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To cite this article: Christine Therriault, Léa Bernard-Desrosiers & Frederick L. Philippe (06 Nov 2023): Integration of sexual and relational mental representations in autobiographical memories is associated with sexual well-being, *Sexual and Relationship Therapy*, DOI: [10.1080/14681994.2023.2273292](https://doi.org/10.1080/14681994.2023.2273292)

To link to this article: <https://doi.org/10.1080/14681994.2023.2273292>



Published online: 06 Nov 2023.



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RESEARCH ARTICLE



Integration of sexual and relational mental representations in autobiographical memories is associated with sexual well-being

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ABSTRACT

Determinants of sexual well-being have often been identified as sexual and relational satisfaction, which both include a focus on partner relationship. Such a conceptualization excludes sexually active single individuals, while confusing sexual and relational satisfaction with sexual well-being as both determinant and outcome. In this research, we propose an intrapersonal perspective focused on cognitive sexual and relational mental representations as determinants of sexual well-being. Based on behavioral systems theory, we suggest that a high level of integration of sexual and relational mental representations should be associated with sexual well-being indicators, whereas a weaker level of integration should correspond to a lower level of sexual well-being. We developed a novel codification scheme to measure the cognitive integration of sexual and relational mental representations in narratives of sexual autobiographical memories. We examined its associations with sexual well-being indicators (satisfaction, passion, and sociosexuality). In a sample of 142 students, results showed that integration of sexual and relational representations in memories was positively associated with sexual satisfaction and harmonious passion, and negatively with obsessive passion and sociosexual desire. Results suggest that an integrated cognitive organization of sexual and relational mental representations in autobiographical memories can reflect a greater sexual well-being. Clinical implications are discussed.

LAY SUMMARY

Autobiographical memories are rich systems formed by the association of mental representations (e.g. images, words, scripts) that may reflect individual's personality. Measuring organization of relational and sexual mental representations in sexual memories— an innovative method – provides an individual indicator reflecting sexual well-being. This is a wealthy avenue for having a new comprehension of mechanisms associated with sexual well-being, beyond relationship status or the type of personal relationships.

ARTICLE HISTORY

Received 2 November 2022
Accepted 20 September 2023

KEYWORDS

Autobiographical memories; cognitive integration; intimacy; mental representations; sexual satisfaction; sexual well-being

Introduction

Sexual well-being is often defined as the quality of one's sexuality and sexual relationships, encompassing both relational and sexual satisfaction (e.g. Laumann et al., 2006). The association between these two indicators of sexual well-being is so strong that several researchers argue that sexual satisfaction is a function of relational satisfaction (e.g. Byers et al., 1998; Laumann et al., 2006). Moreover, most scales assessing sexual satisfaction defines it as being fundamentally relational, with items that tap into partner's behavior (e.g. "I am satisfied with the orgasms that I have with my partner").

Two issues arise from such a conceptualization. First, it specifies that sexual well-being should only be conceptualized within a relational context, making single people or people who do not have sexual relationships with a partner denied of sexual well-being. Second, sexual and relationship satisfaction measured within a dyadic context are highly correlated, which has led certain researchers to include both concepts as subscales of relationship quality (e.g. Fletcher et al., 2000), making it a redundant concept with sexual well-being. There is thus a need to understand how sexual well-being can take place from an intrapersonal perspective, thereby avoiding the highly shared variance of the romantic relationship context. One way to investigate this aspect is to examine how sexuality and relationship exist at the cognitive level in the forms of mental representations and to use this measure of mental organization to predict subjective feelings of sexual satisfaction and well-being. The purpose of the present research was to examine the level of integration of sexual and relational mental representations in narratives of autobiographical memories and its association with indicators of sexual well-being in both singles and partnered individuals.

Sexual and relational mental representations and their integration

Mental representations can be visual images, semantic words, concepts, beliefs, or norms associated with a specific construct or aspect. For instance, a visual image related to the construct of sexuality could be a naked body. Similarly, a belief or a norm related to sexuality could be the way sexual intercourse should be performed (e.g. spontaneous vs. scheduled). Relational mental representation refers to these same aspects but related to the interpersonal area (e.g. intimacy, romance, caring, Philippe et al., 2017). Mental representations in each of these cognitive spheres may be more or less integrated with each other, thereby influencing individuals' sexual and relational behaviors and feelings of sexual satisfaction (Philippe et al., 2017).

According to Bowlby (1969) and his followers (e.g. Birnbaum, 2007; Hazan & Shaver, 1987; Mikulincer & Shaver, 2003, 2007), individuals' relational and sexual development is based on three distinct conceptual behavioral systems growing from infancy to adulthood: caregiving, attachment, and sexuality systems, with each serving their own functions (Mikulincer & Goodman, 2006). The first two correspond to the cognitive relational sphere, while sexuality pertains to the cognitive sexual sphere. During adolescence and early adulthood, the relational sphere (caregiving and attachment systems) begins to merge more importantly with the sexual sphere (sexual system), such that sexual mental representations will begin to associate with relational mental representations in a more or less harmonious and coherent manner (Birnbaum, 2007; Hazan & Shaver, 1987; Mikulincer & Shaver, 2007).

A strong integration of sexual and relational representations implies that when one type of representation is activated there is a high likelihood that the other type will be activated as well at the same time. This has important consequences for how information is processed. When encountering a sexual environmental cue (e.g. someone attractive), the sexual representations activated will activate relational representations as well. When both types of representations are activated, it allows individuals to be empathic and consider the other with potentially distinct feelings and motives—as a distinct individual in relationship with them, instead of just an object of arousal (Bateman & Fonagy, 2004). This therefore leads to a more nuanced interpretation of a situation, enables alternative explanations, and inhibitory activation of one's sexual arousal when external cues signal that such arousal is unfitted or inappropriate in the context. A strong integration should then reduce conflict, inappropriate or impulsive behaviors, and facilitate the harmonious expression of one's sexuality within interpersonal settings in a coherent and non-conflicting manner (Philippe et al., 2017, 2019). In this way, sexual and relational mental representations will nourish each other, allowing people to both give and receive in a sexual relationship, achieving mutual intimate and pleasurable relationships (Lawrance & Byers, 1995; Mikulincer & Goodman, 2006).

A weak integration of sexual and relational representations implies that these representations are not intertwined and that activation of one type frequently occurs independently of the other type. Thus, when a sexual representation is activated by a cue from the environment, only sexual representations are activated. Sexual mental representations are then activated in a loop without the input and the nuance of the relational mental representations (Kruglanski et al., 2002). This leads the person to interpret situations with a sexual cue as inexorably sexual, without alternative explanations. Moreover, because there is no inhibitory activation from other types of representations, this can lead the person to act inappropriately without consideration for the other and to experience intrusive sexual thoughts when the context is inadequate (Daspe et al., 2018). Sexuality may therefore be experienced as intrusive, imposing onto the person, and in conflict with other life spheres (Philippe et al., 2017, 2019). In this case, sexuality may be used as a tool and the partner instrumentalized in order to meet individual needs such as personal pleasure, reducing stress, and boosting self-esteem (Davis et al., 2004). This unidirectional relationship will typically result in less positive emotions and sexual satisfaction (McNulty & Widman, 2013).

Memory systems and mental representations

This integration of sexual and relational mental representations can be observed at different cognitive levels. For instance, it can be observed at the semantic level where some words can be classified as “purely” sexual (e.g. penis, vibrator) and others as an integration of sexual and relational cognitive sphere (e.g. intimate, caress). One way to measure this level of integration is to present participants with a timed associative words generation task. In two studies, Philippe et al. (2017, 2019) asked participants to list in one minute as many words as they could, associated with the word “sex.” Two independent judges then coded these words into three categories: purely sexual words, sexual-relational words, or other (e.g. energy). The higher the ratio of sexual to sexual-relational words, the weaker

was the integration of sexual and relational semantic representations. Such a weaker integration was associated with subjective feelings that sexuality is intrusive and not in harmony with other life spheres, with a faster cognitive processing of sexual stimuli (faster to determine whether a word is sexual or not) and with the classification of ambiguous words (e.g. nurse, heel) as sexual instead of neutral. There is thus some evidence that at the semantic level, a weak integration of sexual and relational representations is associated with a subjective experience of sexuality as intrusive and conflicting, and with an interpretation of sexual stimuli as quick and with little nuance.

Another level to cognitively observe the integration of sexual and relational representations is the episodic memory system. Most specific episodic memories are constituted of sensory detail information, mostly visual images, providing the specificity and contextual detail of a past event (Conway, 2009; Tulving, 2002). They typically combine with autobiographical knowledge, providing social and personal schematic scripts and semantic information, making these memories autobiographical (Cabeza & St-Jacques, 2007). Sexual autobiographical memories can then be recalled and narrated with sexual aspects strongly integrated to relational ones (sexual-relational sensory details and narratives) or with a weaker integration, displaying purely sexual images and a narrative focused on sexual actions or material. Therefore, a first sexual intercourse with someone may be narrated with a strong level of integration where it is possible to denote some relational aspects integrated to some sexual ones: “[...] We talked a lot and we made some clearer sexual advances. [...] We had several very passionate sexual intercourses until the next morning resulting in many orgasms for both of us. The sexual fit was (and still is) incredible [...] it was easy to understand and adapt to each other.” or with a weaker level of integration where the other is describe like an *object*: “I slept with a 40-year-old guy. He had a big penis. This man was really good-looking, he was thrusting deep and hard into me and liked to *dirty talk*. It was really good. He cum two times inside me.”

Given that autobiographical memories reflect the self (Conway & Pleydell-Pearce, 2000; Singer & Salovey, 1993) and have been shown to be used to appraise situations and direct behaviors (Philippe et al., 2012; Pillemer, 2003) their construction in terms of integrated sexual and relational representations may be a good indicator of an individual's level of sexual well-being (Philippe et al., 2017, 2019). However, to our knowledge, no studies have explored the link between sexual autobiographical memories and sexual well-being. A few studies have investigated the associations between relational autobiographical memories and outcomes of relational well-being. Alea and Vick (2010) found that certain qualities (e.g., positive, vivid, intense, and frequently rehearsed) characterizing autobiographical memories related to one's current romantic relationship were positively associated with relational satisfaction, regardless of participants' age or gender. Another study demonstrated this effect experimentally by showing that remembering a personal and significant memory related to one's current romantic relationship increased warmth and closeness toward one's romantic partner immediately after the recall, irrespective of the duration of the relationship and of the age of the participants (Alea & Bluck, 2007). Other studies have also shown that these types of couple-related memories could predict changes in relational outcomes. In line with self-determination theory (Ryan & Deci, 2017), satisfaction of the three psychological needs (i.e. autonomy, relatedness, and competence) in couple-related

autobiographical memories was found to be associated with higher relationship quality, beyond attachment and need satisfaction generally experienced in the current romantic relationship. It was also found to predict increases in relationship quality and a decreased likelihood of breakup over a 1-year period (Philippe et al., 2013). In summary, these studies showed that autobiographical memories and their characteristics (e.g. need satisfaction, vividness, valence) can reflect the functioning of the relational self, but can also induce immediate feelings of relationship quality when recalled (e.g. warmth, closeness), and predict changes in relational outcomes over time. Thus, similarly, sexual autobiographical memories and their integration of sexual and relational mental representations may reflect people's sexual well-being.

The current study: objectives and hypotheses

The purpose of this study was to examine the level of integration of sexual and relational representations in autobiographical memories and its association to various indicators of sexual well-being. Sexual well-being will be defined in the present study as the evaluation of one's sex life paired up with the balance between positive and negative feelings towards sexuality (Byers & Rehman, 2014). Therefore, we have used a typical measure of sexual satisfaction that assesses evaluation of one's sex life, but one that has no mention of a partner. To assess the positive and negative feelings related to sexuality, we used the scale of dualistic sexual passion, which assesses subjective feelings that sexuality is well integrated in one's life (harmonious sexual passion) or at the opposite, that sexuality is conflicting with other aspects of one's life (obsessive sexual passion; Philippe et al., 2017, 2019). We also examined whether a greater integration of sexual and relational representations in memories would be associated with a sociosexual orientation, that is a tendency to engage in sexual relations without love or engagement (Simpson & Gangestad, 1992). We hypothesized that individuals showing an inclination for sexual relationships without love, would display a weaker integration of sexual and relational representations in memories. As recommended, we examined each of the three facets of sociosexual orientation separately (e.g. behavior, attitude, desire; Penke, 2011).

In line with past studies on relationship memories (e.g. Alea & Vick, 2010; Philippe et al., 2013), it was hypothesized that integration of sexual and relational representations, as coded from narratives of sexual autobiographical memories, would be associated with sexual well-being, that is, positively associated with sexual satisfaction and harmonious sexual passion and negatively associated with obsessive sexual passion and sociosexual orientation. Moreover, we expected that these associations would hold after controlling for memories characteristics that have been shown to relate to relationship quality and well-being in relationship memories research, such as need satisfaction (i.e. autonomy, competence, and relatedness; Philippe et al., 2013) and characteristics of autobiographical memories, such as vividness, significance, and rehearsal (Alea & Bluck, 2007; Alea & Vick, 2010). We also expected results to hold after controlling for demographic variables, that is, sex, age, and relational status (single or partnered). In line with past research on relationship memories and recent research on sexual passion, we did not expect that the results would be moderated by age, sex (e.g. Alea & Vick, 2010), or relational status (Philippe et al., 2019).

Method

Participants and procedure

Between November 2014, and January 2015, a total of 142 undergraduate and graduate students took part in this study (104 women, 38 men). Their mean age was 27.04 years ($SD=6.79$). They were invited by email to participate in an online study on sexuality in exchange for being entered into a draw for one of three prizes of \$125 CAD. The project obtained approval from the Université du Québec à Montréal's Institutional Review Board (#2014_e_282). The sample was mostly composed of participants in a relationship (68.4%) and 87.4% described themselves as heterosexual. Before answering the demographic questions, participants had to consent to the study. They then completed scales assessing sexual aspects of their life and described in detail a personal and significant sexual memory (Philippe et al., 2015).

Measures

Sexual satisfaction

Five key items from the general sexual satisfaction subscale of the *Pinney Sexual Satisfaction Inventory* were used to measure sexual satisfaction (Pinney et al., 1987). These items used successfully in other research (Philippe et al., 2019) were chosen because they assess sexual satisfaction with no reference to a long-term partner. Items such as “I feel that nothing is lacking in my sex life” and “I am satisfied with the frequency with which I have sexual intercourse” were responded to on a 7-point Likert scale (1=Do *not agree at all*, 7= *Very strongly agree*). Cronbach's alpha coefficient was $\alpha = .92$.

Sexual passion

The sexual passion scale (e.g. Philippe et al., 2017, 2019) assesses the way sexuality is integrated in a person's life and self, either harmoniously or obsessively. Three items assess harmonious sexual passion (HSP) which is reflected by the feeling that sexuality is well balanced in one's life (e.g. Sex is in harmony with the other things that are part of me). Three items assess obsessive sexual passion (OSP) which is reflected by the subjective feeling that sexuality is in conflict with other life spheres (e.g. I have the impression that sex controls me). Participants indicated their level of agreement with each item on a 7-point Likert scale (1= *Do not agree at all*; 7= *Very strongly agree*). Cronbach's alpha coefficients were adequate for both dimensions ($\alpha > .75$).

Sociosexuality

The revised Sociosexual Orientation Inventory (SOI-R: Penke & Asendorpf, 2008) was used to assess the tendency for an individual to have casual, uncommitted sexual relationships. Nine items measure three components (i.e. behavior, attitude, desire). Sociosexual behavior measures the habitual behavioral tendencies of an individual in the mating domain (e.g. “With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?”). Participants responded to each item using a 9-point Likert scale (1=0, 9=20 or more). Cronbach's alpha coefficient was $\alpha = .73$. Sociosexual attitude is “the

evaluative disposition toward uncommitted sex” (Penke & Asendorpf, 2008, p. 1114). A sample item is “I can imagine myself being comfortable and enjoying “casual” sex with different partners.” Participants respond to each item using a 9-point Likert scale (1 = *Strongly disagree*, 9 = *Strongly agree*). Cronbach’s alpha coefficient was $\alpha = .78$. Sociosexual desire is the “motivational state that is characterized by heightened sexual interest and that is often accompanied by subjective sexual arousal and sexual fantasies” (Penke & Asendorpf, 2008, p. 1114). A sample item is “In everyday life, how often do you have spontaneous fantasies about having sex with someone you just met?” This measure was used to assess participant’s mental reactivity to sexuality. Participants responded to each item using a 9-point Likert scale (1 = *Never*; 9 = *At least once a day*). Cronbach’s alpha coefficient was $\alpha = .91$.

Sexual autobiographical memory narrative

Participants were asked to describe a personal memory of a specific sexual experience which was significant (important) for them. The instructions were followed with: “Choose a memory that often comes to your mind. This memory can be either positive, negative, or both. However, do not take too much time to find the perfect memory. Choose the memory that comes to your mind the most spontaneously. Describe generally what happened, where it happened, who you were with (if anyone), and how you and other people reacted. What was your role and what were the consequences of your reaction and/or your behavior during this event? Provide enough details so that we can understand what happened, like if you were telling a story to someone.”

These instructions were derived from past research on self-defining memories (Philippe et al., 2011; Singer & Salovey, 1993; Sutin & Robins, 2005). The narrative of each memory description was subsequently coded by two independent judges according to the level of integration of sexual and relational mental representations. One judge rated all the material, whereas the second one rated 50% of it. Interjudge reliability was adequate, intraclass $r > .72$. The rating scale varied between 1 and 5, where 1 indicated a complete dissociation of the sexual and relational spheres; 3 indicated a partial integration and 5 a complete integration of the sexual and relational spheres.

Strong integration

Narratives describing 1) intimacy or complicity, 2) sexual partner’s importance, 3) sexual partner’s peculiarity or 4) sensations experienced through the relationship (e.g. butterflies in the stomach) were coded as strong on integration. This is an example: “I had a sexual intercourse with a sex partner in a trip. It is a positive memory. We had had some drinks in the evening, and we had all the weekend to enjoy each other. We had different sexual activities: oral, vaginal and anal. All was good, filled with respect and complicity. It was the most positive relationship I had in the last year because it was unbridled, but without being pornographic or scripted. We were feeling good, satisfied, and impressed by the strength of desire and pleasure.” In this example, the narrator gives a description where his/her partner seems important. There’s intimacy, complicity, and sensations derived from the relationships and the singularity of the partner even if it is not occurring in a long-term romantic relationship.

Weak integration

Inversely, narratives displaying 1) a person-centered narration from the participant, 2) a narration detached from the event, 3) an emphasis on body parts or objects such as clothes, 4) a focus on the part of the body doing the action instead of the person, 5) the reduction of the partner as an object, or 6) negative emotion showing conflict between sexuality and relationship (e.g. feeling ashamed, feeling impure/dirty) were coded weak on integration. This is an example: “One night, on my room balcony, my girlfriend and I made love. She was wearing a little black dress. She was smoking and I was penetrating her and touching her breasts. We had two orgasms.” In this example, the narrator focused on his partner clothing, on her body parts and a non-sexual action. It seems that the woman is instrumentalized by the narrator. She could be replaced by an object and there would be no or little difference in the narrative.

Need satisfaction

Following the sexual memory’s description, participants rated nine items assessing the satisfaction of each of the three psychological needs postulated by self-determination theory (i.e. autonomy, competence, and relatedness). Participants were asked to think back to how they experienced the event of their memory and to respond to the items accordingly. Each need was measured with two items, which were responded to on a scale ranging from -3 (*Strongly disagree*) to $+3$ (*Strongly agree*), with 0 representing “Do not agree nor disagree or not applicable.” A sample item for autonomy is “I felt free to do things and to think how I wanted”; for competence: “I felt capable or skillful”; and for relatedness: “I felt connected to one or more people.” Cronbach’s alpha was .91 for this scale.

Memory characteristics

Following the memory description, participants rated the importance (“This memory is important/significant for me”), vividness (“This memory is still vivid and detailed in my mind”), and rehearsal (“I have often rethink about this memory”) of their sexual memory, using a slider button ranging from “Not at all” (0%) to “Extremely” (100%). An aggregate of these memory characteristics was formed by averaging their score. Cronbach’s alpha coefficient was $\alpha = .76$.

Data analysis

Means, standard deviations, and correlations are presented in [Table 1](#). Hierarchical multiple regressions were conducted using SPSS 26, and results are shown in [Table 2](#). The same steps were used for all of them, but with different dependent variables (i.e. sexual satisfaction, harmonious sexual passion, obsessive sexual passion, sociosexual behavior, sociosexual attitude, sociosexual desire). Steps 1 and 2 were used to include control variables. At Step 1, age, biological sex, and relational status (i.e. single or in a relationship) were included as demographic variables. At Step 2, memory’s characteristic (i.e. importance, vividness, and recall of the sexual memory) and need satisfaction in sexual memory were included. At Step 3, the integration score of sexual autobiographical memories was included. In a final Step 4, moderation effects were tested (i.e. age, sex, and relational status in interaction with integration).

Table 1. Correlations between sociodemographic variables, sexual well-being outcomes, and level of integration of sexual and relational mental representations.

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	27.04	6.94	—											
2. Sex	—	—	.12	—										
3. Relational status	—	—	.28**	.21*	—									
4. Memory characteristics	77.19	17.94	.06	−0.07	.03	—								
5. Need satisfaction	1.84	1.32	.17	.02	.17*	.35**	—							
6. HSP	5.02	1.34	−0.15	−0.07	.03	.11	.27**	—						
7. OSP	2.23	1.11	−0.12	.23**	.08	.04	.01	.003	—					
8. Sexual satisfaction	4.20	1.58	−0.22**	−0.01	.06	.01	.20*	.48**	−0.07	—				
9. Sociosexual behavior	1.95	1.67	.06	−0.06	−0.11	.10	.10	.09	.003	−0.03	—			
10. Sociosexual attitudes	5.26	2.27	−0.11	.06	−0.17	.03	−0.01	.16	.10	−0.03	.49**	—		
11. Sociosexual desire	3.36	2.16	−0.03	.24**	−0.29**	−0.07	−0.12	−0.08	.40**	−0.28**	.27**	.47**	—	
12. Level of integration	3.87	1.33	−0.08	.03	.01	.12	.28**	.25**	−0.19*	.27**	−0.14	.001	−0.21*	—

Note. HSP = harmonious sexual passion; OSP = obsessive sexual passion;

* $p < .05$.

** $p < .01$.

Table 2. Hierarchical multiple regressions analyses of the level of integration of sexual and relational mental representations and control variables on sexual Well-Being.

Variables	Sexual satisfaction		HSP		OSP		Sociosexual behavior		Sociosexual attitude		Sociosexual desire	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.13**		.04		.11**		.07*		.04		.27**	
Age		-.021**		-.014		-.023**		.06		-.012		-.008
Sex		.001		-.005		.027**		-.007		.09		.029**
Status		.28**		.12		-.001		-.024**		-.016		-.045**
Step 2	.05*		.08**		.002		.01		.001		.02	
Mem. char.		-.004		.03		.01		.01		.03		-.011
Need satisf.		.23*		.28**		.04		.07		.02		-.003
Step 3	.04*		.03*		.05**		.01		<.001		.03*	
Integration		.20*		.17*		-.024**		-.011		-.001		-.018*
Step 4	.01		.01		.01		.02		.002		.01	
Age X Integ.		-.006		.05		-.005		.02		.003		.05
Sex X Integ.		.06		.12		-.007		-.010		-.001		-.003
Rel. X Integ.		.07		-.0004		-.005		.12		.05		.06
Total R ²	.22		.16		.17		.11		.05		.32	

Note. HSP=Harmonious sexual passion; OSP=Obsessive sexual passion; Need satisf=Need satisfaction; Mem. char=Memory characteristics; Integ. = Integration of sexual and relational mental representations; Rel. = Relational status.

* $p < .05$.

** $p < .01$.

Results

Sexual satisfaction

At Step 1, age was negatively associated with sexual satisfaction and partnered participants reported greater sexual satisfaction than singles, both variables explaining 13% of the variance of sexual satisfaction, $F(3,138) = 6.64$, $p < .001$. At Step 2, need satisfaction in sexual memory was positively associated with sexual satisfaction, explaining 5% of its variance, $F(2,136) = 3.83$, $p = .024$. At Step 3, integration of sexual and relational mental representations in sexual memories was shown to be significantly associated with sexual satisfaction, explaining 4% of its variance beyond demographics and need satisfaction in memory, $F(1,135) = 6.07$, $p = .015$. There were no significant interactions with age, sex, or status at Step 4.

Harmonious sexual passion (HSP)

At Step 1, no demographic variables (i.e. age, sex, relational status) predicted harmonious sexual passion, $F(3,138) = 1.90$, $p = .133$. At Step 2, need satisfaction in sexual memory was again positively associated with harmonious sexual passion, explaining 8% of its variance, $F(2,136) = 6.47$, $p = .002$. At Step 3, results indicated that integration of sexual and relational mental representations was positively associated with harmonious sexual passion, explaining 3% of its variance beyond the effect of need satisfaction in memory, $F(1, 135) = 4.03$, $p = .047$. There were no significant interactions with age, sex, or status at Step 4.

Obsessive sexual passion (OSP)

At Step 1, age was positively associated with OSP and men were more likely to report OSP than women, both explaining 11% of the variance, $F(3,138) = 5.74$, $p = .001$. At Step 2, none of the two variables (i.e. need satisfaction in memory and memory characteristics) included in the model were associated with OSP, $F(2,136) = 0.17$, $p = .845$. At Step 3, results indicated that integration of sexual and relational mental representations was negatively associated with OSP, explaining 5% of obsessive sexual passion, $F(1, 135) = 8.03$, $p = .005$. There were no significant interactions with age, sex, or status at Step 4.

Sociosexuality

Behavior

At Step 1, single participants were more likely to report sociosexual behavior explaining 7% of its variance, $F(3,138) = 3.31$, $p = .022$. At Step 2, none of the two variables (i.e. need satisfaction in memory and memory characteristics) included in the model were associated with sociosexual behavior, $F(2,136) = 0.40$, $p = .670$. At Step 3, integration of sexual and relational mental representations was not associated with sociosexual behavior, $F(1,135) = 1.52$, $p = .220$.

Attitude

None of the variables included in the three steps predicted the sociosexual attitude.

Desire

At Step 1, men and single participants were more likely to report sociosexual desire explaining 27% of its variance, $F(3,138) = 16.67$, $p < .001$. At Step 2, none of the two variables (i.e. need satisfaction in memory and memory characteristics) included in the model were associated with sociosexual desire ($F(2,136) = 1.38$, $p = .255$). At Step 3, integration of sexual and relational representations was negatively associated with sociosexual desire, explaining 3% of sociosexual desire, $F(1,135) = 5.72$, $p = .018$. Again, there were no significant interactions between integration and age, sex, or status for any of the dimensions of sociosexuality.

General discussion

Results showed that a higher level of integration in autobiographical sexual memories was positively associated with markers of sexual well-being (i.e. sexual satisfaction and harmonious sexual passion) and was negatively associated with obsessive sexual passion and sociosexual desire. None of the moderation by sex, age, or relational status were significant, which implies that the association between the integration of sexual and relational representations and sexual well-being was the same across age, sex, and relationship status (but see the limitations section below). Taken together, these results suggest that a stronger level of integration could allow individuals to experience sexuality as more coherent with other life spheres and as more positive and satisfactory. A weaker integration was associated with more conflictual

experiences of sexuality. Indeed, obsessive sexual passion, an indicator of the conflictual and overly extensive space that sexuality takes in one's life (Guilbault et al., 2020; Philippe et al., 2017), was negatively associated with the level of integration of sexual and relational mental representations. Similarly, sociosexual desire, which can be conceptualized as compulsive thoughts about sexuality occurring in potentially irrelevant contexts (e.g. spontaneous fantasies about having sex with someone you have just met) was also negatively associated with integration. Finally, need satisfaction in sexual memories was also found to be associated with sexual satisfaction and harmonious sexual passion, which extends findings of past research on the role of need satisfaction in memories and relational outcomes (Guilbault & Philippe, 2017; Lejeune et al., 2021; Philippe et al., 2013).

Findings worthy of note

Two of these results are worthy of note. First, results of integration were the same regardless of whether people were single or partnered, as there was no moderation by relational status. In other words, in both single or partnered people, those who showed strong level of integration of their sexual and relational mental representations in their memories also reported high level of sexual well-being, including higher sexual satisfaction. This evidence suggests that it may be warranted to move away from a strict interpersonal perspective of sexual well-being and sexual satisfaction to also consider an intrapersonal cognitive perspective. The way sexual and relational mental representations have been shaped and organized by prior experiences and development appears to be a fruitful avenue, regardless of the person's current relational status.

A second noteworthy result is the unexpected null association between the level of integration of sexual and relational representations and sociosexual attitudes and behaviors, but a negative association with sociosexual desire. Sociosexual attitudes and behaviors assess the openness to engage in uncommitted sexual relationships and the actual frequencies of uncommitted sex in the past, respectively. Sociosexual desire rather represents the frequency of spontaneous fantasies related to having sex with strangers (e.g. "how often do you have spontaneous fantasies about having sex with someone you just met"). Many of these "fantasies" may be intrusive sexual thoughts, such as imagining having sex with someone at moments where this may not be contextually relevant and may interfere with tasks at hand (Philippe et al., 2017). This more likely represents a low integration of sexual and relational representations. Conversely, an openness to engage in uncommitted relationship and past uncommitted engagements do not necessarily imply that these relationships were experienced as not integrated in terms of sexual and relational mental representations. Uncommitted relationships do not denote that the other person is used as an object and that his/her needs are not taken into account or disregarded (the illustrative narrative provided in the Method section is a good example of this). For instance, Garcia et al. (2018) found that more than 50% of their single participants would engage in affectionate behaviors (e.g. cuddling, eye gazing, foreplay and spending the night) in casual sex encounters. This is an important distinction to keep in mind when defining and assessing the level of integration of sexual and relational mental representations.

Why is integration associated with sexual well-being

One explanation for the association between the level of integration and sexual well-being is that the way sexual and relational mental representations are organized and internalized throughout one's developmental process will lead individuals to experience sexuality more coherently and as less conflicting. When both sexual and relational mental representations are activated within a situation by internal or external cues, either at the semantic (Philippe et al., 2017, 2019) or autobiographical level (this study), it provides individuals with greater cognitive resources to analyze the situation with greater nuance. Access to more diversified representations, including both sexual and relational ones, gives access to deeper and more abstract cognitive processing, with the ability to inhibit inappropriate thoughts or behaviors in certain contexts (Jin & Maren, 2015; e.g. "I feel sexually aroused by this person and want to satisfy my urge" vs. "I feel sexually aroused by this person, but s/he does not look interested in flirting"). From a neuropsychological point of view, this is likely afforded by more projections to the neocortex, notably the medial prefrontal cortex (D'Argembeau et al., 2014; Eichenbaum, 2017), which once activated can send downward inhibitory signals to the hippocampus that explain away its activation (Barron et al., 2020). Over time, integrated sexual and relational mental representations are more likely to develop a sense of sexuality that is coherently organized within oneself and with respect to other life aspects, thereby avoiding issues and conflict between sexuality and these other life aspects. Such an experience of sexuality promotes harmonious sexual passion, sexual satisfaction, and well-being (Philippe et al., 2017, 2019).

When sexual representations are only weakly embedded with relational ones, there is little inhibitory control to restrain activation when sexual representations are activated by internal or external cues. Indeed, when sexual representations are not enmeshed with relational ones, there are fewer higher-level and abstract representations that can inhibit sexual cues occurring in irrelevant contexts. Therefore, intrusive sexual thoughts are frequent, and situations are inexorably interpreted as sexual, even when it is inappropriate in the context (Philippe et al., 2017, 2019; Rachman, 1981). In turn, intrusive sexual thoughts and inappropriate behaviors in relational contexts may increase the feeling that sexuality is conflictual in one's life and decrease sexual satisfaction and well-being (Daspe et al., 2018; Smith et al., 2011).

Overall, the results suggest that the ability to combine both sexual and relational representations may be fundamental for sexual well-being, but also for interpersonal functioning as well. A greater integration facilitates the understanding of one's thoughts, feelings, and behaviors and those of others, which is critical for adequate interpersonal interactions (Fonagy & Bateman, 2016). It enables the ability to consider the other with distinctive feelings and motives, which allow the development of alternative explanations in a given situation, instead of an exclusive focus on representations of one's personal thoughts and feelings (e.g. imposing one's desire onto the other or being insistent). This leads to more bidirectional interactions where both partners are devoted to the relationship at a given time, thus facilitating interpersonal and sexual well-being (Sprecher & Cate, 2004).

Alternative explanations

An alternative explanation for the present findings is that individuals with a high level of sexual well-being (i.e. a harmonious, satisfying, and non-conflicting

experience of sexuality) might organize their memories and narrate them with more integrated sexual and relational mental representations. This greater sense of satisfaction and coherence felt with respect to sexuality may facilitate the reconstruction of past sexual events by focusing on both sexual and relational aspects of a life episode. Although the current design prevents us from determining which explanation is the best one, it is likely that there is a feedback loop between integration and positive sexual outcomes. Indeed, forging integrated mental representations is likely facilitating coherent and satisfying future experiences of sexuality, which in turn are likely to be encoded as integrated autobiographical memories, which will further influence one's experience of sexuality. We argue that it is this feedback loop which evolved over one's development and that, when observed at one point in time such as in the present study, shows this positive association between the level of integration of sexual and relational representations in sexual autobiographical memories and sexual well-being. Future research will be needed to confirm this claim.

Clinical implications

A better integration of sexual autobiographical memories could be a therapeutic target to improve sexual well-being through clinical interventions. Based on the Basic-Systems Model of Memory, memories are encoded and reconstructed through several independent subsystems, such as visual, auditory, kinesthetics, emotional, linguistic, and narrative subsystems (Rubin, 2005). The relational and sexual spheres may act as independent subsystems within this model. As such, certain memories may only be encoded through the relational or the sexual subsystem, or only weakly integrated within one of these two subsystems. Since memories are now known to be malleable (Elsev & Kindt, 2016; Nader, 2016), certain interventions could focus on reconstructing or rescripting (Romano et al., 2020) sexual memories by activating (or reactivating) both the relational and the sexual subsystems. Through this reconstruction process, one endeavor would be to complement the memory with new mental representations (Hupbach et al., 2007; McKenzie & Eichenbaum, 2011; Skowronski & Walker, 2004). When a patient recalls a particular sexual memory, psychotherapists may help them to complement its reconstruction with some relational aspects. For example, this weakly integrated memory narrative may be addressed in therapy: "One night, on my room balcony, my girlfriend and I made love. She was wearing a little black dress. She was smoking and I was penetrating her and touching her breasts. We had two orgasms." It is possible to ask the patient to elaborate on what happened before going on the balcony, to help him connect the relational moments with the sexual experience. It is also possible to ask what he and his girlfriend were feeling during this sexual intercourse. Finally, abstract representations could be formed by inquiring about what this memory tells of him as a lover or how this memory shows what kind of person his girlfriend is or what means their relationship (Habermas, 2011). These new associations, interpretations of the event, and abstractions that are coherent with the memory will help to encode the memory with a stronger level of integration between the relational and sexual mental representations, which over time may increase sexual well-being. Therefore, elaborating and rescripting sexual memories while (re-) activating the relational sphere may be one way to modify the level

of integration of sexual autobiographical memories and improve sexual well-being. However, more research is necessary to investigate this possibility.

Limitations and future research

A number of limitations need to be acknowledged regarding the present research. First, the present study used a correlational design and only showed associations between the integration of sexual and relational mental representations and indicators of sexual well-being. Such a design prevented us from concluding on causality or on the direction of the effect (VanderWeele, 2021). Even if there is the hypothesis that a feedback loop exists between the level of integration of memories and sexual well-being, there is a need to conduct longitudinal studies to confirm the presence of these reciprocal effects (VanderWeele, 2021). Moreover, future studies could use longitudinal designs to observe the stability of the level of integration of sexual and relational mental representations over time. Indeed, new interpersonal experiences and their encoding may promote the emergence of new sexual and relational mental representations or new links among them, thus influencing the level of integration over time.

Second, the sample used was not representative of the population. The sample was mostly composed of women. Thus, results must be interpreted with caution when generalizing to men. Moreover, samples of students, like the one used in this study, typically include younger participants who have potentially experienced fewer romantic or sexual relationships and of shorter terms. This might have influenced the results. For instance, relationship duration is typically positively associated with sexual satisfaction (Heiman et al., 2011) and age is negatively associated with sexual satisfaction (Byers & Rehman, 2014). Future studies should examine the association between the level of integration of sexual and relational mental representations and sexual well-being in a more representative population of all age. This would also help to move away from cohort effects, thereby avoiding generation biases related to certain sexual cultures (e.g. hooked-up culture, Heldman & Wade, 2010) or certain attitudes and behaviors related to sexuality (e.g. casual sex or premarital sex, Harding & Jencks, 2003; Twenge et al., 2015).

A third limitation is that all assessed outcomes were measured with self-reports. Future studies should use more objective markers of sexual well-being. Objective measures complement subjective measures. They allow researchers to have access to impartial sexual indicators about one's sexuality (Hook et al., 2010). For example, clinicians could rate sexual functioning (e.g. sexual dysfunctions, sexual addiction) to have an objective measure of sexual well-being. However, it remains important to preserve measures of subjective feelings about sexuality (Hook et al., 2010) as a high level of sexual well-being does not equal the absence of sexual problems or inversely, the presence of sexual dysfunction does not equal a lower level of sexual well-being (George et al., 2014). Another way to use objective measures is to observe participants' behavior in laboratory-based interactions, such as with a confederate participant or by using fake potential dating partners. Laboratory-based interactions coded by external judges provide independent behavioral measures which can be paired up with self-report measures in order to increase studies validity. Similarly, physiological responses, such as electrodermal reactivity or heart rate variability may be assessed as objective marker of sexual interest or desire (Hughes et al.,

2020; Prochazkova et al., 2019). Future research on integration of sexual and relational representations need to move away from self-report to use more objective markers of sexual well-being and behavior.

Finally, the present study only assessed a limited number of indicators of sexual well-being. Future research should investigate a greater extent of indicators of sexual well-being. For example, given the association between intrusive sexual thoughts and impulsive sexual behaviors (Coleman et al., 2018; Warman, 2020), future research could investigate the relationship between integration and such behaviors, notably of impulsive sexual aggressive behaviors in relational or sexual contexts. Indeed, levels of integration of sexual and relational mental representations may help to understand the occurrence of impulsive sexual behaviors, such as harassment, aggression, and rape-related behaviors, in context where one of the partners is objectified or that sexual interest is not mutual between partners (Awasthi, 2017; Gervais & Eagan, 2017).

Conclusion

The results of the present study open the way to a novel intrapersonal cognitive perspective to better understand the psychological mechanisms of sexual well-being. The level of integration of sexual and relational mental representations appears to be a fruitful avenue to consider sexuality from both a partnered and a non-partnered status. More research is necessary to determine the direction of the effect of integration over time, its stability, and the extent of measures and concepts related to sexuality that can be predicted by integration.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Social Sciences and Humanities Research Council of Canada under Grant 435-2017-1358.

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