

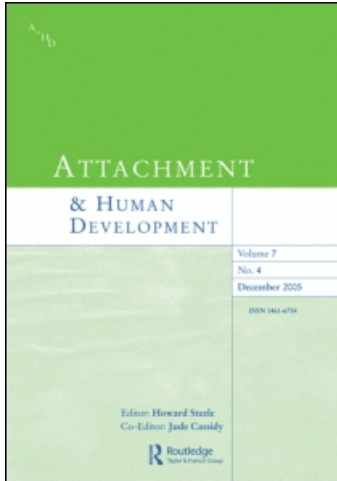
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Attachment & Human Development

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713394054>

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Online publication date: 18 April 2011

To cite this Article Beaulieu-Pelletier, Genevieve , Philippe, Frederick L. , Lecours, Serge and Couture, Stéphanie(2011) 'The role of attachment avoidance in extradyadic sex', Attachment & Human Development, 13: 3, 293 — 313

To link to this Article: DOI: 10.1080/14616734.2011.562419

URL: <http://dx.doi.org/10.1080/14616734.2011.562419>

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The role of attachment avoidance in extradyadic sex

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(Received 30 August 2009; final version received 1 July 2010)

The purposes of the present research were to examine the relationship between attachment and extradyadic sex and to investigate a mediator of this relationship. Study 1 showed that attachment avoidance was positively associated with extradyadic sex, while attachment anxiety was unrelated to it. These results were maintained after controlling for sexual satisfaction, sexual desire, gender, and age. Study 2 replicated the results from Study 1, while also controlling for couple adjustment. Study 3 used a prospective design and further showed that concerns with the partner's desire for engagement mediated the relationship between attachment avoidance and extradyadic sex. Overall, the findings suggest that attachment avoidance increases people's irritation relative to their partner's desire for engagement which, in turn, increases their likelihood to engage in extradyadic sex. The possibility that individuals characterized by attachment avoidance might use extradyadic sex as a way to distance themselves from their partner is discussed.

Keywords: attachment; avoidance; extradyadic sex; infidelity

Introduction

We live in a society characterized by a strong endorsement of faithfulness in couples. This is easily perceived through various social indices, such as wedding wishes (e.g., swearing fidelity to one's partner), standards for monogamy, or massive coverage of public figures' affairs in the media. In addition, people generally have a negative perception of extradyadic sex involvement (i.e., having a sexual intercourse with someone other than the primary romantic partner, in violation of this partner's understanding that the relationship is monogamous or exclusive to this partner). Past studies (e.g., Laumann, Gagnon, Michael, & Michaels, 1994) showed that up to 77% of American citizens believed that extramarital sex was always wrong. Despite such a social context, extradyadic sex is not exceptional. Indeed, prior research revealed that 31% to 49% of undergraduate students (Wiederman & Hurd, 1999) and 19% to 34% of married people (Wiederman, 1997) reported at least one lifetime incident of extradyadic sex. It is thus not surprising that extradyadic sex is one of the major sources of relationship distress and dissolution (Allen & Baucom, 2004; Buss & Shackelford, 1997). These estimates, combined with the significant negative repercussions of extradyadic sex, suggest that extradyadic sex is an important social phenomenon that needs to be further understood.

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The type of emotional investment people hold with respect to their romantic relationships appears to be critical when considering extradyadic sex (e.g., Allen & Baucom, 2004; Buss & Shackelford, 1997; Drigotas, Safstrom, & Gentilia, 1999). These patterns of emotional involvement in couples can be understood as being grounded on attachment styles. Indeed, adult attachment theory appears to be a highly relevant framework for examining extradyadic sex (Blow & Hartnett, 2005) as adult attachment has been related to numerous relational behaviors, such as relationship satisfaction and commitment (Collins & Read, 1990; Simpson, 1990), beliefs and attitudes toward romantic love (Hazan & Shaver, 1987), and relationship-threatening situations (Simpson, Ickes, & Grich, 1999). In addition, interactions between the attachment and sexual systems are theorized to constitute romantic love (e.g., Fraley & Shaver, 2000; Shaver, Hazan, & Bradshaw, 1988) and to affect a person's motives for having sex (Mikulincer & Shaver, 2007). Thus, the goal of the present research was to examine the role of attachment in extradyadic sex.

Attachment and extradyadic sex

Past research has shown that attachment *avoidance* is positively associated with a positive attitude toward casual sex (e.g., sex without love, uncommitted sex), a larger number of casual sex experiences, and an interest in emotionless sex and one-night stands (e.g., Allen & Baucom, 2004; Brennan & Shaver, 1995; Gentzler & Kerns, 2004; see also Mikulincer & Shaver, 2007). Avoidant individuals are not prone to form long-term relationships (Hazan & Shaver, 1987), thus potentially increasing their number of partners (Bogaert & Sadava, 2002). Avoidant individuals are believed to fear intimacy in such a way that this uncomfortableness with engagement and closeness is usually conducive to emotional distance and independence (Hazan & Shaver, 1987; Mikulincer & Shaver, 2007). Therefore, they might need to distance themselves from their partner when they perceive cues of engagement and proximity from their partner. Because extradyadic sex has been shown to reduce couple's intimacy, proximity, and emotional engagement levels (Charny & Parnass, 1995; Shackelford & Buss, 1997), avoidant individuals might be more inclined to use extradyadic sex (Brennan & Shaver, 1995; Mikulincer & Shaver, 2007; Stephan & Bachman, 1999) as a strategy to reduce the degree of intimacy within their romantic relationship (Allen & Baucom, 2004). Overall, these various results suggest that attachment avoidance may be positively related to extradyadic sex.

Conversely, attachment *anxiety* has been associated with stable and long-term relationships (Davis, Shaver, & Vernon, 2004; Feeney, 1994, 2002) and a desire for highly committed relationships (Hazan & Shaver, 1987; Mikulincer & Erev, 1991). Moreover, anxious individuals fear losing their partner or being abandoned (Mikulincer & Shaver, 2007) and are dependent lovers (Collins & Read, 1990). Consequently, extradyadic sex involvement should be perceived as a threat to their current romantic relationship, as anxious individuals are hypervigilant to potential sources of relationship distress (e.g., Simpson et al., 1999) and are more likely to believe that their behavior in relationships can be destructive (Feeney & Noller, 1992; Stackert & Bursik, 2003). Thus, attachment anxiety should be negatively associated or unrelated to extradyadic sex (Stephan & Bachman, 1999).

Overall, the above findings indirectly suggest that anxious individuals may not get involved into casual or uncommitted sex, because of their deep reliance on a partner and strong need to be loved and cared for reliably. However, contradictory

to these theoretical positions and empirical findings, some studies have found that attachment anxiety was positively related to favorable attitudes toward casual sex (Scharfe & Eldredge, 2001) and uncommitted sex, but only in women (e.g., Allen & Baucom, 2004; Bogaert & Sadava, 2002; Feeney, Peterson, Gallois, & Terry, 2000).

Little research has clearly examined the role of attachment in extradyadic sex per se. In fact, as specified in the review of Blow and Hartnett (2005), only two studies (Allen & Baucom, 2004; Bogaert & Sadava, 2002) have linked attachment to extradyadic sex and since then, to our knowledge, only one more study has been conducted on this specific topic (Cooper, Pioli, Levitt, Talley, Micheas, & Collins, 2006). Allen and Baucom (2004) showed that undergraduate *men* with an avoidant attachment style reported the largest number of partners with whom they experienced either romantic (e.g., falling in love) or sexual behavior (e.g., sexual intercourse) while engaged in a primary romantic relationship. These authors have also reported that avoidant participants from a community sample were more likely to report having had romantic and/or sexual extradyadic partners, although this effect was only marginally significant. In addition, they also found that undergraduate *women* with an anxious attachment style were also likely to report a large number of romantic and/or sexual extradyadic partners, but there were no such differences for anxious attachment, for either men or women, in a community sample. Bogaert and Sadava (2002) reported no significant relationship between attachment avoidance and a past-year infidelity factor (including having had an affair, to have found that one's partner had an affair, and number of partners). However, they showed that attachment anxiety, particularly for women, was positively associated with this infidelity factor. Finally, Cooper and colleagues (2006) also reported that avoidant men and anxious women were more likely to cheat, although the effect for avoidant men was only marginally significant ($p < .10$).

Thus, overall, the results of these studies are rather mixed. First, attachment avoidance was significantly related to cheating in only two of the three studies presented above. In addition, this effect was only significant for men in two samples and marginally significant for men and women in one sample. Second, attachment anxiety was significantly related to extradyadic sex in three of the four samples presented above, but only for women. One reason for these rather mixed and theoretically contradictory results might be that most of the studies presented above used different types of extradyadic sex definition and measures that do not all tap extradyadic sexual intercourses per se. For example, Allen and Baucom (2004) defined extradyadic involvement as including romantic and sexual behavior with someone other than the primary partner. Thus, behavior could range from falling in love to sexual intercourse. This broad definition could partly explain why anxious women were more likely to engage in extradyadic relationships in their study. Indeed, anxious individuals may be more likely to seek love with an extradyadic partner as a mean to obtain more reassurance and care compensation, as they have been found to fall in love easily and indiscriminately in hope of merging with another person and increasing felt security (Hazan & Shaver, 1987). However, extradyadic sex involvement per se might be perceived as too much of a threat of losing their primary romantic relationship (Feeney & Noller, 1992; Simpson et al., 1999; Stackert & Bursik, 2003). Other researchers have also not defined extradyadic sex. For example, Bogaert and Sadava's (2002) definition of *affair* was left up to the respondents, which could thus include falling in love or other aspects unrelated to sexual intercourses.

In terms of the measures used, Allen and Baucom (2004) measured extradyadic sex with the *number* of extradyadic partners within the last two years, which limits the findings, as the frequency of extradyadic sex involvement is not accounted for. Bogaert and Sadava (2002) evaluated infidelity with a composite score that included aspects unrelated to personal extradyadic sex, such as measures of whether one's partner had had an affair in the past year. Overall, because attachment anxiety and avoidance may be associated with different aspects of extradyadic relationships (love vs. sex), there is a clear need to conduct research examining attachment and extradyadic sex with very specific and operational definitions and measures of extradyadic sex.

Sexual satisfaction and desire

The studies presented above posit that extradyadic sex may be predicted by *attachment-related motives*. However, past research on extradyadic sex has also shown that people may engage in extradyadic sex for *sex-related motives*. Indeed, sexual dissatisfaction within the couple has been frequently linked to extradyadic sex (Buss & Shackelford, 1997; Glass & Wright, 1992). The level of sexual desire (i.e., interest in sex) is also believed to be associated with extradyadic sex (Meston & Buss, 2007; Treas & Giesen, 2000). Therefore, the relationship between attachment and extradyadic sex should be examined independently of sexual satisfaction and desire.

Present research

The purpose of the present research was to examine the relationship between attachment and extradyadic sex, independently of sex-related motives for extradyadic sex. Three studies have been conducted to examine this issue. Study 1 investigated the association between attachment and extradyadic sex in undergraduate students, while controlling for sexual satisfaction and desire. Study 2 replicated results of Study 1 within a community-dwelling population, while also controlling for couple adjustment. Study 3 examined the relationship between attachment and extradyadic sex within a prospective design over a 10-month period. In addition, Study 3 examined a mediator of the relationship between attachment avoidance and extradyadic sex. All three studies also examined the effect of gender and age and their interaction with attachment.

Study 1

The purpose of Study 1 was to assess the relationship between attachment and extradyadic sex. In light of the mixed results between attachment and extradyadic sex and of the lack of empirical evidence on extradyadic sexual intercourse per se, we founded our hypotheses on the theoretical positions advanced by attachment theory rather than on past empirical findings. Thus, because avoidant individuals might be more inclined to engage in extradyadic sex as a way to reduce their degree of intimacy and to maintain distance with their partner, it was hypothesized that attachment avoidance would be positively associated with extradyadic sex. Conversely, because anxious individuals are highly dependent and seek high commitment with their primary partner, they should not be inclined to engage in extradyadic sex, as it might be perceived as a threat to their current romantic

relationship. Therefore, attachment anxiety was expected to be either negatively associated or unrelated to extradyadic sex. In addition, it was hypothesized that these results should hold after controlling for sexual satisfaction and desire and for the effects of gender and age.

Finally, no past research to our knowledge has clearly distinguished extradyadic sex intentions from actual extradyadic sex involvement in the infidelity domain. Because some differences might exist between contemplating extradyadic sex and actually involving in extradyadic sex intercourse, separate items were used in Study 1 to assess extradyadic sex intentions and involvement.

Method

Participants

Participants were 151 undergraduate students from a French-Canadian university. Only participants engaged in a romantic relationship were selected. The final sample was composed of 89 (58 females, 31 males) participants with a mean age of 24.45 years ($SD = 5.86$).

Measures

Attachment. The Experiences in Close Relationships Inventory (ECR; Brennan, Clark, & Shaver, 1998) is composed of 36 items responded to on a seven-point Likert scale ranging from 1 (*do not agree at all*) to 7 (*completely agree*) and assesses participants' attachment dimensions. Half of the items pertains to attachment-related avoidance (e.g., "I prefer not to be too close to my romantic partners") while the other half assesses attachment-related anxiety (e.g., "I worry a lot about my relationship"). On the basis of prior pilot studies from other data (Philippe et al., 2009), the 10 top-loading items of the full ECR scale on their respective avoidant and anxious dimensions were retained for the present study in order to form a short 20-item version of the ECR. A Confirmatory Factor Analysis was conducted to examine the two-factor structure of this short ECR using the present Studies 1 and 2 full databases combined ($n = 415$). Robust Maximum Likelihood was used as the method of estimation because attachment scale responses are usually non-normally distributed (Brennan et al., 1998). Results revealed excellent fit indices for a two-factor structure, $SB \chi^2 (df = 165, n = 415) = 367.48, p = .000, NFI = .93, NNFI = .96, CFI = .96, RMSEA = .05 [.045; .059], SRMR = .09$ (with four measurement error covariances). Factor loadings were acceptable, ranging from .37 to .77. The correlation between the two latent variables (attachment anxiety and avoidance) was .35, $p < .05$. Finally, an alternative one-factor model yielded poor fit indices, $SB \chi^2 (df = 166, n = 415) = 940.18, p < .000, NFI = .83, NNFI = .83, CFI = .85, RMSEA = .10 [.094; .107], SRMR = .12$. These findings imply that the two-factor structure should be preferred, and thus that the present short 20-item ECR version preserves the factorial structure of the full ECR version. Alphas in this study were .78 and .84 for the avoidant and anxious subscales, respectively.

Sexual satisfaction. One item devised for the purpose of the present study was responded to on a five-point Likert scale (1 = *not satisfied at all*, 5 = *totally satisfied*) and sought to assess participants' current sexual satisfaction ("To what extent are

you currently sexually satisfied in your life?”). This item was shown to correlate at .79 with the Pinney Sexual Satisfaction Inventory (Pinney, Gerrard, & Denney, 1987), based on other data of ours (Philippe, Koestner, & Beaulieu-Pelletier, 2009).

Sexual desire. Four key items were derived from past research (Rosen, Riley, Wagner, Osterloh, Kirkpatrick, & Mishra, 1997; Spector, Carey, & Steinberg, 1996) in order to assess sexual desire. A sample item is “How frequently is it necessary for you to undertake a sexual activity”. All items were responded to on a seven-point Likert scale (1 = *never*, 7 = *extremely often*). A Principal Components Analysis was conducted to examine the factorial structure of these four items. One component emerged at 2.38 eigenvalues, explaining 60% of the variance (all other eigenvalues <0.88). All four items had high factor loadings on this single component ranging from .53 to .91. Alpha was .79.

Extradyadic sex. Three items were devised for the purpose of the present study in order to examine extradyadic sex. First, unfaithfulness was defined for the participants as *having a sexual intercourse with someone at the same time you are seriously engaged in a romantic relationship with a partner and in violation of this partner's understanding that the relationship is monogamous (exclusive to this partner)*. Two items sought to assess past and present intentions of extradyadic sex: “At what frequency have you ever thought about being unfaithful to a partner with whom you were with?” and “To what extent do you presently think about being unfaithful to your partner?” One item sought to assess past extradyadic sex involvement: “At what frequency have you actually been unfaithful to a partner with whom you were with”. All three items were responded to on a seven-point Likert scale ranging from 1 (*never*) to 7 (*extremely often*). Inter-item correlations ranged from .52 to .73 for all three items.

Procedure

Participants were told that the purpose of the study was to find out more about students' sexual attitudes and behavior. It was also mentioned that their participation was voluntary and anonymous and that all their responses would remain confidential. Participants were asked to complete the ECR, the extradyadic sex items and the items with respect to sexual satisfaction and desire.

Results

Preliminary analyses were conducted to examine gender differences among all study variables. Results revealed gender differences on attachment anxiety ($t[87] = 2.72$, $p < .01$, $d = .62$) and sexual desire ($t[87] = 2.49$, $p < .05$, $d = .55$). Women reported higher levels of attachment anxiety ($M = 3.63$, $SD = 1.15$) than men ($M = 2.97$, $SD = 0.88$), while men reported higher levels of sexual desire ($M = 5.09$, $SD = 0.97$) than women ($M = 4.58$, $SD = 0.90$). There were no gender differences on all extradyadic sex variables.

A Principal Component Analysis was first conducted in order to examine if the three extradyadic sex items actually referred or not to the same construct. Results revealed that all three extradyadic sex items loaded on the same factor, with factor loadings ranging from .82 to .91. Furthermore, correlational results revealed that

each of the three extradyadic sex items was positively associated with attachment avoidance ($r_s > .29$, $p_s < .05$, see Table 1). In addition, they were all unrelated to attachment anxiety. These results suggest that extradyadic sex intentions (past and present) and extradyadic sex involvement converge on a same dimension and are all correlated similarly with attachment avoidance. Therefore, a composite extradyadic sex score was created by averaging the three items and was used in the subsequent analyses.

To assess the relationship between attachment and extradyadic sex while controlling for sexual satisfaction, sexual desire, and gender, a multiple hierarchical regression analysis was conducted. The composite extradyadic sex score served as the dependent variable. At Step 1, attachment anxiety, sexual satisfaction, sexual desire, and gender were entered as independent variables. At Step 2, attachment avoidance was entered. As can be seen in Table 2, attachment anxiety was not a significant predictor of the composite extradyadic sex score at Step 1, while controlling for sexual satisfaction, sexual desire, and gender. At Step 2, attachment avoidance was positively associated with extradyadic sex, over and above all other variables, accounting for 10% of the variance. Finally, controlling for age did not alter the

Table 1. Means, standard deviations, and correlations: Study 1.

	Mean	SD	Attachment avoidance	Attachment anxiety
Attachment avoidance	2.50	.89	—	—
Attachment anxiety	3.40	1.11	.31**	—
Composite extradyadic sex score	2.19	1.15	.38**	.10
Past extradyadic sex intentions	2.73	1.56	.29**	.13
Present extradyadic sex intentions	2.00	1.27	.37**	-.01
Past extradyadic sex involvement	1.84	1.15	.32**	.16
Sexual satisfaction	3.84	.87	-.30**	-.25*
Sexual desire	4.76	.96	-.03	.08

Note: $n = 89$. * $p < .05$, ** $p < .01$.

Table 2. Multiple regression analyses of extradyadic sex variables on attachment anxiety and avoidance, controlling for sexual satisfaction, sexual desire and gender: Study 1.

	Past extradyadic sex intentions	Past extradyadic sex involvement	Present extradyadic sex intentions	Composite extradyadic sex score
Step1. Attachment anxiety	.07	.09	-.10	.02
Sexual satisfaction	-.17	-.35	-.33**	-.31**
Sexual desire	.26*	.10	.24*	.24**
Gender	-.01	.02	-.02	-.01
<i>F</i>	2.55*	3.76**	3.75**	4.05**
<i>R</i> ²	.11	.16	.16	.17
Step 2. Attachment avoidance	.28*	.23*	.37**	.34**
<i>F</i> _{change}	6.01*	4.35*	12.61**	10.34**
<i>R</i> ² _{change}	.06	.04	.12	.10

Note: $n = 89$. * $p < .05$, ** $p < .01$.

present results. In addition, there were no significant interactions between attachment and gender or between attachment and age. Also, results were the same when examining in a regression each extradyadic sex item separately (see Table 2).

Overall, results of Study 1 supported the theoretical positions of attachment theory, as it was found that attachment avoidance was positively associated with extradyadic sex. Such was not the case for attachment anxiety that was found to be unrelated to extradyadic sex. Finally, these results were maintained even after controlling for sexual satisfaction, sexual desire, gender, and age.

Study 2

Study 2 aimed at replicating the results of Study 1 within a sample of community-dwelling participants. Such a sample was obtained in order to increase the ecological validity of the relationship found in Study 1 between attachment avoidance and extradyadic sex. In addition, the sample of Study 2 was sufficiently large in order to use more refined statistical analyses, namely structural equation modeling.

Study 2 also aimed at controlling for couple adjustment. In past research, couple adjustment has been related to attachment (Lussier, Sabourin, & Turgeon, 1997; Mikulincer & Shaver, 2007). Research has shown that both attachment avoidance and anxiety led to lower satisfaction in the romantic relationship. Couple adjustment has also been related to extradyadic sex (see Allen et al., 2005, for a review on extramarital involvement). Thus, the relationship between attachment and extradyadic sex should be examined while taking into account couple adjustment. In line with Study 1, it was hypothesized that attachment avoidance would be positively associated with measures of extradyadic sex (independently of sexual satisfaction, desire, couple adjustment and gender) while attachment anxiety was expected to be unrelated to extradyadic sex.

Method

Participants

Participants were 270 (151 females, 119 males) visitors of a commercial exhibition on “love and romance” held in Montreal, Canada. Only participants engaged in a romantic relationship were recruited. Participants were 27 years old on average ($SD = 9.33$ years).

Measures

Attachment. The 20-item version of the ECR used in Study 1 was used in Study 2 to assess attachment. Alphas in this study were .71 and .83 for the avoidant and anxious subscales, respectively.

Extradyadic sex. The items used in Study 1 to examine extradyadic sex were also used in Study 2. An additional item slightly modified from the Anonymous Romantic Attraction Survey (ARAS; Schmitt et al., 2004) was also employed to assess extradyadic sex (“While you were engaged in a romantic relationship, to what extent have you ever tried to attract someone else for a short-term sexual relationship with you?”). All items were responded to on a seven-point Likert scale

(1 = never, 7 = extremely often). Finally, the relationship exclusivity dimension of the Sexy-Seven (Schmitt & Buss, 2000) was administered in order to assess participants' self-description related to faithfulness. Eight adjectives compose the Relationship Exclusivity dimension (e.g., faithful, promiscuous, adulterous). These items were mixed with other filler adjective items (e.g., loving, careful). Participants were asked to evaluate "the extent to which each of these adjectives describe your sexuality" on a nine-point Likert scale (1 = extremely false, 9 = extremely true). Alpha in this study was .75 for this dimension. Items were reverse-coded so that a high score on this dimension expresses high levels of unfaithfulness or of relationship non-exclusivity. Overall, inter-item correlations among the extradyadic sex items and the Relationship Non-Exclusivity Scale ranged from .51 to .71.

Sexual satisfaction and desire. The items used in Study 1 were used in Study 2. Alpha for the sexual desire items was .60.

Couple adjustment. The Dyadic Adjustment Scale (DAS-32; Spanier, 1976) was used to assess couple adjustment. Recently, Sabourin, Valois, and Lussier (2005) showed using IRT analyses that four items derived from the original DAS accounted for a maximum of variance in couple adjustment and were representative of the complete original scale. These four items were thus used. It should be noted that this short version of the DAS does not include items assessing sexual satisfaction or sexual communication within the couple. The DAS-4 uses a six-point Likert scale ranging from 0 (*always disagree*) to 5 (*always agree*). A sample item is "In general, how often do you think that things between you and your partner are going well?" Alpha was .84.

Procedure

Participants were solicited by one of three research assistants at a commercial exhibition on "love and romance" held in Montreal, Canada. Participants were told that the purpose of the study was to find out more about people's sexual attitudes and behavior. It was also mentioned that their participation was voluntary and anonymous, and that all their responses would remain confidential. Participants were asked to complete the questionnaire individually on tables that were made available for this purpose and then handed it to one of the assistants.

Results

Preliminary analyses were conducted in order to examine gender differences among all study variables. Results revealed that there were gender differences on attachment anxiety ($t[268] = 2.43, p < .05, d = .30$), sexual desire ($t[268] = 3.14, p < .01, d = .39$), and relationship non-exclusivity ($t[268] = 2.00, p < .05, d = .26$). Females reported higher levels of attachment anxiety than males ($M_F = 3.64, SD_F = 1.23; M_M = 3.30, SD_M = 1.02$), whereas males reported higher levels of sexual desire ($M_M = 5.35, SD_M = 0.85; M_F = 5.03, SD_F = 0.79$) and of relationship non-exclusivity ($M_M = 3.03, SD_M = 1.39; M_F = 2.67, SD_F = 1.34$) than females.

Table 3 reports the means, standard deviations, and correlations of all study variables. Preliminary correlational results revealed that attachment avoidance was positively associated with all extradyadic sex variables ($r_s = .16$ to $.23$, all $p_s < .05$),

Table 3. Means, standard deviations, and correlations: Study 2.

	Mean	SD	1	2	3	4	5	6	7	8	9
Attachment avoidance (1)	2.42	.86	—								
Attachment anxiety (2)	3.46	1.16	.26**	—							
Past extradyadic sex intentions (3)	2.19	1.52	.18**	-.01	—						
Present extradyadic sex intentions (4)	1.89	1.48	.23**	-.01	.49**	—					
Past extradyadic sex involvement (5)	1.77	1.31	.16*	.07	.66**	.37**	—				
Intentions to attract someone for a sexual intercourse (6)	1.84	1.41	.17**	.03	.55**	.32**	.63**	—			
Relationship non-exclusivity (7)	3.46	1.45	.18**	.07	.46**	.45**	.49**	.45**	—		
Sexual satisfaction (8)	4.16	.89	-.37**	-.04	-.23**	-.37**	-.13*	-.19**	-.20**	—	
Sexual desire (9)	5.19	.84	-.05	.01	.18**	.06	.20**	.23**	.18**	-.03	—
Couple adjustment (10)	4.04	.66	-.43**	-.13*	-.18**	-.42**	-.16**	-.13*	-.28**	.59**	.05

Note: $n = 270$. * $p < .05$, ** $p < .01$.

while attachment anxiety was unrelated to them ($r_s = -.01$ to $.07$, ns). These results support our hypotheses and corroborate results of Study 1. In line with Study 1, the extradyadic sex items will be used as a single component in the full model.

To assess the relationship between attachment and extradyadic sex while controlling for sexual satisfaction, desire, couple adjustment, and gender, a structural equation model was conducted in LISREL 8 (Jöreskog & Sörborm, 2003) with Robust Maximum Likelihood as the method of estimation. Observed variables were computed using items random parceling for each construct (Bandalos, 2002). That is, groups of two or three items were combined in an observed variable for each construct, except for extradyadic sex, as it was deemed important to examine the factor loading of each item separately. Gender and sexual satisfaction were only composed of one observed variable, so their variance was fixed to 1.00. Paths were drawn from each latent variable (attachment, sexual satisfaction, desire, couple adjustment, and gender) to the latent variable of extradyadic sex. Test of this model revealed adequate fit indices, $SB \chi^2 (df = 100, n = 270) = 223.69, p < .001$, $NC = 2.24$, $NNFI = .91$, $CFI = .93$, $RMSEA = .068$ [.056; .080], $GFI = .91$, $SRMR = .071$. This final model, shown in Figure 1, revealed that attachment avoidance was positively associated with extradyadic sex, while anxious attachment was unrelated to it. All control variables were non-significantly related to extradyadic sex, except for sexual desire that positively predicted extradyadic sex. Finally, including age in the model did not alter the results.

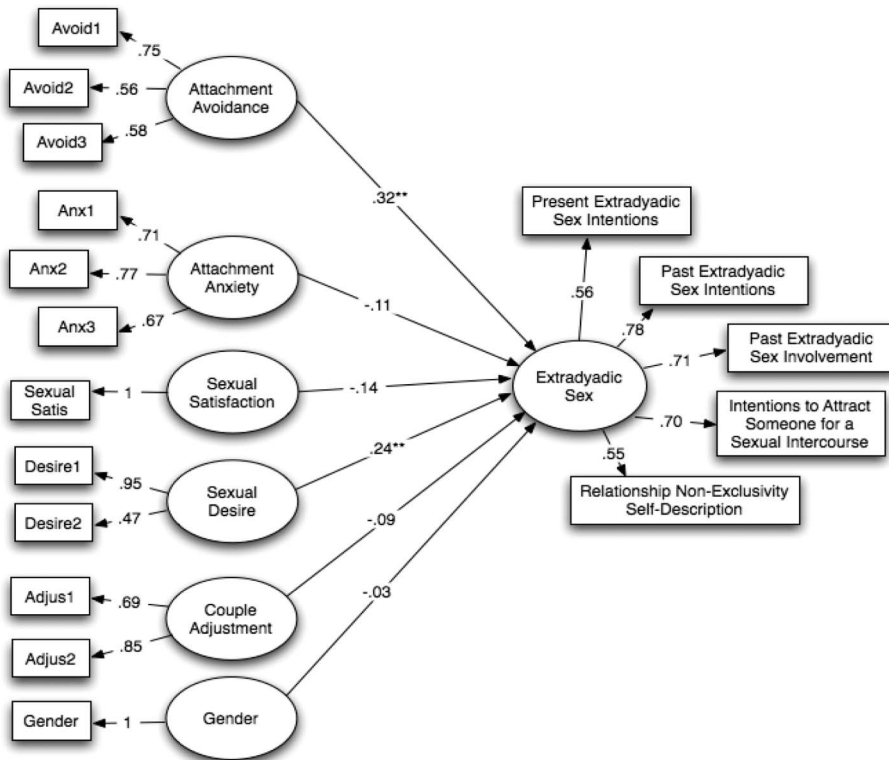


Figure 1. Structural equation model of the relationship between attachment and extradyadic sex, while controlling for sexual satisfaction, sexual desire, couple adjustment, and gender.

Model invariance was tested as a function of gender. Results for the baseline model with all parameters freely estimated were adequate: $\chi^2(181) = 295.97$, RMSEA = .069. Results for the same model with all parameters fixed were $\chi^2(226) = 366.11$. The chi-square difference between these two models was significant, $\Delta\chi^2(45) = 61.66$, $p < .01$, thus suggesting that the model was not totally invariant across gender. A less stringent model was then tested, allowing all measurement errors, variances and covariances to be freely estimated. The results of this alternative model were $\chi^2(196) = 316.80$. The chi-square difference between this latter model and the baseline model showed to be non-significant, $\Delta\chi^2(15) = 20.83$, *ns* (also taking into account the scaling factor of the Satorra-Bentler chi-square). These results thus suggest that there was no difference in the structural equation model with respect to factor loadings and path coefficients between males and females.

In sum, results of Study 2 replicated those of Study 1, while extending their ecological validity. Indeed, it was found that attachment avoidance was positively associated with extradyadic sex, even after controlling for sexual satisfaction, desire, couple adjustment, gender, and age. Such was not the case for attachment anxiety that was found to be unrelated to extradyadic sex. Overall, the present findings provide support for the role of attachment avoidance in extradyadic sex intentions and behaviors in a sample of community-dwelling people engaged in romantic relationships.

Study 3

Study 3 served two purposes. First, Studies 1 and 2 both used cross-sectional designs. Consequently, the direction of the relationship between participants' ratings on the attachment scale and their report of extradyadic sex remains ambiguous. Therefore, the first purpose of Study 3 was to examine this relationship within a prospective design over a 10-month period. A second purpose of Study 3 aimed at uncovering a mediator of this relationship. Because avoidant individuals are irritated and bothered by the intimacy and proximity requested by their romantic partner (Mikulincer & Shaver, 2007), their irritation might increase their likelihood to engage in subsequent extradyadic sex as a mean to reduce their felt intimacy levels with their partner. Indeed, Allen and Baucom (2004) showed that avoidant individuals were more likely to report autonomy-related motives for extradyadic sex, such as "I wanted a little freedom" and "I wanted some space from my primary partner". Consequently, avoidant people who feel concerned with the prominent expression of engagement and proximity of their partner during a particular period of time may be more likely to engage in extradyadic sex (Mikulincer & Shaver, 2007; Stephan & Bachman, 1999). Therefore, concerns with one's partner's desire for engagement and proximity over a given period may mediate the relationship between avoidance and extradyadic sex engagement over this period.

At Time 1, participants completed measures of attachment, sexual satisfaction, desire, and couple adjustment. At Time 2, 10-month later, participants completed a scale measuring their concerns with their partner's desire for engagement and proximity. In addition, they reported whether they have had a sexual intercourse with someone other than their primary romantic partner between Times 1 and 2. In line with the results of Studies 1 and 2, it was hypothesized that attachment avoidance would be positively associated with extradyadic sex involvement 10-month

later, while attachment anxiety would be unrelated to it. In addition, it was hypothesized that concerns with partner's desire for engagement and proximity during the last 10 months (or for the duration of the relationship) would mediate the association between attachment avoidance and extradyadic sex. Finally, all these results should hold after controlling for sexual satisfaction, desire, and couple adjustment measured at Time 1.

Method

Participants

At Time 1, participants were 174 (151 females and 23 males) undergraduate and graduate psychology students from a French-Canadian university.¹ A total of 90 participants (76 females and 14 males) completed both Times 1 and 2 for a response rate of 52%. These participants were 28.53 years old on average ($SD = 7.78$ years). Participants who completed both phases of the study did not differ from those who only completed the questionnaire at Time 1 on all study variables (all $F_s < 1.20$, ns). From these 90 participants, six had not been involved at all in any romantic relationship during the 10-month period. A total of 84 participants were thus finally retained for the analyses. A total of 52 participants remained with their partner over the 10-month period, while 13 separated between Time 1 and Time 2 (four of them were with another partner at Time 2). In addition, 10 participants who were not in a romantic relationship at Time 1 found a partner throughout the 10-month period and remained with this partner, while nine people who were single at Time 1 experienced at least one serious romantic relationship and separated from their partner, so that they were again single at Time 2.

Measures

Time 1 measures

Attachment. The ECR-S (Wei, Russell, Mallinckrodt, & Vogel, 2007), a recently validated short version of the ECR, was used in the present study. The ECR-S is composed of 12 items. Because the items of the ECR-S do not entirely overlap with the items included in our 20-item version (used in Studies 1 and 2), we decided to use this 12-item version in order to examine the relationship between attachment and extradyadic sex with a relatively different self-report measure of attachment. Adequate evidence of validity and reliability has been reported for this short scale (Wei et al., 2007). Alphas in this study were .73 (avoidance) and .70 (anxiety).

Sexual satisfaction and desire. The items used in Studies 1 and 2 were used in Study 3. Alpha for the sexual desire items was .64.

Couple adjustment. The DAS-4 used in Study 2 was used in Study 3. Alpha was .89.

Time 2 measures

Participants were asked to complete the scales used at Time 2 according to the following conditions. Participants who were engaged in a romantic relationship at

Time 1 were asked to complete the scales while referring to this relationship, and that for the interval of time between Time 1 and Time 2 or between Time 1 and the moment of their break-up. Participants who were not involved in a romantic relationship at Time 1, but that had been involved in a relationship between Times 1 and 2 and/or who were still currently engaged in one at Time 2 were asked to complete the scales while referring to their last significant relationship or current relationship. Data showed that the minimum extent of time for either a last or a current relationship was at least over three months.

Concerns with partner's engagement and proximity. Three items devised for the purpose of the present study were used to measure one's concerns with his/her partner's desire for engagement and proximity: "To what extent have you been irritated by your partner's desire of engagement", "To what extent have you been bothered by your partner's insistence on expressing his/her affection to you", and "To what extent have you been bothered by your partner's desire for closeness with you".² Participants were asked to complete these items while referring to the relationship condition that conformed to their situation and for a maximum since Time 1. Alpha for this scale was .88.

Actual extradyadic sex. Participants who were currently engaged in a romantic relationship were asked to respond to the following item: "From the time you have been with your current partner and only considering the time elapsed from July 2007 [i.e., Time 1], have you had a sexual intercourse with someone other than your current partner". Participants who were engaged in a romantic relationship at Time 1 but who had separated between Time 1 and Time 2 were asked to respond to the following item: "From July 2007 [i.e., Time 1] up until the time of your separation, have you had a sexual intercourse with someone other than your primary partner". The items were responded to on a yes-or-no basis.

Procedure

All participants were randomly contacted with their institutional e-mail. Those who agreed to complete the questionnaire logged into a secure website. At Time 1, participants were asked to complete the attachment, sexual satisfaction, desire, and couple adjustment scales. At Time 2, they completed the scale related to concerns with the partner's engagement first, and then the items evaluating their actual extradyadic sex involvement.

Results

Table 4 reports the means, standard deviations, and correlations of all study variables. A total of 11 individuals reported having engaged in an extradyadic sexual intercourse while they were with a primary partner for a rate of 13.1%. Correlational results revealed that attachment avoidance was significantly associated with both concerns with partner's engagement desire ($r = .57, p < .001$) and extradyadic sex ($r = .26, p < .05$). Concerns with partner's desire for engagement were also positively associated with extradyadic sex ($r = .38, p < .01$). Attachment anxiety was unrelated to both concerns with partner's desire for engagement and extradyadic sex.

To test the full mediation model, a path analysis was conducted with Mplus 5.2 (Muthen & Muthen, 2007), using weighted least squares as the method of estimation. This method of estimation handles dichotomous endogenous variables by estimating logit regression coefficients for the dichotomous variable (Muthen & Muthen, 2007). Attachment avoidance and anxiety as well as sexual desire and satisfaction were modeled as exogenous variables, while concerns with one's partner engagement and extradyadic sex served as endogenous variables. Paths were drawn from the control variables (sexual satisfaction and desire) to all endogenous variables. Figure 2 displays the full model. Results showed that attachment avoidance was

Table 4. Means, standard deviations, and correlations: Study 3.

	Mean	SD	1	2	3	4	5	6
Attachment avoidance (1)	2.62	1.03	–					
Attachment anxiety (2)	3.38	1.04	.12	–				
Extradyadic sex involvement (3)	–	–	.26*	–.03	–			
Concerns with partner's desire of engagement and proximity (4)	1.88	1.16	.57**	.10	.38**	–		
Sexual satisfaction (5)	3.55	1.21	–.09	–.36**	.05	.12	–	
Sexual desire (6)	4.64	0.87	–.07	.13	.56**	–.03	–.08	–
Couple adjustment ^a (7)	3.81	0.87	–.42**	–.30*	–.03	–.26*	.35**	.10

Note: $n = 84$. Correlations were derived from the weighted least squares estimation. ^a $n = 65$. * $p < .05$, ** $p < .01$.

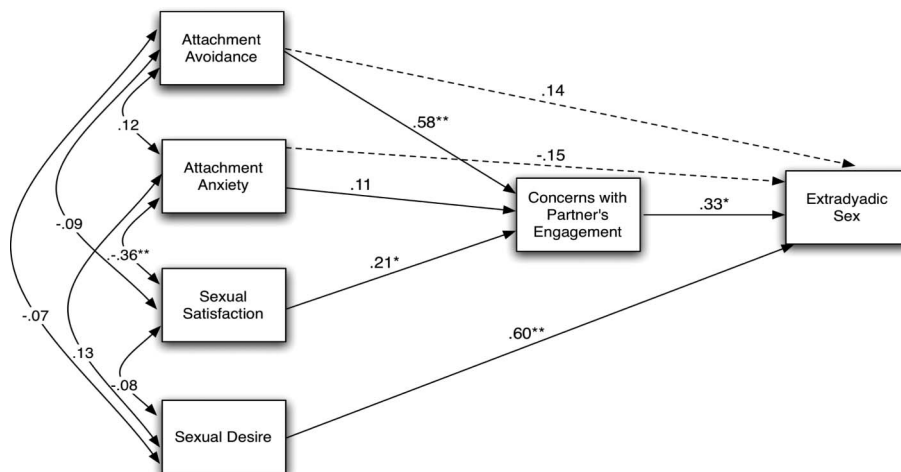


Figure 2. Path analysis of the mediation among attachment avoidance, concerns with partner's engagement and extradyadic sex, while controlling for sexual satisfaction, sexual desire, and attachment anxiety. Non-significant paths from the control variables of sexual satisfaction and sexual desire are not shown for the sake of clarity. Non-significant direct paths from attachment types to extradyadic sex are shown as dashed lines.

positively associated with concerns with partner's engagement, which were, in turn, positively associated with extradyadic sex, even after controlling for sexual desire and satisfaction. Fit indices for the full model are perfect because this full model is just-identified. Fit indices for the mediating model without the direct paths were adequate and the chi-square value was non-significant, $\chi^2 (df = 2, n = 84) = 2.28$, $p < .31$, CFI = .99, RMSEA = .04, thus highlighting that these direct paths were non-significant, as shown by the dashed lines in Figure 2. Bootstrapping estimations were then used to determine if the mediation was significant. Results revealed that the bias-corrected bootstrap 95% confidence interval did not include zero [0.23; 2.77], suggesting that the mediation was significant at $p < .05$. Finally, results were the same when only examining participants who remained with their partner over the 10-month period ($n = 52$), when excluding males from the analyses, or when couple adjustment was included in the model for the 65 participants who were engaged at Time 1. Couple adjustment was not a significant predictor of extradyadic sex when included in the model ($\beta = .02, ns$).

In sum, results of Study 3 supported our hypotheses. First, it was found that attachment avoidance was positively associated with extradyadic sex involvement over a 10-month period. Second, attachment anxiety was found to be unrelated to extradyadic sex involvement over this period of time. In addition, all these results were maintained after controlling for sexual satisfaction, desire, and couple adjustment. Finally, results showed that concerns with partner's desire for engagement and proximity fully mediated the relationship between attachment avoidance and extradyadic sex involvement. Overall, the present findings provide support for the predictive role of attachment avoidance in extradyadic sex involvement and for the mediating role of concerns with partner's desire for engagement and proximity in this association.

General discussion

The present findings lead to a number of implications. A first implication is that the relationship between attachment avoidance and extradyadic sex was maintained even after controlling for sexual satisfaction and desire. Results showed that attachment-related motives to engage in extradyadic sex did not overlap with sexual-related reasons, thus supporting the fact that attachment plays a role in extradyadic sex independently of one's sexual desire and sexual satisfaction. This finding was replicated in Study 3 within a prospective design. Such a result may imply that motives for being unfaithful go far beyond sexual arousal and sexual satisfaction, as one's typical interpersonal functioning appears to characterize one's likeliness to engage or not in extradyadic sex (Mikulincer & Shaver, 2007). These findings thus support the idea that attachment and sexual systems are independent, but interrelate to affect a person's motives for having sex (Mikulincer & Shaver, 2007).

A second implication refers to the positive association between attachment avoidance and extradyadic sex. The present findings suggest that avoidant respondents are more likely to engage in extradyadic sex, and that they may do so in reaction to their concerns relative to their partner's desire for engagement and proximity. Results of Study 3 were noteworthy, as people were not asked for the reasons for which they engaged in extradyadic sex. They were only asked about the extent to which they have been concerned with their partner's desire for engagement and proximity during a given period of time. Thus, the use of such a measure

reduced the likelihood that the results obtained were the consequence of participants' rationalized explanation for their extradyadic sex involvement (Buunk & Dijkstra, 2006), as they were less likely to be aware that their responses to this scale might be related to their extradyadic sex behavior (as opposed to questionnaires asking participants reasons for their unfaithfulness). Although it would have been stronger to assess concerns with one's partner desire for engagement and extradyadic sex in two separate time points, the present results still highlight the fact that concerns with partner's desire for engagement is cross-sectionally related to extradyadic sex.

Conceptualizing extradyadic sex as a consequence of avoidant respondents' irritation and concerns relative to their partner's desire for engagement sheds some light onto *why* individuals characterized by attachment avoidance may engage in extradyadic sex. For instance, they may not necessarily be more interested in having many short-term partners or more inclined to satisfy their sexual desire and arousal. Rather, they might use extradyadic sex to reduce their discomfort with the desire for intimacy and engagement of their partner (Mikulincer & Shaver, 2007; Stephan & Bachman, 1999). This proposal is in line with Allen and Baucom (2004) who found that avoidant individuals were more likely to report engaging in extradyadic sex for autonomy-related reasons. Individuals characterized by attachment avoidance who feel that their partner wishes to get closer or to engage even more can become irritated. They may need to find a way to distance themselves and reduce their proximity with their partner as a mean to lower their irritation (Baumeister, Vohs, DeWall, & Zhang, 2007). Extradyadic sex may be one of the strategies used by individuals characterized by attachment avoidance to feel less close to their partner, which consequently helps them to regulate their irritation. However, the present research does not allow us to confirm that extradyadic sex actually leads to reduced engagement and lower irritation. More empirical evidence is needed with respect to this issue and different methods and designs should be used to this effect.

A third implication is that attachment anxiety was unrelated to all measures of extradyadic sex. Over three samples composed of undergraduate and graduate students and community-dwelling individuals, the relationship between attachment anxiety and extradyadic sex intentions or involvement was assessed nine times with six different measures of extradyadic sex. Overall, we did not find a single positive association for this relationship across all three studies, even after controlling for sexual satisfaction, desire, couple adjustment, gender, and after the examination of the interactions between attachment anxiety and gender and between attachment anxiety and age. Furthermore, Study 3 even showed that there was a slight negative correlation between attachment anxiety and extradyadic sex over time, although this relationship was not significant. These results are in line with the theoretical point of view that anxious individuals (because of their dependence, their fear of losing their partner or to be abandoned, and their commitment to their current romantic relationship) are not likely to engage in extradyadic sexual intercourses, presumably because this would be perceived as a potential threat to their primary relationship (Feeney & Noller, 1992; Simpson et al., 1999; Stackert & Bursik, 2003; Stephan & Bachman, 1999). Therefore, the present research contradicts past research (Allen & Baucom, 2004; Bogaert & Sadava, 2002; Cooper et al., 2006) that showed a positive relationship between attachment anxiety and extradyadic sex. However, at the difference of these past studies (except for Cooper et al., 2006), we focused on the assessment of extradyadic sexual intercourses. Future research would do well to assess the relationship between attachment and other specific cases of extradyadic

behavior that do not include extradyadic sexual intercourses, such as falling in love or being emotionally involved with someone else than the primary partner.

Limitations and conclusions

The present research was limited in certain aspects. First, all measures were self-reported. Although we tried to reduce participants' discomfort or reluctance to report extradyadic sex incidents by making explicit our commitment to assuring anonymity and confidentiality, we cannot rule out the intervention of bias due to apprehension, as extradyadic sex is usually negatively perceived. Indirect sexual extradyadic behavior indices might be needed in future research in order to confirm the present research findings (e.g., Gaillot & Baumeister, 2007). Future research may also examine couples or multiple reporters in order to reduce the shared method variance. A second limitation concerns the overrepresentation of women in Study 3. Even if no difference were found when excluding male participants, a greater number of men would have been required to test more precisely the mediation between attachment and extradyadic sex and conduct gender comparison. A third limitation is the potential sample biases (students in Studies 1 and 3 and visitors of an exhibition in Study 2), which limits the generalization of the results to the general population. Future research should replicate the present finding in an unbiased community-dwelling population. A fourth limitation is that the information whether any participants were actually couples in Study 2 was not collected. It should be noted, however, that most participants were not couples; many participants were with friends or, when they were with their partner, it frequently happened that only one of them responded to our questionnaire by the time the other attended another stand. Although we do not think that this bias unduly affected the results of Study 2 by boosting the results (indeed, the correlations in Study 2 were even lower than in Study 1), this limitation needs to be underscored. Finally, all three studies used a correlational design, although Study 3 used a partial prospective design. Quasi-experimental designs are needed in order to replicate the present findings.

In sum, the present research made important contributions to the literature in two areas. First, it provided evidence for the association between attachment avoidance (but not attachment anxiety) and extradyadic sex, independently of sex-related motives. Second, it offered a deeper understanding of attachment, as avoidant respondents have been found to be more likely to engage in extradyadic sex in reaction to their irritation and concerns with respect to their partner's desire for engagement. This study sheds some light on the role of attachment-related motives in extradyadic sex.

Notes

1. The small number of males recruited in Study 3 probably reflects the small number of male students in the department of psychology at the establishment where they have been recruited. Unfortunately, this did not allow us to statistically examine the role of gender in this study or the potential interactions between gender and attachment. However, it should be noted that results were virtually the same when males were excluded from the analyses. Therefore, all participants were kept for all analyses.
2. A Confirmatory Factorial Analysis examining the conceptual distinction between attachment avoidance and concerns with one's partner's engagement revealed that they were clearly distinct and should not be considered as overlapping constructs. Detailed results are available from the first author.

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