



Solving the problem of partner infidelity: Individual mate retention, coalitional mate retention, and in-pair copulation frequency



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ABSTRACT

Humans deploy various strategies to solve adaptive problems associated with a long-term partner's infidelity. We investigated the relationships among three such strategies: individual mate retention, coalitional mate retention (i.e., mate retention with assistance from allies), and in-pair copulation frequency. Participants ($n = 387$; 176 women) in a committed, heterosexual relationship reported how often they (1) perform individual mate retention, (2) request coalitional mate retention, and (3) had sexual intercourse with their partner. The results indicate that women's individual mate retention and men's coalitional mate retention are positively associated with in-pair copulation frequency. The discussion notes limitations of this research and highlights the diversity of strategies humans deploy to address the adaptive problems of partner infidelity.

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1. Introduction

A long-term romantic partner's infidelity inflicts costs on both men and women. Infidelity can increase the risk of contracting sexually transmitted diseases, often produces psychological distress (e.g., depression, anxiety; Cano & O'Leary, 2000), and is a leading cause of relationship dissolution (Allen & Atkins, 2012). Given these costs, individuals deploy various strategies to reduce the risk of partner infidelity, including individual mate retention (Buss, 1988; Buss & Shackelford, 1997), coalitional mate retention (i.e., mate retention with assistance from allies; Pham, Barbaro, & Shackelford, 2015), and in-pair copulation (Shackelford, Goetz, Guta, & Schmitt, 2006).

Men and women also incur sex-specific costs from their partner's infidelity. A man whose partner is sexually unfaithful risks cuckoldry—unwitting investment in another man's offspring (Buss & Shackelford, 1997). A woman whose partner is emotionally unfaithful risks losing partner-provisioned resources should these be diverted to another woman (Schutzwohl & Koch, 2004). Over evolutionary time, sex-specific costs of partner infidelity have produced sex-differentiated mate retention behaviors that appeal to the mate preferences of the opposite sex (Buss, 1988; Buss & Shackelford, 1997). For example, men will display resources and

protection, whereas women will focus on increasing their perceived reproductive value (Buss, 1988; Salkicevic, Stanic, & Grabovac, 2014).

One strategy both sexes use to retain a mate is *individual mate retention*. Buss (1988) developed the Mate Retention Inventory to assess individual mate retention behaviors along 19 tactics, from vigilance about a partner's whereabouts to violence against rivals. Nearly all (102 of 104) items in the Mate Retention Inventory are individual-level behaviors, or behaviors performed alone. There are sex differences in the performance of mate retention tactics. For example, women more than men perform Appearance Enhancement (e.g., making oneself more attractive for one's partner) because men more than women value a partner's attractiveness (Pfluger, Oberzaucher, Katina, Holzleiner, & Grammer, 2012). Men more than women perform direct violence against rivals, because women more than men value a partner's ability to provide physical protection (Buss, 1989; Buss & Barnes, 1986).

Individuals also perform mate retention with assistance from allies, or *coalitional mate retention*, as a strategy to reduce the risk of partner infidelity (Pham et al., 2015). Two items in the Mate Retention Inventory (e.g., "had my friends check up on my partner") suggest that individuals request assistance from others to perform mate retention (Pham et al., 2015; Stafford & Canary, 1991), and that friends play important roles in relationship maintenance (Canary & Stafford, 1992). The Coalitional Mate Retention Inventory (Pham et al., 2015) assesses the occurrence of coalitional mate retention behaviors across seven tactics: *Manipulation* (i.e., an

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ally deceives the partner into admitting or demonstrating an interest in infidelity), *Praise* (i.e., an ally says positive things to the partner and to others, thereby increasing the romantic partnership's desirability), *Vigilance* (i.e., an ally watches the partner's behaviors), *Therapy* (i.e., an ally strengthens the romantic partnership by repairing relationship problems and listening to relationship concerns), *Gifts* (i.e., an ally secures information about desired gifts for the partner), *Monopolizing Time* (i.e., an ally spends time with the partner), and *Violence* (i.e., an ally performs violence against potential rivals). Pham et al. found that performance of coalitional mate retention is correlated positively with performance of individual mate retention and, additionally, individuals request different coalitional mate retention tactics from their male friends than from their female friends.

In-pair copulation is a third mate retention strategy. Both men and women use frequent in-pair copulation to increase their partner's sexual satisfaction (Greeley, 1991; Laumann, Gagnon, Michael, & Michaels, 1994), thereby increasing their partner's relationship commitment (Sprecher, 2002). In-pair copulation also may function as Direct Guarding—a set of individual-level mate retention tactics that comprise the Direct Guarding category of the Mate Retention Inventory (Buss, 1988; Buss & Shackelford, 1997; Leivers, Rhodes, & Simmons, 2014). During in-pair copulation, individuals monopolize their partner's time, conceal their partner, and are vigilant of their partner's whereabouts. For men, frequent in-pair copulation also functions as a sperm competition tactic. Sperm competition occurs when a female copulates with two or more males within a sufficiently brief time period, resulting in sperm of different males concurrently occupying her reproductive tract and competing to fertilize ova (Shackelford & LeBlanc, 2001; Shackelford, Pound, & Goetz, 2005). Men engage in frequent in-pair copulation to increase the population of viable sperm in their partner's reproductive tract, to thereby increase the likelihood that their sperm, and not a rival's sperm, fertilizes ova (Baker & Bellis, 1993; Pham et al., 2014; Shackelford & Goetz, 2006; Simmons, Firman, Rhodes, & Peters, 2004).

There is limited research addressing the relationships between individual mate retention, coalitional mate retention, and frequent in-pair copulation. For men, frequent in-pair copulation and individual mate retention behaviors are positively correlated (Shackelford et al., 2006), and men's and women's coalitional mate retention behaviors and individual mate retention behaviors are positively correlated (Pham et al., 2015). Both studies suggest that individuals might use several mate retention strategies *concurrently* to solve the adaptive problems associated with a partner's infidelity. However, research has not yet investigated (1) the relationship between frequent in-pair copulation and individual mate retention behaviors in women, and (2) the relationship between coalitional mate retention behaviors and frequent in-pair copulation for either sex.

2. The current research

The current research investigates the relationships among three mate retention strategies—individual mate retention, coalitional mate retention, and frequent in-pair copulation—to identify whether these strategies are used concurrently to solve the adaptive problems associated with partner infidelity. We extend the findings of Shackelford and Goetz (2006) to a female sample, and hypothesize that women who more frequently perform individual mate retention tactics also will perform more frequent in-pair copulation (Hypothesis 1). Because women more than men deploy the mate retention tactics of Appearance Enhancement, Sexual Inducements (e.g., “performed sexual favors to keep my partner around”), and Jealousy Induction (e.g., “talked to another woman [man] at a party to make my partner jealous”) (Buss, 1988; Buss

& Shackelford, 1997), we hypothesize that women's use of these tactics, in particular, will correlate positively with their performance of frequent in-pair copulation. For reportorial completeness, we also computed correlations between in-pair copulation frequency and the remaining 16 individual mate retention tactics.

Concurrent use of coalitional mate retention and frequent in-pair copulation has not yet been investigated, although research demonstrates that individuals use several strategies concurrently to address partner infidelity (Pham et al., 2015; Shackelford et al., 2006). Because research has documented sex differences in requests for coalitional mate retention (Pham et al., 2015), we generated separate hypotheses for men and women. We hypothesize that men (Hypothesis 2) and women (Hypothesis 3) who more frequently request coalitional mate retention tactics also will perform more frequent in-pair copulation. Because individuals who perform in-pair copulations necessarily also perform Direct Guarding behaviors (i.e., Monopolization of Time, Concealment of Mate, and Vigilance tactics; Buss, 1988; Buss & Shackelford, 1997), we control statistically for the performance of Direct Guarding behaviors to rule out the possibility that in-pair copulation is merely another Direct Guarding behavior (see Leivers et al., 2014).

3. Method

3.1. Participants

We used data secured by Pham et al. (2015). We recruited 387 participants (176 women) in a committed, heterosexual relationship lasting at least 1 year via Amazon's Mechanical Turk (MTurk). Participants' mean age was 32.1 years ($SD = 9.1$), and the mean relationship length was 66.0 months ($SD = 88.5$). Participants reported on interactions with two friends (one man and one woman—see below), each of whom they considered a good friend, and each of whom they had known for at least 1 year. The mean length of the friendship was 88.7 months ($SD = 90.2$) with the male friend, and 76.6 months ($SD = 89.6$) with the female friend. We implemented MTurk filters recommended by Peer, Vosgerau, and Acquisti (2013): MTurk participants could access and participate in this study if they had successfully completed 95% of at least 500 accessed MTurk jobs.

3.2. Materials

Participants were instructed to think of one heterosexual man and one heterosexual woman, each of whom they considered a good friend and had known for at least 1 year. Participants completed the 44-item initial Coalitional Mate Retention Inventory (Pham et al., 2015) twice (i.e., once for each friend), reporting on a 4-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*) how often they requested their friend perform each behavior in the past year. Participants completed the Mate Retention Inventory-Short Form (Buss, Shackelford, & McKibbin, 2008), reporting on a 4-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*) how often they performed 38 individual mate retention behaviors in the past year. Participants also reported how often they have sexual intercourse with their partner during a typical week, as a measure of in-pair copulation frequency.

3.3. Procedure

Eligible prospective participants viewed an advertisement for the study on MTurk's job listings. Those interested in and eligible to participate were provided a link to a consent form. Those who electronically signed the consent form could access the survey, and those who did not sign were exited from the study. Participants that completed the study were compensated \$4.00.

4. Results

4.1. Individual mate retention and in-pair copulation frequency

Descriptive statistics are displayed in Table 1. Zero-order correlations among all study variables are available upon request. We calculated zero-order correlations to assess the relationships between women’s individual mate retention tactics and women’s reports of in-pair copulation frequency. Following Buss et al. (2008) we constructed 19 mate retention tactic variables from responses to the Mate Retention Inventory-Short Form. We correlated scores for each mate retention tactic with women’s reports of in-pair copulation (see Table 2). Supporting Hypothesis 1, women who more frequently perform the individual mate retention tactics of Appearance Enhancement, Jealousy Induction, and Sexual Inducements tactics also performed more frequent in-pair copulation. Women who reported more frequent in-pair copulation also reported more frequent Emotional Manipulation, Monopolization of Time, Punishment of Mate’s Infidelity Threat, Expressions of Love and Care, Submission and Debasement, Verbal Signals of Possession, Intrasexual Threats, and Violence against Rivals.

4.2. Coalitional mate retention and in-pair copulation frequency

Participants provided reports on the Coalitional Mate Retention Inventory for their male friend and their female friend. Following

Table 1
Descriptive statistics for study variables.

Mate retention tactics	Male Participants		Female Participants	
	Mean	SD	Mean	SD
<i>CMR: male friends</i>				
Gifts	1.55	.70	1.51	.76
Therapy	1.36	.57	1.34	.56
Monopolize time	1.65	.61	1.60	.66
Vigilance	1.36	.55	1.28	.45
Praise	1.53	.65	1.50	.71
Manipulation	1.24	.51	1.15	.35
Violence	1.24	.52	1.15	.45
<i>CMR: female friends</i>				
Gifts	1.56	.66	1.17	.47
Therapy	1.37	.53	1.35	.53
Monopolize Time	1.67	.69	1.37	.54
Vigilance	1.50	.63	1.38	.53
Praise	1.45	.58	1.40	.57
Manipulation	1.28	.50	1.19	.38
Violence	1.35	.64	1.26	.56
<i>Individual mate retention</i>				
Vigilance	1.78	.63	1.77	.72
Concealment of mate	1.34	.53	1.24	.50
Monopolization of time	1.56	.74	1.56	.78
Jealousy inducement	1.36	.55	1.28	.59
Punish mate’s infidelity threat	1.57	.64	1.61	.73
Emotional manipulation	1.68	.80	1.61	.82
Commitment manipulation	1.90	.84	1.74	.86
Derogation of competitors	1.77	.74	1.82	.81
Resource display	2.86	.61	2.53	.76
Sexual inducement	2.64	.66	2.40	.78
Appearance enhancement	2.84	.67	2.98	.78
Love and care	3.45	.62	3.25	.69
Submission and debasement	2.49	.72	2.24	.87
Verbal possession signals	2.22	.77	2.28	.90
Physical possession signals	2.96	.70	2.85	.94
Possessive ornamentation	1.96	.88	1.54	.88
Derogation of mate	1.40	.57	1.43	.55
Intrasexual threats	1.65	.76	1.59	.82
Violence against rivals	1.17	.49	1.09	.32
In-pair copulation frequency	3.28	2.85	2.72	2.50

Table 2

Zero-order correlations between women’s performance of individual mate retention tactics and in-pair copulation frequency.

Mate retention tactics	r	α
Vigilance	-.00	.51
Jealousy inducement	.20*	.78
Appearance enhancement	.21*	.70
Concealment of mate	.08	.71
Monopolization of time	.19*	.83
Punish mate’s infidelity threat	.23**	.61
Emotional manipulation	.26**	.67
Commitment manipulation	.09	.60
Derogation of competitors	.05	.70
Resource display	-.06	.66
Sexual inducements	.31***	.40
Love and care	.18*	.64
Submission and debasement	.19*	.80
Verbal possession signals	.21*	.68
Physical possession signals	.08	.80
Possessive ornamentation	.07	.78
Derogation of mate	-.03	.48
Intrasexual threats	.34***	.86
Violence against rivals	.17*	.64

n = 141 women. r = correlation coefficient.

α = Cronbach’s alpha.

* p < .05.

** p < .01.

*** p < .001.

Pham et al. (2015), we constructed seven coalitional mate retention tactics from responses to the Coalitional Mate Retention Inventory. To identify unique relationships between men’s requests for coalitional mate retention and in-pair copulation frequency, we conducted multiple regression analyses for men’s requests of coalitional mate retention (separately for their male friends and their female friends). In all multiple regression analyses, we statistically controlled for Direct Guarding behaviors by entering the composite of the Direct Guarding category constructed from the scores on the Concealment of Mate, Vigilance, and Monopolization of Time tactics (see Buss, 1989; Buss et al., 2008; Shackelford et al., 2006). Each coalitional mate retention tactic was then entered separately to predict in-pair copulation frequency from coalitional mate retention requests for men’s male and female friends. Supporting Hypothesis 2, men who more frequently requested coalitional mate retention from their male friend also performed more frequent in-pair copulation. Specifically, men who more frequently requested Manipulation, Vigilance, Monopolization, Therapy, and Violence from their male friends reported greater in-pair copulation frequency (see Table 3). Men who more frequently requested coalitional mate retention from their female friend also performed more frequent in-pair copulation. Specifically, men who more frequently requested Manipulation, Vigilance, Gifts, Therapy, and Violence from their female friends reported greater in-pair copulation frequency (see Table 3).

To identify unique relationships between women’s requests for coalitional mate retention and in-pair copulation frequency, we conducted multiple regression analyses separately for women’s requests of coalitional mate retention from their male friends and requests from their female friends. In each of the multiple regression analyses, we statistically controlled for Direct Guarding behaviors (see Buss, 1989; Buss et al., 2008; Shackelford et al., 2006). Each of the seven coalitional mate retention tactics was then entered separately to predict in-pair copulation frequency from coalitional mate retention requests for women’s male and female friends. Hypothesis 3 was not supported: Women’s requests for coalitional mate retention from both male friends and female friends were not associated with their reports of in-pair copulation frequency (see Table 4).

Table 3

Multiple regression analyses assessing relationships between men's requested performance of coalitional mate retention (CMR) tactics predicting in-pair copulation frequency, controlling statistically for men's individual Direct Guarding.

CMR tactics	Male friends			Female friends		
	β	t	α	β	t	α
Manipulation	.22	2.90**	.95	.28	3.76***	.93
Monopolization	.19	2.65**	.89	.13	1.35	.91
Vigilance	.23	3.11**	.88	.18	2.34*	.83
Gifts	.04	.52	.55	.30	4.02**	.32
Therapy	.21	2.67**	.90	.23	2.94**	.86
Praise	.09	1.21	.84	.14	1.84	.80
Violence	.25	3.24**	.86	.24	3.23**	.83

$n = 172$ men. β = standardized beta coefficient, t = test statistic associated with β . α = Cronbach's alpha.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Multiple regression analyses assessing relationships between women's requested performance of coalitional mate retention (CMR) tactics predicting in-pair copulation frequency, controlling statistically for women's individual Direct Guarding.

CMR tactics	Male friends			Female friends		
	β	t	α	β	t	α
Manipulation	.09	.93	.92	.08	.79	.91
Praise	.01	.05	.88	.05	.52	.81
Vigilance	.04	.35	.84	.15	1.53	.83
Gifts	.08	.94	.78	.03	.31	.57
Therapy	-.04	-.36	.89	.09	.95	.86
Monopolization	-.00	-.04	.91	.07	.73	.91
Violence	-.05	-.47	.89	.09	.94	.76

$n = 146$ women. β = standardized beta coefficient, t = test statistic associated with β . α = Cronbach's alpha.

5. Discussion

The current research investigated the relationships between three strategies that can address the problem of partner infidelity: Individual mate retention, coalitional mate retention, and frequent in-pair copulation. We conducted separate analyses for men and women because the ancestral costs of partner infidelity are sex-differentiated (e.g., cuckoldry for men, resource diversion for women). Consistent with Hypothesis 1, women who performed more frequent individual mate retention tactics (Appearance Enhancement, Jealousy Induction, and Sexual Inducements) also reported greater in-pair copulation frequency. The results also supported Hypothesis 2 in that men who more frequently requested coalitional mate retention from male friends and female friends also performed more frequent in-pair copulation, after controlling for Direct Guarding behavior. The results did not support Hypothesis 3. We did not document relationships between women's requests for coalitional mate retention reports of in-pair copulation frequency, after controlling for Direct Guarding behavior.

We extended the findings of Shackelford et al. (2006) by investigating the unexplored relationship between women's individual mate retention and their reports of in-pair copulation frequency. We assessed the relationships between women's use of individual mate retention tactics that increase their perceived mate value (e.g., Appearance Enhancement) and their reports of in-pair copulation frequency. As hypothesized, women's reports of in-pair copulation frequency correlated positively with their use of Appearance Enhancement, Sexual Inducements, and Jealousy Induction, suggesting that women may use frequent in-pair copulation as a "sexual satisfaction" tactic, indicating

receptivity to their partner's needs (Greeley, 1991; Laumann et al., 1994). Additionally, women might engage in frequent in-pair copulation to increase their partner's commitment to the relationship and thereby minimize the risk of their partner investing resources in other women. Of 19 correlations between women's use of individual mate retention tactics and in-pair copulation frequency, 11 were significantly positive. These results indicate that women deploy individual mate retention tactics, in general, and specifically tactics that increase their perceived mate value, along with in-pair copulation. We interpret these results to suggest that women's use of individual mate retention and in-pair copulation are deployed concurrently to reduce the risk of partner infidelity.

Previous research has not investigated the relationships among tactics of coalitional mate retention and in-pair copulation frequency for either sex, although related research (Pham et al., 2015; Shackelford et al., 2006) suggests that coalitional mate retention is used concurrently with other strategies to thwart partner infidelity. In the current research, men who more frequently requested coalitional mate retention from both male friends and female friends also reported more frequent in-pair copulation, suggesting that coalitional mate retention and frequent in-pair copulation are concurrently deployed to address the adaptive problems of partner infidelity. Direct Guarding was statistically controlled to address the possibility that in-pair copulation can be categorized as an individual mate retention behavior (see Leivers et al., 2014). The results suggest that, for men, in-pair copulation is not another form of direct guarding. For men, in-pair copulation can be categorized as a separate mate retention strategy that might serve multiple functions, including sexually satisfying their partner (Greeley, 1991; Laumann et al., 1994), or as a sperm competition tactic (Shackelford & Goetz, 2006) to increase their chance of fertilizing their partner's ova if sperm from a rival male is present. Although men request assistance from both male friends and female friends, they request that their male friends, more than their female friends, monopolize their partner's time, and that their female friends, more than their male friends, assist with gift information. These differences suggest that aspects of same-sex friendships and opposite-sex friendships may affect the types of coalitional mate retention tactics requested.

The current research does not resolve whether women deploy coalitional mate retention and in-pair copulation as concurrent or compensatory strategies of mate retention. We note, however, that women (like men) who report greater in-pair copulation frequency might also request coalitional mate retention from their female friends more than from their male friends, as indicated by the positive (but non-significant) correlations between in-pair copulation frequency and all seven coalitional mate retention tactics. This pattern of results suggests that women might request coalitional mate retention from female friends and use frequent in-pair copulation concurrently as solutions to address the adaptive problems of partner infidelity. An alternative explanation might be developed which focuses on the salience of costs associated with male partner infidelity. Because women risk losing partner provisioned resources as a result of partner infidelity, women may not deploy multiple mate retention strategies until the costs of partner infidelity are salient, such as when a woman has a child with her partner. Having a child with a current partner increases the costs of partner's infidelity, thus motivating a woman to deploy multiple mate retention strategies concurrently.

5.1. Limitations and future directions

We asked participants to report the average number of times they have sexual intercourse with their partner in a typical week, but self-reports may contain reporting and recall errors. Future research might secure participant reports as well as partner reports

of in-pair copulation frequency to afford constructing more reliable reports of in-pair copulation frequency from the two sources. We did not ask participants about a specific period of time (e.g., in the past year) in which to estimate how often they have sexual intercourse in a typical week. Future research could specify a time period for participants to report how often they have sexual intercourse with their partner to secure more detailed data about in-pair copulation frequency.

We did not assess who initiated in-pair copulation. Men typically initiate in-pair copulation (Symons, 1979). Even if women are less likely to initiate in-pair copulation, they nevertheless engage in in-pair copulation: women's sexual receptivity constitutes mate retention designed to sexually satisfy their partner, thereby reducing his interest in pursuing extra-pair partners. Women's sexual receptivity to their partner increases his sexual satisfaction (Byers & Macneil, 2006; Haavio-Mannila & Kontula, 1997). Additionally, men perceive greater partner infidelity risk if their partner refuses their in-pair copulation request (Shackelford & Buss, 1997; Shackelford, Goetz, McKibbin, & Starratt, 2007; Shackelford et al., 2002). Because flirting and seduction—incremental escalation of sexual interest from both partners—is a common dynamic that leads to in-pair copulation, future research might assess women's perceptions and men's perceptions of who initiated in-pair copulations to determine whether in-pair copulation initiation or receptivity (or both) function as mate retention strategies.

The number of analyses conducted in the current research increases the potential risk of Type 1 error. Specifically, the results regarding the relationships between women's individual mate retention tactics and in-pair copulation frequency (Hypothesis 1) that are significant at $p < .05$ should be interpreted with caution. Because this is the first research to explore these relationships, these results contribute to the literature on women's mate retention and can provide guidance for future research. All significant results concerning men's requests of coalitional mate retention and (Hypothesis 2) in-pair copulation frequency are significant at $p < .01$ or $p < .001$, and thus are less likely than the results of tests of Hypothesis 1 to reflect Type I error.

The current research provides several insights into the use of three strategies to address adaptive problems associated with partner infidelity. Men, but not women, use coalitional mate retention and frequent in-pair copulation as concurrent mate retention strategies. These findings contribute to the emerging literature on coalitional mate retention, and can aid in guiding future research on this topic. Additionally, this research is the first to investigate the relationships between women's mate retention strategies and in-pair copulation frequency and suggests that women use individual mate retention and frequent in-pair copulation as concurrent mate retention strategies. These findings contribute to the understanding of the psychological mechanisms underlying women's mate retention. More generally, the findings of the current research add to the broader literature on mate retention and highlight fruitful avenues for future research on coalitional mate retention and women's strategies to thwart partner infidelity.

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