level and refers to a general tendency to behave in an autonomous or controlled manner. *Contextual motivation* is located at the intermediate level and refers to motivational orientations for a specific life domain (e.g., sexuality, relationships, work, etc.). *Situational motivation* is located at the most specific level and refers to motivation for a behavior at a particular point in time (e.g., sexual motives for one's most recent sexual encounter). Next, the HMIEM proposes that top–down associations between levels are important antecedents of motivation. This premise entails that if a person is autonomous at the global level, they are more likely to be autonomous at the contextual and situational levels. Following SDT (Deci and Ryan 1985), the HMIEM also proposes that autonomous motivation leads to positive consequences, whereas controlled motivation leads to negative consequences (Vallerand 1997). Regarding the magnitude of these consequences, the HMIEM posits a specificity hypothesis in which the main predictor of an outcome at a given level should be the motivation at the corresponding level (Vallerand 1997). For example, global motivation should be the main predictor of global well-being, whereas sexual motivation should be the main predictor of sexual well-being. Interestingly, the specificity hypothesis deviates from the predictions of a pure hierarchical model as it does not rule out the possibility that

outcomes at one level can be directly influenced by motivation at other levels; rather, the HMIEM predicts that these associations would simply be weaker (Vallerand 1997).

1.3 An SDT Approach to Sexual Motivation

SDT provides a valuable framework to understand the antecedents and consequences of the quality of sexual motives. Research suggests that the self-determination of sexual motives is associated with sexual well-being. For instance, Boislard-Pépin et al. (2002) found that higher self-determined sexual motives were associated with higher sexual satisfaction and sexual competence. Gravel et al. (2016, Study 2) found that more autonomous and less controlled sexual motivation were associated with higher sexual satisfaction, better sexual function, and lower sexual distress. In addition, the self-determination of sexual motives is linked to broader psychological functioning. Brunell and Webster (2013) found that higher self-determined sexual motivation was associated with higher levels of relational and global well-being. In a study on motives for casual sex, Vrangalova (2015) found that higher non-self-determined motives were associated with symptoms of depression and anxiety, more physical symptoms, and poorer self-esteem. However, self-determined motives did not significantly predict well-being outcomes. Finally, Gravel et al. (2016, Study 2) found that autonomous and controlled motivation at the relational (i.e., reasons for being in a relationship with a committed partner) and global levels were associated with individual differences in autonomous and controlled sexual motivation. Furthermore, the correlations between relational motivation and sexual motivation appeared stronger than those between global motivation and sexual motivation, suggesting that relational processes were a stronger correlate of the quality of sexual motives than broader personality dispositions.

1.4 Toward a Structural Model of Autonomous and Controlled Sexual Motivation

Collectively, the studies reviewed suggest that the quality of sexual motives is not a compartmentalized process within the self, strictly operating within the sexual level. Rather, the available evidence suggests that, given its associations with personality dispositions and relational processes, the quality of sexual motives is integrated to broader psychological functioning. Thus, an important direction for researchers is to integrate the findings from previous studies in a unified model, describing the structure of these motivational antecedents and well-being consequences. This model would address four questions pertaining to the nature of the associations between the quality of sexual motives and psychological functioning at the sexual, relational, and global level.

First, although there is evidence that individual differences in the quality of sexual motives are associated with relational and global motivation, it is not clear whether their contributions are comparable in magnitude. Gravel et al. (2016, Study 2) found that correlations between global and relational motivation were different in magnitude, but they were not tested for statistical differences. The HMIEM provides a useful framework to delineate the magnitude of associations between different levels of motivation; however, it does not readily address questions pertaining to the magnitude of top–down associations between two strongly interrelated contexts, as is the case with relationships and sexuality (Impett et al. 2014). Based on the strong connections between these two levels, it is reasonable to expect that sexual motivation should share a stronger association with relational motivation than with global motivation.

Second, given that relationships and sexuality share a close association it is important to determine whether sexual motivation is best understood as a contextual motivation that is fully nested within relational motivation or as an independent contextual motivation. If sexual motivation is fully nested within relational motivation, then global motivation should not share a direct top–down association with sexual motivation, but only a mediated association through relational motivation. However, if sexual motivation operates independently from relational motivation, then global motivation should share a direct top–down association with sexual motivation.

Besides hierarchical modeling, there is another approach to modeling multilevel psychological processes that has been less commonly used in personality and social psychology: heterarchical modeling (e.g., Milyavskaya et al. 2013). Heterarchical models share some fundamental characteristics of hierarchical models in that psychological processes are organized following levels of increasing generality, and top–down and bottom–up associations operate across levels (e.g., Berntson and Cacioppo 2008). However, where heterarchical models fundamentally differ is in the association between levels of organization as each level is only partially nested within the other, operating independently from one another (e.g., Berntson and Cacioppo 2008). This implies that in a heterarchical model, non-adjacent levels can also exert a direct, non-mediated influence on one another (Berntson and Cacioppo 2008).

Although the sexual level shares an important association with the relational level (Impett et al. 2014), we believe that sexuality is best understood as a life domain in its own right and for this reason, sexual motives cannot be reduced to interpersonal processes; they are also rooted in intrapersonal processes in important ways. For example, sexual passion—a strong motivation for and valuation of sexual activities—is independent of relationship status; thus, it can emerge within the person and in the absence of a partner (e.g., Philippe et al. 2017). From this perspective, a heterarchical model may provide a better representation of the associations between the sexual, relational, and global level than a hierarchical model. We should then expect that global motivation should share a direct top–down association with sexual motivation instead of sharing only a mediated association through relational motivation, as would be the case if sexual motivation was fully nested within relational motivation.

Another question to consider is the nature of the association between global and relational motivation in their contribution to sexual motivation; that is whether the global and relational levels are linked in their top–down associations on sexual motivation. According to the HMIEM, the strongest antecedent of motivation at a given level in the hierarchy should be motivation at the adjacent level, and the associations of more distal levels should be mediated by associations involving more proximal levels (Vallerand 1997). Therefore, as relational motivation should be more proximal to sexual motivation, it likely behaves as a mechanism in the contribution of global motivation to sexual motivation. From a broader perspective, this would suggest that one way in which personality dispositions contribute to the quality of sexual motives is by influencing the quality of the broader relationship context in which partnered sexual activities occur.

A final question to consider is the breadth of the contribution of the quality of sexual motives to well-being. Although previous studies showed associations between the quality of sexual motives and well-being at the global and relational level (Brunell and Webster 2013; Vrangalova 2015; for approach-avoidance sexual motivation, see also Impett et al. 2005), the contributions of global and relational motivation were not taken into account in these studies. As a result, it remains unclear whether the quality of sexual motives made a unique contribution to global and relational well-being, or whether these associations

were simply confounded by an unmeasured shared variance between sexual, relational, and global motivation. If this were true, we should expect the contributions of sexual motivation to global and relational well-being to disappear once the contributions of global and relational motivation are considered. This would be in line with principles of hierarchical modeling, in which lower levels in the hierarchy cannot exert a direct influence on outcomes located at higher levels. However, if sexual motivation does indeed contribute to well-being beyond the sexual level, the specificity hypothesis of the HMIEM (Vallerand 1997) would predict that its strongest association would be with sexual well-being, followed by relational well-being, and then by global well-being. This would be in line with a heterarchical model of sexual motivation, in which the sexual motivation would operate independently from the relational and the global level.

1.5 The Present Study

In this cross-sectional study, we used the HMIEM (Vallerand 1997) and principles of heterarchical modeling (Berntson and Cacioppo 2008; Milyavskaya, et al. 2013) to better understand the structure of motivational antecedents and well-being consequences of autonomous and controlled sexual motivation (see Fig. 1a). Overall, we anticipate that a heterarchical model will provide a better representation of the patterns of associations among the study variables. We propose the following hypotheses regarding the antecedents of autonomous and controlled sexual motivation. Autonomous global motivation will be positively associated with autonomous relational and sexual motivation (1), whereas controlled global motivation will be positively associated with controlled relational and sexual motivation (2). Autonomous relational motivation will be positively associated with autonomous sexual motivation (3), whereas controlled relational motivation will be positively associated with controlled sexual motivation (4). The contribution of relational motivation to sexual motivation will be larger than the contribution of global motivation (5). A portion of the association between global motivation and sexual motivation will be mediated by relational motivation (6).

Regarding the well-being consequences of autonomous and controlled sexual motivation, we expect that autonomous sexual motivation will be positively associated with sexual, relational, and global well-being (7), whereas controlled sexual motivation will be negatively associated with sexual, relational, and global well-being (8). Finally, the contribution of sexual motivation to well-being will be the strongest for sexual well-being, followed by relational well-being, and then by global well-being (9).

2 Method

2.1 Participants and Procedure

A convenience sample of university students was recruited using a participant pool at the researchers' university in the context of a larger research program on sexual motivation. Eligibility criteria were: (a) being at least 17 years old, (b) currently sexually active with a committed partner of at least 3 months, and (c) fluent in English. An advertisement for the study was posted on the participant pool's website. The goal of the study was described as an investigation of the interplays between sexuality, relationships, and well-being. Interested students accessed the online survey by following a link to the study's
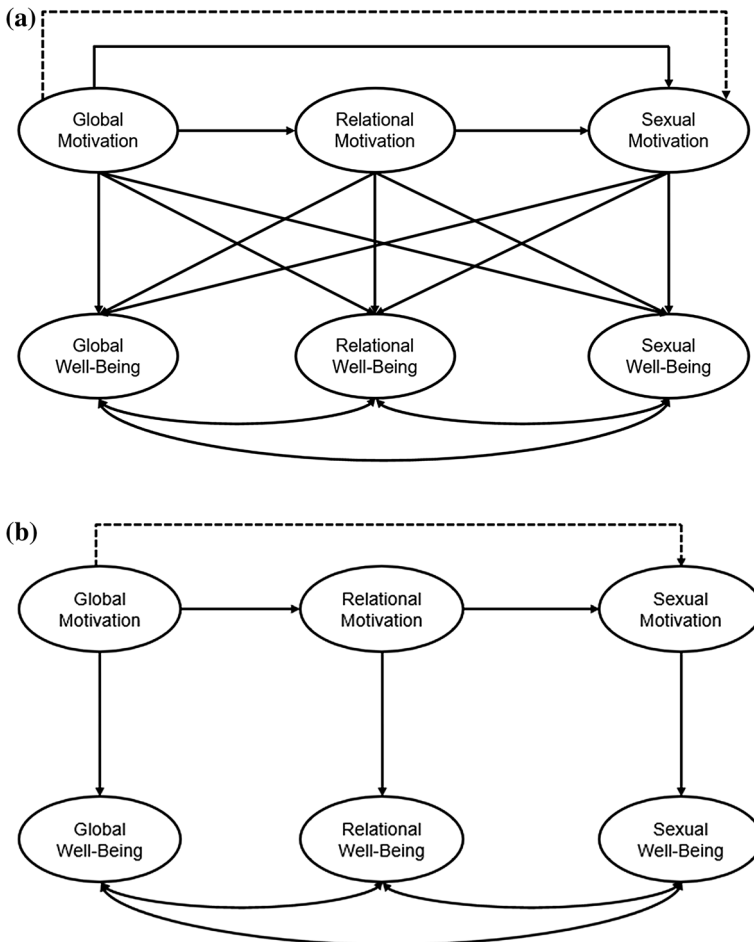
Fig. 1 Models of antecedents and consequences of sexual motivation. Solid lines represent direct effects and dashed lines represent indirect effects. **a** Hypothesized heterarchical model, **b** alternative hierarchical model

website. Students were informed that their participation in the study would be anonymous and confidential. All study procedures were approved by the ethics review committee at the researchers' university and participants provided their informed consent prior to completing the survey. Students were rewarded with one course credit for their participation.

A total of 1411 students submitted an online survey. Data from participants (a) who completed the survey more than once ($n=200$), (b) who did not meet the eligibility criteria ($n=220$), (c) who did not provide their participant pool identifier ($n=45$), (d) who only answered the demographic section or had more than 5% of missing data on any scale of the survey ($n=90$), and (e) who did not provide their gender ($n=3$) were removed from the database. The final sample of eligible participants was composed of 853 university students (684 women and 169 men; $M_{age}=19.93$, $SD=4.14$). The ethnic heritage of these participants was as follows: 2% African, 6% Asian, 76% European, 4% Hispanic, 6% Middle Eastern, 4% mixed ethnic heritage, and 5% did not report their

ethnic heritage. In terms of sexual orientation, 4% were bisexual, 2% were gay or lesbian, 93% were heterosexual, and less than 1% of participants reported "other". Average relationship length was 23.37 months ($SD = 30.97$).

2.2 Measures

2.2.1 Global Motivation

The Global Motivation Scale (GMS; Pelletier et al. 2013; Sharp et al. 2003) is an 18-item measure of the six forms of motivation proposed by SDT (i.e., intrinsic, integrated, identified, introjected, external, and amotivation; for a detailed discussion, see Deci and Ryan 1985, 2000). Each item corresponds to a reason for performing behaviors in general (e.g., autonomous item: "because they reflect what I value most in life; controlled item: "because I would beat myself up for not doing them"). Items are answered using a Likert scale ranging from 1 (*not agree at all*) to 7 (*strongly agree*). Results from confirmatory factor analysis of the GMS suggested that a six-factor structure corresponding to each type of motivation presented a good fit with the data (Sharp et al. 2003). Internal consistency for each subscale was adequate, with alpha coefficients ranging from .66 to .89 (Sharp et al. 2003). Separate measures of autonomous and controlled global motivation were created by averaging all autonomous items (i.e., intrinsic, integrated, and identified) into one scale and all controlled items (i.e., introjected and external) into another scale (for a discussion, see Pelletier and Sarrazin 2007). As the focus of this study was on autonomous and controlled forms of motivation, amotivation items were not used in all measurements of motivation. In this study, reliability coefficients for the GMS were .81 for the autonomous scale and .76 for the controlled scale.

2.2.2 Relational Motivation

The Couple Motivation Questionnaire (CMQ; Blais et al. 1990; Patrick et al. 2007) is a 21-item measure of the extent to which a person's reasons for being in a committed relationship are intrinsic, integrated, identified, introjected, external, or amotivated. Items are answered using a Likert scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). Sample items include "because I value the way my relationship with my partner allows me to improve as a person" (autonomous relational motivation) and "because I need to be in a relationship with my partner to feel important" (controlled relational motivation). As the factorial validity of the scale has not been formally established, we conducted a principal component analysis of the CMQ items. Results suggested that the autonomous and controlled relational motivation items loaded on distinct factors explaining 31.96% and 16.43% of the variance, respectively. The CMQ has demonstrated adequate reliability in previous studies, with alpha coefficients ranging from .75 to .80 (Blais et al. 1990; Patrick et al. 2007). Separate measures of autonomous and controlled relational motivation were created using the same procedure used for the GMS. In this study, reliability coefficients for the CMQ were .88 for the autonomous relational motivation scale and .74 for the controlled relational motivation scale.

2.2.3 Sexual Motivation

The Sexual Motivation Scale (SexMS; Gravel et al. 2016) is a 24-item measure of the extent to which a person's reasons for engaging in sexual activities are intrinsic, integrated, identified, introjected, external, or amotivated. Items are answered using a Likert scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds completely*). The SexMS has an excellent factorial validity as it can reproduce the factor structure predicted by SDT and its subscales possess good to excellent reliability (Gravel et al. 2016). Sample items include "because sexuality brings so much to my life" (autonomous sexual motivation) and "because I don't want to be criticized by my partner" (controlled sexual motivation). Separate measures of autonomous and controlled sexual motivation were created using the same procedure used for the GMS. In this study, reliability coefficients for the SexMS were .92 for the autonomous sexual motivation subscale and .80 for the controlled sexual motivation subscale.

2.2.4 Sexual Well-Being

We evaluated sexual well-being using two proxies: the presence of sexual satisfaction and the absence of sexual distress (for a discussion, see Stephenson and Meston 2010). Sexual satisfaction was measured using the New Sexual Satisfaction Scale (NSSS; Štulhofer et al. 2010), a 20-item instrument measuring five dimensions of sexual satisfaction: (a) sexual sensations (e.g., "the intensity of my sexual arousal"), (b) sexual presence (e.g., "my focus and concentration during sexual activity"), (c) sexual exchange (e.g., "the balance between what I give and what I receive in sex"), (d) emotional connection/closeness (e.g., "my partner's emotional opening up during sex"), and (e) sexual activity (e.g., "the variety of my sexual activities"). Items are answered using a Likert scale ranging from 1 (*not at all satisfied*) to 5 (*extremely satisfied*). Confirmatory factor analysis showed that a two-factor structure represented the best fitting model, with one factor representing the participant's experiences and sensations and the other representing the participant's perceptions of satisfaction with their partner (Štulhofer et al. 2010). The NSSS has also demonstrated good reliability, with an internal consistency ranging from .90 to .96 and test–retest reliability ranging from .72 to .84 (Štulhofer et al. 2010). In this study, the reliability coefficient for the NSSS was .93.

Sexual distress was measured using the seven gender-neutral questions from the Female Sexual Distress Scale (FSDS; Derogatis et al. 2002). This scale evaluates the extent to which a person experiences sexuality-related distress (e.g., feeling "sexually inadequate"). The items are answered with a Likert scale ranging from 0 (*never*) to 4 (*always*). The items were recoded such that higher scores denoted lower sexual distress. A principal component analysis of these seven items produced a one-factor solution explaining 56.58% of the variance in this sample. In this study, the reliability coefficient for this version of the FSDS was .89.

2.2.5 Relational Well-Being

The Relationship Assessment Scale (RAS; Hendrick et al. 1998) is a 7-item measure of the extent to which a person values their partner and their relationship (e.g., "how much do you love your partner?") and the overall relationship ("to what extent has your relationship met

your original expectations?"). Items are answered using a Likert scale ranging from 1 (*low satisfaction*) to 5 (*high satisfaction*). In a validation study of the RAS, principal component analysis produced a one-factor structure and a Cronbach's alpha of .86 was obtained (Hendrick et al. 1998). In this study, we obtained a reliability coefficient of .84 for the RAS.

2.2.6 Global Well-Being

Global well-being was measured by evaluating positive and negative affect, life satisfaction, and psychological well-being. Affect was measured using the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988). The PANAS is a 20-item scale measuring the extent to which a person experienced ten positive (e.g., interest, excitement, pride) and ten negative (e.g., shame, fear, irritability) emotions over the past week. Items are answered using a Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). The items for the negative affect scale were recoded such that higher scores denoted lower negative affect. In this study, the reliability coefficient was .85 for both the positive affect and the negative affect subscales.

We used the Satisfaction with Life Scale (SWLS; Diener et al. 1985) to evaluate quality of life. The SWL is a 5-item instrument that uses a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item includes "The conditions of my life are excellent". In this study, the reliability coefficient for the SWLS was .89.

Psychological well-being was measured with the 42-item version of the Psychological Well-Being Scales (PWBS; Abbott et al. 2006; Ryff 1989), which assesses autonomy (e.g., "I judge myself by what I think is important, not by the values of what others think is important"), self-acceptance (e.g., "My attitude about myself is probably not as positive as most people feel about themselves"), environmental mastery ("I have difficulty arranging my life in a way that is satisfying to me"), personal growth (e.g., "For me, life has been a continuous process of learning, changing and growth"), positive relations with others (e.g., "People would describe me as a giving person, willing to share my time with others"), and purpose in life (e.g., "Some people wander aimlessly through life, but I am not one of them"). Items are answered using a Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Reliability analyses showed that alpha coefficients for the six subscales ranged from .82 to .90 (Schmutte and Ryff 1997). For this study, the alpha reliability coefficient for the total PWBS was .92.

2.2.7 Frequencies of Sexual Activities

Participants were asked to report how frequently they engaged in the following sexual activities over the last week: masturbation, manual sex, oral sex, vaginal sex, anal sex, and the use of sex toys. An index of sexual frequency was created by taking the sum of the frequency of these six activities. This measure was used as a control variable.

2.3 Analytical Strategy

We performed structural equation modeling (SEM) using AMOS 18 with maximum likelihood estimation to evaluate the hypotheses. Due to the complexity of the model, we used parceling to create indicators for the model's latent variables, a strategy which improves parameter estimation in structural models (Little et al. 2002). A detailed discussion on the parceling procedures used in this study is provided in Appendix A. A bootstrap procedure

with 5000 replacement samples was used to generate estimates for standard errors for both indirect effects and standardized regression paths.

A critical step in structural equation modeling is model specification (Kline 2010). This involves the representation of all relevant associations among the variables in the model; failure to do so can result in biased parameter estimates (Kline 2010). In our model, several associations that were not part of the hypotheses but were nonetheless theoretically and empirically relevant were included in the model to achieve proper model specification. We modeled associations between relational motivation and well-being at the sexual and global levels given the links between relationship processes and sexuality (Impett et al. 2014) and the interplay between motivational factors related to close relationships and global well-being (Weinstein and DeHaan 2014). We also modeled associations between global motivation and well-being at the sexual and relational levels given that the specificity hypothesis of the HMIEM (Vallerand 1997) and principles of heterarchical modeling predict associations between global motivation and well-being at the contextual level. We modeled covariances between autonomous and controlled motivation at the global level, between the error terms of autonomous and controlled motivation at the sexual and relational levels, and between autonomous and controlled forms of motivation across levels (e.g., between global autonomous motivation and controlled relational motivation) given that these two motivational orientations tend to be associated with one another (Deci and Ryan 2000). Finally, we modeled covariances between the error terms of the well-being variables given the associations between well-being at the sexual, relational, and global levels (Byers and Rehman 2014; Diamond and Huebner 2012).

We first evaluated the fit of the hypothesized heterarchical model to determine whether it provided a good representation of the pattern of associations in the data. Next, we compared the adequacy of the hypothesized model to that of an alternative hierarchical model. In this alternative model (see Fig. 1b) the direct associations between global and sexual motivation were removed to provide a test of a heterarchical association between these two levels. The associations global, relational, and sexual motivation share with non-corresponding levels of well-being (e.g., the associations between sexual motivation and relational and global well-being) were also removed because in a standard hierarchical model motivation at one level should not share a direct association with well-being outcomes at other levels, providing a test of heterarchical associations between motivation and well-being outcomes at different levels.

Lastly, as previous studies found gender differences in the self-determination of sexual motivation (Brunell and Webster 2013), we compared the invariance of our model in women and men. We used confirmatory fit index differences (ΔCFI) to establish measurement invariance because the commonly used likelihood ratio test based on Chi square differences between models is markedly stringent with larger samples (Kline 2010). Findings from a simulation study suggest using ΔCFI $\leq .002$ to establish measurement invariance between groups (Meade et al. 2008). We also controlled for potential confounding effects of frequency of sexual activities and relationship length. Finally, to compare the relative magnitude of regression coefficients, we used critical ratios for differences between parameters (CR) provided by AMOS, which follow a standard normal distribution.

3 Result

Data cleaning procedures are presented in Appendix B, descriptive statistics and mean comparisons are presented in Appendix C, and correlations are presented in Appendix D.

3.1 Model Fit

As shown in Table 1, the results demonstrated that the hypothesized model presented a good fit with the data, providing support for the notion that global and relational motivation were associated with sexual motivation, and that sexual motivation was associated with well-being outcomes at different level of generality. We then compared our heterarchical model against an alternative hierarchical model to provide a more stringent test of its adequacy (see Table 1). In the hierarchical alternative model, the direct path between global and sexual motivation were removed, as were the path between motivation and well-being at non-corresponding levels. The Chi square difference test was significant, $\Delta\chi^2$ (26) = 357.60, $p < .001$, suggesting that a heterarchical structure provided a better representation of the patterns in the data than a hierarchical structure.

Next, we explored the invariance of the model with respect to gender. Results showed that the values of the ΔCFIs were smaller or equal to .002 for measurement paths, structural paths, covariances, structural residuals, and measurement residuals (see Table 1). Therefore, for both women and men, our model therefore provided a good representation of the motivational antecedents and well-being consequences of autonomous and controlled motivation.
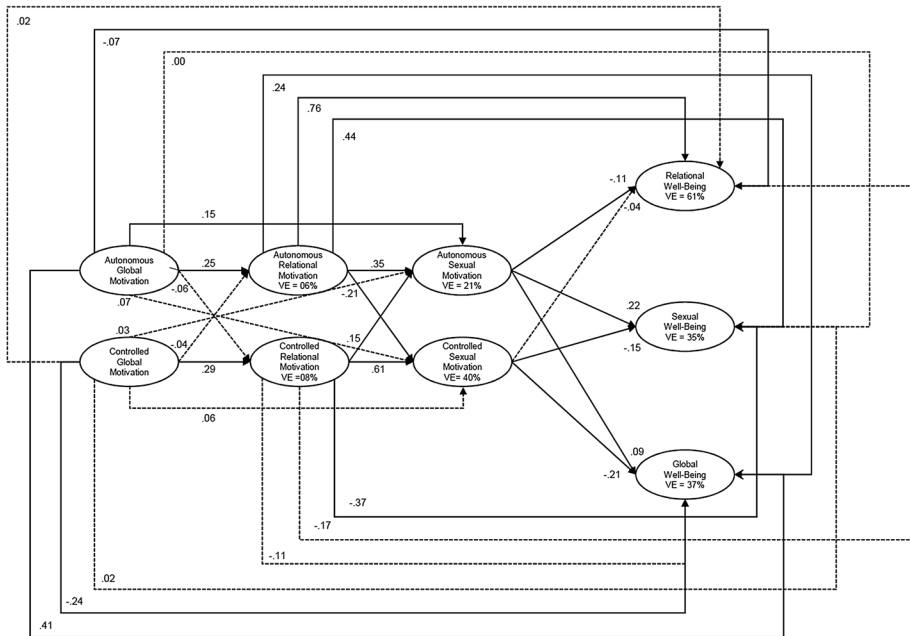
3.2 Antecedents of Sexual Motivation

We found support for most hypotheses (see Fig. 2). Global autonomous motivation shared a significant positive association with relational and sexual autonomous motivation, and global controlled motivation shared a significant positive association with relational controlled motivation. Contrary to our prediction, the association between controlled global motivation and controlled sexual motivation was not significant. Finally, autonomous relational motivation shared a significant positive association with autonomous sexual motivation, and controlled relational motivation shared a significant positive association with controlled sexual motivation.

Next, we investigated the relative contributions of global and relational motivation to sexual motivation. As predicted, critical ratios for differences between parameters revealed that autonomous relational motivation was a stronger correlate of autonomous sexual motivation than autonomous global motivation, CR = 3.42, $p < .001$, and that controlled

Table 1 Model fit statistics

Model	χ^2	df	χ^2/df	RMSEA (90% CI)	CFI	TLI	NFI
Structural model	751.26	288	2.60	.044 (.040, .048)	.970	.96	.95
Alternative model	1008.55	304	3.32	.053 (.049, .057)	.954	.95	.94
Gender invariance models							
Unconstrained	1106.22	576	1.92	.033 (.030, .036)	.966	.96	.93
Measurement weights	1129.13	594	1.90	.033 (.030, .036)	.965	.96	.93
Structural weights	1173.52	624	1.88	.033 (.030, .036)	.964	.96	.93
Structural covariances	1174.81	627	1.87	.033 (.030, .035)	.964	.96	.93
Structural residuals	1191.43	639	1.87	.032 (.029, .035)	.964	.96	.93
Measurement residuals	1225.19	666	1.84	.032 (.029, .035)	.964	.96	.92

$N = 828$. All Chi square tests were significant at $p < .001$

Fig. 2 Standardized path coefficients for antecedents and consequences of sexual motivation. Path represented by solid lines are significant at least at $p <.05$, paths represented by a dashed line are nonsignificant. VE = total explained variance of predictors on outcome variables. For readability purposes, factor loadings for indicator variables, covariances, and standard errors of parameter estimates are not shown, but are available from the authors upon request

relational motivation was a stronger correlate of controlled sexual motivation than controlled global motivation, CR = 8.09, $p <.001$.

We then examined whether relational motivation was a mediator in the association between global and sexual motivation. Autonomous global motivation shared a significant and positive indirect association with autonomous sexual motivation, β= .08, $SE =.02$, 95% CI [.04, .12], and controlled global motivation shared a significant and positive indirect association with controlled sexual motivation, β = .18, $SE =.03$, 95% CI [.13, .24]. Therefore, relational motivation was a mediator in the association between global and sexual motivation.

3.3 Consequences of Sexual Motivation

For the most part, the results supported our hypotheses (see Fig. 2). Sexual motivation was significantly associated with well-being at the sexual, relational, and global level. Specifically, higher autonomous sexual motivation and lower controlled sexual motivation were associated positively and negatively, respectively, with sexual well-being. Controlled sexual motivation was not associated with relational well-being and surprisingly, autonomous sexual motivation was negatively associated with relational well-being. We suspected that this may have been the result of a suppression effect—in which the addition of a variable to a model changes the direction of an association between two other variables and which are not uncommon in SEM (see Kline 2010)—because correlations suggested a positive

association between autonomous sexual motivation and relational well-being (see Appendix D). We attempted to locate a potential suppressor variable by removing all global and relational motivation variables from the model, and then re-introducing each of them one at a time until we observed a change in the association between autonomous sexual motivation and relational well-being. Upon removing all other motivation variables from the model, the association between autonomous sexual motivation and relational well-being became positive, $\beta = .08$, $SE = .04$, 95% CI [.002, .17]. When controlled sexual motivation was added to the model, the association between autonomous sexual motivation and relational motivation remained positive, $\beta = .24$, $SE = .04$, 95% CI [.16, .33]. We then added autonomous relational motivation and the association between autonomous sexual motivation and relational well-being became negative and nonsignificant, $\beta = -.07$, $SE = .04$, 95% CI [−.16, .01]. When controlled relational motivation was added to the model, the association became significant and negative, $\beta = -.12$, $SE = .04$, 95% CI [−.20, −.04]. Additionally, the sign of the association between autonomous sexual motivation and relational motivation remained negative when we removed controlled sexual motivation while autonomous and controlled relational motivation remained in the model, $\beta = -.14$, $SE = .04$, 95% CI [−.21, −.07]. Thus, there was a possibility that autonomous and controlled relational motivation may have been suppressor variables in the association between autonomous sexual motivation and relational well-being.

We then examined the associations between autonomous and controlled sexual motivation and global well-being. Higher autonomous sexual motivation and lower controlled sexual motivation were associated with higher global well-being. Finally, when we added relationship length and frequency of sexual activities to the model to control for potential confounding effects, all the associations between autonomous and controlled motivation and the well-being variables remained significant and in the same direction.

When comparing the relative magnitude of the association between autonomous and controlled sexual motivation and the well-being variables, we found partial support for our predictions. The association between autonomous sexual motivation and sexual well-being was stronger than its association with relational well-being (CR = −7.29, $p < .001$) and its association with global well-being (CR = −3.82, $p < .001$). The association between autonomous sexual motivation and relational well-being was also stronger than its association with global well-being (CR = 4.21, $p < .001$). However, the association between controlled sexual motivation and sexual well-being and the association between controlled sexual motivation and global well-being were similar in magnitude (CR = .38, $p = .70$). We did not conduct a comparison involving the association between controlled sexual motivation and relational well-being as it was non-significant.

4 Discussion

To the best of our knowledge, this is the first study to examine the structure of motivational antecedents and well-being consequences of autonomous and controlled sexual motivation. Overall, the results suggested that these two motivational orientations toward sexual activities may operate within a heterarchical structure that extends beyond the sexual domain, sharing associations with broader psychological functioning. Furthermore, the results suggested that autonomous sexual motivation was part of an overall pattern of optimal functioning, whereas controlled sexual motivation was part of an overall pattern of non-optimal functioning.

4.1 Antecedents and Consequences of Sexual Motivation

Consistent with previous research (Gravel et al. 2016, Study 2), global and relational motivation were associated with individual differences in the quality of sexual motives. Specifically, people with a stronger general disposition to behave autonomously and a stronger autonomous orientation toward their relationship with their partner were more likely to engage in sexual activities for autonomous reasons. In contrast, people with a stronger controlled orientation toward their relationship with their partner were more likely to engage in sexual activities for controlled reasons.

Our findings also demonstrated that individual differences in autonomous and controlled sexual motivation were linked to important well-being consequences at the sexual and global level. Specifically, people who endorsed more autonomous reasons to engage in sexual activities reported better sexual experiences and overall well-being. For people who endorsed more controlled reasons to engage in sexual activities, the opposite pattern was found. These trends are consistent with previous studies demonstrating that well-being correlates of the self-determination of sexual motivation extended beyond the sexual domain to the global level of psychological functioning (Brunell and Webster 2013; Gravel et al. 2016, Study 2; Vrangalova 2015). Importantly, these associations held beyond those involving global motivation and our hypothesized model showed a superior fit in comparison to an alternative model in which the associations involving sexual motivation and global well-being were removed. Therefore, this study is the first to demonstrate that quality of sexual motives makes a unique contribution to global well-being.

However, findings were less clear with respect to the associations between the quality of sexual motives and relational well-being. First, we found that controlled sexual motivation was not associated with relational well-being. This finding may be explained by the fact that the four items in the controlled sexual motivation measure pertained directly to pressures stemming from the partner, possibly resulting in a substantial shared variance between controlled relational motivation and controlled sexual motivation. As such, a potential association between controlled sexual motivation and relational well-being may have disappeared when accounting for the contribution of relational motivation.

Additionally, we found a negative association between autonomous sexual motivation and relational well-being, contrasting with an extensive body of evidence on the benefits of autonomous motivation (for a review, see Ryan and Deci 2017). Our findings suggested that this association may have been the result of a suppression effect produced by autonomous and controlled relational motivation. The association between autonomous sexual motivation and relational well-being became positive once these variables were removed from the model. Interpretation of suppressing effects is complex as they can be the product of a statistical artifact or a substantive effect (Kline 2010). At this point, it is difficult to determine the exact nature of this result and both explanations are plausible. Regarding the possibility of a substantive effect, one explanation may be that a particular motivational profile (i.e., a specific combination of the three variables; for instance, high autonomous and controlled relational motivation combined with high autonomous sexual motivation) was associated with poorer relationship quality and was sufficiently represented in the sample to produce the association we observed. It is also plausible that the negative association between autonomous sexual motivation and relational well-being may have been caused by other factors than a suppressing effect, such as an unknown unmeasured confounder.

4.2 A Structural Understanding of Sexual Motivation

The present study is the first to integrate motivational antecedents and consequences of sexual motivation in a theoretical framework delineating the structure of their organization. Overall, the results indicated that a heterarchical approach may better capture the complex patterns of associations between the sexual, relational, and global levels than a hierarchical approach. Indeed, contrary to a standard hierarchical model, in which more specific levels are fully nested within the more general levels, the pattern of results in this study for both antecedents and consequences suggested that sexual motivation is best represented as only partially nested into the global and relational level.

Of particular importance was the pattern of results suggesting that the sexual level shared a direct association with the global level, showing that the sexual level was not fully nested within the relational level. Thus, sexual motivation appears to belong to a domain in its own right that operates at the same level of generality as relation motivation, but that nonetheless shares a strong association with the relational level. More broadly, these results suggest that despite the close associations between the sexual and relational domains, the manifestations of the sexual self cannot be strictly reduced to relational processes as it unfolds through a complex interaction of both intrapersonal and interpersonal factors.

Although the results suggesting that a heterarchical model may be more appropriate than a hierarchical model to describe the structure of the quality of sexual motives, some assumptions of the HMIEM remain highly relevant to our understanding of the antecedents of the quality of sexual motives. First, the results demonstrated that relational motivation was a stronger correlate of sexual motivation than global motivation, suggesting that the sexual level was more proximal to the relational level than the global level. Again, this result is consistent with the HMIEM, which predicts that the associations between two adjacent levels should be stronger than the associations between non-adjacent levels (Vallerand 1997). A second piece of evidence was gleaned from mediation analyses, which suggested that relational motivation mediated the association between global and sexual motivation. This is also consistent with the HMIEM's proposition that the association between two distal levels of motivation should be mediated by motivation from more proximal levels (Vallerand 1997), and with our proposition that the sexual level should be more proximal to the relational level than the global level.

Findings for the well-being consequences of sexual motivation were less consistent with the propositions of the HMIEM. Results suggested that the strength of the associations involving autonomous sexual motivation diminished when moving from the sexual level to the relational level, and from the relational level to the global level. This is consistent with the HMIEM, which predicts that the consequences of motivation at a given level should be the strongest for outcomes located at the same level (Vallerand 1997). These results are also consistent with our prediction that the sexual level should be closer to the relational level than to the global level in the model. Contrary to our prediction, the associations between controlled sexual motivation and well-being at the sexual and global level were similar in magnitude. Given that negative events tend to have a stronger impact than positive ones (Baumeister et al. 2001), it is possible that the negative sexual well-being consequences (i.e., lower sexual satisfaction and higher sexual distress) associated with higher controlled sexual motivation may produce a considerable spillover effect on global well-being. A similar line of reasoning has been invoked in previous research on approach-avoidance sexual motives to support the notion that negative sexual experiences may be more impactful than positive ones. In a series of studies, approach sexual motives were

associated with increased sexual desire, sexual satisfaction, and relational satisfaction, whereas the opposite was found for avoidance sexual motives (Muise et al. 2013). However, the effects of avoidance sexual motives were more consistent than those of approach sexual motives across studies, particularly for effects measured over longer periods of time.

4.3 Implications

Our results converge with an extensive body of research on the critical role of the self-determination of behavior for optimal psychological functioning (e.g., Ryan and Deci 2017). Specifically, this study contributes to the growth of research demonstrating the relevance of SDT as a framework of the quality of sexual motives (Boislard-Pépin et al. 2002; Brunell and Webster 2013; Gravel et al. 2016; Vrangalova 2015). In this study, we integrated findings from previous studies in a unified model and we extended them by showing that a heterarchical structure provides a useful model of the motivational antecedents and well-being consequences of the self-determination of sexual motivation. This is a timely contribution given that a major gap in the literature on the quality of sexual motives is a paucity of research on their antecedents (Muise 2017). In this study, we demonstrated that people's overarching dispositional motivation and their motivational orientation toward their relationship may contribute to individual differences in optimal and non-optimal sexual motivation.

Additionally, we adapted the HMIEM to better account for some important particularities of sexuality as a life domain. A possible limitation of the HMIEM was that its predictions regarding the magnitude of the associations between different levels and contexts of motivation may not clearly address situations in which close connections between two life domains exists—as is the case for committed relationships and sexuality. We demonstrated that the sexual level should be considered more proximal to the relational level than to the global level. This finding is an important theoretical development for the HMIEM as few studies have explored the properties of the model in situations involving closely intertwined life domains. This adaptation enhances the generalizability HMIEM to the domains of sexuality and committed relationships, allowing for more accurate hypothesis generation in future research.

This study also contributes to sexuality research by demonstrating that self-determination is an important dimension of the quality of sexual motives. We demonstrated that autonomous sexual motivation may be considered an optimal type of sexual motivation as it was associated with an overall pattern of positive psychological functioning at the sexual and global level. In contrast, controlled sexual motivation may be considered a non-optimal type of sexual motivation as it was associated with an overall pattern of poorer psychological functioning. Thus, although sexual activities can make a meaningful contribution to committed relationships (e.g., Birnbaum and Finkel 2015) and quality of life (Laumann et al. 2006), the reasons why people engage in them may be critical in determining the nature of their outcomes. Overall, our results suggest that by considering the extent to which sexual motives are autonomous or controlled, we may extend our understanding of the processes that determine for whom and when engaging in sexual activities results in either benefits or costs for well-being.

From a broader perspective, our study suggests that sexuality is an integral dimension of the self as the quality of sexual experiences were associated with broader psychological functioning. By highlighting the complex connections that exist among the sexual, relational, and global level of psychological functioning, our study lends important support to

calls for a better integration of sexuality in health, well-being, personality, and social psychology research (Byrne 1976; Diamond and Huebner 2012; Hooghe 2012).

4.4 Limitations and Future Directions

The results from this study must be interpreted in light of some limitations. First, definite conclusions regarding the direction of the associations cannot be formulated with the use of a cross-sectional design. We refer to the distinct parts of our model as antecedents and consequences on a theoretical basis, but the associations we investigated are likely bidirectional. Thus, experimental and longitudinal studies are needed to provide more rigorous support for the directions of the associations found in this study. A second limitation was common method bias. All the data was collected using self-report measures taping into the same broad constructs (i.e., motivation and well-being) measured at different levels, in different domains, and at the same time. Taking measurements at different times, from different sources (e.g., the partner), and with different types of measures (e.g., using scenarios) may help to minimize the variance contributed by this methodology in future research. The composition of the external regulation items for the SexMS also limits the theoretical validity of our results. Given that these items all focus on partner-related pressures, this subscale captures elements of both sexual and relational motivation. To provide a more robust test of a heterarchical structure between controlled relational and sexual motivation, the external regulation items from the SexMS should be modified as to reflect general external pressures regarding sexual activities. Additionally, the study was conducted with a sample primarily composed of privileged (i.e., educated, heterosexual, and of European descent) emerging adult women. Notably, the small sample size for men and the use of a university student population are important limitations for the generalizability of the results from this study. Indeed, we cannot conclude at this point whether the direction and magnitude of the associations observed in this study would be similar in other groups that were underrepresented in the sample. Replication of this study with a more diverse sample of non-students will be critical to establish the generalizability of its conclusions. Finally, although we combined different indicators of well-being into indexes to facilitate parameter estimation, this procedure ultimately masks the unique associations that sexual motives share with different well-being indicators. For example, one study found that more controlled types of sexual motives were associated with increased negative outcomes and decreased positive outcomes, whereas the opposite pattern was found for more autonomous types of sexual motives (Gravel et al. 2016). Further research on the quality of sexual motives remains critical to understand the complexity of their associations with different well-being outcomes.

We propose two broad directions for future research on autonomous and controlled sexual motivation. First, research should examine the contribution of the partner to the determination of autonomous and controlled sexual motivation and their consequences. As members of a couple are interdependent, it is important to understand the ways in which self-determination in one partner influences the sexual experiences of the other partner. Second, in this study we focused on individual differences in autonomous and controlled sexual motivation. However, as proposed by the HMIEM (Vallerand 1997) and previous studies (for a review, see Muise 2017), sexual motivation is also situational and fluctuates from one sexual encounter to another. Therefore, an important direction for future research is to investigate within-person variations in autonomous and controlled sexual motivation and how they contribute to daily variations in well-being.

More broadly, research on sexual motives may benefit from adapting the HMIEM and integrating principles of heterarchical modeling to other commonly used models of sexual motives, such as the YSEX (Meston and Buss 2007) and the approach-avoidance model of sexual motivation (Cooper et al. 1998). These modeling approaches may provide important insights on the motivational antecedents of other types of sexual motives. Indeed, few studies so far have focused on identifying antecedents of sexual motives (Muise 2017). Additionally, examining whether other types of sexual motives can impact well-being at the global and relational levels while controlling for the contributions of global and relational motivation is an important step in determining the scope of their influence on well-being beyond the sexual level.

5 Conclusion

This study contributes to our understanding of autonomous and controlled sexual motivation by shedding light on the complex structure of their motivational antecedents and well-being consequences. A global disposition toward autonomy or control in daily life as well as an orientation toward autonomy or control with respect to one's relationship with their partner may play key roles in the quality of sexual motives. In turn, a general tendency to be autonomous or controlled with respect to sexual activities may entail important consequences for well-being beyond the sexual domain. From a broader perspective, this investigation of the structure of sexual motivation suggests that sexuality is far from being compartmentalized aspect of the self; rather, it permeates important aspects of people's lives because it is woven to other domains of the self in intricate ways.

References

Abbott, R. A., Ploubidis, G. B., Huppert, F. A., Kuh, D., Wadsworth, M. E., & Croudace, T. J. (2006). Psychometric evaluation and predictive validity of Ryff's psychological well- being items in a UK birth cohort sample of women. *Health and Quality of Life Outcomes, 4,* 76–91. https://doi.org/10.1186/1477-7525-4-76.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5,* 323–370. https://doi.org/10.1037//1089-2680.5.4.323.

Berntson, G. G., & Cacioppo, J. T. (2008). The neuroevolution of motivation. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 188–200). New York: The Guilford Press.

Birnbaum, G. E., & Finkel, E. J. (2015). The magnetism that holds us together: Sexuality and relationship maintenance across relationship development. *Current Opinion in Psychology, 1,* 29–33. https://doi.org/10.1016/j.copsyc.2014.11.009.

Blais, M. R., Sabourin, S., Boucher, C., & Vallerand, R. J. (1990). Toward a motivational model of couple happiness. *Journal of Personality and Social Psychology, 59,* 1021–1031. https://doi.org/10.1037/0022-3514.59.5.1021.

Boislard-Pépin, M.-A., Green-Demers, I., Pelletier, L., Chartrand, J., & Séguin Lévesque, C. S. (2002). L'impact du style interpersonnel du partenaire sur la compétence, la motivation et la satisfaction sexuelle. *Revue Québécoise de Psychologie, 23*(3), 105–119.

Brunell, A. B., & Webster, G. D. (2013). Self-determination and sexual experience in dating relationships. *Personality and Social Psychology Bulletin, 39,* 970–987. https://doi.org/10.1177/0146167213485442.

Byers, E. S., & Rehman, U. S. (2014). Sexual well-being. In D. L. Tolman, L. M. Diamond, J. A. Bauermeister, W. H. George, J. G. Pfaus, & L. M. Ward (Eds.), *APA handbook of sexuality and psychology: Person-based approaches* (Vol. 1, pp. 317–337). Washington: American Psychological Association.

Byrne, D. (1976). Social psychology and the study of sexual behavior. *Personality and Social Psychology Bulletin, 3,* 3–30. https://doi.org/10.1177/014616727600300102.

Cooper, M. L., Barber, L. L., Zhaoyang, R., & Talley, A. E. (2011). Motivational pursuits in the context of human sexual relationships. *Journal of Personality, 79,* 1333–1368. https://doi.org/10.1111/j.1467-6494.2010.00713.x.

Cooper, M. L., Shapiro, C. M., & Powers, A. M. (1998). Motivation for sex and risky sexual behavior among adolescents and young adults: A functional perspective. *Journal of Personality and Social Psychology, 75,* 1528–1558. https://doi.org/10.1037/0022-3514.75.6.1528.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227–268. https://doi.org/10.1207/S15327965PLI1104_01.

Derogatis, L. R., Rosen, R., Leiblum, S., Burnett, A., & Heiman, J. (2002). The Female Sexual Distress Scale (FSDS): Initial validation of a standardized scale for assessment of sexually related personal distress in women. *Journal of Sex and Marital Therapy, 28,* 317–330. https://doi.org/10.1080/00926230290001448.

Diamond, L. M., & Huebner, D. M. (2012). Is good sex good for you? Rethinking sexuality and health. *Social and Personality Psychology Compass, 6,* 54–69. https://doi.org/10.1111/j.1751-9004.2011.00408.x.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49,* 71–75. https://doi.org/10.1207/s15327752jpa4901_13.

Gravel, E. E., Pelletier, L. G., & Reissing, E. D. (2016). "Doing it" for the right reasons: Validation of a measurement of intrinsic motivation, extrinsic motivation, and amotivation for sexual relationships. *Personality and Individual Differences, 92,* 164–173. https://doi.org/10.1016/j.paid.2015.12.015.

Hendrick, S. S., Dicke, A., & Hendrick, C. (1998). The relationship assessment scale. *Journal of Social and Personal Relationships, 15,* 137–142. https://doi.org/10.1177/0265407598151009.

Hooghe, M. (2012). Is sexual well-being part of subjective well-being? An empirical analysis of Belgian (Flemish) survey data using an extended well-being scale. *Journal of Sex Research, 49,* 264–273. https://doi.org/10.1080/00224499.2010.551791.

Impett, E. A., Muise, A., & Peragine, D. (2014). Sexuality in the context of relationships. In D. L. Tolman, L. M. Diamond, J. A. Bauermeister, W. H. George, J. G. Pfaus, & L. M. Ward (Eds.), *APA handbook of sexuality and psychology: Person-based approaches* (Vol. 1, pp. 269–315). Washington, DC: American Psychological Association.

Impett, E. A., Peplau, L. A., & Gable, S. L. (2005). Approach and avoidance sexual motivation: Implications for personal and interpersonal well-being. *Personal Relationships, 12,* 465–482. https://doi.org/10.1111/j.1475-6811.2005.00126.x.

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Laumann, E. O., Paik, A., Glasser, D. B., Kang, J. H., Wang, T., Levinson, B., et al. (2006). A cross-national study of subjective sexual well-being among older women and men: Findings from the Global Study of Sexual Attitudes and Behaviors. *Archives of Sexual Behavior, 35,* 145–161. https://doi.org/10.1007/s10508-005-9005-3.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9,* 151–173. https://doi.org/10.1207/S15328007SEM0902_1.

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93,* 568–592. https://doi.org/10.1037/0021-9010.93.3.568.

Meston, C. M., & Buss, D. M. (2007). Why humans have sex. *Archives of Sexual Behavior, 36,* 477–507. https://doi.org/10.1007/s10508-007-9175-2.

Milyavskaya, M., Philippe, F. L., & Koestner, R. (2013). Psychological need satisfaction across levels of experience: Their organization and contribution to general well-being. *Journal of Research in Personality, 47,* 41–51. https://doi.org/10.1016/j.jrp.2012.10.013.

Muise, A. (2017). When and for whom is sex most beneficial? Sexual motivation in romantic relationships. *Canadian Psychology/Psychologie Canadienne, 58,* 69–74. https://doi.org/10.1037/cap0000094.

Muise, A., Impett, E. A., & Desmarais, S. (2013). Getting it on versus getting it over with: Sexual motivation, desire, and satisfaction in intimate bonds. *Personality and Social Psychology Bulletin, 39,* 1320–1332. https://doi.org/10.1177/0146167213490963.

Patrick, H., Knee, C. R., Canevello, A., & Lonsbary, C. (2007). The role of need fulfilment in relationship functioning and well-being: A self-determination theory perspective. *Journal of Personality and Social Psychology, 92,* 434–457. https://doi.org/10.1037/0022-3514.92.3.434.

Pelletier, L. G., Rocchi, M. A., Vallerand, R. J., Deci, E. L., & Ryan, R. M. (2013). Validation of the revised sport motivation scale (SMS-II). *Psychology of Sport and Exercise, 14,* 329–341. https://doi.org/10.1016/j.psychsport.2012.12.002.

Pelletier, L. G., & Sarrazin, P. (2007). Measurement issues in self-determination theory and sports. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self- determination in sports* (pp. 143–152). Champaign, IL: Human Kinetics.

Philippe, F. L., Vallerand, R. J., Bernard-Desrosiers, L., Guilbault, V., & Rajotte, G. (2017). Understanding the cognitive and motivational underpinnings of sexual passion from a dualistic model. *Journal of Personality and Social Psychology.* https://doi.org/10.1037/pspp0000116.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and well-being.* New York: Guilford Press.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57,* 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069.

Schmutte, P. S., & Ryff, C. D. (1997). Personality and well-being: Reexamining methods and meanings. *Journal of Personality and Social Psychology, 73,* 549–559. https://doi.org/10.1037/0022-3514.73.3.549.

Sharp, E. C., Pelletier, L. G., Blanchard, C., & Lévesque, C. (2003, February). The global motivation scale: Its validity and usefulness in predicting success and failure at self- regulation. In: *Paper presented at the Fourth Annual Conference for the Society for Personality and Social Psychology*, Los Angeles, CA.

Stephenson, K. R., & Meston, C. M. (2010). Differentiating components of sexual well-being in women: Are sexual satisfaction and sexual distress independent constructs? *Journal of Sexual Medicine, 7,* 2458–2468. https://doi.org/10.1111/j.1743-6109.2010.01836.x.

Štulhofer, A., Buško, V., & Brouillard, P. (2010). Development and bicultural validation of the New Sexual Satisfaction Scale. *Journal of Sex Research, 47,* 257–268. https://doi.org/10.1080/00224490903100561.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 271–360). San Diego, CA: Academic.

Vrangalova, Z. (2015). Does casual sex harm college students' well-being? A longitudinal investigation of the role of motivation. *Archives of Sexual Behavior, 44,* 945–959. https://doi.org/10.1007/s10508-013-0255-1.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063.

Weinstein, N., & DeHaan, C. R. (2014). On the mutuality of human motivation and relationships. In Human Motivation & Interpersonal Relationships (Eds.), *Weinstein N* (pp. 3–25). Dordrecht: Springer.