



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Daughters promote pair-bonding in fathers in modern Western cultures

Krystal Duarte ^{a,*}, Kristina M. Durante ^b, Jeffrey Gassen ^c, Americus Reed ^d, Steven Rholes ^e, Jeffrey A. Simpson ^f

^a Rutgers University, Rutgers Business School, Center for Women in Business, 1 Washington Park, Newark, NJ, 07102, United States of America

^b Rutgers University, Rutgers Business School, Department of Marketing, 1 Washington Park, Newark, NJ, 07102, United States of America

^c University of California, Los Angeles, Semel Institute for Neuroscience and Human Behavior, UCLA Medical Center Plaza 300, Los Angeles, CA, 90095, United States of America

^d University of Pennsylvania, The Wharton School, 3730 Walnut Street, Philadelphia, PA, 19104, United States of America

^e Texas A&M University, Psychological and Brain Sciences, 4235 TAMU, College Station, TX, 77843, United States of America

^f University of Minnesota, Department of Psychology, 75 East River Road, Minneapolis, MN, 55455, United States of America

ARTICLE INFO

Keywords:

Pair-bonding
Close relationships
Parenting
Evolutionary psychology

ABSTRACT

Prior research demonstrates a reliable association between low-quality father involvement or absence and negative outcomes for daughters, particularly in contemporary Western cultures. For example, low-quality father involvement and absence are associated with accelerated sexual development, promiscuity, and risk-taking. The current research tests the prediction that having a daughter shifts fathers' mating psychology to promote long-term pair-bonding, signaling to daughters that male investment is reliable. Using cross-sectional, longitudinal, and transition-to-parenthood data from parents with either a daughter or a son ($N = 1694$), we found an association between daughters and fathers' long-term pair-bond motivation toward the biological mother. Longitudinal evidence suggested that this effect diminished with daughters' age, consistent with the father absence literature. Transition-to-parenthood data provided additional support that this pattern. Changes in male mating psychology occurred alongside daughters' births and was not related to individual differences between fathers of daughters and sons prior to parenthood. This effect could reflect an adaptation to signal reliability of male investment and prevent abandonment during girls' development.

Research consistently demonstrates that father involvement is a robust predictor of children's development and sociosexual outcomes. Low-quality paternal behavior and absence from the home are often associated with earlier puberty (Alvergne et al., 2008; Bogaert, 2008; James et al., 2012; Moffitt et al., 1992; Tither & Ellis, 2008; Webster et al., 2014), earlier sexual initiation (Moffitt et al., 1992), and higher rates of teenage pregnancy (D'Onofrio et al., 2006; Ellis et al., 2003; James et al., 2012; Valge et al., 2022), especially for daughters (Ellis, 2004; Hehman & Salmon, 2021; James et al., 2012). Daughters who experience low-quality paternal involvement also report engaging in riskier sexual behaviors (Coley et al., 2009) and thus may face heightened risks of contracting sexually transmitted diseases (Mackey & Coney, 2000). This body of research consistently highlights that daughters' reproductive fitness, is uniquely tied to fathers' behavior and absence.

While considerable research documents associations between paternal behavior and daughters' outcomes, less attention has been

given to the reverse—how having a daughter may correspond with variation in paternal behavior. Although low-quality paternal behavior negatively affects both sons and daughters (DelPriore & Reeder, 2025; Hehman & Salmon, 2019; Sheppard & Sear, 2012), its effects on daughters' sexual behavior and partner expectations are unique (DelPriore et al., 2019). Consistent with paternal investment theory (Draper & Harpending, 1982; Ellis, 2004), fathers may serve as daughters' earliest model of male investment, shaping broader expectations about men's reliability and availability in long-term relationships (McWayne et al., 2013).

Drawing on the idea that fathers serve as an important model of male investment for daughters, we investigate whether having a daughter strengthens paternal commitment to the child's mother. We hypothesize that the presence of a daughter (versus son) will be associated with greater paternal commitment to the child's biological mother and stronger demonstrations of partner quality as reported by the mother.

The present framework operates at two levels. First, daughters may

* Corresponding author.

E-mail address: krystal.duarte@business.rutgers.edu (K. Duarte).

<https://doi.org/10.1016/j.paid.2026.113901>

Received 4 March 2026; Received in revised form 19 May 2026; Accepted 20 May 2026

Available online 8 June 2026

0191-8869/© 2026 Elsevier Ltd. All rights reserved, including those for text and data mining, AI training, and similar technologies.

calibrate mating expectations based on cues derived from paternal relationship behavior, using fathers' investment as developmental information about the likely availability of long-term male investment in the broader mating ecology (Draper & Harpending, 1982; Ellis, 2004). Second, fathers may be motivated to maintain stronger pair-bonds when daughters are present, given that daughters' reproductive outcomes are especially sensitive to cues of male investment reliability. These processes may operate recursively: daughters calibrate expectations from paternal behavior, while fathers may indirectly enhance inclusive fitness by maintaining stable relational environments. (Hamilton, 1964).

Importantly, these patterns need not reflect conscious paternal strategy. Rather, they may emerge through evolved paternal psychologies that promote pair-bond investment when daughters are present—with proposed developmental cues reflecting downstream consequences of paternal behavior rather than intentionally produced signals.

1. Paternal investment theory and the influence of fathers

Paternal investment theory has guided previous work on the effects of low-quality paternal behavior and father absence on children (Draper & Harpending, 1982; Ellis et al., 1999). This theory proposes that fathers' social behavior and family role shape children's adult sexual strategies by signaling whether long-term investment can be expected in future relationships (Draper & Harpending, 1982; Ellis, 2004; Ellis et al., 1999; Ellis et al., 2003; Ellis et al., 2012). A large body of research has found stronger effects of father absence or low involvement on such outcomes among daughters than sons (Davis & Friel, 2001; Ellis, 2004; Hehman & Salmon, 2021; James et al., 2012), though other work has found comparable effects across child sex (Coley et al., 2009; DelPriore & Reeder, 2025; D'Onofrio et al., 2006). Evolutionary-developmental perspectives offer a potential resolution: daughters may be particularly sensitive to cues of paternal investment and pair-bond stability because these cues calibrate expectations about male provisioning and long-term partnership (Draper & Harpending, 1982; Ellis, 2004).

A father's commitment to the child's mother may serve as a salient signal to daughters about the reliability of male investment more broadly. Under paternal investment theory, fathers' relationship behavior provides daughters with information not about one individual male, but about the broader availability of long-term male investment within the local mating ecology (Draper & Harpending, 1982; Ellis, 2004). Low paternal investment may signal an environment where sustained male investment is unreliable, favoring faster reproductive strategies, while high paternal investment and pair-bond stability may signal that long-term investment is attainable, corresponding with slower strategies characterized by greater mate selectivity and delayed reproduction. Sons may be less sensitive to these cues when forming mating expectations, potentially explaining the weaker and less consistent effects observed for sons across studies (McLanahan et al., 2013).

Consistent with this possibility, low-quality paternal behavior and absence have been found to be associated with faster reproductive strategies in girls, including by an increased likelihood of early puberty (Alvergne et al., 2008; Maestripieri et al., 2004), which often precedes earlier sexual initiation (Moffitt et al., 1992). For example, Mendle et al. (2009) found that daughters from father-absent homes experience their first sexual intercourse at an earlier age. Low paternal involvement and absence have also been associated with sexual risk-taking (Coley et al., 2009; Dinh et al., 2022; Salmon & Hehman, 2018) and teenage pregnancy (D'Onofrio et al., 2006; James et al., 2012; Valge et al., 2022).

Low paternal involvement also relates to women's attitudes and perceptions. For example, research has shown that exposure to low-quality paternal behavior and father absence is associated with women perceiving greater sexual intent in men's actions and increased interest in babies (DelPriore et al., 2018; Maestripieri et al., 2004). Experimental work has also shown that recalling instances of paternal

disengagement increases women's, not men's, reported likelihood of engaging in sexual risk-taking, but not other types of risk (DelPriore & Hill, 2013). More recently, research using a differential sibling exposure design found that low-quality paternal behavior (but not father absence per se) predicted adult women's lowered expectations for men as romantic partners as well as increased number of sexual partners (DelPriore et al., 2019).

The effect of low-quality father involvement and absence on the risky sexual behavior of daughters is believed to be causal (DelPriore et al., 2017; Ellis, 2004; Ellis et al., 2012; Tither & Ellis, 2008). Within the same family, differences between older and younger daughters emerge in terms of how low-quality paternal behavior relates to a daughter's risky sexual behavior. Specifically, daughters who have longer exposure to low-quality paternal care tend to engage in riskier sexual behavior compared to their sisters who have less exposure (DelPriore et al., 2019; Ellis et al., 2012).

Paternal impact on daughters' sexual behavior is consistent with life history theory: in environments where male parental investment is low, girls are less likely to benefit from delaying reproduction in search of a higher-investing partner (Ellis, 2004). Conversely, when fathers are present and involved, daughters tend to report patterns consistent with slower reproductive strategies (e.g. delaying reproduction, investing more in education or career development, and expecting greater investment from future male partners; DelPriore et al., 2017).

It is important to note that the effects of low-quality father involvement are distinct from the effects of other childhood stress on sexual maturation (Ellis, 2004). Early childhood psychosocial stressors, such as harsh and neglecting family relationships, are also associated with earlier onset of puberty and reproduction (Belsky, 2012; Simpson and Rholes, 2017). These findings are also consistent with a life history perspective, whereby harsh environments are predicted to accelerate reproduction for both sexes (Belsky et al., 1991). However, paternal investment theory is thought to operate on a different pathway, separate from psychosocial stress (Draper & Harpending, 1982; Ellis, 2004). Indeed, research has shown that low-quality paternal involvement is associated with earlier onset of puberty and riskier sexual behavior for girls, even when they come from high socioeconomic status homes that have low levels of psychosocial stress (Gaml-Sørensen et al., 2021).

Recent research indicates that sons, like daughters, calibrate mating strategies to father involvement. Father absence predicts earlier reproduction and more casual sexual behavior in sons, alongside beliefs that men invest little in relationships (DelPriore & Reeder, 2025; Hehman & Salmon, 2019; Sheppard & Sear, 2012). In contrast, maternal involvement shows weaker effects on offspring mating psychology, consistent with the greater historical reliability of maternal versus paternal investment (DelPriore & Hill, 2013).

Although father involvement is connected to the development of both sons and daughters, the reproductive costs of early sexual activity and fast mating strategies are disproportionately higher for daughters because females bear the energetic burdens of pregnancy, lactation, and early childcare (Trivers, 1972). Consequently, while low-quality paternal care may calibrate mating strategies in both sexes, daughters incur greater fitness costs from accelerated reproduction.

Parents appear sensitive to this asymmetry, adopting sex-differentiated investment strategies that reflect distinct reproductive pathways (Geary & Flinn, 2001; Silk, 1987). For daughters, reproductive value is closely tied to sexual reputation and mate selectivity, leading fathers to monitor mating-relevant behavior and guard against sexual and reputational threats (Apostolou, 2012; Perilloux et al., 2008) — vigilance that may increase daughters' likelihood of securing investing partners (Apostolou & Papageorgi, 2014). For sons, reproductive success has historically depended more on status acquisition and competitive ability, leading fathers to monitor sons' social standing rather than sexual behavior (Alvarado et al., 2018; Apostolou, 2012), with father absence more strongly linked to externalizing and risk-taking outcomes in boys (Amato & Sobolewski, 2004; Harper & McLanahan, 2004; Lamb,

2004).

Because daughters' reproductive outcomes are especially sensitive to cues of long-term male investment, fathers may be motivated not only to regulate daughters' behavior directly, but also to model relationship stability through a strong pair-bond with the child's mother. Such modeling may calibrate daughters' expectations of male partners, corresponding with slower reproductive strategies characterized by selectivity and delayed reproduction. We therefore predict that having a daughter, relative to a son, will be associated with greater paternal attraction to and commitment toward the child's mother, providing daughters with observable cues of reliable male investment.

2. Daughter presence and father's partner-related behavior

Relationship stability is strongly predicted by commitment, attachment bond strength, and day-to-day maintenance processes (Le & Agnew, 2003; Rusbult, 1983; Rusbult et al., 2001), which are closely tied to attachment security and bonding (Fletcher et al., 2000; Tancredy & Fraley, 2006). If paternal presence functions as a cue of expected male investment for daughters, then daughter presence (vs. son presence) should elicit paternal psychology favoring pair-bond maintenance with the child's biological mother. We therefore assess fathers' pair-bond motivation using validated measures of attachment bond strength and relationship quality, complemented by partner-reported support behaviors in longitudinal data. We predict that fathers of daughters will report — and be perceived as showing — greater commitment and partner-directed maintenance, whereas mothers will show weaker or no corresponding shifts as a function of child sex.

3. The current research

Across three studies, we tested whether daughter presence is associated with fathers' pair-bond motivation. Study 1 examined whether having a daughter versus a son was associated with fathers' and mothers' self-reported attachment, commitment, alternative partner appeal, and experiences of passion and intimacy (Mikulincer & Shaver, 2007). Study 2 used longitudinal partner reports to examine whether daughter presence predicted fathers' partner-directed maintenance behaviors specifically—such as fairness, affection, and encouragement—rather than general parenting or co-parenting behavior. Study 3 tested whether daughter birth was associated with within-person changes in fathers' attachment orientations, relationship satisfaction, and partner-directed support across the transition to parenthood, allowing us to rule out pre-existing individual differences.

Because father absence effects are strongest early in development (Alvergne et al., 2008; Ellis et al., 2003; Hehman & Salmon, 2019; Moffitt et al., 1992; Sheppard & Sear, 2012), with early absence (ages 0–5) predicting the highest rates of daughters' early sexual activity and pregnancy (Ellis et al., 2003), we examined child age as a moderator across all studies. Together, these studies provide converging evidence—across self-report, longitudinal partner report, and within-person change designs—that daughters uniquely relate to variation in paternal pair-bond investment.

4. Study 1: impact of daughters on specific components of primary relationship quality

Study 1 examined whether having a daughter, compared to a son, is associated with stronger pair-bond motivation in fathers. Mothers were included as a comparison group. We predicted that having a daughter would be associated with higher relationship quality for fathers but not mothers.

5. Method

5.1. Participants

Participants were 184 parents ($M_{age} = 32.42$; $SD = 7.91$) recruited from Amazon Mechanical Turk (MTurk) who participated for payment (fathers, $n = 101$; mothers, $n = 83$) and met the following inclusion criteria: (a) the parent reported only one child, (b) the parent's child was under the age of 18 years old (i.e., non-adult), and (c) the parent was currently in an exclusive romantic relationship with the other biological parent of the child. This sample size was based on the power analysis conducted, which indicated that a minimum sample of 82 fathers was necessary to detect the predicted effect. Thus, we also set the minimum number of mothers at 82. The focal children included 75 daughters ($M_{age} = 4.88$; $SD = 4.29$; fathers, $n = 39$; mothers, $n = 36$) and 109 sons ($M_{age} = 4.95$; $SD = 3.94$; fathers, $n = 62$; mothers, $n = 47$).

5.2. Materials and procedure

Participants completed a short survey that assessed their romantic attachment bond strength and the quality of their relationship with the other parent. They also answered demographic questions, including the age and sex of their child.

5.3. Attachment bond strength

Participants completed the Attachment Features and Functions scale (16 items, 1–9; Tancredy & Fraley, 2006) assessing attachment to the child's mother. These items together yielded strong reliability ($\alpha = 0.97$) and were averaged to form a composite score.

5.4. Specific components of relationship quality

Participants also completed the Perceived Relationship Quality Components scale (PRQC; Fletcher et al., 2000), comprising six 3-item subscales (satisfaction, commitment, intimacy, trust, passion, love; 1–7). Subscales showed good reliability ($\alpha = 0.86$ – 0.95) and were averaged separately with higher scores indicating greater relationship quality.

5.5. Covariates

We also collected information on several variables that may influence the association between child sex and the key dependent measures, such as parents' age, marital status, and whether the focal child lived with both parents. Parents' socioeconomic status was measured using the following seven questions answered on a 9-point scale: 1) "I do not need to worry too much about paying my bills"; 2) "I do not think I will have to worry about money too much in the future"; 3) "I have enough money to buy the things I want"; 4) "Relative to others, the financial situation in my household is prosperous"; 5) "Relative to others, the financial situation in my household is stable"; 6) "Relative to others, my household is able to buy the things we need"; and 7) "Relative to others, my household is able to buy the extra things we want." These 7 items were aggregated to form a mean SES composite ($\alpha = 0.95$).

6. Results

Using two-way MANOVAs, we tested whether participants' (i.e., parents') sex, the sex of their child, or the interaction between these two variables predicted the dependent measures. For each of these analyses, we examined all interactions that reached or approached significance by comparing associations between daughters and sons within fathers and mothers. We also conducted comparisons between mothers and fathers within daughters and sons. We then tested a follow-up model to determine whether the effects of the primary model were robust after

controlling for the covariates (using MANCOVAs). Additionally, we conducted follow-up moderated regression analyses to examine whether associations between participants' sex, the sex of their child, and each dependent measure was moderated by their child's age. For these analyses, the dichotomous variables of sex of the child and participant sex were dummy-coded (0 = female, 1 = male), and the continuous variable of child age was grand mean-centered. No three-way interactions

between the sex of the child, participants' (parents') sex, and the child's age emerged for any of the PRQC components. See the Appendix.

6.1. Attachment bond strength

Results revealed no significant main effects of participant sex, $F(1, 176) = 3.25, p = .07$, or sex of the child, $F(1, 176) = 1.88, p = .17$, on

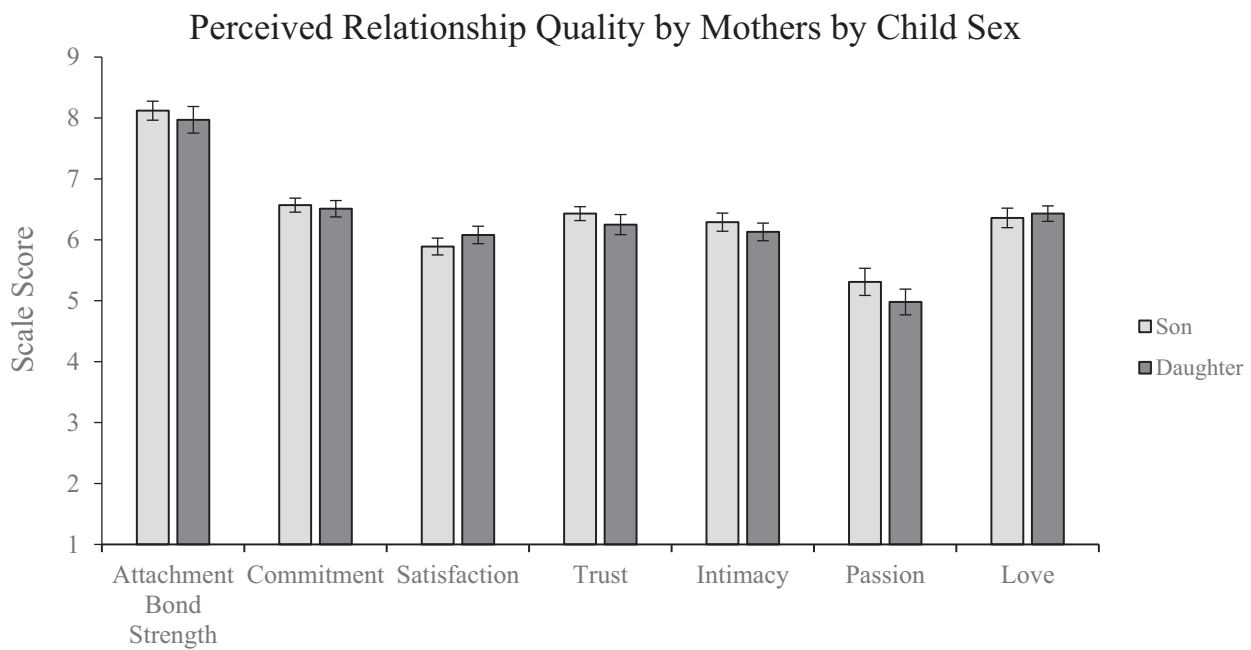
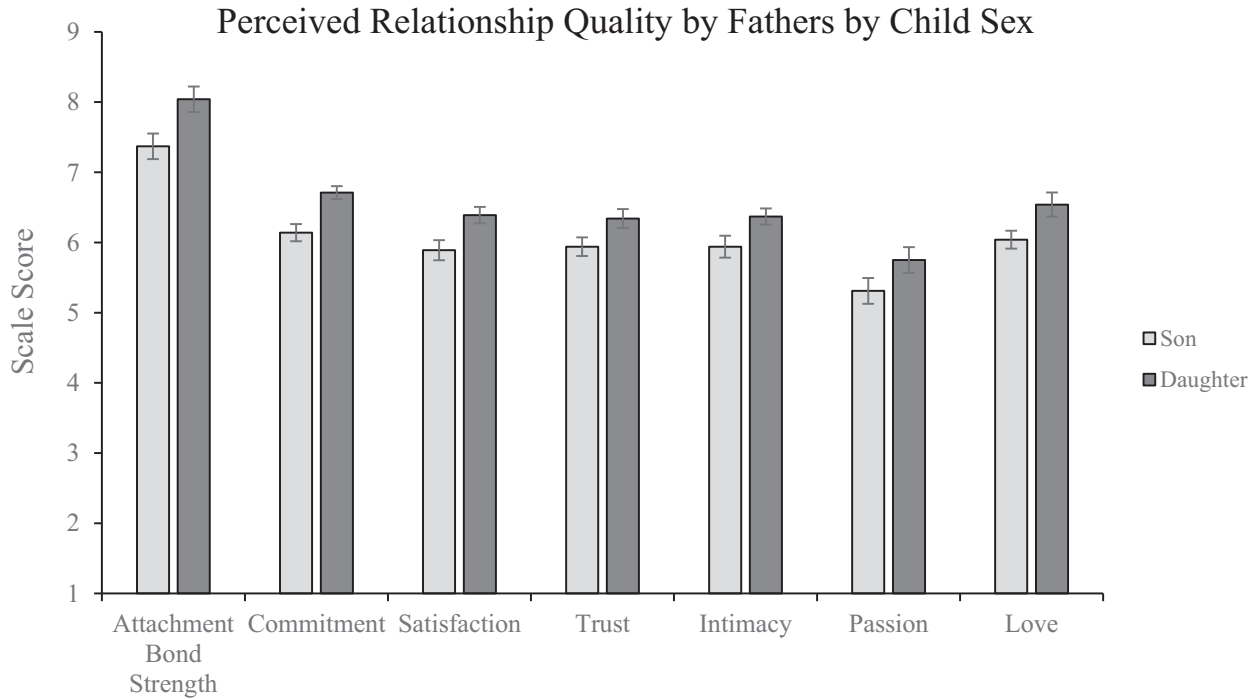


Fig. 1. Summary of Study 1 results, separated by participant sex (fathers in upper panel, mothers in lower panel). Commitment, satisfaction, trust, intimacy, passion, and love are subscales of the Perceived Relationship Quality Components scale (PRQC; Fletcher et al., 2000). Error bars reflect standard errors of the statistic for comparison.

attachment bond strength. However, these results were qualified by a significant two-way interaction between participant sex and sex of the child, $F(1, 176) = 4.75, p = .03$. Specifically, as predicted, mothers' bond strength was not significantly associated with whether they had a daughter ($M = 7.97, SD = 1.32$) or a son ($M = 8.12, SD = 1.07$), $F(1, 176) = 0.31, p = .58, d = 0.13$. We found that fathers reported stronger attachment bonds when they had a daughter ($M = 8.04, SD = 1.12$) compared to when they had a son ($M = 7.37, SD = 1.40$), $F(1, 176) = 6.72, p = .01, d = 0.53$. The pattern and significance of these results did not change when we controlled for covariates (interaction $p = .03$).

6.2. Commitment subscale

For the commitment subscale, there was no significant main effect of participant sex, $F(1, 176) = 0.88, p = .35$. However, there was a significant main effect of child sex on commitment, $F(1, 176) = 4.44, p = .04, d = 0.35$, with greater commitment found in parents of daughters ($M = 6.61, SD = 0.70$) than parents of sons ($M = 6.33, SD = 0.90$). Further, these results were qualified by a significant two-way interaction between participant sex and sex of the child, $F(1, 176) = 6.67, p = .01$. Specifically, there was no difference in reported commitment between mothers of daughters ($M = 6.51, SD = 0.81$) and mothers of sons ($M = 6.57, SD = 0.79$), $F(1, 176) = 0.11, p = .75, d = 0.08$. However, fathers of daughters ($M = 6.71, SD = 0.57$) were significantly more committed than fathers of sons ($M = 6.14, SD = 0.94$), $F(1, 176) = 11.73, p = .001, d = 0.75$. The pattern and significance of these results did not change when we controlled for covariates (interaction $p = .009$). See Fig. 1 for a depiction of the results.

6.3. Satisfaction subscale

For the satisfaction subscale, results revealed no main effects of participant sex, $F(1, 176) = 0.05, p = .82$, or sex of the child, $F(1, 176) = 1.21, p = .27$. However, there was a significant two-way interaction between these variables in predicting relationship satisfaction, $F(1, 176) = 5.74, p = .02$. Specifically, there was no significant difference in relationship satisfaction between mothers of daughters ($M = 6.08, SD = 0.86$) and mothers of sons ($M = 6.27, SD = 0.95$), $F(1, 176) = 0.79, p = .38, d = 0.23$. However, fathers of daughters ($M = 6.39, SD = 0.72$) reported significantly more relationship satisfaction than fathers of sons ($M = 5.89, SD = 1.10$), $F(1, 176) = 6.52, p = .01, d = 0.55$. The pattern and significance of these results did not change when we controlled for covariates (interaction $p = .008$).

6.4. Trust subscale

For the trust subscale, there were no significant main effects of either participant sex, $F(1, 176) = 1.96, p = .16$, or sex of the child, $F(1, 176) = 0.64, p = .42$. There was, however, a significant two-way interaction between participant sex and sex of the child, $F(1, 176) = 4.25, p = .04$. There was no significant difference in relationship trust between mothers of daughters ($M = 6.25, SD = 0.99$) or mothers of sons ($M = 6.43, SD = 0.78$), $F(1, 176) = 0.75, p = .39, d = 0.20$. However, fathers of daughters ($M = 6.34, SD = 0.84$) reported significantly more relationship trust than fathers of sons ($M = 5.94, SD = 1.02$), $F(1, 176) = 4.38, p = .04, d = 0.43$. The pattern and significance of these results did not change when we controlled for covariates (interaction $p = .02$).

6.5. Intimacy subscale

For the intimacy subscale, there were no significant main effects of either participant sex, $F(1, 176) = 0.14, p = .71$, or sex of the child, $F(1, 176) = 0.78, p = .38$. The interaction between these two predictors approached, but did not reach statistical significance, $F(1, 176) = 3.78, p = .053$. There was no significant difference in relationship intimacy between mothers of daughters ($M = 6.13, SD = 0.87$) and mothers of

sons ($M = 6.29, SD = 1.02$), $F(1, 176) = 0.53, p = .47, d = 0.17$. However, fathers of daughters ($M = 6.37, SD = 0.71$) reported more intimacy than fathers of sons ($M = 5.94, SD = 1.20$), $F(1, 176) = 4.27, p = .04, d = 0.45$. Given that the interaction term was not statistically significant, these results should be interpreted with due caution. The pattern of these results did not change when we controlled for covariates, with the exception that the two-way interaction between participant sex and sex of the child became statistically significant (interaction $p = .04$).

6.6. Passion subscale

For the passion subscale, neither the main effect of participant sex, $F(1, 176) = 3.51, p = .06$, nor the main effect of child sex, $F(1, 176) = 0.05, p = .82$, reached significance. Furthermore, the two-way interaction was not conventionally significant, $F(1, 176) = 3.51, p = .06$. Mothers of daughters ($M = 4.98, SD = 1.27$) and mothers of sons ($M = 5.31, SD = 1.53$) did not significantly differ in their relationship passion, $F(1, 176) = 1.28, p = .26, d = 0.24$. There was also no significant difference in passion between fathers of daughters ($M = 5.75, SD = 1.14$) and fathers of sons ($M = 5.31, SD = 1.42$), $F(1, 176) = 2.35, p = .13, d = 0.34$. The pattern of these results did not change when we controlled for covariates. However, the two-way interaction between participant sex and sex of the child became significant (interaction $p = .04$).

6.7. Love subscale

Finally, for relationship love, results revealed no significant main effect of participant sex, $F(1, 176) = 0.56, p = .46$, or sex of the child, $F(1, 176) = 3.75, p = .06$. There was also no significant two-way interaction between these predictors, $F(1, 176) = 2.14, p = .15$. The pattern and significance of these results did not change when we controlled for covariates (interaction $p = .10$).

7. Discussion

Study 1 revealed that fathers of daughters reported stronger attachment to the child's mother—and greater commitment, satisfaction, and trust—than fathers of sons, whereas mothers' pair-bond reports did not vary by child sex. Intimacy and passion showed similar patterns but were less consistently significant depending on model covariates. Child age was unrelated to outcomes. These findings provide initial evidence that daughters may uniquely relate to differences in paternal pair-bond motivation.

8. Study 2: impact of daughters on partner-reported relationship support

Study 2 tested whether daughter presence predicts fathers' partner-directed relationship maintenance using longitudinal partner reports from the Fragile Families and Child Wellbeing Study (FFCWS; Reichman et al., 2001), a multi-wave cohort of parents of children born in large U. S. cities. The longitudinal, partner-reported design provides a stronger test of whether daughters uniquely relate to increases in fathers' pair-bond-relevant behavior. To distinguish pair-bond maintenance from general parenting, we examined both partner support (behaviors toward the mother) and parenting support (co-parenting/child-focused behavior). Consistent with our framework, we predicted that fathers of daughters would show greater partner support but not greater parenting support than fathers of sons.

9. Methods

9.1. Sample selection

Couples in the FFCWS were interviewed shortly after the focal child's

birth and at ages 1, 3, 5, and 9. Consistent with study 1, we retained couples with no other biological children at baseline or during the study period and with an intact parental relationship at baseline. The final analytic sample consisted of 587 couples (306 boys, 281 girls).

9.2. Partner support

At Waves 1–5, mothers and fathers each reported partner-directed

support using four items assessing fairness/compromise, affection, encouragement, and criticism (1–3). Because these items were not from a standardized scale, we conducted a confirmatory factor analysis, which supported a single-factor structure across parents and waves (all loadings $p < .001$; see Tables S1-S2). These items were combined into a mean composite for each parent at each wave, ($\alpha = 0.51-0.79$).

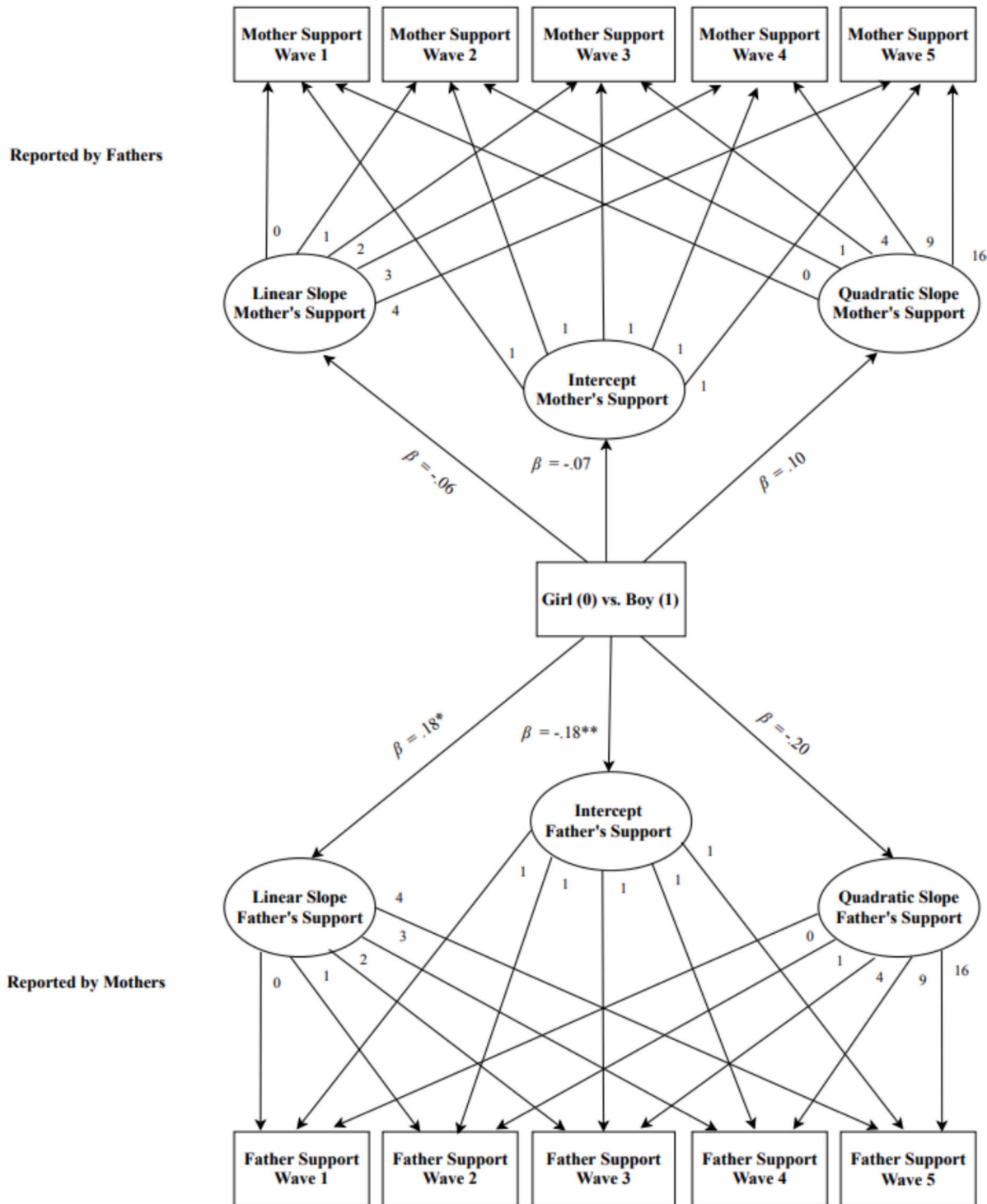


Fig. 2. Effects of having a daughter versus a son on mothers' (as rated by fathers) and fathers' (as rated by mothers) partner support measured in the Fragile Families and Child Wellbeing Study (Study 2). Ovals represent latent factors; rectangles represent observed variables. Not shown here are correlations modeled between all latent factors and covariates included in the model. * $p < .05$, ** $p < .01$.

9.3. Parental support

To test whether daughter effects were specific to pair-bond maintenance rather than general parenting, we examined partner-reported parental support at Waves 2–4 using five items assessing co-parenting and child-focused support (e.g., trust in care, respect for parenting rules; 1–4). Confirmatory factor analyses supported a single-factor structure across parents and waves (all loadings $p < .001$; Tables S1–S2). Items were averaged to form parent-specific composites at each wave ($\alpha s = 0.72$ – 0.88).

9.4. Data analysis plan

Longitudinal partner- and parenting-support trajectories were analyzed using parallel-process latent growth models (see Fig. 2) estimating mothers' and fathers' trajectories simultaneously, accounting for repeated measures nested within individuals and couples. Models included latent intercepts and slopes (quadratic for partner support; linear for parenting support) predicted by child sex and covariates (parent age, marital status, relationship status across waves, poverty ratio, and child co-residence). Missing data were handled with full information maximum likelihood. Model fit was evaluated using standard SEM indices (CFI, RMSEA, SRMR; Tables S1–S2).

10. Results

10.1. Partner support

Consistent with predictions, child sex significantly predicted mothers' perceptions of fathers' partner support at baseline: mothers of daughters reported receiving more partner support from fathers than mothers of sons ($\beta = -0.18$, $SE = 0.07$, $p = .006$). Child sex also predicted the linear rate of change over time ($\beta = 0.18$, $SE = 0.08$, $p = .03$), such that perceived support from fathers of sons increased with child age across waves, gradually narrowing the initial gap. The quadratic slope was nonsignificant. Standardized coefficients and covariate effects for all models are reported in Table S3.

In contrast, child sex did not predict fathers' perceptions of mothers' partner support at baseline or change over time (all $ps > 0.30$), indicating that the effect of daughter presence was specific to fathers' behavior as perceived by mothers.

To assess robustness, the model was re-estimated retaining only significant covariates (marital status at baseline, relationship status across waves, and child co-residence). Results were consistent with the full model: fathers of daughters were perceived as more supportive at baseline ($\beta = -0.16$, $SE = 0.06$, $p = .01$), and no effects of child sex emerged for changes in partner support over time or for mothers' partner support.

Together, these findings indicate that fathers of daughters were perceived as more supportive early after childbirth, with differences attenuating over time.

10.2. Parental support

Table S4 presents results for models predicting parental support. Contrary to partner support findings, child sex did not predict parental support. Child sex was unrelated to mothers' perceptions of fathers' parenting support or fathers' perceptions of mothers' parenting support at baseline or across time (all $ps > 0.25$).

This pattern remained unchanged in models retaining only significant covariates (father age, child co-residence, and relationship status). Child sex did not predict either intercepts or slopes for parental support for mothers or fathers (all $ps > 0.10$). Thus, the presence of a daughter was selectively associated with fathers' partner-directed support, rather than with parenting or co-parenting behaviors more broadly.

11. Discussion

Study 2 found that mothers perceived fathers of daughters (vs. sons) as more supportive partners, but not more supportive parents. In the model including all covariates, the daughter-linked difference in partner support appeared to diminish as children approached age nine, primarily because support from fathers of sons increased at a higher rate than from fathers of daughters. However, in the reduced model that included only significant covariates, the greater partner support from fathers of daughters remained stable over time (i.e., there were no daughter-based differences in change over time among fathers).

No associations emerged between child sex and fathers' perceptions of mothers' support, indicating that daughter effects were specific to paternal, rather than maternal, relational behavior. These findings suggest that daughters may preferentially relate to differences in fathers' investment in the romantic pair-bond rather than in parenting support.

12. Study 3: how child sex is associated with change in fathers' mating psychology during the transition to parenthood

Because Studies 1 and 2 cannot rule out the possibility that the association between child sex and paternal pair-bond motivation reflects pre-existing individual differences such as evidence that men with more restricted sociosexual orientations are more likely to father daughters (Gangestad & Simpson, 1990; Kanazawa & Apari, 2009), study 3 tested the focal hypothesis using within-person change from before to after a child's birth. Using longitudinal data from a transition-to-parenthood cohort that followed first-time parents from late pregnancy to two years postnatal (Rholes et al., 2011), we examined whether the birth of a daughter, compared to a son, was associated with pre-to-postpartum differences in fathers' romantic attachment, commitment, and partner-directed support. We predicted that fathers of daughters would show greater increases in partner-directed support but not parenting-focused support, thereby isolating effects specific to the pair-bond rather than reflecting a general increase in positive caregiving.

13. Materials and methods

The analyses for study 3 were pre-registered (https://aspredicted.org/RPG_5W8).

13.1. Sample selection

Heterosexual couples expecting their first biological child were recruited from childbirth classes and doctor's offices when the mothers were in their last trimester of pregnancy. Each partner completed self-report questionnaires at 6 weeks prenatal and then when their child was 6, 12, 18, and 24 months old. Couples were excluded if they did not report the sex of their child after childbirth. This resulted in 168 couples (who in total had 91 boys and 77 girls).

13.2. Attachment anxiety and avoidance

Romantic attachment to the partner (the other parent) was assessed by the Experiences in Close Relationships Relationship-Specific scale (ECR; Brennan et al., 1998), comprising of two 18-item subscales (anxiety, avoidance; 1–7). Subscales showed excellent reliability across waves (anxiety $\alpha = 0.90$ – 0.96 ; avoidance $\alpha = 0.84$ – 0.96) and were averaged separately.

13.3. Relationship satisfaction

Participants' satisfaction with their partner/relationship (the other parent of their child) was assessed by the Dyadic Adjustment Scale (DAS; 10 items; 1–6; Spanier, 1976). Reliability was good across waves ($\alpha = 0.81$ – 0.89), and items were averaged.

13.4. Partner support

Partner-directed support was assessed using the Social Support Questionnaire (SSQ; 7 items; 1–7; Sarason et al., 1983). Reliability was very good across waves ($\alpha = 0.88\text{--}0.93$), and items were averaged.

13.5. Childcare satisfaction

Parenting-focused satisfaction was assessed with the Childcare Satisfaction Inventory (12 items; 1–5; Pistrang, 1984). The prenatal wave assessed anticipated satisfaction. Reliability was excellent across waves ($\alpha = 0.90\text{--}0.95$), and items were averaged.

13.6. Data analysis plan

Models followed the study 2 parallel-process latent growth framework, estimating mothers' and fathers' trajectories simultaneously. Because quadratic change was not supported in study 2, only linear slopes were estimated (Table S5). The prenatal assessment was specified as the intercept, allowing tests of pre-birth differences, and child sex predicted intercepts and slopes. Baseline covariates included parent age, marital status, and household income.

14. Results

14.1. Attachment anxiety

Results revealed that the sex of the child did not significantly predict the intercepts of relationship-specific attachment anxiety before childbirth of mothers ($\beta = 0.22, SE = 0.17, t = 1.27, p = .20, 95\% CI = [-0.12, 0.56]$) or fathers ($\beta = -0.24, SE = 0.15, t = -1.64, p = .10, 95\% CI = [-0.53, 0.05]$). It also did not predict the slope of relationship-specific attachment anxiety of mothers ($\beta = -0.04, SE = 0.04, t = -1.00, p = .32, 95\% CI = [-0.13, 0.04]$). However, sex of the child did

significantly predict the linear slope of relationship-specific attachment anxiety of fathers ($\beta = 0.14, SE = 0.04, t = 3.32, p = .001, 95\% CI = [0.06, 0.23]$). Before the birth of their first child, mothers and fathers of sons or daughters did not significantly differ in their relationship-specific attachment anxiety. However, after the birth of their child, attachment anxiety was significantly higher among fathers of sons compared to fathers of daughters. While this appeared to be driven primarily by decreases in attachment anxiety among fathers with daughters (see Fig. 3, Panel A), there was also a modest increase among fathers with sons.

14.2. Attachment avoidance

Results revealed that the sex of the child did not significantly predict the intercepts of relationship-specific attachment avoidance before childbirth of mothers ($\beta = 0.09, SE = 0.11, t = 0.85, p = .40, 95\% CI = [-0.12, 0.31]$) or fathers ($\beta = -0.07, SE = 0.13, t = -0.57, p = .57, 95\% CI = [-0.33, 0.18]$). It also did not predict the slope of relationship-specific attachment avoidance of mothers ($\beta = 0.02, SE = 0.03, t = 0.65, p = .52, 95\% CI = [-0.04, 0.08]$). However, the sex of the child did significantly predict the linear slope of relationship-specific attachment avoidance of fathers ($\beta = 0.10, SE = 0.04, t = 2.66, p = .007, 95\% CI = [0.03, 0.17]$). No pre-birth differences by child sex emerged for mothers or fathers on relationship-specific attachment avoidance. After the birth of their child, however, fathers of daughters were less avoidantly attached to their partner over time compared to fathers of sons. Although there appeared to be a small decrease in attachment avoidance in fathers with daughters, postnatal differences were driven in large part by fathers of sons become more avoidantly attached in their relationships after their child's birth (see Fig. 3, Panel B).

14.3. Relationship satisfaction

Results revealed that the sex of the child did not significantly predict

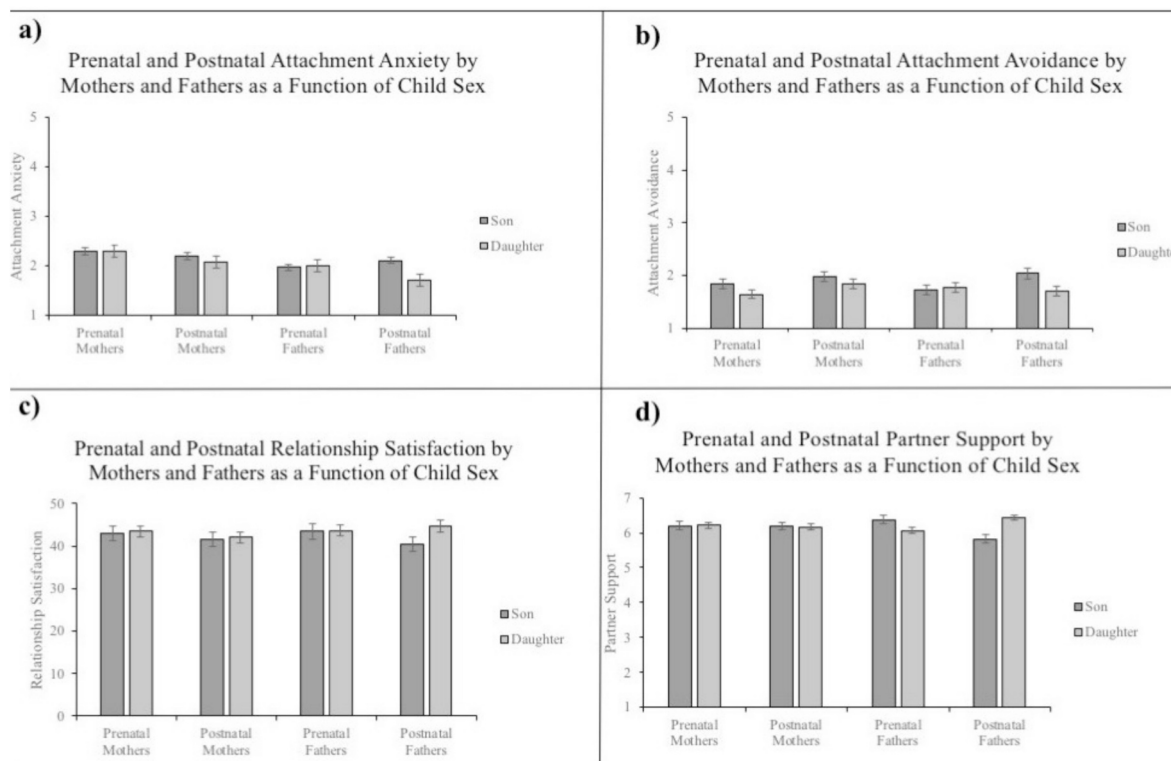


Fig. 3. Summary of Study 3 results from the prenatal measure to the first postnatal measure. Attachment anxiety (a), attachment avoidance (b), relationship satisfaction (c), and partner support. Error bars indicate standard errors of the mean.

the intercepts of relationship satisfaction before childbirth of mothers ($\beta = -1.40$, $SE = 0.74$, $t = -1.87$, $p = .06$, 95% CI = [-2.87, 0.07]) or fathers ($\beta = -0.80$, $SE = 0.77$, $t = -1.04$, $p = .30$, 95% CI = [-2.31, 0.71]), nor did it predict the slope of relationship satisfaction of mothers ($\beta = 0.03$, $SE = 0.22$, $t = 0.14$, $p = .89$, 95% CI = [-0.41, 0.47]). However, the sex of the child did significantly predict the linear slope of relationship satisfaction of fathers ($\beta = -0.79$, $SE = 0.27$, $t = -2.88$, $p = .004$, 95% CI = [-1.32, -0.25]). No pre-birth differences by child sex emerged for mothers or fathers emerged here as well. However, after the birth of their child, fathers of daughters reported greater relationship satisfaction than fathers of sons. Interestingly, plots of fathers' pre- and postnatal means (see Fig. 3, Panel C) suggest that differences in satisfaction by child sex were driven by decreases among fathers of sons. Relationship satisfaction for fathers of daughters, on the other hand, remained relatively stable from before to after the birth of their children.

14.4. Partner support

Results revealed that the sex of the child did not significantly predict the intercepts of perceived enacted partner support before childbirth of mothers ($\beta = -0.22$, $SE = 0.13$, $t = -1.76$, $p = .08$, 95% CI = [-0.47, 0.03]) or fathers ($\beta = 0.14$, $SE = 0.11$, $t = 1.19$, $p = .24$, 95% CI = [-0.08, 0.36]). It also did not predict the slope of enacted partner support of mothers ($\beta = -0.05$, $SE = 0.04$, $t = 1.42$, $p = .16$, 95% CI = [-0.02, 0.12]). However, the sex of the child did significantly predict the linear slope of enacted partner support of fathers ($\beta = -0.15$, $SE = 0.04$, $t = -3.61$, $p < .001$, 95% CI = [-0.23, -0.07]). As before, no pre-birth differences by child sex emerged for mothers or fathers emerged. However, after the birth of their child, partner support was greater among fathers of daughters than fathers of sons. As is shown in Fig. 3 (Panel D), postnatal differences in partner support among fathers was driven by both decreases in support from fathers of sons and increases from fathers of daughters.

14.5. Childcare satisfaction

Results revealed that the sex of the child did not significantly predict the intercepts of childcare satisfaction before childbirth of mothers ($\beta = -0.04$, $SE = 0.11$, $t = -0.37$, $p = .71$, 95% CI = [-0.26, 0.18]) or fathers ($\beta = -0.09$, $SE = 0.11$, $t = -0.80$, $p = .42$, 95% CI = [-0.31, 0.12]), nor did it predict the slopes of childcare satisfaction of mothers ($\beta = -0.01$, $SE = 0.03$, $t = -0.37$, $p = .71$, 95% CI = [-0.06, 0.04]) or fathers ($\beta = -0.02$, $SE = 0.03$, $t = -0.67$, $p = .50$, 95% CI = [-0.07, 0.04]). Specifically, before and after the birth of their child, mothers and fathers of sons and mothers and fathers of daughters did not significantly differ in their childcare satisfaction.

Fig. 3 reports the means for the four focal dependent measures. For all analyses, the effect of having a daughter on fathers' pair-bond support did not appreciably diminish as their child got older.

15. Discussion

Study 3 revealed that fathers of daughters reported greater attachment security, relationship satisfaction, and partner support than fathers of sons across the postnatal period—differences that did not emerge for mothers. These patterns were driven by divergent within-person changes: attachment anxiety decreased from pre- to postnatal among fathers of daughters but remained stable for fathers of sons, while relationship satisfaction remained stable for fathers of daughters but declined for fathers of sons. Together, these findings suggest that fatherhood involves a reconfiguration of pair-bond motivation that is sensitive to child sex.

These results are consistent with evolutionary perspectives proposing that fathers maintain or increase relationship investment in the presence of daughters, given daughters' heightened sensitivity to cues of long-term male investment. One potential mechanism involves

endocrine changes associated with fathering daughters, such as testosterone decline (Gettler et al., 2011; Grebe et al., 2019), though this remains to be directly tested. Notably, daughter birth was not associated with changes in parenting satisfaction, suggesting the observed effects were specific to romantic pair-bonding rather than reflecting broader increases in caregiving engagement.

16. General discussion

Across three studies, we found that having a daughter was associated with stronger paternal pair-bond perceptions and behavior toward the biological mother. Fathers of daughters reported higher attachment security and higher relationship quality and partner-directed support, and longitudinal analyses showed daughter-linked increases in paternal bonding across the transition-to-parenthood. No parallel effects emerged for mothers.

One plausible alternative account is that men with fewer sexual partners and more restricted sociosexual orientations are more likely to have daughters (Gangestad & Simpson, 1990). Under this selection-based account, preexisting individual differences between fathers of daughters versus sons could explain the observed effects. However, study 3 demonstrated that daughter presence was associated with increases in paternal bonding behaviors from the prenatal to the postnatal period, which reduces the possibility that the pattern was driven solely by baseline individual differences.

An important question concerns developmental timing. Study 2 suggested that the effect of child sex on fathers' partner-directed support may weaken as daughters age, mirroring sensitive periods in the father-absence literature in which early childhood is a particularly consequential window for paternal investment (Alvergne et al., 2008; Ellis et al., 2003). If daughter-linked increases in pair-bond motivation are strongest early in development, this may help reconcile our findings with prior research showing that parents of first-born daughters face slightly elevated divorce risk (Dahl & Moretti, 2008; Morgan et al., 1988)—consistent with the idea that daughters most strongly elicit paternal pair-bond motivation when cues of investment are most diagnostic and costs of disengagement are greatest.

Socioeconomic status, alloparenting, and cultural context may moderate the focal effect. Although poorer environmental conditions are associated with greater parental investment in daughters relative to sons (Trivers & Willard, 1973), evidence for Trivers-Willard effects in humans remains mixed (Thouzeau et al., 2023). Critically, daughter presence should uniquely influence fathers' mating psychology and partner-directed maintenance rather than producing broad differences in general parenting—as cues of long-term male investment may offer daughters more protection than most changes in day-to-day parenting practices (Mendle et al., 2016).

Several mechanisms may account for these effects. Having a daughter may lead men to prioritize pair-bond maintenance because stable male investment is particularly consequential for daughters' reproductive outcomes given women's greater energetic investment in reproduction (Geary, 2000; Trivers, 1972). Alternatively, daughter birth may trigger endocrine shifts that facilitate bond-maintaining behavior—fatherhood is associated with testosterone decline linked to caregiving and pair-bonding motivation (Gettler et al., 2011; Grebe et al., 2019), though whether child sex moderates this effect remains untested.

The specificity observed in study 2—where daughter presence predicted partner support but not parenting support—suggests the effect is tied to romantic relationship maintenance rather than generalized increases in paternal prosociality, consistent with theories of conditional and evoked responses positing that offspring characteristics activate distinct motivational systems (Buss & Schmitt, 1993; Del Giudice, 2011). Alternative social mechanisms also remain plausible: daughters may evoke cultural norms surrounding protection, alter perceived family vulnerability, or shift relational expectations within couples—proximate pathways through which these functional outcomes may be

realized (Hrdy, 2005).

Overall, the present work extends paternal investment theory by proposing a reciprocal pathway: daughters may not only be shaped by paternal investment but also cue fathers to strengthen pair-bond stability. Because daughters' reproductive success depends heavily on reliable male investment (Gangestad & Simpson, 2000; Geary, 2000), fathers may be motivated to maintain relationship stability when a daughter is present—integrating evolutionary accounts of parental investment with relationship science models of commitment and attachment (Le & Agnew, 2003; Murray et al., 2015; Rusbult, 1983; Rusbult et al., 2001).

16.1. Limitations and future directions

Much of the father-absence literature has focused on contemporary Western populations (Webster et al., 2014), and anthropological evidence suggests that father absence is not consistently associated with accelerated reproduction in daughters — and may even be linked to delayed reproduction in some non-Western and hunter-gatherer populations (Sear et al., 2019). Because humans are cooperative breeders, father absence may exert weaker or qualitatively different effects where alternative investment sources are available (Hrdy, 2005; Sear & Mace, 2008).

Cultural norms may also moderate daughter-related increases in paternal pair-bonding. In some societies fathers play key roles in reproductive matchmaking, with father absence associated with later age at first birth (Allal et al., 2004); in others, such as China, strong son preference may attenuate or reverse the predicted pattern (Coale & Banister, 1994). How cultural valuation of offspring sex interacts with evolved motivational systems remains an important direction for future work, as does whether sibling sex composition moderates daughter effects and whether similar patterns emerge in non-heterosexual partnerships.

Taken together, these studies suggest that offspring sex may function not only as an outcome of parental investment processes but as an input that relates to variation in fathers' pair-bond psychology in theoretically meaningful ways—a reciprocal dynamic with implications for understanding family stability.

CRedit authorship contribution statement

Krystal Duarte: Writing – review & editing, Writing – original draft. **Kristina M. Durante:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Jeffrey Gassen:** Writing – original draft, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Americus Reed:** Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Steven Rholes:** Writing – original draft, Formal analysis, Data curation, Conceptualization. **Jeffrey A. Simpson:** Writing – original draft, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2026.113901>.

Data availability

Data will be made available on request.

References

- Allal, N., et al. (2004). An evolutionary model of stature, age at first birth and reproductive success in Gambian women. *Proceedings of the Royal Society of London B*, 271, 465–470.
- Alvarado, L. C., Muller, M. N., Eaton, M. A., et al. (2018). Steroid hormone reactivity in fathers watching their children compete. *Human Nature*, 29, 268–282. <https://doi.org/10.1007/s12110-018-9318-2>
- Alvergne, A., Faurie, C., & Raymond, M. (2008). Developmental plasticity of human reproductive development: Effects of early family environment in modern-day France. *Physiology & Behavior*, 95, 625–632.
- Amato, P. R., & Sobolewski, J. M. (2004). The effects of divorce and marital discord on adult children's psychological well-being. *American Sociological Review*, 69(6), 895–914. <https://doi.org/10.1177/000312240406900604>
- Apostolou, M. (2012). Sexual selection under parental choice: The role of parents in mating and reproduction. *Evolutionary Psychology*, 10(1), Article 147470491201000104. <https://doi.org/10.1177/147470491201000104>
- Apostolou, M., & Papageorgi, I. (2014). Parental mate choice manipulation tactics: Exploring prevalence, sex and personality effects. *Evolutionary Psychology*, 12(3), Article 147470491401200305. <https://doi.org/10.1177/147470491401200305>
- Belsky, J. (2012). The development of human reproductive strategies: Progress and prospects. *Current Directions in Psychological Science*, 21(5), 310–316. <https://doi.org/10.1177/0963721412453588>
- Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization. *Child Development*, 62, 647–670.
- Bogaert, A. F. (2008). Menarche and father absence in a national probability sample. *Journal of Biosocial Science*, 40(4), 623–636. <https://doi.org/10.1017/S0021932007002386>
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). The Guilford Press.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100(2), 204–232. <https://doi.org/10.1037/0033-295X.100.2.204>
- Coale, A., & Banister, J. (1994). Five decades of missing females in China. *Demography*, 31, 459–479.
- Coley, R. L., Votruba-Drzal, E., & Schindler, H. S. (2009). Fathers' and mothers' parenting predicting and responding to adolescent sexual risk behaviors. *Child Development*, 80, 808–827.
- Dahl, G. B., & Moretti, E. (2008). The demand for sons. *The Review of Economic Studies*, 75(4), 1085–1120.
- Davis, E. C., & Friel, L. V. (2001). Adolescent sexuality: Disentangling the effects of family structure and family context. *Journal of Marriage and Family*, 63(3), 669–681. <https://doi.org/10.1111/j.1741-3737.2001.00669.x>
- Del Giudice, M. (2011). Sex differences in romantic attachment: A meta-analysis. *Personality and Social Psychology Bulletin*, 37(2), 193–214. <https://doi.org/10.1177/0146167210392789>
- DelPriore, D. J., & Hill, S. E. (2013). The effects of paternal disengagement on women's sexual decision making: An experimental approach. *Journal of Personality and Social Psychology*, 105(2), 234–246. <https://doi.org/10.1037/a0032784>
- DelPriore, D. J., Proffitt Leyva, R., Ellis, B. J., & Hill, S. E. (2018). The effects of paternal disengagement on women's perceptions of male mating intent. *Journal of Personality and Social Psychology*, 114(2), 286.
- DelPriore, D. J., & Reeder, R. (2025). Quality of paternal investment and adult sons' beliefs about romantic relationships. *Evolutionary Psychological Science*, 11(1), 65–75. <https://doi.org/10.1007/s40806-025-00426-6>
- DelPriore, D. J., Schlomer, G. L., & Ellis, B. J. (2017). Impact of fathers on parental monitoring of daughters and their affiliation with sexually promiscuous peers: A genetically and environmentally controlled sibling study. *Developmental Psychology*, 53(7), 1330–1343. <https://doi.org/10.1037/dev0000327>
- DelPriore, D. J., Shakiba, N., Schlomer, G. L., Hill, S. E., & Ellis, B. J. (2019). The effects of fathers on daughters' expectations for men. *Developmental Psychology*, 55(7). <https://doi.org/10.1037/dev0000741>
- Dinh, T., Haselton, M. G., & Gangestad, S. W. (2022). "Fast" women? The effects of childhood environments on women's developmental timing, mating strategies, and reproductive outcomes. *Evolution and Human Behavior*, 43(2), 133–146. <https://doi.org/10.1016/j.evolhumbehav.2021.12.001>
- D'Onofrio, B. M., Turkheimer, E., Emery, R. E., Slutske, W. S., Heath, A. C., Madden, P. A., & Martin, N. G. (2006). A genetically informed study of the processes underlying the association between parental marital instability and offspring adjustment. *Developmental Psychology*, 42, 486–499.
- Draper, P., & Harpending, H. (1982). Father absence and reproductive strategy: An evolutionary perspective. *Journal of Anthropological Research*, 38, 255–273.
- Ellis, B. J. (2004). Timing of pubertal maturation in girls: An integrated life history approach. *Psychological Bulletin*, 130, 920–958.
- Ellis, B. J., Bates, J. E., Dodge, K. A., Fergusson, D. M., Horwood, L. J., Pettit, G. S., & Woodward, L. (2003). Does father absence place daughters at special risk for early sexual activity and teenage pregnancy? *Child Development*, 74, 801–821.
- Ellis, B. J., McFadyen-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Quality of early family relationships and individual differences in the timing of pubertal maturation in girls: A longitudinal test of an evolutionary model. *Journal of Personality and Social Psychology*, 77, 387–401.
- Ellis, B. J., Schlomer, G. L., Tilley, E. H., & Butler, E. A. (2012). Impact of fathers on risky sexual behavior in daughters: A genetically and environmentally controlled sibling study. *Development and Psychopathology*, 24, 317–332.

- Fletcher, G. J., Simpson, J. A., & Thomas, G. (2000). The measurement of perceived relationship quality components: A confirmatory factor analytic approach. *Personality and Social Psychology Bulletin*, 26(3), 340–354.
- Gaml-Sørensen, A., Brix, N., Ernst, A., Lunddorf, L. L. H., & Ramlau-Hansen, C. H. (2021). Father absence in pregnancy or during childhood and pubertal development in girls and boys: A population-based cohort study. *Child Development*, 92(4), 1494–1508. <https://doi.org/10.1111/cdev.13488>
- Gangestad, S. W., & Simpson, J. A. (1990). Toward an evolutionary history of female sociosexual variation. *Journal of Personality*, 58(1), 69–96. <https://doi.org/10.1111/j.1467-6494.1990.tb00908.x>
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, 23(4), 573–587.
- Geary, D. C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin*, 126(1), 55–77. <https://doi.org/10.1037/0033-2909.126.1.55>
- Geary, D. C., & Flinn, M. V. (2001). Evolution of human parental behavior and the human family. *Parenting: Science and Practice*, 1(1–2), 5–61. <https://doi.org/10.1080/15295192.2001.9681209>
- Gettler, L. T., McDade, T. W., Feranil, A. B., & Kuzawa, C. W. (2011). Longitudinal evidence that fatherhood decreases testosterone in human males. *Proceedings of the National Academy of Sciences*, 108(39), 16194–16199. <https://doi.org/10.1073/pnas.1105403108>
- Grebe, N. M., Sarafin, R. E., Strenth, C. R., & Zilioli, S. (2019). Pair-bonding, fatherhood, and the role of testosterone: A meta-analytic review. *Neuroscience & Biobehavioral Reviews*, 98, 221–233. <https://doi.org/10.1016/j.neubiorev.2019.01.010>
- Hamilton, W. D. (1964). The genetical evolution of social behaviour I. *Journal of Theoretical Biology*, 7(1), 1–16. [https://doi.org/10.1016/0022-5193\(64\)90038-4](https://doi.org/10.1016/0022-5193(64)90038-4)
- Harper, C., & McLanahan, S. (2004). Father absence and youth incarceration. *Journal of Research on Adolescence*, 14(3), 369–397. <https://doi.org/10.1111/j.1532-7795.2004.00079.x>
- Helman, J. A., & Salmon, C. A. (2019). Sex-specific developmental effects of father absence on casual sexual behavior and life history strategy. *Evolutionary Psychological Science*, 5(1), 121–130. <https://doi.org/10.1007/s40806-018-0173-5>
- Helman, J. A., & Salmon, C. A. (2021). Differences between behavior and maturation: Developmental effects of father absence. *Adaptive Human Behavior and Physiology*, 7(2), 166–182. <https://doi.org/10.1007/s40750-021-00166-4>
- Hrdy, S. B. (2005). Evolutionary context of human development: The cooperative breeding model. In C. S. Carter, L. Ahnert, K. E. Grossmann, S. B. Hrdy, M. E. Lamb, S. W. Porges, & N. Sachser (Eds.), *Attachment and bonding: A new synthesis* (pp. 9–32). Boston Review.
- James, J., et al. (2012). Sex-specific pathways to early puberty, sexual debut, and sexual risk taking: Tests of an integrated evolutionary-developmental model. *Developmental Psychology*, 48, 687–702.
- Kanazawa, S., & Apari, P. (2009). Sociosexually unrestricted parents have more sons: A further application of the generalized Trivers–Willard hypothesis (gTWH). *Annals of Human Biology*, 36(3), 320–330.
- Lamb, M. E. (Ed.). (2004). *The role of the father in child development* (4th ed.). Wiley.
- Le, B., & Agnew, C. R. (2003). Commitment and its theorized determinants: A meta-analysis of the investment model. *Personal Relationships*, 10(1), 37–57.
- Mackey, W. C., & Coney, N. S. (2000). The enigma of father presence in relationship to sons' violence and daughters' mating strategies: Empiricism in search of a theory. *Journal of Men's Studies*, 8, 349–373.
- Maestripieri, D., Roney, J. R., DeBias, N., Durante, K. M., & Spaepen, G. M. (2004). Father absence, menarche and interest in infants among adolescent girls. *Developmental Science*, 7, 560–566.
- McLanahan, S., Tach, L., & Schneider, D. (2013). The causal effects of father absence. *Annual Review of Sociology*, 39(1), 399–427.
- McWayne, C., Downer, J. T., Campos, R., & Harris, R. D. (2013). Father involvement during early childhood and its association with children's early learning: A metaanalysis. *Early Education and Development*, 24(6), 898–922. <https://doi.org/10.1080/10409289.2013.746932>
- Mendle, J., Ryan, R. M., & McKone, K. M. (2016). Early childhood maltreatment and pubertal development: Replication in a population-based sample. *Journal of Research on Adolescence*, 26(3), 595–602. <https://doi.org/10.1111/jora.12201>
- Mendle, J., et al. (2009). Associations between father absence and age of first sexual intercourse. *Child Development*, 80(5), 1463–1480. <https://doi.org/10.1111/j.1467-8624.2009.01345.x>
- Mikulincer, M., & Shaver, P. R. (2007). Boosting attachment security to promote mental health, prosocial values, and inter-group tolerance. *Psychological Inquiry*, 18(3), 139–156.
- Moffitt, T. E., et al. (1992). Childhood experience and the onset of menarche: A test of a sociobiological model. *Child Development*, 63, 47–58.
- Morgan, et al. (1988). Sons, daughters, and the risk of marital disruption. *American Journal of Sociology*, 94(1), 110–129.
- Murray, S. L., Holmes, J. G., Griffin, D. W., & Derrick, J. L. (2015). The equilibrium model of relationship maintenance. *Journal of Personality and Social Psychology*, 108(1), 93–113. <https://doi.org/10.1037/pspi0000004>
- Perilloux, C., Fleischman, D. S., & Buss, D. M. (2008). Meet the parents: Parent-offspring convergence and divergence in mate preferences. *Personality and Individual Differences*, 45(7), 678–682. <https://doi.org/10.1016/j.paid.2008.07.015>
- Pistrang, N. (1984). Women's work involvement and the experience of new motherhood. *Journal of Marriage and Family*, 46, 433–447. <https://doi.org/10.2307/352475>
- Reichman, N. E., et al. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, 23(4–5), 303–326.
- Rholes, W. S., et al. (2011). Attachment orientations and depression: A longitudinal study of new parents. *Journal of Personality and Social Psychology*, 100, 567–586.
- Rusbult, C. E. (1983). A longitudinal test of the investment model: The development (and deterioration) of satisfaction and commitment in heterosexual involvements. *Journal of Personality and Social Psychology*, 45, 101–117.
- Rusbult, C. E., Olson, N., Davis, J. L., & Hannon, M. A. (2001). Commitment and relationship maintenance mechanisms. In J. M. Harvey, & A. E. Wenzel (Eds.), *Close romantic relationships: Maintenance and enhancement* (pp. 87–113). Mahwah, NJ: Erlbaum.
- Salmon, C. A., & Helman, J. A. (2018). Second to fourth digit ratio (2D:4D), tomboyism, and temperament. *Personality and Individual Differences*, 123, 131–134. <https://doi.org/10.1016/j.paid.2017.11.017>
- Sarason, I. G., et al. (1983). Assessing social support: The social support questionnaire. *Journal of Personality and Social Psychology*, 44, 127–139.
- Sear, R., & Mace, R. (2008). Who keeps children alive? A review of the effects of kin on child survival. *Evolution and Human Behavior*, 29, 1–18.
- Sear, R., et al. (2019). Cross-cultural evidence does not support universal acceleration of puberty in father-absent households. *Philosophical Transactions of the Royal Society B*, 374, 1–14.
- Sheppard, P., & Sear, R. (2012). Father absence predicts age at sexual maturity and reproductive timing in British men. *Biology Letters*, 8(2), 237–240.
- Silk, J. B. (1987). Social behavior in evolutionary perspective. *Behavioral and Brain Sciences*, 10(3), 434–435. <https://doi.org/10.1017/S0140525X00054639>
- Simpson, J. A., & Rholes, W. S. (2017). Adult attachment, stress, and romantic relationships. *Current Opinion in Psychology*, 13, 19–24. <https://doi.org/10.1016/j.copsyc.2016.04.006>
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, 38, 15–28. <https://doi.org/10.2307/350547>
- Tancredy, C. M., & Fraley, R. C. (2006). The nature of adult twin relationships: An attachment-theoretical perspective. *Journal of Personality and Social Psychology*, 90(1), 78.
- Thouzeau, V., Bollée, J., Cristia, A., & Chevallier, C. (2023). Decades of Trivers-Willard research on humans: What conclusions can be drawn? *Evolution and Human Behavior*, 44(4), 324–331. <https://doi.org/10.1016/j.evolhumbehav.2023.03.005>
- Tither, J. M., & Ellis, B. J. (2008). Impact of fathers on daughters' age at menarche: A genetically and environmentally controlled sibling study. *Developmental Psychology*, 44(5), 1409–1420.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. G. Campbell (Ed.), *Sexual selection and the descent of man: 1871–1971* (pp. 136–179). Chicago, IL: Aldine.
- Trivers, R. L., & Willard, D. E. (1973). Natural selection of parental ability to vary the sex ratio of offspring. *Science*, 179, 90–92.
- Valge, M., Meitern, R., & Hörak, P. (2022). Pubertal maturation is independent of family structure but daughters of divorced (but not dead) fathers start reproduction earlier. *Evolution and Human Behavior*, 43(2), 107–114.
- Webster, G. D., Graber, J. A., Gesselman, A. N., Crosier, B. S., & Schember, T. O. (2014). A life history theory of father absence and menarche: A meta-analysis. *Evolutionary Psychology*, 12(2), Article 147470491401200202.