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A contemporary exploration of the relationship between attachment and sexual satisfaction: the role of technology-mediated sexual interaction

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ABSTRACT

The evolution of technology has transformed the way young adults develop and maintain relationships, including their sexuality. Since many young adults report low sexual satisfaction, it is important to understand what contributes to these negative experiences. Several studies have identified that attachment anxiety and avoidance are related to lower sexual satisfaction. However, few studies have considered technology-mediated sexual interactions (TMSI) – and the motives for doing so – in the associations between attachment and sexual satisfaction. This study explored the mediating and moderating role of TMSI (frequency and motives) in these associations in a sample of 478 young adults (Study 1) and 142 couples (Study 2). Results showed that attachment anxiety was related to a higher TMSI frequency and engaging in TMSI for avoidance motives. Engaging in TMSI for approach motives was related to higher sexual satisfaction, while engaging in TMSI for avoidance motives was related to lower sexual satisfaction. Finally, engaging in TMSI to manage distance moderated the association between attachment avoidance and sexual satisfaction. These results suggest that beyond the role of attachment anxiety and avoidance, contemporary factors related to digital technologies, such as sexting frequency and motives, are related to sexual satisfaction.

LAY SUMMARY

This study showed that young adults who have developed insecure attachment are less sexually satisfied and more frequently use technology-mediated sexual interactions (TMSI) such as sexting with their partner, but mostly to avoid negative consequences. Adults who engage in TMSI for positive reasons such as intimacy are more sexually satisfied.

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Sexuality is central in all stages of romantic relationships (Dewitte, 2012), especially in early adulthood as it sets the foundation for future relationships (Arnett, 2015).

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Negative sexual experiences among youth could impair their future sexual satisfaction (Muise et al., 2010), which is defined as the affective response resulting from the subjective assessment of positive and negative aspects of a sexual relationship (Lawrance & Byers, 1995). As sexual dissatisfaction is common (Mulhall et al., 2008) and prevalent among couples seeking therapy (Brassard et al., 2012; Gurman & Fraenkel, 2002), investigating its risk markers is crucial. Insecure attachment is a key factor in understanding sexual dissatisfaction in adults (Stefanou & McCabe, 2012), yet studies are needed to determine the mechanisms underlying this association (Dewitte, 2012; Gewirtz-Meydan & Finzi-Dottan, 2018). Authors have suggested looking at how technology-mediated sexual interactions (TMSI) can contribute to young adults' sexual satisfaction (Northrup & Smith, 2016; Schade et al., 2013), as most of them are using social networking sites (Gramlich, 2018) and smartphones (Bourget & Poulin de Courval, 2017) to communicate with their partner (Schade et al., 2013). Technology can provide intimacy despite the physical distance between partners (Madell & Muncer, 2007), notably through TMSI, which include *sexting*, the act of sharing sexually explicit content (e.g. messages, photos, or videos), and *cybersex*, the act of engaging in live sexual explicit video exchange (Ringrose et al., 2013; Shaughnessy et al., 2011). A study has shown that sexting is frequent among young adults in romantic relationships (78%; Drouin et al., 2013), but the reasons to engage in this behavior – or motives – are numerous (Bianchi et al., 2017). As sexting and cybersex are usually dyadic exchanges, research should adopt a dyadic perspective (McDaniel & Drouin, 2015). Relying on an individual *and* a dyadic methodology, this study investigates whether the association between attachment insecurity and sexual dissatisfaction is mediated or moderated by TMSI (frequency and motivations).

Attachment and sexuality

Attachment theory postulates two dimensions of attachment insecurity: anxiety and avoidance (Brennan et al., 1998). People reporting high levels of attachment anxiety hold negative representations of themselves and are hypervigilant to signs of abandonment by their partners. When an anxiously attached individual perceives a potential relationship threat, the attachment system becomes hyperactivated, leading to excessive proximity-seeking behaviors and demands for reassurance from the romantic partner. Attachment avoidance is characterized by discomforts regarding emotional intimacy and vulnerability, and a preference for self-reliance based on negative representations of others, leading to chronic deactivation of the attachment system (e.g. denial, minimization; Mikulincer & Shaver, 2016). People reporting low levels of anxiety and avoidance have a secure attachment, which is characterized by closeness, the ability to engage in mutually pleasing sexual intercourse, and a positive representation of the ability to satisfy their own's and their partner's sexual needs (Brennan et al., 1998; Bretherton & Munholland, 2008).

Attachment needs (e.g. intimacy, reassurance) can be fulfilled through sexuality (Birnbaum, 2010; Davis et al., 2004; Mikulincer & Shaver, 2016). Attachment and sexual behaviors influence each other, and both contribute to romantic relationship

quality (Birnbaum et al., 2006; Butzer & Campbell, 2008). Reviews have demonstrated that attachment anxiety and avoidance are related to sexual dissatisfaction (Mikulincer & Shaver, 2016; Stefanou & McCabe, 2012). Individuals with higher levels of attachment anxiety are less sexually satisfied because they respond to the sexual needs of their partner before their own to avoid losing their romantic partner (Butzer & Campbell, 2008; Davis et al., 2004) and they tend to use tenderness and affection to seek intimacy and reassurance (Dewitte, 2012). In contrast, individuals with higher levels of attachment avoidance tend to have sexual intercourse without emotional implication to maintain a distance (Mikulincer & Shaver, 2016) and they are more likely to abstain from any sexual activity to avoid feeling close to their partner (Birnbaum, 2007). Yet, the mediators and moderators of the associations between attachment insecurity and sexual satisfaction remain to be clarified (Dewitte, 2012; Stefanou & McCabe, 2012). Few authors have considered factors pertaining to digital technologies as explanatory processes, except for one study (Ferron et al., 2017) identifying cyberpornography and cyberinfidelity as mediators of the attachment and sexual satisfaction link. As it can be used to manage intimacy in the relationship, TMSI is a particularly relevant behavior to consider in the associations between attachment and sexual satisfaction, especially among young adults.

Technology-mediated sexual interactions

TMSI is the exchange of sexual content through digital technology and includes a range of sexual activities, such as sexting and cybersex (Courtice & Shaughnessy, 2017). Despite the risks of disclosure of sexual content to unwanted parties (Van Ouytsel et al., 2016), the prevalence of sexting varies from 30% to 81% among adults (Courtice & Shaughnessy, 2017; Klettke et al., 2014) and is more prevalent among romantic partners (Courtice & Shaughnessy, 2017). In addition, Döring et al. (2017) have found that 30.8% of their sample of college students in four countries (Canada, Germany, Sweden, and the U.S.) reported engaging in cybersex. However, people may engage in TMSI for different reasons (Courtice & Shaughnessy, 2017) including to flirt, to initiate sexual intercourse, because their partner asked them to, for sexual experimentation, or because they are in a long-distance relationship (Drouin et al., 2013; Walker et al., 2013). Sexual motivations refer to the reasons why individuals engage in sexual activities and the goals that are achieved through these activities (Cooper et al., 1998). Based on the approach-avoidance motivational framework, TMSI motivations can be divided into two categories: approach and avoidance motivations. *Approach motivations* are based on the desire to maintain the relationship and lead individuals toward incentives and positive outcomes (e.g. intimacy, pleasure). Individuals with approach motivations may engage in sexual activities to express their love, get closer to their partner, and to have physical pleasure or emotional well-being (Cooper et al., 1998; Strachman & Gable, 2006). In contrast, *avoidance motivations* lead individuals away from potential threats and negative outcomes. Individuals endorsing avoidance motivations may engage in sexual activities to minimize their negative feelings (e.g. stress, sadness) and to avoid disapproval, rejection, or conflict with their romantic partner (Cooper et al., 1998; Strachman & Gable, 2006). Offline approach sex motives are related to higher sexual

satisfaction (Muise et al., 2017; Sanchez, Phelan et al., 2012), while offline avoidance sex motives are related to lower sexual satisfaction (Dewitte, 2012). As such, approach and avoidance TMSI motivations may have the same association with sexual satisfaction as offline sex motives and could help understand how attachment is related to sexual dissatisfaction.

While a study found that romantic partners who sext more frequently to their partner have higher levels of attachment anxiety and avoidance (Galovan et al., 2018), another found that only attachment anxiety was related to sexting more frequently (Weisskirch & Delevi, 2011). Attachment anxiety has been related to seeking sexual intimacy (Impett, Gordon et al., 2008; Jardin et al., 2017; Snapp et al., 2014), suggesting that anxiously attached adults could engage in TMSI for approach motives. Indeed, individuals with approach motives tend to be driven by the pursuit of a positive outcome which determines their satisfaction (Strachmann & Gable, 2006). Anxiously attached adults could also engage in TMSI for avoidance motives. Studies have shown that individuals reporting higher levels of attachment anxiety were more likely to engage in sexual activities to avoid and reduce negative emotions or minimize feelings of inadequacy and low self-esteem (e.g. Davis et al., 2004; Schachner & Shaver, 2004), but also to decrease feelings of insecurities and avoid rejection from others (Favez & Tissot, 2017; Jardin et al., 2017; Snapp et al., 2014). Anxiously attached women also reported engaging in sexual activities to avoid losing their partner (Tracy et al., 2003).

Studies have documented that attachment avoidance is related to lower approach sexual motivations (Birnbaum et al., 2011; Davis et al., 2004; Jardin et al., 2017; Schachner & Shaver, 2004). Avoidantly attached individuals would be more likely to engage in TMSI for avoidance motives, as they tend to comply with their partners' sexual requests to avoid conflict (Impett, Strachman et al., 2008). Individuals with avoidant attachment typically tend to minimize intimacy and be interested in emotionless sex (Mikulincer & Shaver, 2016). This may lead them to engage in sexual activities to avoid upsetting their partner or being rejected by their peers (Jardin et al., 2017; Snapp et al., 2014; Tracy et al., 2003) or to decrease the negative emotions associated with their discomfort with physical and emotional intimacy (Mikulincer & Shaver, 2016), which are consistent with avoidance motivations. Yet, only one study examined sexual motives for sexting among young adults, in which avoidance and anxiety were related to sexting to avoid arguments (Drouin & Tobin, 2014), but sexual satisfaction was not assessed.

TMSI has been related to both positive and negative sexual outcomes among young adults (Courtice & Shaughnessy, 2017), such as engaging in sexual intercourse (Klettke et al., 2014; Kosenko et al., 2017), a larger repertoire of sexual behaviors (Grov et al., 2011; Rice et al., 2018), and risky sexual behaviors (e.g. multiple partners, unprotected sex; Benotsch et al., 2013; Temple et al., 2012; Ybarra & Mitchell, 2014). Wéry and Billieux (2016) have shown that problematic use of TMSI is associated with lower sexual satisfaction. Yet, one study found that adults who sexted their romantic partner reported greater sexual satisfaction than non-sexters (Galovan et al., 2018). A dyadic study also found that married adults with higher attachment avoidance or anxiety who had engaged in sexting reported higher relationship satisfaction than non-sexters (McDaniel & Drouin, 2015), but overlooked sexual satisfaction.

Because TMSI can relate to both positive and negative sexual outcomes among young adults, exploring the underlying motivations of TMSI could help understand whether some TMSI motives could contribute to higher (e.g. approach) or lower (e.g. avoidance) sexual satisfaction. Indeed, individuals who engage in sex for approach motivations report greater relationship satisfaction compared to those who have sex for avoidance motivations (Impett, Strachman et al., 2008; Muise et al., 2017). As attachment anxiety and avoidance are related to offline sex motives, approach and avoidance TMSI motivations could constitute a contemporary mediator of the attachment and sex association. In addition, individuals may engage in TMSI to manage distance (e.g. traveling, not cohabiting, long-distance relationship, studying abroad) as a way to sustain the intimacy in the relationship (Drouin et al., 2013). As engaging in TMSI to manage distance is a contextual factor, this motive could moderate the association between attachment avoidance and sexual dissatisfaction.

Objective

This research includes two studies that aim to explore the role of TMSI frequency and motivations in the associations between attachment anxiety and avoidance and low sexual satisfaction among young adults. These two studies have similar hypotheses, but the first one uses an individual sample whereas the second one examines partner effects on an exploratory basis using a dyadic sample. The first hypothesis (H1) is that attachment anxiety and avoidance will be related to lower sexual satisfaction. Second (H2), approach and avoidance TMSI motives, as well as TMSI frequency, will mediate the link between attachment anxiety and lower sexual satisfaction. Third (H3), avoidance TMSI motives will mediate the link between attachment avoidance and lower sexual satisfaction. Finally (H4), engaging in TMSI to manage distance will moderate the association between attachment avoidance and lower sexual satisfaction.

Method

Participants and procedures

The sample for Study 1 included 422 young adults (aged 18 to 29), involved in an exclusive relationship. The sample for Study 2 included 142 mixed-sex couples involved in a romantic relationship. Demographic characteristics are shown in Table 1. These independent samples were drawn from a larger study on technologies and romantic relationships among youth. Participants were recruited through online advertisements, conferences, and media interviews. They completed an online eligibility survey for the larger study (targeting youth aged 16 to 29). Participants were excluded from the current studies because they were minors ($n=71$) or were not in a current relationship ($n=219$). Participants were directed to an online survey (40 minutes) on the Qualtrics secure platform to complete a series of questionnaires. Participants had to answer correctly to two attention-testing questions to be retained in the studies (no excluded participants). As approved by the Research Ethics Board of our institutions, each participant received CAN\$10.

Table 1. Description of participants in Study 1 (N=422) and Study 2 (N=142 couples).

	Study 1			Study 2				
			Women		Men			
	n	M	%	SD	n	M	%	SD
Gender								
Women	302		71.6		142		100	
Men	120		28.4					
Age	23.06		2.78		22.66		2.80	
Relationship duration (in months)	31.82		29.47		30.82		26.06	
Relationship status								
Living separately	213		50.6		56		39.7	
Cohabiting	197		46.8		84		59.6	
Married and living together	11		2.6		1		0.7	
Country of Origin								
Canada	387		91.9		130		91.5	
European country	14		3.3		8		5.6	
Another Country	20		4.8		4		2.8	
Education								
High school	66		15.6		25		17.6	
Pre-university	177		41.9		66		46.5	
University	179		42.4		51		35.9	
Income < CAN\$ 15,000	221		52.4		80		57.1	
Sexual attraction								
Opposite sex	375		88.9		126		88.7	
Same sex	17		4.0		0		0.0	
Both sexes	14		3.3		5		3.5	
Not caring about gender	16		3.8		11		7.7	

Measures

Alpha coefficients for the study measures are shown in Tables 2 (Study 1) and Table 3 (Study 2). All measures and materials were in French.

Attachment

The 12-item version of the Experiences in Close Relationships scale (ECR-12; Lafontaine et al., 2016) assessed attachment anxiety and avoidance. Participants indicated their level of agreement with statements using a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Scores are computed by averaging the items of each subscale; a high score of attachment anxiety or avoidance indicates higher attachment insecurity. Confirmatory factor analyses within five samples supported the ECR-12's bidimensional structure; along with good reliability for anxiety ($\alpha = .78-.87$) and avoidance ($\alpha = .74-.83$; Lafontaine et al., 2016). Its convergent validity is supported by positive links with psychological and relationship distress measures (Lafontaine et al., 2016).

Sexual satisfaction

The Global Measure of Sexual Satisfaction (GMSEX; Lawrence & Byers, 1995) assessed sexual satisfaction using five seven-point continuums that characterize sexuality (e.g. very unsatisfactory-very satisfactory). The global score (sum of the values) ranges from 5 to 35, with a higher score indicating greater sexual satisfaction. The GMSEX has demonstrated good criterion validity (Mark et al., 2014) and

Table 2. Descriptive statistics, alpha coefficients, and Pearson correlations for the main variables in Study 1 (N=422).

	1	2	3	4	5	6	7
1. Sexual satisfaction	–						
2. Attachment anxiety	-.11*	–					
3. Attachment avoidance	-.37**	.06	–				
4. Frequency of TMSI	.12*	.11**	-.07	–			
5. TMSI for approach motives	.18**	.03	-.06	.48**	–		
6. TMSI for avoidance motives	-.05	.12*	-.01	.42**	.24**	–	
7. TMSI to manage distance ¹	-.04	.02	-.04	.26**	-.06	.04	–
<i>M</i>	28.44	3.78	2.23	1.99	.40	.13	.12
<i>SD</i>	5.91	1.44	1.05	.94	.38	.19	.32
Cronbach's or ordinal α^2	.91	.84	.87	.70	.83	.78	–

* $p < .05$. ** $p < .01$. ¹Point biserial correlations were used for this dichotomous item. ²Ordinal alpha coefficient using polychoric correlations were computed on dichotomous items.

reliability among students ($\alpha = .90$) and adults from the community ($\alpha = .96$; Lawrence & Byers, 1995).

Technology-mediated sexual interactions

Eleven items assessed TMSI frequency and motivations in the past year (Drouin et al., 2013; Impett et al., 2005). Three items assessed how often participants sent (1) sexual text messages, (2) photos or videos with sexual content, and (3) had cybersex (i.e. made a live video of a sexual nature with their partner). These items, evaluated with a six-point scale ranging from 1 (never) to 6 (very frequently), were averaged to form an index of TMSI frequency. Eight items assessed participants' motives to engage in TMSI: to promote desire/sex, for one's own pleasure, to express one's desire, to maintain the partner's interest, to answer the partner's requests, to avoid losing the partner, by obligation, and to manage distance (e.g. traveling, not cohabiting, long-distance relationship, studying abroad). Participants were asked to select every motive that applied to their situation, then the motives were coded as dichotomized items (yes/no). Based on an exploratory factorial analysis, relevant items were averaged to create a subscale of approach (e.g. to promote desire) and avoidance (e.g. to avoid losing the partner) TMSI motivations. Engaging in TMSI to manage distance was kept as a distinct contextual motive.

Results

Tables 2 and 3 present descriptive statistics, reliability coefficients, and bivariate correlations for Study 1 and 2, respectively. Preliminary correlations showed that, in both samples, attachment anxiety is negatively related to sexual satisfaction and positively related to TMSI frequency and avoidance TMSI motivations. Attachment avoidance is negatively related to sexual satisfaction only. In Study 2, women's attachment avoidance is related to their partners' lower avoidance TMSI motivations. In both samples, TMSI frequency and approach – but not avoidance – TMSI motivations are related to higher sexual satisfaction.

Correlations and ANOVAs were conducted to examine the relevance of including demographic covariates (e.g. children, income; Brassard et al., 2007) in the main

Table 3. Descriptive statistics, alpha coefficients, and Pearson correlations for the main variables in Study 2 (N=142 couples).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sexual satisfaction W														
2. Sexual satisfaction M	.34**													
3. Attachment anxiety W	-.17*	-.12												
4. Attachment avoidance W	-.19*	-.06	.09											
5. Attachment anxiety M	-.01	-.13	.09	.03										
6. Attachment avoidance M	-.07	-.22**	.11	.27**	.16									
7. Frequency of TMSI W	.11	-.01	.21*	.07	.06	.06								
8. TMSI for approach W	.24**	.07	-.05	-.06	.03	-.08	.35**							
9. TMSI for avoidance W	.02	.01	.18*	.04	.12	.01	.41**	.27**						
10. TMSI for distance W ¹	.04	.05	-.06	.04	-.10	.01	.20*	-.14	.04					
11. Frequency of TMSI M	.21*	.12	.17*	-.03	.11	-.03	.79**	.37**	.35**	.20*				
12. TMSI for approach M	.12	.19*	-.04	-.10	.05	-.16	.27**	.30**	.09	.17*	.35**			
13. TMSI for avoidance M	.04	.14	-.02	-.19*	.20*	-.09	.20*	-.05	.09	.14	.39**	.35**		
14. TMSI for distance M ¹	.11	.10	.03	-.04	.04	-.04	.25*	.09	.08	.10	.28**	-.08	-.01	
M	29.50	29.01	3.76	1.99	3.25	2.42	2.15	.43	.13	.11	1.99	.41	.10	.05
SD	4.95	5.32	1.60	1.01	1.38	1.20	1.01	.38	.19	.32	.84	.38	.16	.23
Cronbach's or ordinal α^2	.89	.88	.90	.81	.86	.86	.76	.79	.75	—	.69	.83	.55	—

* $p < .05$. ** $p < .01$. ¹Point biserial correlations were used for dichotomous items. ²Ordinal alpha coefficient using polychoric correlations were computed on dichotomous items. M=Men. W=Women.

analyses. Results reveal the importance of controlling for relationship duration in Study 1 ($r = -.21$, $p < .001$) and Study 2 (women: $r = -.19$, $p = .020$; men: $r = -.21$, $p = .010$) due to correlations with sexual satisfaction. Preliminary examinations of the data showed that all assumptions for performing regression and path analyses were respected. Multiple regressions tested the possible interaction between attachment anxiety and avoidance in concurrently predicting sexual satisfaction and TMSI variables, but no interactions were found.

Study 1

To verify the mediating roles of TMSI frequency and approach and avoidance TMSI motivations in the associations between attachment (anxiety, avoidance) and sexual satisfaction, a path analysis was computed with AMOS 25, using maximum likelihood estimator. To determine if an indirect path was significant, confidence intervals (95% CI) were computed using 5000 bootstrap samples (Preacher & Hayes, 2008). To verify the moderating role of distance as a TMSI motive, the interaction effect (avoidance X distance) was included in this model, which also controls for relationship duration.

The results (see Figure 1) revealed that attachment anxiety – but not avoidance – was associated with higher TMSI frequency and avoidance TMSI motivations. Avoidance TMSI motivations were related to lower sexual satisfaction and approach TMSI motivations were related to higher sexual satisfaction, but TMSI frequency was not related to sexual satisfaction. Indirect paths through TMSI variables (H2 and H3) were not significant (all CIs include 0) beyond the direct links between attachment (avoidance, anxiety) and lower sexual satisfaction (H1). However, the avoidance X distance interaction was significant (H4), suggesting moderation: when young adults do not engage in TMSI to manage distance, attachment avoidance is related to lower sexual satisfaction, whereas when they engage in TMSI to manage distance, attachment avoidance is no longer related to sexual satisfaction.

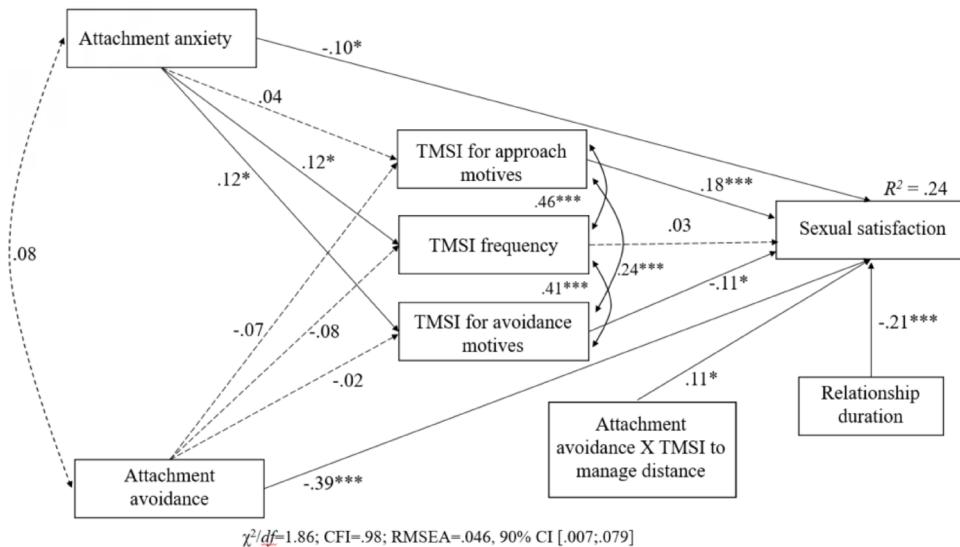


Figure 1. Associations among Attachment Insecurity, TMSI Frequency and Motivations, and Sexual Satisfaction in study 1, controlling for relationship duration. *Note.* Standardized path coefficients are shown. Dashed lines represent non-significant paths. * $p < .05$. ** $p < .01$.

Study 2

Because of the smaller sample size, three dyadic path analyses based on the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann et al., 2011) were conducted separately to assess the mediating role of TMSI frequency (Figure 2a), avoidance TMSI motivations (Figure 2b), and approach TMSI motivations (Figure 2c) in the associations between attachment and sexual satisfaction, controlling for relationship duration. APIMeM analyses simultaneously examine actor effects (e.g. one's attachment avoidance on one's TMSI frequency), partner effects (e.g. one's attachment avoidance on the partner's TMSI frequency), and indirect effects (with 95% CI estimated on 5000 bootstrap samples), while considering the non-independence of dyadic data. The interaction term (avoidance X distance) was first included in each model to assess moderation (H4), then removed ($ps < .05$).

All path analyses revealed direct negative associations between men and women's attachment (anxiety and avoidance) and their own lower sexual satisfaction (H1). No significant indirect effects of attachment on sexual satisfaction through TMSI (H2 and H3) were found (all CIs include 0). Results showed that men's and women's attachment anxiety was related to their own higher TMSI frequency (Figure 2a). Men's TMSI frequency was positively related to their own sexual satisfaction (actor effect), while women's TMSI frequency was *negatively* related to their partners' sexual satisfaction (partner effect). Men's and women's attachment anxiety was positively related to their own avoidance TMSI motivations (actor effects), but these motivations were not related to sexual satisfaction (Figure 2b). Finally, while attachment was not related to approach TMSI motivations (Figure 2c), these motivations were positively related to sexual satisfaction in both men and women (actor effects).

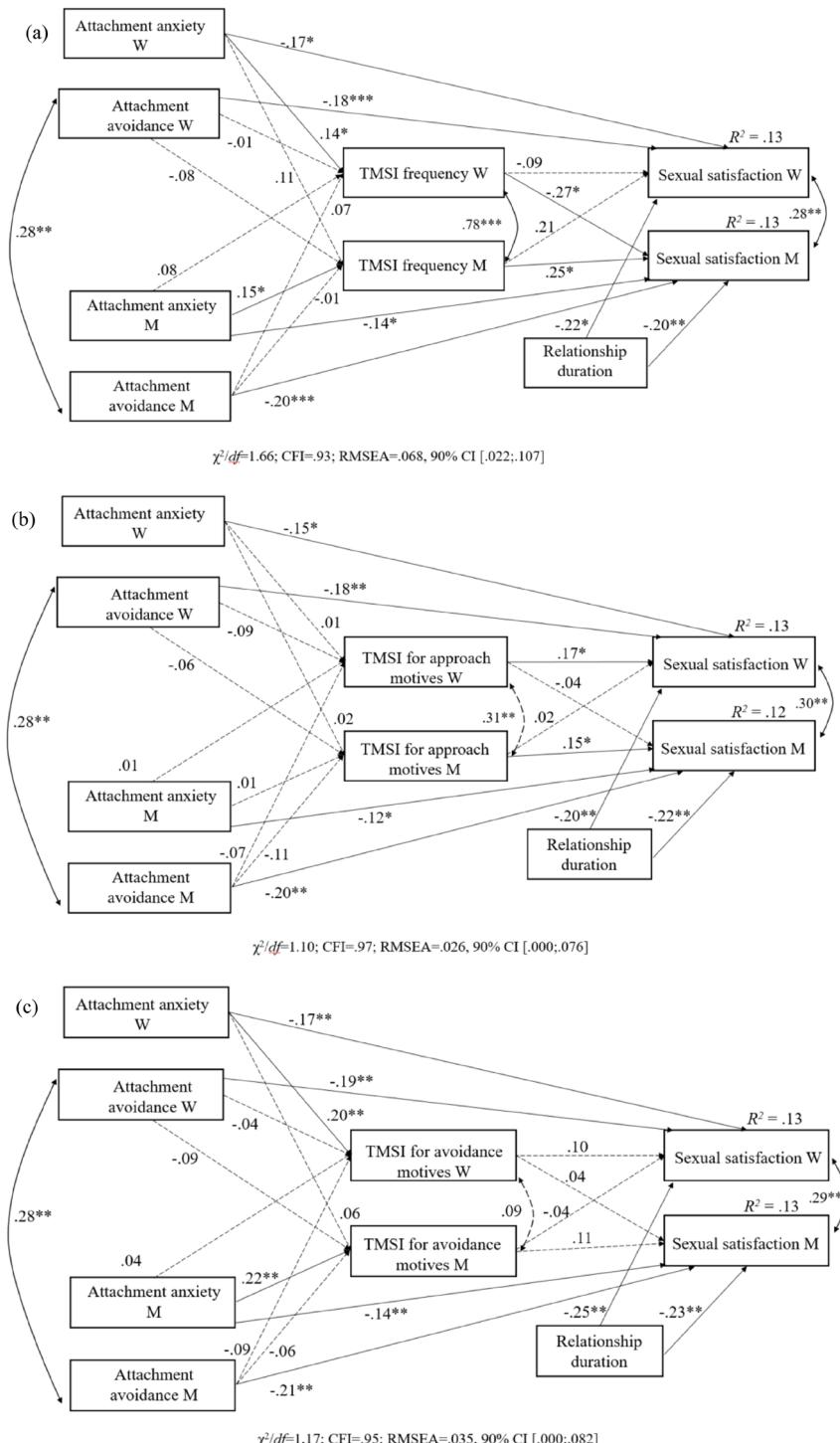


Figure 2. Dyadic Associations among Attachment Insecurity, (a) TMSI Frequency, (b) TMSI Approach Motives, (c) TMSI Avoidance Motives, and Sexual Satisfaction in study 2, controlling for relationship duration. Note. Standardized path coefficients are shown. Dashed lines represent non-significant paths. * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

These studies explored the mediating and moderating roles of TMSI frequency and motivations in the associations between attachment and sexual satisfaction among young adults, using two samples of individuals and couples in romantic relationships. Results revealed that TMSI frequency and motives did not explain the attachment and sexual satisfaction associations, although direct associations were found. In study 1, but not in study 2, TMSI to manage distance moderated the association between attachment avoidance and lower sexual satisfaction.

In support of the first research hypothesis, findings from both studies evidenced the direct links between attachment anxiety and avoidance and lower sexual satisfaction in young adults. This result is consistent with previous reviews (Mikulincer & Shaver, 2016; Stefanou & McCabe, 2012). Anxiously attached individuals may have doubts about their sexual attractiveness and experience sexual anxiety, while avoidantly attached individuals tend to have negative representations of others which minimizes their propensity to engage in intimate exchanges with their partner. In both cases, insecurity can interfere with their sexual satisfaction (Mikulincer & Shaver, 2016). Contrary to H2 and H3, the associations between attachment anxiety and avoidance and lower sexual satisfaction were not explained by TMSI frequency nor TMSI motives. Rather, direct links were found between TMSI and sexual satisfaction and attachment anxiety.

Study 1 revealed that TMSI frequency is not significantly related to young adults' sexual satisfaction when TMSI motivations are accounted for. When adopting a dyadic perspective, however, engaging in TMSI frequently was related to higher sexual satisfaction only in men. In contrast, the more frequently women reported engaging in TMSI, the less satisfied their partners were. These findings bring nuances to previous results showing better sexual satisfaction in frequent sexters than non-sexters (Galovan et al., 2018). Men who engage in TMSI frequently may enjoy doing so, thus nurturing their sexual satisfaction. But when their partners engage in TMSI more frequently, men might feel obligated to reply to them. Research based on gender-role expectations has shown that men are uncomfortable not engaging in TMSI in return since their sex drive is expected to be greater (Soller & Haynie, 2017). As sexual compliance can alter sexual satisfaction (Sanchez, Fetterolf et al., 2012), feeling obligated to engage in TMSI in return could explain why men partnered with women who engage in TMSI frequently are less sexually satisfied. Another possible explanation for this result is that when the relationship is in trouble (e.g. men are less satisfied) women tend to engage in TMSI as a way to satisfy their partners and revive the relationship (Impett & Peplau, 2003).

Our findings highlight the importance of the motivations underlying TMSI. Indeed, our results revealed that approach TMSI motivations are related to better sexual satisfaction in both samples, suggesting that sexting would be beneficial to one's sex life when it is practiced to connect with a partner or to experience pleasure. This is consistent with findings suggesting that individuals who use approach motives tend to encounter more positive experiences and are therefore more likely to report positive relationship events (Elliot et al., 2006), which promotes sexual satisfaction. As using approach motivations to engage in sexual intercourse has been related to greater sexual

satisfaction (Cooper et al., 2011; Impett & Tolman, 2006), engaging in TMSI to get closer to one's partner is also beneficial for one's sex life.

Among our sample of young adults, we found that avoidance TMSI motivations relate to lower sexual satisfaction. Namely, the more young adults are sexting to avoid consequences (e.g. losing their partner), the less satisfied they are with their sex life. This result corroborates past studies showing that individuals who engaged in sexual activities for avoidance motivations felt more negative emotions (Impett et al., 2005) and reported lower sexual satisfaction (Impett, Strachman et al., 2008; Muise et al., 2017). Individuals with avoidance TMSI motivations may experience more negative affects and be more sensitive to potential threats and negative outcomes about their sexuality, which could contribute to their lower sexual satisfaction (Dosch et al., 2016). Given our correlational design, these results can also mean that sexually satisfied young adults may engage in TMSI for approach motives, whereas dissatisfied young adults may engage in TMSI for avoidance motives. Although not replicated in our sample of couples, this result is congruent with the approach-avoidance motivational framework, in which individuals with avoidance TMSI motivations report lower sexual satisfaction and individuals with approach TMSI motivations report higher satisfaction (Muise et al., 2013, 2017).

Attachment anxiety was related to TMSI frequency and TMSI avoidance motives (but not approach motives) in both studies. Consistent with previous research (Galovan et al., 2018; Trub & Starks, 2017; Weisskirch & Delevi, 2011), this result suggests that anxiously attached young adults may engage in more TMSI because they perceive this behavior as normal and expected in a relationship (Weisskirch & Delevi, 2011) and they want to please their partner (Galovan et al., 2018). Anxiously attached young adults would engage in TMSI to avoid negative outcomes like conflict or rejection (Drouin & Tobin, 2014; Gable, 2006), which seems compatible with their tendency to engage in behaviors for avoidance motives (fear of rejection; Cooper et al., 2011, 1998; Elliot & Reis, 2003; Gable, 2006). As suggested by Weisskirch and Delevi (2011), sexting might be a new manifestation of reassurance-seeking behavior common among anxiously attached individuals. These individuals might alleviate some of their internal tension created by their fear of abandonment and rejection by sending their partner sexually connote text messages. Although past research found anxiously attached individuals to engage in sexual activities for intimacy motives (Schachner & Shaver, 2004), we found that they did not engage in TMSI for approach motives. Locke (2008) suggested that anxiously attached individuals may have approach and avoidance motivations, but more importantly, they are motivated to avoid distance. These individuals might be more likely to engage in sex to minimize feelings of inadequacy and low self-esteem as a result of their doubts about being sexually attractive (e.g. Mikulincer & Shaver, 2016; Schachner & Shaver, 2004).

In both studies, attachment avoidance was not related to TMSI frequency nor motives. Although consistent with some studies (Trub & Starks, 2017; Weisskirch & Delevi, 2011), our results contradict those showing that frequent sexters reported higher levels of attachment avoidance (Galovan et al., 2018). It is possible that young adults in our sample who report high levels of attachment avoidance are more or less inclined to resort to TMSI since their use may imply some form of self-disclosure

or investment in the relationship while also maintaining a physical distance with their partner (Mikulincer & Shaver, 2016; Weisskirch & Delevi, 2011). Supporting H4, we found that engaging in TMSI to manage distance rather moderates the link between attachment avoidance and sexual satisfaction, but only in Study 1. When young adults do not engage in TMSI to manage distance in their relationship, attachment avoidance relates to lower sexual satisfaction. When adults higher in attachment avoidance are engaging in TMSI to manage distance, this link disappears, suggesting that engaging in TMSI for this motive would attenuate their dissatisfaction. Because avoidant individuals are uncomfortable with affection and closeness (Birnbaum, 2007), engaging in TMSI to manage distance may be a less direct way to fulfill their sexual needs without necessitating a physical encounter. Engaging in TMSI to manage distance has been found to be more frequent among non-cohabiting partners than with partners who live together (Weisskirch & Delevi, 2011). The fact that more couples were cohabiting in study 2 could explain why the moderation was not replicated in this sample.

Limitations

Despite these original findings from two samples, several limitations must be considered. Given the cross-sectional nature of the research, caution should be used when interpreting the results. Although the sequence of associations was theory-driven, bidirectional associations are also possible. Data collection relied solely on self-report questionnaires, which are prone to social desirability. However, verifying participants' attention reduced inattention biases. The validity of the TMSI motivations measure has not been assessed. It was also limited to dichotomized items and may have omitted TMSI motivations. In addition, the first sample included mainly women, while the second sample included only mixed-sex couples, and both samples included only cisgender individuals and couples, limiting the generalizability of the results. Finally, the magnitudes of the effects were small; although they are comparable to the effect sizes found previously (Ferron et al., 2017), it suggests that other factors are required to better account for young adults' sexual satisfaction. These results should be replicated with larger and more diverse samples (gender, sexual orientations, relational arrangements). Studies should adopt longitudinal research designs and/or combine questionnaires and diaries assessing daily TMSI. Future studies should include potential confounding variables (e.g. sexual frequency, desire) and additional aspects of digital technologies (e.g. content of TMSI).

Implications

Our findings add to the current literature by revealing new associations among attachment insecurity, TMSI, and sexual dissatisfaction in young adults. They support the relevance of considering TMSI, along with attachment insecurity, to understand young adults' sexual functioning. As part of prevention programs on sexual health, young adults may benefit from psychoeducation about the use of TMSI in romantic relationships and the motivations to do so (Courtice & Shaughnessy, 2017). Also, clinicians

would benefit from assessing and addressing TMSI practice's frequency and motivations in their clinical work with young adults (e.g. Hertlein & Twist, 2017). As anxiously attached young adults are more likely to engage in TMSI frequently (e.g. Galovan et al., 2018) – and for avoidance motives – clinicians could assess their TMSI practices using the approach and avoidance motivations framework. Clinicians working in the context of couples' therapy could also help romantic partners in discussing their TMSI motivations and establishing their own set of rules or preferences when engaging in TMSI, especially if they are less sexually satisfied.

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