

Mothers and Fathers Perform More Mate Retention Behaviors than Individuals without Children

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Abstract Human life history is unique among primates, most notably the extraordinary length of infant dependency and the formation of long-term pair-bonds. Men and women are motivated to remain pair-bonded to maintain the distribution of male-provisioned resources to a woman and her offspring, or to protect offspring from infanticide. Men and women can employ several strategies to retain their mate and prevent their partner from defecting from the relationship, including *individual mate retention* (behaviors performed alone) and *coalitional mate retention* (behaviors performed by a close ally). The current research investigates whether men and women with children perform more frequent mate retention behaviors than men and women without children. Participants ($n = 1003$) currently in a heterosexual romantic relationship completed a survey, reporting whether they had genetic children with their current romantic partner and how frequently they performed various mate retention behaviors. The results indicate that men ($n = 262$) and women ($n = 234$) who share genetic children with their current partner performed more frequent individual mate retention behaviors and requested more frequent coalitional mate retention behaviors than men ($n = 280$) and women ($n = 227$) who do not share genetic children with their current partner. The results are interpreted as they relate to hypotheses concerning the evolution of pair-bonding in humans, and mate retention behaviors more generally. Limitations of the current research are discussed, and profitable avenues for future research in this domain are suggested.

Keywords Mate retention · Coalitional mate retention · Pair-bonds · Children · Family · Evolutionary psychology

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Human life history is unique among the primate order. Humans have shorter inter-birth intervals, an extended juvenile period, later age at sexual maturity, and longer lifespan relative to nonhuman primates (Kaplan et al. 2000; Robson et al. 2006; Yamagiwa 2015). The extraordinary length of infant dependency and the formation of pair-bonds are particularly striking human life history traits. Because bipedal locomotion requires a skeletal frame that inhibits a large brain from passing safely through the birth canal, human infants are born at a much earlier stage of brain development than other great apes (Lovejoy 2005; Rosenberg and Trevathan 1995). The evolution of substantially larger brains in *Homo*, coupled with bipedal locomotion, may account for the greater duration of infant dependency in humans. Human infants are, more generally, precocial at birth, but an underdeveloped brain and extreme duration of infant dependency constitute altricial features (Martin 2013). This unique set of traits in human infants may have been a primary selection pressure for pair-bonding in humans (Yamagiwa 2015).

Pair-bonding in humans facilitates biparental care. Paternal investment is common in humans, although the degree to which fathers invest in their offspring varies cross-culturally (Fernandez-Duque et al. 2009). Variation in paternal investment is associated with the local ecology (e.g., resources, morbidity and mortality) and the social environment (e.g., availability of mates, availability of alloparents) (Fernandez-Duque et al. 2009; Hewlett 1991, 1992; Marlowe 1999; Quinlan 2007). Two non-mutually-exclusive hypotheses concerning the selection pressures that led to the evolution of pair-bonds and biparental investment in humans have emerged in the literature: (1) the Male-Provisioning Hypothesis and (2) the Male-Male Competition Hypothesis.

The Male-Provisioning Hypothesis proposes that men remain pair-bonded to provision their offspring with resources (e.g., food) (Quinlan 2008). The period of time during which a woman nurses her infant may be a “critical period” for paternal investment (Fisher 1987). Research among Hadza foragers of East Africa (Marlowe 2003) documented that women’s foraging returns—which account for higher caloric return than men’s hunting returns, on average—significantly decreased while a woman is nursing (e.g., for two to four years). Men with nursing wives compensate for diminished foraging returns by sharing fewer hunting returns with the social group and redirecting hunting returns to their family. In a cross-cultural ethnographic analysis, paternal investment was shown to be positively related to the duration that a woman nurses her infant (Quinlan and Quinlan 2008). Increases in paternal investment may afford women the opportunity to nurse their infants for a longer period of time.

Research further demonstrates that men benefit from increased parental effort and provisioning, rather than mating effort, when they have children. Among the Hadza, for example, a man’s own hunting success does not directly impact the nutritional status of his offspring. However, better hunters are married to better foragers, which does directly impact the nutritional status and, thus, the survival prospects of their children (Hawkes et al. 2001). Better hunters are able to acquire higher-quality mates—which benefits the welfare of their children. These findings demonstrate that both women and men can benefit from pair-bonding and paternal investment (Quinlan and Quinlan 2007, 2008).

The Male-Male Competition Hypothesis emphasizes a man’s role as protector of his partner and offspring (Hawkes 2004; Wrangham et al. 1999). Because human infants are extremely dependent on caregivers and require high levels of parental investment

for a prolonged period of time, harassment and violence from adult men (e.g., infanticide) can impose substantial costs on women and their offspring (Blurton Jones et al. 2000). For women, in particular, remaining pair-bonded to a man—and particularly a man high in social status—who can protect her and her offspring from other men can facilitate offspring survival. Married women are at less risk of violence from other men (Wilson and Mesnick 1997), and cross-culturally, women prefer men high in social status and dominance as long-term partners (Buss 1989; Conroy-Beam et al. 2015; Shackelford et al. 2005b)—signals of the man’s ability to protect a woman and her offspring.

By remaining pair-bonded, a woman depends on her mate to protect her offspring from infanticide by other adults. In nonhuman primates, when a new male usurps a group, he might kill existing offspring to whom he is genetically unrelated. Infanticide brings females into estrus and affords the new alpha male paternity of future offspring (Muller and Wrangham 2009; Palombit 1999). Infanticide also occurs in humans. The rate of infanticide in humans is highest when a stepfather—who is not genetically related to a woman’s children—is present, and when children are young (Daly and Wilson 1994; Weekes-Shackelford and Shackelford 2004). Among the Ache of Paraguay, infanticide is an important cause of child mortality (Hill and Hurtado 1996). Both men and women can benefit from remaining pair-bonded when they have children because infanticide directly and negatively impacts men’s and women’s reproductive success.

Biparental investment can reduce the likelihood of child mortality and other negative outcomes for children. Among the Tsimane of Bolivia, the death of a father corresponds with higher mortality rates for children (Winking et al. 2011). Among the Ache of Paraguay, children whose genetic father lived with them had a mortality rate of 20%, whereas father-absence was associated with a mortality rate of 45% (Hill and Hurtado 1996). Similarly, in preindustrial countries prior to the twentieth century, father-absence was related to increased child mortality (Geary 2000). Moreover, a mother’s death early in a child’s life has a profound and negative impact on offspring survival (see Sear and Mace 2008 for a review). In Western societies, divorce predicts lower educational attainment, more aggression, more substance use, and more mental illness in children (Barber and Demo 2006).

These findings demonstrate that biparental investment and remaining pair-bonded are beneficial to both men and women for offspring survival. Simulation models comparing the payoffs of mate retention versus extra-pair mating effort for men with children demonstrate that men reliably secure higher fitness payoffs for mate retention (Hawkes et al. 1995). The research reviewed above suggests that men and women are motivated to remain pair-bonded when they have children. However, no previous research has directly assessed whether men and women increase their mate retention efforts when they have children together relative to when they do not.

Mate retention in humans is designed to reduce the risk of a romantic partner defecting from the relationship (Buss 1988; Buss and Shackelford 1997). Partner infidelity can inflict costs on men and women and is a leading cause of relationship dissolution (Allen and Atkins 2012). When children are introduced into a relationship, partner infidelity may impose greater costs on men and women than when children are not present. For example, a woman whose partner defects from the relationship is at risk of male violence and her offspring are at risk of infanticide. In ancestral

environments and hunter-gatherer societies, a man's defection from the relationship can reduce male-provisioned resources and adversely affect offspring nutrition. A man whose partner defects from the relationship increases the likelihood of offspring mortality, whether by decreasing nutritional welfare of his offspring or by infanticide committed by other men.

Men and women deploy mate retention strategies concurrently to prevent a romantic partner from defecting from the relationship (Barbaro et al. 2015). One strategy is *individual mate retention* (Buss 1988). Individual mate retention behaviors are performed alone and function to maintain a romantic relationship. Individual mate retention behaviors can be organized into domains, such as Intrasexual Manipulations (behaviors directed at same-sex rivals) and Intersexual Manipulations (behaviors directed at a romantic partner). Individual mate retention behaviors can also be organized into Benefit-Provisioning (behaviors that reduce the risk of partner infidelity by increasing a partner's relationship satisfaction) and Cost-Inflicting (behaviors that reduce the risk of partner infidelity by lowering a partner's self-esteem, thereby causing that partner to feel unworthy of the current or any other relationship) domains (Miner et al. 2009). See Table 1 for organization of individual mate retention behaviors and examples. Another mate retention strategy is *coalitional mate retention* (Pham et al. 2015a), whereby an individual asks a close ally (e.g., a friend) to perform mate retention behaviors. Coalitional mate retention can reduce the risk of a partner being perceived as "overbearing" or jealous (Pham et al. 2015a).

Research assessing mate retention behaviors with the Mate Retention Inventory (Buss 1988) and the Coalitional Mate Retention Inventory (Pham et al. 2015a) has not investigated the effect of having children on mate retention effort in men and women. Humans are among the 3% of mammals that form long-term pair-bonds as a result of selection pressures arising from underdeveloped brain function at birth (relative to other primates) and lengthy infant dependency (Buss and Schmitt 1993; Reichard 2002; Symons 1979). Although the specific selection pressures driving the evolution of pair-bonds in humans—Male-Provisioning or Male-Male Competition—are debated, a general hypothesis can be formulated: *Men and women who share genetic children with their current partner will perform more frequent mate retention behaviors than men and women who do not share genetic children with their current partner.* We secured reports of various mate retention behaviors from two groups of men and women: Individuals who share at least one genetic child with their current partner and those who do not.

Method

Participants

We recruited 1003 participants (54% male; 46% female; 49% white, 34% Asian) via Amazon's Mechanical Turk (MTurk). Participants were eligible to participate if they were currently in a committed, heterosexual relationship; at least 18 years of age; and located in the United States. Participants ranged from 19 to 74 years of age, with a mean of 30.6 years ($SD = 8.4$), and the mean relationship length was 47.7 months ($SD = 68.2$). Participants provided information on interactions with two people (one woman and one man) they considered good friends. The mean length of the friendship

was 52.9 months ($SD = 63.5$) for the female friend and 61.5 months ($SD = 75.9$) for the male friend. We implemented MTurk filters (Peer et al. 2013) whereby prospective participants could access and participate in this study if they had successfully completed 95% of at least 500 accessed MTurk jobs.

Procedure

Prospective participants viewed an advertisement for the study on MTurk's job listings. Individuals interested in participating and eligible to participate were provided with a link to an information sheet about the study. Those who agreed to participate could access and complete the survey, and those who did not agree to participate were exited from the study. Participants reported demographic information (age, relationship length, and number of children) and then completed two measures of mate retention behaviors. Participants were compensated \$0.50 for completing the study.

Measures

Participants were asked the following question to determine whether they have a child with their current romantic partner: "Do you have a child with your current partner to whom you are both the biological parent?" to which they responded "yes" or "no." Participants were split into one of two groups based on their response to this question. Participants who answered "yes"—indicating they had at least one genetic child with their current romantic partner—were included in the "with children" group ($n = 234$ women and 262 men). Participants who answered "no"—indicating they did not have a genetic child with their current romantic partner—were included in the "without children" group ($n = 227$ women and 280 men).

Participants completed the Mate Retention Inventory-Short Form (MRI-SF; Buss et al. 2008), a 38-item measure assessing performance frequencies of mate retention behaviors that function to reduce the risk of partner infidelity during the previous year. Studies have shown that the MRI-SF has adequate psychometric properties (Brewer and Riley 2010; Holden et al. 2014; Shackelford et al. 2005a) and is a valid measure of mate retention behaviors (Buss et al. 2008). Participants were instructed to report how often during the previous year they had performed each mate retention behavior on a four-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often).

The MRI-SF can be hierarchically organized into domains, categories, and tactics. Each organized cluster increases in specificity of the types of mate retention behaviors performed by an individual: domains reflect clusters of broad and varying mate retention behaviors (e.g., behaviors directed at one's partner), whereas tactics reflect specific types of behaviors (e.g., making oneself especially attractive for one's partner). Table 1 provides a visual representation of the hierarchical structure of individual mate retention behaviors and includes example items/behaviors for each mate retention tactic.

Following Buss et al. (2008), we calculated composite scores for overall mate retention ($\alpha = 0.96$), two mate retention domains (Intersexual Manipulations, $\alpha = 0.84$; Intrasexual Manipulations, $\alpha = 0.73$), five mate retention categories (Direct Guarding, $\alpha = 0.91$; Intersexual Negative Inducements, $\alpha = 0.91$; Positive Inducements, $\alpha = 0.80$; Public Signals of Possession, $\alpha = 0.70$; Intrasexual Negative

Table 1 Mate retention domains, categories, tactics, and sample items

| Domain/Category | Tactic | Sample item |
|---|---------------------------------|--|
| Intersexual manipulations | | |
| Direct guarding ^b | Vigilance | <i>“Called to make sure my partner was where they said they would be”</i> |
| | Concealment of mate | <i>“Took my partner away from a gathering where other women were around”</i> |
| | Monopolization of time | <i>“Insisted that my partner spend all his free time with me”</i> |
| Intersexual negative inducements ^b | Jealousy induction | <i>“Talked to another man at a party to make my partner jealous”</i> |
| | Punish mate’s infidelity threat | <i>“Became angry when my partner flirted to much”</i> |
| | Emotional manipulation | <i>“Pleaded that I could not live without my partner”</i> |
| | Commitment manipulation | <i>“Told my partner that we needed total commitment to each other”</i> |
| | Derogation of competitors | <i>“Pointed out to my partner the flaws of another woman”</i> |
| Positive inducements ^a | Resource display | <i>“Bought my partner an expensive gift”</i> |
| | Sexual inducements | <i>“Performed sexual favors to keep my partner around”</i> |
| | Appearance enhancement | <i>“Made myself ‘extra attractive’ for my partner”</i> |
| | Love and care | <i>“Displayed greater affection for my partner”</i> |
| | Submission and debasement | <i>“Went along with everything my partner said”</i> |
| Intrasexual manipulations | | |
| Public signals of possession ^a | Verbal possession | <i>“Told my same sex friends how much my partner and I were in love”</i> |
| | Physical possession | <i>“Put my arm around my partner in front of others”</i> |
| | Possessive ornamentation | <i>“Gave my partner jewelry to signify that he was taken”</i> |
| Intrasexual negative inducements ^b | Derogation of mate | <i>“Told other women that my partner was a pain”</i> |
| | Intrasexual threats | <i>“Stared coldly at a man who was looking at my partner”</i> |
| | Violence against rivals | <i>“Slapped a woman who made a pass at my partner.”</i> |

^a Benefit-provisioning mate retention domain

^b Cost-inflicting mate retention domain

Inducements, $\alpha = 0.91$), and 19 mate retention tactics (α values = 0.53–0.85; with the exception of Sexual Inducements, which demonstrated lower reliability, $\alpha = 0.25$) by averaging each participant’s responses to the constituent items. Following Miner et al. (2009), we constructed composite scores for Benefit-Provisioning mate retention behaviors ($\alpha = 0.79$) by averaging participant’s scores on the Positive Inducements and Public Signals of Possession categories, and for Cost-Inflicting mate retention behaviors ($\alpha = 0.96$) by averaging participant’s scores on the Direct Guarding, Intersexual Negative Inducements, and Intrasexual Negative Inducements categories.

Participants completed the 44-item Coalitional Mate Retention Inventory (CMRI; Pham et al. 2015a) twice—once for their male friend and once for their female friend. Participants were instructed to identify one man and one woman, each of whom they considered a good friend, and report on a four-point scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often) how often they had asked their friend to perform each mate retention behavior during the past year. The Coalitional Mate Retention Inventory assesses requests of coalitional mate retention behaviors across seven tactics: Manipulation (e.g., an ally deceives the partner into admitting or demonstrating an interest in infidelity), Praise (e.g., an ally says positive things to the partner and to others, thereby increasing the romantic partnership's desirability), Vigilance (e.g., an ally watches the partner's behaviors), Therapy (e.g., an ally strengthens the romantic partnership by repairing relationship problems and listening to relationship concerns), Gifts (e.g., an ally secures information about desired gifts for the partner), Monopolizing Time (e.g., an ally spends time with the partner), and Violence (e.g., an ally performs violence against potential rivals).

Following Pham et al. (2015a), we calculated separate scores for overall request frequencies of coalitional mate retention from their male friend ($\alpha = 0.97$) and from their female friend ($\alpha = 0.97$) (see also Pham et al. 2015b). We also calculated separate request frequencies for the participant's male friend and female friend for the seven coalitional mate retention tactics: Manipulation (male friend, $\alpha = 0.95$; female friend, $\alpha = 0.95$), Praise (male friend, $\alpha = 0.89$; female friend, $\alpha = 0.89$), Vigilance (male friend, $\alpha = 0.90$; female friend, $\alpha = 0.90$), Monopolize Time (male friend, $\alpha = 0.90$; female friend, $\alpha = 0.91$), Therapy (male friend, $\alpha = 0.90$; female friend, $\alpha = 0.91$), Gifts (male friend, $\alpha = 0.77$; female friend, $\alpha = 0.76$), and Violence against Rivals (male friend, $\alpha = 0.84$; female friend, $\alpha = 0.84$) by averaging each participant's responses to the constituent items.

Results

In all subsequent data analyses (see below), we conduct separate analyses for men and for women for several reasons: (1) some of the costs of partner infidelity are sex-specific (Buss and Shackelford 1997), (2) previous research documents sex differences in performance frequencies of several individual and coalitional mate retention behaviors (Buss 1988; Pham et al. 2015a, b), and (3) motivations for retaining a partner after having a child with that person may differ for men and women (see above). Means and standard deviations for individual mate retention behaviors and coalitional mate retention behaviors for men and women are displayed in Table 2.

We conducted multiple independent samples *t* tests to test the study hypothesis.¹ We compared women who reported sharing at least one child with their current romantic

¹ Multiple Analyses of Covariance (ANCOVAs) were also conducted separately by participant sex. Whether the participant shared a genetic child with their current romantic partner was included as a between-subjects variable, and participant age and length of the romantic relationship were entered as covariates. Each individual and coalitional mate retention variable (see Table 2) was entered separately as the dependent variable. All results of ANCOVAs are similar in direction and magnitude to the results of independent samples *t* tests reported in Tables 3–6; therefore, the more parsimonious results of the *t* tests are reported throughout the manuscript. Full results of ANCOVAs are available upon request.

Table 2 Means and standard deviations for study variables

| | Women | | Men | |
|----------------------------------|-------------|-----------|-------------|-----------|
| | <i>Mean</i> | <i>SD</i> | <i>Mean</i> | <i>SD</i> |
| Individual mate retention | | | | |
| Intersexual manipulations | 1.45 | 0.68 | 1.46 | 0.65 |
| Direct guarding | 1.24 | 0.86 | 1.22 | 0.87 |
| Vigilance | 1.36 | 0.89 | 1.33 | 0.89 |
| Concealment of mate | 1.08 | 0.98 | 1.11 | 0.97 |
| Monopolization of time | 1.28 | 0.96 | 1.23 | 0.97 |
| Intersexual negative inducements | 1.25 | 0.85 | 1.27 | 0.82 |
| Jealousy induction | 1.11 | 1.05 | 1.09 | 1.03 |
| Punish mate's infidelity threat | 1.22 | 0.98 | 1.17 | 0.96 |
| Emotional manipulation | 1.33 | 0.96 | 1.32 | 0.94 |
| Commitment manipulation | 1.37 | 0.94 | 1.47 | 0.93 |
| Derogation of competitors | 1.20 | 0.94 | 1.28 | 0.92 |
| Positive inducements | 1.86 | 0.54 | 1.90 | 0.55 |
| Resource display* | 1.75 | 0.75 | 1.96 | 0.64 |
| Sexual inducements | 1.73 | 0.78 | 1.74 | 0.72 |
| Appearance enhancement* | 2.05 | 0.69 | 1.90 | 0.73 |
| Love and care | 2.11 | 0.68 | 2.15 | 0.70 |
| Submission and debasement | 1.67 | 0.82 | 1.74 | 0.78 |
| Intrasexual manipulations | 1.35 | 0.75 | 1.41 | 0.70 |
| Public signals of possession | 1.61 | 0.70 | 1.70 | 0.66 |
| Verbal possession | 1.67 | 0.83 | 1.64 | 0.80 |
| Physical possession | 1.90 | 0.80 | 1.98 | 0.75 |
| Possessive ornamentation* | 1.26 | 1.00 | 1.48 | 0.95 |
| Intrasexual negative inducements | 1.08 | 0.94 | 1.13 | 0.92 |
| Derogation of mate | 1.10 | 0.99 | 1.10 | 0.97 |
| Intrasexual threats | 1.18 | 1.02 | 1.27 | 1.00 |
| Violence against rivals | 0.97 | 1.03 | 1.03 | 1.03 |
| Benefit-provisioning | 1.74 | 0.57 | 1.80 | 0.55 |
| Cost-inflicting | 1.19 | 0.85 | 1.21 | 0.84 |
| Overall mate retention | 1.44 | 0.67 | 1.47 | 0.63 |
| CMR: female friend | | | | |
| Manipulation | 0.74 | 0.80 | 0.75 | 0.78 |
| Praise | 0.87 | 0.83 | 0.92 | 0.82 |
| Vigilance | 0.83 | 0.83 | 0.84 | 0.82 |
| Monopolize time | 0.84 | 0.84 | 0.96 | 0.84 |
| Therapy | 0.86 | 0.83 | 0.93 | 0.82 |
| Gifts | 0.84 | 0.94 | 0.96 | 0.91 |
| Violence against rivals | 0.74 | 0.88 | 0.78 | 0.87 |
| Overall requests of CMR | 0.81 | 0.79 | 0.84 | 0.74 |

Table 2 (continued)

| | Women | | Men | |
|-------------------------|-------------|-----------|-------------|-----------|
| | <i>Mean</i> | <i>SD</i> | <i>Mean</i> | <i>SD</i> |
| CMR: male friend | | | | |
| Manipulation | 0.76 | 0.80 | 0.76 | 0.79 |
| Praise | 0.92 | 0.86 | 0.93 | 0.80 |
| Vigilance | 0.80 | 0.79 | 0.79 | 0.80 |
| Monopolize time | 0.92 | 0.81 | 0.91 | 0.80 |
| Therapy | 0.91 | 0.82 | 0.90 | 0.77 |
| Gifts | 0.88 | 0.94 | 0.85 | 0.87 |
| Violence against rivals | 0.78 | 0.88 | 0.77 | 0.87 |
| Overall requests of CMR | 0.85 | 0.77 | 0.84 | 0.74 |

*Independent samples *t* tests indicate sex differences: Men report more frequent Resource Display and Possessive Ornamentation individual mate retention behaviors (all *p* values <0.001). Women report more frequent Appearance Enhancement individual mate retention behavior (*p* < 0.001)

partner with women who reported not sharing a child with their current partner, and we compared men who reported sharing at least one child with their current romantic partner to men who reported not sharing a child with their current partner. Because of the large number of statistical analyses conducted, in the text we only present results that are significant at *p* < 0.001 to correct for alpha inflation. We report all significance values in Tables 3, 4, 5, and 6.

Mate Retention by Women

Overall performance frequencies of individual mate retention behaviors for women sharing genetic children with their current partner are higher than performance frequencies of individual mate retention behaviors for women who do not (Table 3). Specifically, women with children report more frequent performance of mate retention across the domains of Intersexual Manipulations, Intrasexual Manipulations, Benefit-Provisioning, and Cost-Inflicting than women without children. Women with children also report more frequent performance of mate retention across the categories of Direct Guarding, Intersexual Negative Inducements, Public Signals of Possession, and Intrasexual Negative Inducements than women without children with their partner. Overall, women with children report more frequent performance than women without children for 14 of 19 mate retention tactics.

Women who share children with their current partner also report requesting coalitional mate retention behaviors from their male and female friends more frequently than women who do not share children with their current partner (Table 4). There were no significant differences regarding women's requests of coalitional mate retention behaviors from their male friend or their female friend. Women with children requested more frequent coalitional mate retention behaviors from both their male friend and their female friend across the seven tactics of Manipulation, Praise, Vigilance, Monopolize Time, Therapy, Gifts, and Violence against Rivals than women without children.

Table 3 Results of *t* tests comparing individual mate retention frequencies of women with and without children (*n* = 461)

| Domains/Categories/Tactics | With biological children | Without biological children | <i>t</i> | Welch's <i>t</i> |
|----------------------------------|--------------------------|-----------------------------|----------|------------------|
| | <i>Mean</i> | <i>Mean</i> | | |
| Intersexual manipulations | 1.66 | 1.23 | 7.14*** | |
| Direct guarding | 1.51 | 0.96 | 7.28*** | |
| Vigilance | 1.61 | 1.10 | | 6.40*** |
| Concealment of mate | 1.35 | 0.80 | | 6.33*** |
| Monopolization of time | 1.57 | 0.97 | 7.03*** | |
| Intersexual negative inducements | 1.52 | 0.96 | 7.41*** | |
| Jealousy induction | 1.42 | 0.79 | 6.74*** | |
| Punish mate's infidelity Threat | 1.50 | 0.94 | 6.30*** | |
| Emotional manipulation | 1.59 | 1.06 | 6.19*** | |
| Commitment manipulation | 1.65 | 1.08 | 6.77*** | |
| Derogation of competitors | 1.44 | 0.95 | | 5.78*** |
| Positive inducements | 1.95 | 1.78 | 3.43** | |
| Resource display | 1.91 | 1.60 | 4.68*** | |
| Sexual inducements | 1.90 | 1.56 | 4.67*** | |
| Appearance enhancement | 2.10 | 2.01 | | 1.40 |
| Love and care | 2.04 | 2.19 | | -2.23* |
| Submission and debasement | 1.80 | 1.54 | 3.42** | |
| Intrasexual manipulations | 1.58 | 1.12 | 1.17*** | |
| Public signals of possession | 1.75 | 1.47 | 4.42*** | |
| Verbal possession | 1.76 | 1.58 | 2.33* | |
| Physical possession | 1.93 | 1.87 | 0.71 | |
| Possessive ornamentation | 1.57 | 0.95 | 6.91*** | |
| Intrasexual negative inducements | 1.41 | 0.75 | | 8.07*** |
| Derogation of mate | 1.38 | 0.80 | | 6.56*** |
| Intrasexual threats | 1.51 | 0.84 | 7.48*** | |
| Violence against rivals | 1.33 | 0.60 | | 8.09*** |
| Benefit-provisioning | 1.85 | 1.62 | 4.39*** | |
| Cost-inflicting | 1.48 | 0.89 | 7.93*** | |
| Overall mate retention | 1.65 | 1.22 | | 7.29*** |

p* < 0.05*p* < 0.01****p* < 0.001

Mate Retention by Men

Overall performance frequencies of individual mate retention behaviors for men sharing genetic children with their current partner are higher than for men who do not share children with their current partner (Table 5). Specifically, men with children

Table 4 Results of *t* tests comparing coalitional mate retention request frequencies of women with and without children (*n* = 461)

| | With biological children | Without biological children | <i>t</i> | Welch's <i>t</i> |
|-------------------------|--------------------------|-----------------------------|----------|------------------|
| | <i>Mean</i> | <i>Mean</i> | | |
| Requests: female friend | | | | |
| Manipulation | 1.00 | 0.48 | | 7.28*** |
| Praise | 1.09 | 0.64 | 6.01*** | |
| Vigilance | 1.08 | 0.57 | | 6.92*** |
| Monopolize time | 1.09 | 0.59 | | 6.71*** |
| Therapy | 1.09 | 0.63 | 6.25*** | |
| Gifts | 1.11 | 0.56 | | 6.69*** |
| Violence against rivals | 1.02 | 0.46 | | 7.23*** |
| Overall requests of CMR | 1.07 | 0.56 | | 7.33*** |
| Requests: male friend | | | | |
| Manipulation | 1.00 | 0.51 | | 6.96*** |
| Praise | 1.15 | 0.70 | 5.84*** | |
| Vigilance | 1.03 | 0.57 | 6.60*** | |
| Monopolize time | 1.16 | 0.67 | 6.91*** | |
| Therapy | 1.15 | 0.66 | 6.72*** | |
| Gifts | 1.12 | 0.63 | | 5.79*** |
| Violence against rivals | 1.08 | 0.48 | | 7.86*** |
| Overall requests of CMR | 1.10 | 0.60 | 7.34*** | |

p* < 0.05*p* < 0.01****p* < 0.001

report more frequent performance of mate retention behaviors across the domains of Intersexual Manipulations, Intrasexual Manipulations, Benefit-Provisioning, and Cost-Inflicting than men without children. Men with children also report more frequent performance of mate retention behaviors across the categories of Direct Guarding, Intersexual Negative Inducements, Public Signals of Possession, and Intrasexual Negative Inducements than men without children with their partner. Overall, men with children report more frequent performance than men without children for 12 of 19 mate retention tactics.

Men who share children with their current partner also report requesting coalitional mate retention behaviors from their male friend and female friend more frequently than men who do not (Table 6). There were no significant differences regarding men's requests of coalitional mate retention behaviors from their male friend or their female friend. Men with children requested more frequent coalitional mate retention behaviors from both their male friend and their female friend across the seven tactics of Manipulation, Praise, Vigilance, Monopolize Time, Therapy, Gifts, and Violence against Rivals than men without children.

Table 5 Results of *t* tests comparing individual mate retention frequencies of men with and without children (*n* = 542)

| Domains/Categories/Tactics | With biological children | Without biological children | <i>t</i> | <i>Welch's t</i> |
|----------------------------------|--------------------------|-----------------------------|----------|------------------|
| | <i>Mean</i> | <i>Mean</i> | | |
| Intersexual manipulations | 1.63 | 1.31 | | 5.92*** |
| Direct guarding | 1.44 | 1.02 | | 5.65*** |
| Vigilance | 1.52 | 1.15 | | 4.84*** |
| Concealment of mate | 1.33 | 0.91 | 5.17*** | |
| Monopolization of time | 1.46 | 1.01 | 5.55*** | |
| Intersexual negative inducements | 1.50 | 1.02 | 6.52*** | |
| Jealousy induction | 1.40 | 0.81 | | 6.90*** |
| Punish mate's infidelity threat | 1.42 | 0.95 | | 5.84*** |
| Emotional manipulation | 1.55 | 1.11 | 5.65*** | |
| Commitment manipulation | 1.64 | 1.31 | 4.26*** | |
| Derogation of competitors | 1.47 | 1.09 | 4.90*** | |
| Positive inducements | 1.95 | 1.84 | | 2.35* |
| Resource display | 2.04 | 1.88 | 3.09** | |
| Sexual inducements | 1.84 | 1.64 | 3.11** | |
| Appearance enhancement | 1.94 | 1.86 | 1.39 | |
| Love and care | 2.09 | 2.20 | -1.72 | |
| Submission and debasement | 1.85 | 1.64 | 3.08** | |
| Intrasexual manipulations | 1.61 | 1.23 | | 6.50*** |
| Public signals of possession | 1.82 | 1.59 | 4.10*** | |
| Verbal possession | 1.76 | 1.54 | 3.21** | |
| Physical possession | 1.98 | 1.97 | 0.18 | |
| Possessive ornamentation | 1.72 | 1.26 | 5.75*** | |
| Intrasexual negative inducements | 1.40 | 0.88 | | 6.99*** |
| Derogation of mate | 1.36 | 0.85 | 6.43*** | |
| Intrasexual threats | 1.50 | 1.05 | 5.45*** | |
| Violence against rivals | 1.34 | 0.73 | | 7.19*** |
| Benefit-provisioning | 1.89 | 1.72 | | 3.60*** |
| Cost-inflicting | 1.45 | 0.98 | | 6.66*** |
| Overall mate retention | 1.64 | 1.31 | | 6.25*** |

p* < 0.05*p* < 0.01****p* < 0.001

Discussion

The current study investigated whether men and women who share genetic children with their current partner performed more frequent mate retention behaviors than men and women who do not share genetic children with their current partner. The results

Table 6 Results of *t* tests comparing coalitional mate retention request frequencies of men with and without children (*n* = 542)

| | With biological children | Without biological children | <i>t</i> | Welch's <i>t</i> |
|-------------------------|--------------------------|-----------------------------|----------|------------------|
| | <i>Mean</i> | <i>Mean</i> | | |
| Requests: female friend | | | | |
| Manipulation | 0.97 | 0.54 | | 6.65*** |
| Praise | 1.12 | 0.72 | 5.83*** | |
| Vigilance | 1.06 | 0.63 | 6.15*** | |
| Monopolize time | 1.17 | 0.76 | 5.82*** | |
| Therapy | 1.14 | 0.74 | 5.95*** | |
| Gifts | 1.16 | 0.77 | 5.09*** | |
| Violence against Rivals | 0.98 | 0.58 | | 5.42*** |
| Overall requests of CMR | 1.09 | 0.68 | 6.48*** | |
| Requests: male friend | | | | |
| Manipulation | 0.98 | 0.54 | | 6.66*** |
| Praise | 1.14 | 0.73 | | 6.18*** |
| Vigilance | 1.02 | 0.58 | | 6.66*** |
| Monopolize time | 1.13 | 0.70 | | 6.51*** |
| Therapy | 1.11 | 0.70 | | 6.45*** |
| Gifts | 1.05 | 0.65 | 5.52*** | |
| Violence against rivals | 1.02 | 0.54 | | 6.71*** |
| Overall requests of CMR | 1.07 | 0.63 | | 7.03*** |

p* < 0.05*p* < 0.01****p* < 0.001

support the study hypothesis. Men and women with at least one genetic child with their current partner perform more frequent *individual mate retention* behaviors than men and women who do not have children with their current partner. Additionally, men and women with at least one genetic child with their current partner request more frequent *coalitional mate retention* behaviors from both their male friend and their female friend than men and women who do not have children with their current partner.

Humans are unique among primates in several life history traits, including the formation of pair-bonds. Pair-bonding in humans may have originated as a consequence of the evolution of large brains in *Homo* and the consequent long duration of infant dependency (Yamagiwa 2015). Pair-bonding in humans facilitates biparental care and promotes offspring survival. Two hypotheses regarding the selection pressures that facilitated pair-bonding throughout human evolution—Male-Provisioning and Male-Male Competition—have a common feature: Men and women, on average, benefit by remaining pair-bonded to their partner following the birth of a child. However, previous research has not directly examined whether men and women, in fact, allocate more effort to mate retention after they have children. The results of the current research address this question and demonstrate that mate retention efforts are

greater for men and women who share genetic children with their current partner than for men and women who do not.

The results of the current research add to the broader literature on mate retention behaviors. Research investigating mate retention behaviors—individual and coalitional—has empirically tested several hypothesized predictors of such behaviors. Men are motivated to retain their partner to reduce the risk of cuckoldry (Buss and Shackelford 1997)—the unwitting investment in genetically unrelated offspring—and women are motivated to retain their mate to ensure continued access to partner-provisioned resources (Schutzwohl and Koch 2004). Previous research, however, has not investigated the influence of children on mate retention efforts in romantic couples. The current research adds to the fields of both evolutionary psychology and evolutionary anthropology in that our findings demonstrate that individuals in romantic relationships who have genetic children with their current partner allocate greater effort to mate retention than do individuals in romantic relationships who do not have children together.

The current research was not designed to test the Male-Provisioning Hypothesis or the Male-Male Competition Hypothesis directly; however, examination of specific mate retention behaviors can provide some insight regarding the two pair-bonding hypotheses. The Male-Provisioning Hypothesis might generate the prediction that men with children (vs. men without children) would more frequently provision their partner with resources (Quinlan 2008). The current results indicate that men with children (vs. men without children) performed significantly more resource display behaviors. Men with children (vs. men without children) more frequently requested information from their male friend and their female friend concerning gifts that their romantic partner would like to receive. And men with children (vs. men without children) performed more positive inducements. The results for Resource Display and Positive Inducements are statistically significant but do not reach $p < 0.001$ and thus should be interpreted with caution.

The Male-Male Competition Hypothesis might generate the prediction that men with children (vs. men without children) more frequently guard their romantic partner and engage in violence against male rivals (Hawkes 2004). The results of the current research reveal that men with children (vs. men without children) perform more direct guarding and more public signals of possession. Most telling, men with children (vs. men without children) perform more violence against rivals and more intrasexual threats. And men with children (vs. men without children) more often ask their close male and female friends to perform violence against rivals. These findings suggests that men with children may be concerned about other males poaching their partner, and perhaps with the associated increased risk of infanticide.

Women with children performed more mate retention behaviors than women without children; however, the mate retention measures of the current research do not afford clear interpretation of women's behaviors with regard to the Male-Male Competition Hypothesis. It does appear that women with children are more generally concerned about other women poaching their partner as indicated by more frequent performance of direct guarding and violence against rivals. These behaviors may be motivated by women attempting to retain access to partner-provisioned resources, as might be expected by the Male-Provisioning Hypothesis.

The basic finding of the current research—that mothers and fathers perform more mate retention behaviors than individuals who do not share children—points to the importance of both the Male-Provisioning and Male-Male Competition hypotheses in the maintenance and evolution of pair-bonding in humans. These hypotheses are not mutually exclusive. Future research could profitably investigate the ecological circumstances in which mate-retention efforts are increased for the benefits of male provisioning or male protection following the birth of offspring. For instance, mate retention efforts may be increased primarily for male provisioning, rather than male protection, following the birth of a child in resource-scarce environments. Conversely, mate retention efforts may be increased primarily for male protection, rather than male provisioning, following the birth of a child in environments with a skewed sex ratio (more males than females), in which male-male competition for mates is more intense.

Limitations and Future Directions

Because the data collected to test the study hypothesis are cross-sectional, causal claims are not defensible. Our results indicate that men and women who share children perform more frequent mate retention behaviors than men and women without children. Alternatively, individual differences in mate retention efforts may explain the results, such that individuals who share children might be, more generally, oriented toward a long-term mating strategy. Future research would benefit from a longitudinal study design whereby performance frequencies of mate retention behaviors are secured in romantic couples before they have children and then again after they have children to identify causal relationships.

Research investigating the evolution of pair-bonding documents moderating variables in the stability of pair-bonds that the current research did not address. For example, pair-bonds are less stable in extremely harsh ecologies where paternal investment does not increase offspring survival (Quinlan 2008). Mate retention efforts in harsh ecologies may *not* increase after having a child if paternal investment does not buffer against environmental harshness. Moreover, the availability of alloparents is negatively related to pair-bond stability (Leonetti et al. 2008; Marlowe 2003). The availability of alloparents could reduce effort allocated to mate retention. If a woman has substantial help from kin or others in rearing her offspring, mate retention efforts directed toward her partner may decrease because alloparents could compensate for lack of paternal investment.

The current analyses did not account for the age of the participants' offspring or presence of multiple children in the relationship. The Male-Provisioning Hypothesis stresses the importance of the “critical period” of lactation (Fisher 1987; Marlowe 2003), and paternal investment is positively related to the duration a woman nurses her infant (Quinlan and Quinlan 2007). It is possible that mate retention effort peaks during the period of time a woman is nursing and then decreases upon weaning. Multiple children (especially older children) may indicate the availability of alloparents, such that older children can compensate for some aspects of paternal investment. Future research could explore these possibilities to gain a more comprehensive view of mate retention efforts in romantic couples with children.

Lastly, the data collected in the current research was secured from participants located in the United States and, thus, generalizability of the results to small-scale societies is limited. Cross-cultural replication of the presented findings is especially warranted.

Conclusion

Men and women are motivated to remain pair-bonded following the birth of a child. The current research provides empirical support demonstrating that men and women who share genetic children with their current partner allocate greater effort toward mate retention by performing more frequent mate retention behaviors than men and women who do not share genetic children with their current partner. Examination of the specific mate retention behaviors performed by men provides preliminary support for both the Male-Provisioning Hypothesis and the Male-Male Competition Hypothesis. The results of this study add to the broader literature on mate retention behaviors and provide further evidence concerning the benefits of human pair-bonding.

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