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The Effects of Paternal Disengagement on Women's Perceptions of Male Mating Intent

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Previous research demonstrates reliable associations between low paternal investment and daughters' precocious and risky sexual behavior. However, little is known about the psychological changes that occur in response to paternal disengagement that encourage these patterns. Here, we aim to redress this empirical gap by testing the effects of paternal disengagement on women's perceptions of male mating intent. In 4 experiments, women who described their fathers' absence (vs. a comparison state) perceived greater mating intent in the described actions of a hypothetical dating partner (Study 1), sexual arousal in male target faces (Studies 2 and 3), and mating interest from a male confederate (Study 4). In a mixed-methods study (Study 5), women with greater developmental exposure to harsh-deviant paternal behavior perceived greater sexual intent in men's actions than women with lesser exposure. Moreover, these perceptual differences predicted unrestricted sociosexuality among women in this sample. An internal meta-analysis ($N = 408$) across studies provided support for a relationship between paternal disengagement and women's perceptions of male sexual intent. Together, this research suggests that low paternal investment (including primed paternal disengagement and harsh-deviant fathering) causes changes in daughters' perceptions of men that may influence their subsequent mating behavior.

Keywords: mating intent, paternal disengagement, paternal investment theory, sexual perceptions, women's sociosexuality

Supplemental materials: <http://dx.doi.org/10.1037/pspi0000113.supp>

Over the past four decades, empirical studies have provided consistent evidence that fathers play a critical role in shaping daughters' developmental, sexual, and reproductive outcomes. This research suggests that the amount and quality of investment that a daughter receives from her father help to adjust the age at which she becomes sexually mature, first engages in sexual activity, and begins to reproduce. Variation in paternal behavior may also produce systematic differences in how young women behave

toward men. In one classic study, Hetherington (1972) examined how growing up without one's biological father relates to daughters' sociosexual behaviors. While interacting with an adult male interviewer (but not a female interviewer), adolescent girls who experienced father absence attributable to divorce stood closer, spoke and smiled more, and exhibited more proceptive nonverbal behavior (e.g., held eye contact longer) compared with girls who experienced father presence or father absence attributable to death.

Despite the extensive body of research demonstrating associations between low paternal investment and daughters' increased sexual proceptivity, empirical studies in this area have primarily assessed risky sexual behavior and related outcomes (early sexual activity, teenage pregnancy, sexually transmitted infections; e.g., Coley, Votruba-Drzal, & Schindler, 2009; Ellis et al., 2003) or shifts in women's explicit sociosexual attitudes that occur in the context of paternal disengagement (see DelPriore & Hill, 2013). Largely missing from this literature are tests of how women's experiences with their fathers shape their perceptions of men. Does low paternal investment lead women to view men in ways that promote unrestricted sexual behavior? In the present work, we begin to address this empirical question by examining the effects of: (a) experimentally activated feelings related to paternal behavior; and (b) developmental experiences with birth fathers on women's perceptions of men's mating intent. We predicted that experiences of paternal disengagement (based on both developmental

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history and experimental primes) would lead women to perceive greater sexual intent in the faces and behaviors of male targets. Such a perceptual shift is theoretically relevant to explaining the link between quality of paternal investment and sociosexual behavior because of its well-established association with sexual approach behaviors (e.g., Howell, Etchells, & Penton-Voak, 2012; Maner et al., 2005). Thus, by testing how and when paternal disengagement impacts women's perceptions of men, the current research aims to provide novel insight into the psychological changes that women incur as the result of low paternal investment.

Paternal Investment Theory and the Effects of Fathers on Daughters' Sexual Behavior

Much research supports the idea that fathers play an important role in shaping their daughters' sociosexual outcomes. Father absence attributable to divorce/separation has been shown to predict daughters': accelerated pubertal development (Alvergne, Faurie, & Raymond, 2008; James, Ellis, Schlomer, & Garber, 2012; see meta-analysis by Webster et al., 2014); early initiation of sexual activity (Davis & Friel, 2001; D'Onofrio et al., 2006; Ellis et al., 2003; James et al., 2012; Quinlan, 2003); higher rates of teenage pregnancy (D'Onofrio et al., 2006; Ellis et al., 2003; Quinlan, 2003); increased engagement in risky sexual behaviors, such as having sex with a greater number of partners and having unprotected sex (Alvergne et al., 2008; Coley et al., 2009; James et al., 2012; Quinlan, 2003); and heightened risk of sexually transmitted infection (Mackey & Coney, 2000). These putative fathering effects on daughters' mating outcomes appear to be most pronounced when physical separation occurs early in life (Alvergne et al., 2008; Ellis et al., 2003; Quinlan, 2003; Vigil & Geary, 2006).

In addition to these well-established overarching effects of the social address of father absence on daughters' sexual outcomes, more fine-grained analyses have shown that lower quality father-daughter relationships are associated with earlier pubertal timing, earlier sexual debut, and increased sexual risk-taking when daughters are reared with their birth father in the home (e.g., Coley et al., 2009; Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999; Ellis, Schlomer, Tilley, & Butler, 2012; Lenciauskiene & Zaboriskis, 2008; Rink, Tricker, & Harvey, 2007). Further, father absence and disengagement appear to exert effects on daughters' sexual development and behavior, independent of the effects of mothers (e.g., Ellis et al., 1999; Manlove, Wildsmith, Ikramullah, Terry-Humen, & Schelar, 2012; reviewed in Guilamo-Ramos et al., 2012). Most notably, the unique effects of fathering (vs. mothering) have been supported in genetically- and environmentally controlled sibling studies examining differential exposure to fathers experienced by sisters as a result of parental separation/divorce (DelPriore, Schlomer, & Ellis, 2017; Ellis et al., 2012; Ryan, 2015; Tither & Ellis, 2008). This research shows that the protective effects of father presence/involvement on daughters' sexual outcomes (e.g., timing of sexual debut, risky sexual behavior, affiliation with sexually promiscuous peers) depends on dosage: Within these families, older sisters (who live with their fathers for longer periods of time) experience greater protective effects than their younger sisters (who live with their fathers for shorter periods of time).

This body of work supports an evolutionary-developmental model of fathering: paternal investment theory (PIT; Draper & Harpending, 1982; Ellis, 2004; Ellis et al., 2003, 2012). According to PIT, the quality of fathering that daughters receive provides information about the availability and reliability of male investment in the local ecology, which girls use to calibrate their mating behavior and expectations for investment from future mates (e.g., leading to less reticence in selecting mates and devaluing long-term relationships in environments characterized by low male parental involvement/investment). PIT thus proposes that fathering quality exerts a unique and targeted causal influence on daughters' sexual and reproductive strategies. Although various developmental theories converge on the hypothesis that childhood exposures to family disruption/father absence and dysfunctional parenting (including dysfunctional fathering) induce emotionally and behaviorally dysregulated functioning among adolescents, including elevated levels of risky sexual behavior (e.g., psychosocial acceleration theory: Belsky, Steinberg, & Draper, 1991; social learning models: Thornton & Camburn, 1987), only PIT posits specific effects of fathering (independent of mothering) in relation to daughters' (more than sons') sexual and reproductive strategies.

Intervening Psychological Processes

A critical research question concerns the proximate psychological changes occurring in the context of father absence/disengagement that potentiate daughters' precocious and unrestricted sexual behavior. Researchers recently began to address this question using experimental methods to test for a causal effect of reminders of paternal disengagement (based on a writing prompt) on women's unrestricted sexual attitudes (DelPriore & Hill, 2013). In this work, women primed with reminders of their father's absence reported more permissive sexual attitudes, greater negativity toward condom use, and a desire to have sex with more partners relative to women primed with relevant comparison states. In line with PIT, similar effects were not demonstrated in response to reminders of maternal disengagement. Further, father disengagement did not increase women's positivity toward nonsexual gratification or risk taking. In addition to extending previous developmental findings, this work provided experimental support for a causal effect of fathers on daughters' sexual decision-making.

Here, we seek to extend this past research by examining the effects of low paternal investment (in comparison to theoretically relevant control conditions) on women's perceptions of male mating intent. On the face of it, it would seem that Person A's perceptions of Person B's sexual and romantic interest would depend almost entirely on the behavioral cues exhibited by Person B. However, because such perceptions play an important role in motivating sexual approach behavior (Haselton & Buss, 2000; Maner et al., 2005), they are often more closely linked to Person A's own sexual motivations than they are to the behavior of Person B. Research supports this view. For example, perceived sexual intent has been shown to effectively track: (a) short-term mating motivation (Howell et al., 2012; Kunstman & Maner, 2011; Lindgren, Parkhill, George, & Hendershot, 2008; Maner et al., 2005); (b) sexual proceptivity (Abbey, 1982; Haselton & Buss, 2000; Lindgren et al., 2008); and (c) sexual attraction to targets (Henningesen & Henningesen, 2010; Koenig, Kirkpatrick, & Ketelaar, 2007; Perilloux, Easton, & Buss, 2012). Thus, for women, infer-

ring greater sexual intent in the faces and behaviors of men should help remove a salient barrier to sexual approach behavior (fear of rejection), thereby encouraging more precocious and unrestricted mating behavior, which is more frequently observed in the context of paternal disengagement (e.g., Coley et al., 2009; Ellis et al., 2003, 2012; van Brummen-Girigori & Buunk, 2016). In total, we conceptualized heightened female perceptions of male sexual intent as an intervening psychological process that should account (in part) for the effect of low paternal investment on daughters' sociosexual outcomes.

The Current Research

Here, we present five studies testing the hypothesis that low paternal investment—experimentally primed (Studies 1–5; Del-Priore & Hill, 2013) or naturally occurring (Study 5)—increases women's perceptions of the sexual interest communicated by men's (a) described dating behaviors, (b) faces, and (c) verbal and nonverbal interaction cues. Based on PIT, we predicted that the effects would be specific to paternal absence/disengagement (as opposed to maternal absence/disengagement) and specific to women's perceptions of *men's* sexual intent (as opposed to perceptions of other women's sexual intent). We also predicted that these perceptions would mediate (at least in part) relations between paternal absence/disengagement and women's sociosexuality. (We did not test the additional prediction from PIT that effects would be specific to daughters versus sons.)

We tested these predictions using varied methods, measures, and samples. In each study, we primed reminders of paternal disengagement (or an ecologically relevant comparison state). This priming procedure was followed by measures assessing women's perceptions of male mating intent. Study 1 assessed perceptions of sexual and romantic intent implied by men's described behaviors. Studies 2–3 assessed perceived sexual arousal in male faces. Study 3 also tested whether the perceptual shifts were specific to male targets or if they would generalize to female targets. Study 4 tested these perceptions in the context of an interaction with a male confederate. Finally, Study 5 examined the relationships between developmental experiences with one's father, primed reminders of the father's behavior, and perceptions of male mating intent among a sample of women who experienced father absence while growing up. Studies 4 and 5 also included measures of women's sociosexuality (observed flirting with the confederate in Study 4 and expressed interest in uncommitted sex in Study 5). This allowed a test of whether perceptions of male mating intent mediate (in part) the relationship between father disengagement (including both experimentally activated feelings and developmental experiences) and women's unrestricted sociosexuality. Lastly, we conducted an internal meta-analysis of the results across studies to examine the robustness of the effects of paternal disengagement on women's perceptions of men's mating intent.

Study 1: Paternal Disengagement and Women's Perceptions of Men's Sexual and Romantic Intent

Study 1 tested whether activating thoughts and feelings associated with paternal disengagement would lead women to perceive greater mating intent in the described actions of male targets. We predicted that primed paternal disengagement would shift wom-

en's perceptions of men's sexual (but not romantic) intent, thereby eliminating a psychological hurdle that typically deters sexual approach behavior in women (e.g., Perilloux et al., 2012). To test this prediction, women were randomly assigned to describe a time that their birth father was absent or present for an important life event before responding to measures of sexual and romantic intent suggested by the actions of a hypothetical dating partner (see Haselton & Buss, 2000). We tested for an interaction between priming condition and mating intent to determine whether paternal disengagement (vs. engagement) increases women's perceptions of sexual (but not romantic) intent in men's dating behaviors.

Method

Participants. Female undergraduate students were recruited from the psychology subject pool at a midsized private university in the southern United States. They received partial course credit in exchange for their participation. Twelve women ($n = 8$ in the paternal disengagement condition) were excluded prior to data analysis based on their responses to the priming procedure. Participants were excluded for: failing to follow instructions for their assigned writing prompt ($n = 9$), describing father absence attributable to death ($n = 2$), or simultaneously describing father absence and presence ($n = 1$). The final analytic sample consisted of 75 heterosexual women (age range: 18–23 years; $M_{\text{age}} = 19.05$, $SD_{\text{age}} = 1.24$; $n = 34$ in the paternal disengagement condition). These women were predominantly White (83%), from relatively wealthy backgrounds (median annual family income: \$120,000–135,000), and had biological parents who were still married at the time of the study (71%).

Procedure and materials. Upon arriving for the study session, participants were seated at private computer terminals. All instructions and stimuli were presented via Qualtrics web based experimental program (Qualtrics, 2015). Participants were told they would complete a study designed to obtain preratings for unrelated tasks being evaluated for use in future studies. To this end, they were first presented with a randomly assigned writing prompt. Participants in the *paternal disengagement* condition were asked to recall and write about a time their birth father was physically or psychologically absent for an important life event. Specifically, these participants received the following instructions:

Take a few seconds to think back to a time in your life when your father was absent for an important event when you really needed him. Try to relive the experience as much as possible. Allow yourself to reexperience the sights and sounds. . . . Please take a minute to vividly imagine this scenario and think about how it made you feel.

After being given a minute to recall a specific event, participants were presented with the following writing prompt:

Now that you have taken some time to remember this moment, please spend the next three minutes writing about your experience. Describe in detail how your father's lack of support—or his physical or psychological absence—made you feel. Describe all features of the event in as much detail as possible, allowing your personal feelings to enter into your description.

Participants in the *paternal engagement* condition received identical instructions except that they were asked to recall and describe a time their birth father was physically or psychologically

present for an important life event. The content of the typed responses in both conditions was coded by the first author to ensure that participants successfully met inclusion criteria for their randomly assigned writing prompt (i.e., they adequately completed the priming procedure; see “Participants” section above regarding exclusion criteria). Following this procedure, participants completed measures of perceived mating intent conveyed by behaviors performed by men (adapted from Haselton & Buss, 2000). Finally, participants answered demographic questions before being thanked and dismissed.

Cross-sex mating perceptions. Women were asked to imagine that they were dating a man and to rate the likelihood that he wanted to have sex or develop a committed relationship with them given that he performed the following 10 behaviors: held hands with me; complimented me; told me he loved me; bought me expensive jewelry; bought me dinner; asked me out on a date; called me on the phone or sent a text message; bought me a drink at the bar; acted flirtatious; and told me I was sexy (anchors: 1 = *very unlikely*, 7 = *very likely*). Higher values represent greater perceived mating (sexual and romantic) intent.

Additional dependent measures.¹ We also presented measures assessing women’s perceptions of a man’s general sexual interest and beliefs about men’s commitment avoidance (with the latter measure included for exploratory purposes). These measures were adapted from Haselton and Buss (2000, Study 1). We did not find significant effects of priming condition on these measures. These measures and analyses are detailed in the supplemental materials (see Appendix A).

Results

By averaging items within the cross-sex mating perceptions measure, we created composite indices of perceived sexual ($\alpha = .88$) and romantic ($\alpha = .79$) intent conveyed by the behaviors of a hypothetical dating partner. Based on previous research, the measures of sexual and romantic intent were intended to assess largely distinct domains; however, these scores were significantly positively correlated, $r = .40, p < .001$. This association suggests that in the current sample, there was overlap in participants’ interpretation of these two constructs. (See Table 1 for descriptive statistics.)

We analyzed between-subjects differences in women’s perceptions of a dating partner’s mating intent using a mixed-model analysis of variance (ANOVA), with priming condition the between-subjects factor and mating domain (sexual, romantic) the within-subjects factor. The analysis did not reveal a significant interaction between condition and mating intention domain ($p =$

.44), nor a main effect of mating intention domain ($p = .21$). However, there was a significant main effect of priming condition, $F(1, 73) = 4.91, p = .030, d = .52$. This result reflects an effect of the experimental prime on women’s perceptions of male mating intent collapsing across the correlated mating domains (sexual and romantic). Specifically, participants in the paternal disengagement condition perceived a dating partner’s behaviors as implying greater overall mating interest ($M = 4.67, SD = .72$) relative to women in the paternal engagement condition ($M = 4.32, SD = .62$).

Discussion

In the current experiment, women who described a time that their birth father was absent (vs. present) perceived greater mating (sexual and romantic) intent in a man’s described dating behaviors. This finding provides initial evidence that paternal disengagement may lead women to perceive men in ways that expedite sexual activity. It is noteworthy, however, that women’s perceptions of the intentions guiding these behaviors did not fully discriminate between sexual and romantic intent. This was evidenced by the significant correlation between these measures, the null interaction effect, and the finding that paternal disengagement (vs. engagement) increased women’s perceptions of overall mating interest suggested by a dating partner’s behaviors. Past research has demonstrated that women perceive greater commitment intent in men to whom they are sexually attracted (Durante, Griskevicius, Simpson, Cantú, & Li, 2012; Henningsen & Henningsen, 2010), making it possible that women’s mating psychology does not always clearly distinguish between these motives. Further, we did not find evidence that primed paternal disengagement increased women’s perceptions of general sexual interest in a man’s behaviors performed outside of a dating relationship (see supplemental materials—Appendix A). We consider these results with those obtained in Studies 2 through 5 (in aggregate) in the internal meta-analysis and General Discussion.

Study 2: Paternal Disengagement and Women’s Perceptions of Sexual Intent in Male Faces

Study 2 was intended to extend Study 1 in two main ways. First, we tested our central hypothesis by measuring women’s perceptions of sexual intent in male target faces. We predicted that women primed with reminders of paternal disengagement would perceive greater sexual arousal (but not other emotions) in men’s faces compared with women in the comparison condition. Second, we included a novel comparison group: *maternal disengagement*. According to PIT, fathers exert unique effects on daughters’ sociosexuality which are nonoverlapping with the effects exerted by mothers (e.g., Draper & Harpending, 1982; Ellis & Essex, 2007; Ellis et al., 1999; Ellis et al., 2012; Sear & Mace, 2008; Tither & Ellis, 2008). To target the specific effect of paternal (as compared

Table 1
Descriptive Statistics (Study 1)

Measure	Paternal disengagement	Paternal engagement
Perceived sexual intent	4.77 (.95)	4.35 (.82)
Perceived romantic intent	4.56 (.70)	4.30 (.76)

Note. Higher values correspond to greater perceived mating intent suggested by men’s actions within a dating relationship. Standard deviations are in parentheses.

¹ For each study, measures directly relevant to testing the central research question (but that were not the focal analysis) are presented under the subheading “Additional dependent measures.” These measures and analyses are reported in full in the supplemental materials (see Appendix A) available online. All relevant measures and results—including those in the online supplement—are included in the internal meta-analysis presented after Study 5.

with maternal) disengagement, participants in the comparison condition described a time that their mother was absent for an important event.

Method

Participants. Participants were female undergraduates from a midsized private university in the southern U.S. They received partial course credit for participating. Eleven women ($n = 6$ in the paternal disengagement condition) were excluded prior to analysis based on their responses to the priming procedure. Participants were excluded for failing to complete their assigned writing prompt as instructed ($n = 6$) or for describing simultaneous father and mother absence ($n = 5$). The final analytic sample included 68 heterosexual women (age range: 18–24 years; $M_{\text{age}} = 18.51$, $SD_{\text{age}} = 1.13$; $n = 35$ in the paternal disengagement condition). These women were predominantly White (76%), from relatively wealthy backgrounds (median annual family income: \$135,000–149,999), and had biological parents who were still married (72%).

Procedure and materials. The cover story and priming procedure were similar to Study 1, except that half of the participants were randomly assigned to describe a time that their mother was absent for an important life event. Prime responses were coded by the first author to ensure that participants adequately completed their assigned writing prompt (see “Participants” section above regarding exclusion criteria). Following the priming procedure, participants completed a functional projection task adapted from Maner et al. (2005) to assess their perceptions of sexual intent (i.e., arousal) in male target faces. Specifically, they were presented with four photographs of male targets exhibiting neutral facial expressions (from Minear & Park, 2004). Because women tend to prefer physically attractive men as sexual partners (e.g., Buss & Schmitt, 1993; Gangestad & Simpson, 1990), we presented faces that were relatively attractive (see Study 3 for target attractiveness ratings). Participants rated the degree to which each target was sexually aroused. To test the specificity of the predicted effects, they also rated the degree to which each target was angry, frightened, and happy (anchors: 1 = *not at all*, 9 = *very much*).

Additional dependent measure. Similar to Study 1, participants also rated their perceptions of sexual intent suggested by the actions of a hypothetical dating partner. (Unlike Study 1, however, we did not present items assessing their perceived commitment/romantic intent.) We did not find a significant effect of priming condition on this measure. This analysis is detailed in the supplemental materials (see Appendix A).

Results

First, we created composite indices of perceived sexual arousal, anger, fear, and happiness in the male faces by averaging ratings on each of these dimensions across the four targets.² We analyzed differences in women’s perceptions of emotions in the male target faces using a mixed-model ANOVA, with priming condition as the between-subjects factor and target emotion as the within-subjects factor. The analysis revealed a significant interaction between condition and target emotion, $F(3, 63) = 4.41$, $p = .007$, suggesting that the relative amounts of the emotions that women perceived in the target faces differed across priming conditions. As predicted, there was a significant simple main effect of condition on women’s

perceptions of male sexual arousal, $F(1, 65) = 4.01$, $p = .049$, $d = .49$. Specifically, participants in the paternal disengagement condition perceived the male targets as experiencing more sexual arousal ($M = 3.96$, $SD = 1.52$) than did women in the maternal disengagement condition ($M = 3.18$, $SD = 1.64$). Although not predicted a priori, there was also a significant effect of priming condition on perceived male happiness, $F(1, 65) = 5.20$, $p = .026$, $d = .56$. Participants in the paternal disengagement condition perceived the targets as experiencing more happiness ($M = 5.22$, $SD = 1.36$) than did women in the maternal disengagement condition ($M = 4.39$, $SD = 1.60$). However, there were no statistically significant between-conditions differences in the amount of anger ($p = .15$) or fear ($p = .42$) that women perceived in the faces (see Figure 1).

Discussion

In the current study, the emotions that women perceived in men’s faces differed based on whether psychological states associated with absence of the father (vs. mother) were activated. Specifically, paternal disengagement cues led women to perceive greater sexual arousal in neutral male faces relative to women who described maternal disengagement. This finding is consistent with PIT, and with research demonstrating that primed paternal disengagement increases activation of sexual thoughts among women (DelPriore & Hill, 2013). Paternal disengagement, however, did not produce a more generalized change in perception across all emotions, as there were no between-conditions differences in perceived male anger or fear. Taken together, these results provide support for paternal disengagement changing women’s perceptions of men’s faces in ways that may promote sexual approach behavior.

Contrary to predictions, we found an effect of paternal disengagement on women’s ratings of male target happiness. In combination with the increase in perceived sexual arousal, it is possible that this shift could function to motivate a more generalized “approach” response on women’s behalf. That is, a woman may be more likely to approach and initiate a relationship (sexual or otherwise) with a man who appears happy—versus unhappy—in her presence. Further, we did not find an effect of the priming procedure on women’s perceptions of sexual interest suggested by a man’s dating behaviors without also assessing his romantic interest, as we did in Study 1 (see supplemental materials—Appendix A). We consider these results along with those from the other studies in the meta-analysis and General Discussion.

Study 3: Specificity of the Effects of Paternal Disengagement on Women’s Perceptions of Sexual Intent

The previous study demonstrated that activating psychological states associated with paternal (vs. maternal) disengagement leads

² We computed reliability coefficients for each emotion across the four targets. Although the reliability of perceived sexual arousal was adequate ($\alpha = .68$), the reliability coefficients were relatively low for anger ($\alpha = .49$), fear ($\alpha = .46$), and happiness ($\alpha = .37$). This indicates that the intertarget correlations were higher for ratings of perceived sexual arousal than for the other emotions.

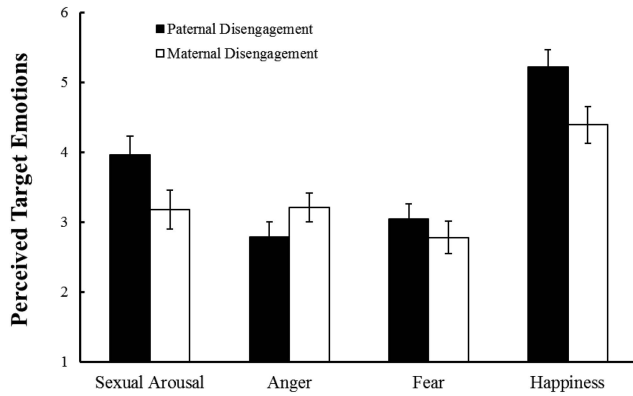


Figure 1. The effects of priming condition (paternal vs. maternal disengagement) on women's perceptions of male target emotions (Study 2). Errors bars reflect the standard error.

women to perceive more sexual intent in relatively attractive male faces. Study 3 was designed to conceptually replicate and extend this finding in two ways. First, it is not clear whether the effects of paternal disengagement are specific to women's perceptions of men (i.e., targets that represent a mating opportunity), or whether these cues might lead women to perceive greater mating intent across all targets, including other women. As such, in the current study we test the prediction that experimentally activated reminders of paternal (vs. maternal) disengagement would lead heterosexual women to perceive greater sexual intent in male faces, specifically, as they provide a mating opportunity.

Second, we wanted to test whether the effect of paternal disengagement on women's sexual perceptions is specific to attractive male targets. As discussed in the Introduction, experiences of paternal disengagement are theoretically linked to higher levels of sexual opportunism. Accordingly, women may relax their attractiveness standards as a means of increasing the number of potential partners immediately available to them (e.g., Buss, 2008; Buss & Schmitt, 1993; Gladue & Delaney, 1990). To examine this possibility, we tested whether primed paternal disengagement would lead women to perceive greater sexual intent among male targets across levels of physical attractiveness, a pattern that would facilitate an opportunistic mating strategy.

Method

Participants. Participants were female undergraduates from a midsized private university in the southern U.S. They received partial course credit for participating. Twenty-two women ($n = 15$ in the paternal disengagement condition) were excluded prior to data analysis based on their responses to the priming procedure. Specifically, participants were excluded for: failing to complete their assigned writing prompt as instructed ($n = 9$); providing a response that was focused on something other than the absence of the father/mother ($n = 5$); describing simultaneous father and mother absence ($n = 4$); describing paternal/maternal absence attributable to death ($n = 2$); or describing the absence of someone other than the birth father/mother ($n = 2$). The final analytic sample included 86 heterosexual women (age range: 18–21 years; $M_{\text{age}} = 18.78$, $SD_{\text{age}} = .69$; $n = 38$ in the paternal disengagement

condition). These women were predominantly White (84%), from relatively wealthy backgrounds (median annual family income: \$150,000 or more), and had biological parents who were still married (79%).

Procedure and materials. Participants were informed that they would participate in a research study examining individual differences in self-expression and perception. The priming procedure was identical to Study 2, and the content of participants' prime responses was screened for potential problems by two trained female research assistants. Specifically, the coders were trained to identify responses in which participants failed to describe their assigned topic, described father/mother absence attributable to death, did not provide any details relevant to their assigned prime, provided a response that focused on something other than the absence of one's birth father/mother, or described simultaneous father and mother absence. Using these ratings, the first author made final decisions regarding the inclusion/exclusion of each essay. We also presented a manipulation check item at the end of the study to verify that the subject of participants' priming responses was their birth father or mother. Specifically, participants were asked: "Whose absence did you describe earlier in the experiment?" Participants who indicated that they described someone other than their birth (biological or adoptive) father/mother were excluded prior to analysis.

Perceived sexual arousal. Following the priming procedure, participants completed the emotion perception measure used in Study 2. Instead of only viewing relatively attractive male faces, however, participants viewed a total of 16 male and female faces that were relatively attractive or unattractive. Again, participants rated the degree to which each target was feeling sexually aroused, angry, frightened, and happy (anchors: 1 = *not at all*, 9 = *very much*).

Target attractiveness preratings. During the emotion perception task, participants viewed eight male and eight female target faces. All targets were facing forward and exhibited neutral facial expressions. Half of the male and female faces were selected to be relatively attractive, and half of the faces were selected to be relatively unattractive. (The four "relatively attractive" male faces were the same as those presented in Study 2.) An independent sample of eight female undergraduates ($M_{\text{age}} = 21.00$ years, $SD_{\text{age}} = 2.20$) prerated the attractiveness of the targets (anchors: 1 = *not at all attractive*, 9 = *extremely attractive*). The ratings confirmed that the relatively attractive male ($M = 6.22$, $SD = 1.25$) and female ($M = 5.84$, $SD = 1.22$) targets were rated as more attractive than the relatively unattractive male ($M = 2.72$, $SD = 1.21$) and female ($M = 3.00$, $SD = 1.32$) targets, respectively ($ps < .001$). There were no statistically significant differences between the attractiveness ratings assigned to attractive males versus females ($p = .29$) or unattractive males versus females ($p = .32$).

Additional dependent measures. Similar to Study 2, we measured women's perceptions of a dating partner's sexual interest. Again, we did not find a significant effect of priming condition on this measure without also including items assessing perceived romantic interest. Additionally, we measured women's perceptions of a man's general sexual interest in another woman (adapted from Haselton & Buss, 2000) as a discriminative test of the effects of primed paternal disengagement. As expected, we did not find a significant effect of priming condition on this measure. These analyses are detailed in the supplemental materials (see Appendix

A) and the results considered further in the meta-analysis and General Discussion.

Results

We created composite indices of perceived sexual arousal, anger, fear, and happiness³ for each of the four sets of targets (attractive and unattractive, male and female). We analyzed women's perceptions of sexual intent in the target faces using a mixed-model ANOVA, with priming condition as the between-subjects factor, and target sex, target attractiveness, and target emotion as within-subjects factors. The analysis did not reveal a significant four-way interaction between priming condition, target sex, target attractiveness, and target emotion ($p = .26$). There was, however, a significant three-way interaction between priming condition, target sex, and target emotion, $F(3, 81) = 2.82, p = .04$. This interaction reflected a significant simple main effect of priming condition on women's perceptions of male sexual arousal, $F(1, 83) = 5.02, p = .028, d = .49$, with participants in the paternal disengagement condition perceiving more sexual arousal among male targets ($M = 3.73, SD = 1.50$) relative to those in the maternal disengagement condition ($M = 3.03, SD = 1.36$). There were no significant effects of priming condition on women's perceptions of other male target emotions ($ps \geq .29$), nor on their perceptions of female target emotions ($ps \geq .35$; see Figure 2).

Discussion

Primed paternal (vs. maternal) disengagement led women to perceive greater sexual intent in male faces, conceptually replicating Study 2. Study 3 also extended this finding by demonstrating that women's perceptions of sexual intent depended on the sex of the target. Specifically, paternal disengagement influenced women's perceptions of male—but not female—sexual arousal. Further, the perceptual shift occurred in response to male targets across levels of attractiveness. This finding is consistent with PIT: When male investment is deemed in short supply, women may be open to considering a broad range of options immediately available to them on the mating market (i.e., enacting an opportunistic mating strategy), regardless of whether these men display the

attractiveness typically favored by women when short-term mating (e.g., Buss & Schmitt, 1993; Gangestad & Simpson, 1990; Gangestad & Thornhill, 1997). In addition, this shift was specific to sexual intent, as it did not lead to changes in perceived male happiness (as was found in Study 2), anger, or fear. This pattern of results suggests that paternal disengagement may most reliably influence women's perceptions of mating-relevant stimuli. In all, Study 3 provided further evidence that paternal disengagement causes shifts in how women perceive men's motivations based on facial cues. Specifically, women perceived men's faces in ways that may promote sexual relationships in contexts where male investment in mates and offspring is relatively scarce.

Study 4: Paternal Disengagement and Women's Perceptions of Male Mating Intent Within a Social Interaction

Study 4 was designed to extend the previous studies by testing whether primed paternal disengagement (relative to a comparison condition) would lead women to perceive greater mating intent during a social interaction with a male confederate. Based on the results of Study 1, we predicted that primed paternal (vs. maternal) disengagement would increase women's perceptions of the confederate's overall mating (including sexual and romantic) interest in them. Further, Study 4 allowed us to test an important theoretical assumption: that perceived mating intent mediates the effects of paternal disengagement on women's mating motivation.

Method

Participants. Participants were female undergraduates recruited from the psychology department participant pool and via campus-wide recruitment at a mid-sized private university in the southern U.S.⁴ We recruited women who were native English speakers, primarily or exclusively heterosexual, ages 18–23, White and/or Hispanic, single or casually dating, and experimentally naïve (previously participated in 10 or fewer psychology studies). We successfully recruited a total

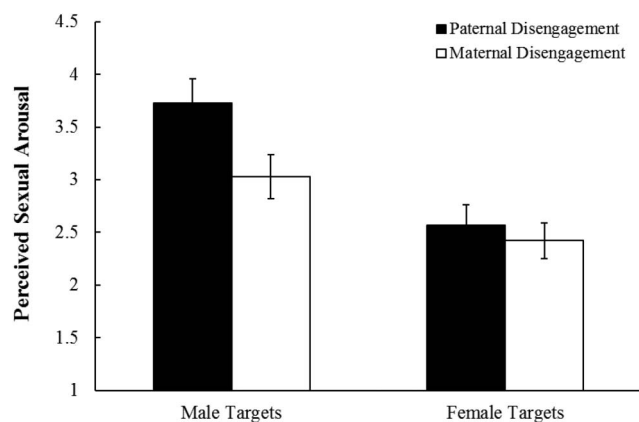


Figure 2. The effects of priming condition (paternal vs. maternal disengagement) and target sex on women's perceptions of sexual arousal in target faces (Study 3). Errors bars reflect the standard error.

³ Similar to Study 2, we computed reliability coefficients for each emotion across the four target faces for each of the four target sets (relatively attractive and unattractive, male and female). Again, the coefficients were highest for participants' perceptions of target sexual arousal (all $\alpha s \geq .59$). The coefficients for perceptions of target fear were also adequate ($\alpha s \geq .59$). However, the reliability of the measures of perceived target anger ($\alpha s \geq .42$) and happiness ($\alpha s \geq .48$) were again relatively low. Therefore, in Study 3, the most reliable assessments across targets were obtained for perceived sexual arousal and fear.

⁴ Because of participant attrition attributable to our simulated interaction paradigm and the specificity of our inclusion criteria, we aimed to recruit more participants than needed to achieve an adequately powered between-subjects multivariate model. A power analysis was performed using G*Power 3.1.9.2 (Faul, Erdfelder, Buchner, & Lang, 2009) to determine the sample size needed to obtain power ($1 - \beta$) of approximately .80 to detect the between-factors effects. To this end, we conducted the analysis for a between-subjects MANOVA including two groups (priming conditions) and four self-report measurements (items assessing perceptions of men's mating and friendship intent). We specified a medium effect size (.25) based on the results obtained in the previous experiments. The probability of Type I error (alpha) was set at .05, and we posited a moderate positive correlation (.40) between our repeated measurements. This analysis indicated that a total sample size of 72 would be necessary to achieve .80 power in this model.

of 124 female participants.⁵ Eleven women were excluded prior to data analysis for violating these inclusion criteria. An additional 22 women ($n = 13$ in the paternal disengagement condition) were excluded based on their responses to the priming procedure. Specifically, participants were excluded for failing to follow instructions for their assigned writing prompt ($n = 6$), focusing on something other than absence of the birth father/mother ($n = 4$), describing simultaneous father and mother absence ($n = 11$), or describing parental absence attributable to death ($n = 1$). The final analytic sample included 62 primarily heterosexual women (age range: 17–22 years; $M_{\text{age}} = 18.95$, $SD_{\text{age}} = 1.02$; $n = 29$ in the paternal disengagement condition). These women self-identified as White, and a majority were non-Hispanic (90%), from relatively wealthy backgrounds (median annual family income: \$135,000–149,999), and had biological parents who were still married (81%).

Procedure and materials. Participants came into the lab individually and were seated in a private room. A female research assistant verbally provided study instructions. Participants were informed that the purpose of the study was to examine the effects of cross-sex social interactions on the physiological stress response system. The study ostensibly included three parts: (a) a guided imagery task during which they would remember and describe a past event while an electrode attached to their finger measured their baseline stress response; (b) an interaction with a man via an online chat paradigm; and (c) an online survey including questions about their interaction partner and themselves.

During the “guided imagery task,” an electrode was attached to each participant’s left ring finger. The electrode was positioned such that it would not interfere with participants’ ability to type their responses during the priming task or while completing the online questionnaires. The women were presented with the same priming procedure used in Studies 2 and 3 (i.e., they were randomly assigned by Qualtrics to describe a time that their birth father or mother was absent for an important life event). Next, participants completed a “getting to know you” interview. Their interaction partner was a male confederate whose interview questions and reactions were prerecorded to standardize content across participants. Following this interaction, participants rated their perceptions of the male confederate. Specifically, participants answered the following questions: How much do you think that your interaction partner would like to: (a) form a friendship with you; (b) go on a date with you; (c) enter into a committed relationship with you; and (d) have a short-term sexual relationship with you? Responses were made on 7-point scales (anchors: 1 = *not at all*, 7 = *very much*).

Male confederate video. Our simulated interaction paradigm was adapted from previous research in which participants responded to prerecorded questions from confederates (see Cantú et al., 2014; Kavanagh, Robins, & Ellis, 2010). Though this method is more artificial than live interview methods, the procedure standardizes confederate behavior across participants, and as such, affords more control than other methods. The interaction paradigm was executed using a male confederate who had been previously recorded and displayed to each participant using a TV located in the experiment room. This TV was controlled using a TV and DVD player located in a separate control room. Prior to data collection, four potential male confederate videos were recorded and evaluated by a sample of women based on their degree of comfort with the men, the men’s physical attractiveness, and the

believability of the interaction. The confederate selected based on this pretesting was a relatively attractive Caucasian male in his early 20s.

At the beginning of the study session, each woman was informed that the male confederate was a fellow participant attending their university. Participants were told that the confederate, who was ostensibly seated in the next room, was instructed to introduce himself as a potential dating partner and to read from a list of questions provided to him by the researchers. The questions pertained to personality, personal experiences, and dating preferences. Participants were encouraged to answer the questions as though they were meeting someone face-to-face for the first time. However, to increase believability, they were instructed to not ask the male confederate any questions in return. Further, while participants responded to each of the confederate’s questions, the participant’s TV screen went black. This procedure allowed the participant to speak for their chosen amount of time while the confederate video remained paused and eliminated the possibility that the confederate’s recorded facial expressions would not be appropriate given what the participant was saying.

Because the male confederate was recruited locally (and to further bolster our cover story), immediately following the interaction participants were asked if they had ever met their interaction partner prior to the study. Four participants ($n = 3$ in the paternal disengagement condition) were excluded prior to analysis for indicating that they had previously met the male confederate.

Suspicion probe and debriefing. After completing the study measures and a demographic questionnaire, participants had an opportunity to express their suspicions regarding the study within the online survey. Before they were dismissed, each participant was also asked by the research assistant if they had final thoughts about any phase of the study. Suspicions regarding the cover story (particularly, the video interaction) were noted through the online and in-person debriefing questions. Eighteen participants ($n = 9$ in the paternal disengagement condition) were excluded from analysis for expressing a belief that the confederate video was prerecorded, and three ($n = 1$ in the paternal disengagement condition) were excluded because of technical difficulties during the study session (i.e., problems involving Qualtrics or the recorded confederate video).

Observed flirting behavior. Participants’ behavior during the interaction was video-recorded and rated for flirtation by two trained female research assistants who were blind to condition. Four participants ($n = 2$ in the paternal disengagement condition) were removed from analysis because of technical difficulties with

⁵ To ensure that our analytic sample was representative of the total sample of women recruited to participate in this experiment, we tested for differences between the women who were retained in our final analytic sample ($N = 62$; $n = 29$ in the paternal disengagement condition) and those who were dropped prior to data analysis because of their responses on the priming procedure, violation of inclusion criteria, suspicions regarding the cover story, and technical difficulties during their study session ($N = 62$; $n = 31$ in the paternal disengagement condition). Specifically, we conducted a binary logistic regression to determine whether various demographic variables predicted whether participants were excluded (vs. retained). This model revealed that whether participants were excluded (vs. retained) was not significantly predicted by their: age ($p = .23$); current family income ($p = .94$); ethnicity ($p = .87$); or parents’ marital status ($p = .99$).

the recording equipment (i.e., the recording started late and did not capture the full interaction). Participant behavior was rated on their (a) interest in what the confederate was saying during his introduction, (b) interest in going on a date with the confederate, (c) liking of the confederate, (d) excitement or enthusiasm during the interaction, and (e) overall flirtatiousness. Ratings were made on 7-point scales, and rater reliability was adequate across dimensions (all $r_s \geq .68$, $p_s \leq .001$). The two independent ratings were averaged together for each dimension, and the resulting scores were combined across indicators to create a composite measure of women’s observed flirting during the interaction ($\alpha = .94$).

Additional measures. Participants also rated their attraction to the confederate and his flirtation during the interaction (items adapted from: McCroskey, McCroskey, & Richmond, 2006; Miller & Maner, 2011; van Straaten, Engels, Finkenauer, & Holland, 2008; White, Fishbein, & Rutsein, 1981). Analyses did not reveal an effect of priming condition on either measure. However, a mediation analysis revealed a significant indirect effect of priming condition on women’s attraction to the confederate through a composite measure of women’s perceptions of the male confederate’s mating interest (i.e., his interest in dating, having a sexual relationship, and forming a committed relationship with them; $\alpha = .85$). Full details regarding these measures and analyses are reported in the supplemental materials (see Appendix A).

Results

Confederate mating intentions. We analyzed between-conditions differences in perceptions of male intent using a one-way multivariate analysis of variance, with priming condition as the between-subjects factor. The analysis revealed a significant main effect of priming condition on women’s perceptions of the male confederate’s dating intent, $F(1, 60) = 5.82, p = .019, d = .61$, and sexual intent, $F(1, 60) = 6.69, p = .012, d = .66$. Participants in the paternal disengagement condition perceived that the male confederate was more interested in dating them and in having sex with them relative to women in the maternal disengagement condition (see Table 2 for descriptive statistics). Women primed with paternal (vs. maternal) disengagement also perceived greater interest in a committed relationship on the part of the confederate, $F(1, 60) = 3.95, p = .051, d = .51$.⁶ As expected, we did not find an effect of priming condition on perceived friendship interest ($p = .38$).

Women’s observed flirting. We tested for between-conditions effects on women’s observed flirting during the interaction. Women in the paternal disengagement condition were rated as engaging in marginally more flirting behavior during the interaction ($M = 4.24$,

$SD = 1.16$) relative to women in the maternal disengagement condition ($M = 3.71, SD = 1.04$), $F(1, 60) = 3.63, p = .062, d = .48$.⁷ Given the extant literature demonstrating reliable effects of paternal absence-disengagement on sexually proceptive behavior in women (as reviewed in the Introduction), a one-tailed statistical test ($p = .031$) could be justified here, supporting a causal effect of paternal disengagement on flirting.

Mediation model. We used Hayes’ (2013) PROCESS SPSS macro (version 2.16.2; Model 4) to determine whether the indirect effects of priming condition on women’s flirtation through perceived male mating (dating/sexual/commitment) intent were significantly different from zero (Hayes & Rockwood, 2016; Preacher & Hayes, 2008). The bootstrap procedure was selected because it tests for indirect effects without imposing assumptions about sample size and distribution that are required by other methods. Following recommendations outlined by Preacher and Hayes (2004), we collected 10,000 bootstrapped samples to generate bias-corrected 95% confidence intervals for each indirect effect (i.e., the path through the mediators). These analyses did not reveal significant indirect effects of primed paternal disengagement on women’s observed flirting behavior through perceived male dating (95% CI $[-.38, .08]$), sexual (95% CI $[-.12, .34]$), or commitment (95% CI $[-.09, .35]$) intent, nor through a composite measure computed from these three items (95% CI $[-.22, .31]$).

Discussion

Study 4 provided additional support for paternal disengagement having a causal impact on daughters’ perceptions of men. Specifically, primed paternal (vs. maternal) disengagement increased women’s perceptions of a male confederate’s interest in dating, having sex with, and forming a committed relationship with them. These results are consistent with the shift in perceived mating (sexual and romantic) intent demonstrated by participants in Study 1. In the current study, paternal disengagement also predicted increased flirting behavior among women, but did not increase their perceptions of the confederate’s interest in friendship. The results suggest that psychological states associated with paternal disengagement can change women’s perceptions of mating intent while interacting with a potential relationship partner (the male confederate) and increase their flirting behavior, although such

⁶ Because responses on the three mating perception items (i.e., perceived confederate interest in dating, having sex, and forming a committed relationship) were strongly intercorrelated ($r_s \geq .64, p_s < .001$), we computed a composite score of perceived male mating interest by averaging these items ($\alpha = .85$). The main effect of priming condition persisted when testing for between-conditions differences on this composite score, $F(1, 60) = 7.26, p = .009, d = .69$.

⁷ Because the final analytic sample ($N = 62$) fell below the sample size suggested by the a priori power analysis ($N = 72$), we obtained a post hoc estimate of observed power using SPSS. The observed power was .69 for the multivariate model including the five main dependent measures, which falls short of our target power for this experiment (.80). However, because of concerns regarding the utility of post hoc power estimates (e.g., assumptions that the obtained sample effect size is equal to the true population effect; observed/post hoc power estimates are determined by the p value, such that observed power increases as the p value decreases; Hoening & Heisey, 2001; Lenth, 2001; O’Keefe, 2007), this estimate should be interpreted with caution. We conducted an internal meta-analysis (reported after Study 5) aggregating findings across studies to address potential concerns about low power within any individual study.

Table 2
Descriptive Statistics (Study 4)

Measure	Paternal disengagement	Maternal disengagement
Male interest in friendship	4.17 (1.10)	3.91 (1.21)
Male interest in dating relationship	3.69 (1.26)	2.91 (1.28)
Male interest in committed relationship	2.83 (1.10)	2.24 (1.20)
Male interest in sexual relationship	3.17 (1.26)	2.33 (1.29)

Note. Standard deviations are in parentheses.

changes were not linked to women's views of the man's flirtation (see supplemental material—Appendix A). This finding may reflect the fact that sexual perceptions often more effectively track the observer's own mating motivation rather than the target's behavior (as noted in the Introduction).

Paternal disengagement indirectly increased women's attraction to the male confederate via their perceptions of male mating interest (see supplemental materials—Appendix A), providing preliminary support for the hypothesized mediational model. However, contrary to prediction, women's perceptions of male mating intent did not mediate increases in women's observed flirtation in response to primed paternal disengagement. Specifically, women's perceptions of the male confederate's interest in them as a mate did not predict how much they flirted with him. Although we expected an association between women's mating perceptions and flirting behavior based on past research demonstrating associations between sexual perceptions and unrestricted sociosexuality (e.g., Howell et al., 2012), flirting in a specific (laboratory) context with a specific individual, on one hand, and general sexual motivation, on the other, are not equivalent (see Henningsen, 2004). Accordingly, the obtained results may not necessarily reflect the lack of a causal pathway between women's perceptions of male mating intent and unrestricted sexual behavior. Instead, it could be that the relationship between mating-related perceptions and unrestricted sociosexuality are more readily detected when women's sociosexuality is assessed in aggregate (rather than relying on a thin behavioral slice). We examine this possibility in Study 5.

Study 5: Paternal Investment, Perceptions of Male Mating Intent, and Women's Sociosexuality

The purpose of the current study was twofold. First, we sought to establish patterns of associations between quality of paternal investment while growing up, women's perceptions of male mating intent, and their sociosexual attitudes and intentions. Specifically, we tested the hypothesis that perceptions of male mating intent (sexual/romantic) would mediate the relationship between harsh paternal behavior and daughters' unrestricted sociosexuality.

Second, the previous experiments were limited by testing for the effects of primed paternal disengagement among women from almost exclusively father-present backgrounds. In the current study, we tested for the effects of both (a) developmental experiences with fathers and (b) primed reminders of paternal disengagement on a sample of women whose parents divorced or separated while they were growing up. Examining these factors together is methodologically important because the priming manipulation used in the previous experiments is somewhat removed from the way father disengagement operates developmentally outside of the lab (and thus may not reflect how actual developmental exposure to paternal behavior calibrates daughters' perceptions of men). We therefore collected data from women from biologically disrupted families whose developmental experiences with their fathers were highly variable (i.e., each woman spent part of her childhood living with her father and part of her childhood living without her father). This enabled a test of how daughters' developmental exposures to their fathers' (vs. mothers') behavior relates to their adult mating perceptions and unrestricted sociosexuality. In conjunction with the randomized priming experiment, this design allowed us to test models including both develop-

mental experiences and current (experimentally manipulated) psychological states of daughters in relation to their fathers.

Method

Recruitment and participants. Participants were recruited online via Craigslist and Amazon's Mechanical Turk (MTurk) and received \$20 in exchange for their participation.⁸ Women in the target sample all experienced the divorce or separation of their parents while growing up and thus had substantial experiences of both father-presence and father-absence, including wide variation in the quality of father-daughter relationships (as reported below). Fourteen women were excluded for failing to meet inclusion criteria (see supplemental materials—Appendix B for details related to data screening). An additional eight women ($n = 5$ in the paternal disengagement condition) were excluded prior to data analysis based on inadequate responses to the priming procedure (e.g., failing to complete their assigned writing prompt).

Participants in the final analytic sample were 117 women (age range: 22–37 years; $M_{\text{age}} = 29.74$, $SD_{\text{age}} = 3.89$; $n = 60$ in the paternal disengagement condition). At the time of parental separation/divorce, the average age of participants was 11.36 years ($SD = 3.87$; age range 4–17). These women primarily self-identified as non-Hispanic White (68.4%), non-Hispanic Black (10.3%), multiracial (9.4%), or Hispanic/Latino (8.5%). Regarding their current marital status, 47.9% were single, 38.5% married, and 12.8% divorced/separated. Regarding their educational attainment, approximately 9% had a high school education/GED or less, 34% attended some college but did not earn a degree, 38% had earned an associate or bachelor's degree, and 20% had some graduate education or a graduate degree.

Procedure and materials. All materials were electronically mailed to participants, and the study questionnaires were presented online via Qualtrics. Participants completed a main questionnaire that included measures of parental behavior while growing up. Approximately 48 hours later, they received a follow-up questionnaire including a writing prompt focused on father disengagement-engagement (similar to Study 1) followed by measures of perceived male mating intent and unrestricted sociosexuality.

Paternal harshness-deviance. Based on past research on the effects of developmental experiences with fathers on daughters' sexual development and behavior (Ellis et al., 2012; Tither & Ellis, 2008), we focused on negative indicators of paternal behavior (i.e., harsh-coercive behavior, social deviance). We used two scales to measure daughters' exposure to paternal harshness and social deviance during childhood/adolescence. The first scale measured harsh fathering during participants' first 16 years of life using four items from the parent-child version of the Conflict Tactics Scale (e.g., "My father insulted me or put me down"; anchors: 1 = *very unlike*, 4 = *very like*; $M = 1.64$, $SD = .83$; $\alpha = .86$; Jouriles, Mehta, McDonald, & Francis, 1997; Straus, 1979; see Ellis et al.,

⁸ Data were collected following procedures described in Ellis et al. (2012) as part of a larger study examining the effects of paternal disengagement on biological sister pairs whose parents had divorced or separated during childhood. For the current purposes, we restricted our sample to the older sister from each family to (a) eliminate nonindependence in the data (thus greatly simplifying our statistical models) and (b) ensure that each participant had some developmental exposure to her father (i.e., multiple years coresidence) and thus could report on his behavior.

2012, for full set of items). To conduct discriminative tests, participants completed matching items assessing harsh mothering ($M = 1.63$, $SD = .76$; $\alpha = .82$). The second scale assessed perceptions of paternal social deviance from birth to age 18 using a 23-item checklist of potential behavioral and mental health problems demonstrated by the father (ranging from relatively mild to severe; see Tither & Ellis, 2008). Example items include: "Did your birth father suffer from nervous or emotional problems (such as anxiety or depression)?" ". . . have trouble with drug abuse?"; and ". . . have temper tantrums or a hot temper?" (scale: $-1 = no$, $0 = do not know$, $1 = yes$, $2 = yes, a lot$; $M = -.34$, $SD = .64$; $\alpha = .94$; see supplemental materials—Appendix B for additional information regarding these measures). Harsh fathering and paternal social deviance scores were standardized and averaged ($r = .56$) to form an overall measure of *paternal harshness-deviance*. The final measure was standardized ($M = 0$, $SD = 1$), with higher scores reflecting greater exposure to harsh and deviant paternal behavior while daughters were growing up.

Perceived male mating intent. Participants completed the same measure of perceived sexual and romantic intent as did participants in Study 1. Composite scores were computed for perceptions of men's sexual ($\alpha = .90$; $M = 4.87$, $SD = 1.01$) and romantic ($\alpha = .82$; $M = 4.34$, $SD = .79$) intent. Examination of the distributions revealed that the sexual intent score was slightly leptokurtic. Four extreme low values were truncated to induce a more normal distribution.

Unrestricted sociosexuality. To measure unrestricted sociosexuality, we presented items adapted from previous research (Simpson & Gangestad, 1991; Snyder, Simpson, & Gangestad, 1986). First, we assessed women's sexual attitudes by asking them to rate their agreement with six statements (e.g., "For me, having sex with someone would not necessarily imply that I am committed to that individual" and "I can imagine myself being comfortable and enjoying casual sex with different partners"). Scores were averaged to create a composite index of women's sociosexual attitudes (endpoints: $1 = strongly disagree$; $9 = strongly agree$; $M = 4.94$, $SD = 2.22$; $\alpha = .92$). Next, to assess women's anticipated number of sexual partners, we asked the following two questions: "Imagine that you were single. How many partners would you expect to have sex with over the next five years?" and "If there was no risk to you (that is, no risk of pregnancy, discovery, disease, or being rejected), how many different people who you currently know would you enjoy having sex with?" Open responses were recoded to reduce the influence of outliers and skew before each item was standardized and averaged ($r = .57$) to form a composite index of women's anticipated number of sexual partners. (see supplemental materials Appendix B for additional details regarding these measures.) The sociosexual attitudes measure was standardized and averaged with the measure of anticipated sex partners ($r = .70$) to form an overall measure of women's unrestricted sociosexuality. The final sociosexuality measure was standardized ($M = 0$, $SD = 1$), with higher scores indicating more unrestricted sociosexual attitudes and intentions.

Priming procedure and essay coding. Similar to Study 1, women were randomly assigned to describe a time that their birth father was absent or present for a life event. However, unlike in Studies 1–4 (which included participants from primarily father-present families who had various positive experiences to draw on with their fathers), inspection of women's responses revealed

considerable overlap in content across conditions. Specifically, many of the women randomly assigned to describe a time that their father was present and engaged provided responses that also described experiences of father disengagement (which could be expected given this sample's history of exposure to parental divorce/separation and variable paternal investment levels). To account for the overlap in experiences recounted across conditions, we trained two female research assistants to code the content of women's prime responses for theoretically relevant feelings regarding the father. Specifically, they independently rated the extent to which each response evoked feelings of "pain, disappointment, or loss" and "warmth or support" regarding the father (regardless of which writing prompt was assigned). The raters showed high reliability on both measures ($r_s = .90$, $p_s < .001$). As such, we averaged their ratings to obtain separate scores reflecting father-related pain and warmth evoked by the primes. (see supplemental materials—Appendix B for additional information regarding these scores).

Results

Experimental mediation models. As in Study 1, we first conducted a mixed-model ANOVA to test for between-conditions differences in women's perceptions of male sexual and romantic intent. Priming condition (paternal disengagement vs. engagement) was the between-subjects factor and mating intention domain (sexual vs. commitment) the within-subjects factor. There was a significant main effect of mating intention domain, with women perceiving greater sexual versus romantic intent in the described actions of a hypothetical dating partner, $F(1, 115) = 28.00$, $p < .001$, $d = .63$. However, the analysis did not reveal a significant main effect of priming condition ($p = .18$) or an interaction between priming condition and mating intention domain ($p = .81$) in the current sample of women.

Given the absence of statistically significant main effects or interactions following from the randomly assigned writing prime, we proceeded to analyze for the effects of the emotions about fathers expressed in the essays. We focused on the pain variable, as it most closely mapped on to our theoretical focus on the effects of paternal *disengagement*. First, we computed a correlation between randomly assigned condition and the amount of pain reported in the essays. As expected, women randomly assigned to the paternal disengagement condition reported more painful experiences with their fathers, $r = .64$, $p < .001$. Given this correlation, we created a standardized residual variable representing father-related pain partialing out the effects of assigned priming condition. The residual pain variable significantly predicted women's perceptions of sexual, $r = .25$, $p = .007$, but not romantic, $r = -.07$, $p = .44$, intent in the described actions of a dating partner.

Next, we tested mediation models of the following form: residual father-related pain \rightarrow perceived male mating intent (i.e., sexual intent in the first model and romantic intent in the second) \rightarrow unrestricted sociosexuality (PROCESS Model 4⁹; Preacher & Hayes, 2008). The analyses revealed a significant indirect effect of residual father-related pain on women's unrestricted sociosexual-

⁹ For models in which the bias corrected method for generating bootstrap confidence intervals produced CI endpoints that were not trustworthy when collecting 10,000 samples, we instead generated percentile bootstrap confidence intervals (following recommendations by Hayes, 2016).

ity through perceptions of male sexual intent, $b = .12$ ($SE = .05$), percentile 95% CI [.02, .22]. Within this model, increases in residual father-related pain predicted increases in perceived male sexual intent ($\beta = .25$ [$b = .24$, $SE = .09$], $t = 2.77$, $p = .007$), which in turn predicted more unrestricted sociosexuality (controlling for residual pain scores), $\beta = .46$ ($b = .48$, $SE = .09$), $t = 5.39$, $p < .001$. This pattern did not replicate when perceived romantic intent replaced sexual intent in the model (indirect effect: bias corrected 95% CI [−.01, .07]).

Developmental mediation models. Next, we tested developmental mediational models to examine the role of mating (sexual/romantic) perceptions in mediating the relationship between daughters' exposure to harsh-deviant paternal behavior while growing up and their current sociosexuality. First, we tested the following model(s): paternal harshness-deviance \rightarrow perceived male sexual/romantic intent \rightarrow unrestricted sociosexuality. The analysis revealed a significant indirect effect of paternal harshness-deviance on women's sociosexuality through perceptions of male sexual intent, $b = .13$ ($SE = .05$), percentile 95% CI [.04, .23]. Increased exposure to harsh-deviant paternal behavior predicted greater perceived sexual intent in men's actions ($\beta = .27$ [$b = .26$, $SE = .09$], $t = 3.06$, $p = .003$), which in turn predicted more unrestricted sociosexuality (controlling for paternal harshness-deviance), $\beta = .46$ ($b = .48$, $SE = .09$), $t = 5.35$, $p < .001$. This pattern did not replicate when perceived romantic intent replaced sexual intent in the model (indirect effect: bias corrected 95% CI [−.02, .05]).

The above models provide support for perceived sexual (but not romantic) intent mediating the effects of both primed father-related pain and developmental exposure to harsh-deviant paternal behavior on women's unrestricted sociosexuality. However, these two variables were not independent, as women with more harsh-deviant fathers provided prime responses that recounted more painful experiences with their fathers, $r = .28$, $p = .002$. Thus, we tested whether the effect of harsh-deviant paternal behavior on perceived sexual intent was mediated by father-related pain activated by the primes. Specifically, we tested the following model: paternal harshness-deviance \rightarrow residual father-related pain \rightarrow perceived male sexual intent. There was a significant indirect effect of paternal harshness-deviance on women's sexual perceptions through activated father-related pain, $b = .05$ ($SE = .03$), bias corrected 95% CI [.003, .13].

Father-effects versus mother-effects. Finally, to test for unique fathering effects, we retested the developmental mediation models using the matched (and standardized) measures of harsh fathering and mothering (described above and in supplemental materials—Appendix B). First, we tested these models including harsh fathering as the predictor and harsh mothering as a covariate. Both indirect pathways remained statistically significant: paternal harshness \rightarrow perceived sexual intent \rightarrow unrestricted sociosexuality: $b = .09$ ($SE = .05$), percentile 95% CI [.002, .18]; paternal harshness \rightarrow residual father-related pain \rightarrow perceived sexual intent: $b = .04$ ($SE = .03$), bias corrected 95% CI [.004, .12]. Second, we tested these models including harsh mothering as the predictor and harsh fathering as the covariate. Consistent with PIT, the indirect effects of maternal harshness controlling for paternal harshness were not significant: maternal harshness \rightarrow perceived sexual intent \rightarrow unrestricted sociosexuality: $b = .02$ ($SE = .04$), bias corrected 95% CI [−.07, .10]; maternal harshness \rightarrow residual father-related pain \rightarrow perceived sexual intent: $b = .01$ ($SE = .02$), bias corrected 95% CI [−.03, .06].

Discussion

The current results meaningfully extend the previous studies. First, Study 5 provided evidence that changes in women's perceptions of men may serve as an intervening mechanism in the relationship between low paternal investment and daughters' unrestricted sociosexuality. Specifically, we conducted both experimental and developmentally informed mediation models to test our hypothesis. We found indirect effects of both primed reminders of father-related pain and developmental exposure to harsh-deviant paternal behaviors on women's unrestricted sociosexuality through increases in perceived male sexual (but not romantic) intent. Further, the effects of paternal harshness-deviance and activated father-related pain on women's sexual perceptions appear to be developmentally ordered, as indicated by a mediation analysis including both factors as predictors. Finally, no effects were found when maternal harshness was substituted for paternal harshness as a predictor in the developmental models.

This study also allowed us to test for the effects of primed paternal disengagement among a sample of women who differed from the university student samples in a number of theoretically relevant ways (most notably, their history of exposure to parental divorce/separation). Analyzing simple between-conditions differences was less informative in this sample, as we did not find main effects of assigned priming condition on women's perceptions of male mating intent. However, we did find that women's perceptions of male sexual intent were predicted by the amount of father-related pain evoked by the priming procedure (independent of randomly assigned condition). As the amount of father-related pain expressed by women increased, so too did their perceptions of male sexual interest. Moreover, the positive effect of harsh-deviant paternal behavior on women's perceptions of male sexual intent was partially mediated by increases in father-related pain activated by the priming procedure.

Internal Meta-Analysis

Given some inconsistencies in our results, it is important to establish the reliability of the effect of paternal disengagement on women's mating-relevant perceptions across studies (as recommended by Maner, 2014), including null results obtained on directly relevant measures. Following procedures outlined by Goh, Hall, and Rosenthal (2016), we first performed an internal meta-analysis of the effect of paternal disengagement on women's perceptions of male sexual intent (five studies; $N = 408$). (See supplemental materials—Appendix C for a list of included measures.) Pearson correlation coefficients were calculated for each constituent analysis. To this end, priming condition was recoded for Studies 1 through 4: comparison condition = 0; paternal disengagement condition = 1.¹⁰ For Study 5, we used the correlation between residual father-related pain activated by the priming procedure and perceived sexual intent. Per convention, for studies with multiple relevant analyses, correlation coefficients were averaged to obtain a single effect size for each study. Study correlations were then Fisher z -transformed for analysis. A fixed effects

¹⁰ As a result of this coding, positive effect size values indicate greater perceptions of mating intent in the paternal disengagement (compared with the comparison) condition.

test was conducted in which the mean effect size (i.e., mean correlation) in each study was weighted by the study's sample size. Overall, the effect across studies was significantly different from zero, $M_r = .19$, $Z = 3.73$, $p < .001$ (two-tailed), with paternal disengagement predicting increases in perceived sexual intent. The aggregate effect size ($r = .19$, $d = .39$) corresponds to a small to medium effect. A fully random effects test of the overall effect was also significant, as indicated by a one-sample t test of the mean effect size against zero, $M_r = .19$, $t(4) = 4.17$, $p = .014$ (two-tailed).

We conducted a similar test of the overall effect of paternal disengagement on women's perceptions of male *romantic/commitment* intent. Because Studies 2 and 3 did not include dependent measures directly relevant to testing this effect, this meta-analysis included measures from Studies 1, 4, and 5 ($N = 254$) only. (see supplemental materials—Appendix C for a list of included measures.) The fixed effects test did not reveal an effect of paternal disengagement on perceptions of romantic/commitment intent across studies, $M_r = .09$, $Z = 1.69$, $p = .09$ (two-tailed). The aggregate effect size ($r = .09$, $d = .18$) corresponds to a small effect. Finally, a fully random effects t test was also nonsignificant, $M_r = .13$, $t(2) = 1.25$, $p = .34$ (two-tailed).

Taken together, the results of the meta-analyses suggest that paternal disengagement reliably increases daughters' perceptions of men's sexual, but not romantic, intent.

General Discussion

Past research has demonstrated robust associations between low paternal investment (biological father absence, low quality fathering) and daughters' accelerated developmental, sexual, and reproductive outcomes (e.g., Coley et al., 2009; James et al., 2012; Quinlan, 2003; Vigil & Geary, 2006). According to paternal investment theory (PIT; Draper & Harpending, 1982; Ellis et al., 2003, 2012), these associations derive from low quality fathering signaling that male investment is not reliably available in the local mating ecology, which regulates daughters toward earlier sexual development and more unrestricted sociosexual attitudes and behavior. In a series of five studies using methods from social and developmental psychology, we found evidence of a conceptual linkage between paternal disengagement and women's perceptions of male mating interest. Paternal disengagement led women to perceive more mating intent in the actions of a hypothetical dating partner (Study 1), male faces (Studies 2 and 3), and verbal and nonverbal cues during an interaction with a male confederate (Studies 4). We found analogous effects of developmental experiences with one's father, with greater exposure to harsh and deviant paternal behavior predicting increased perceptions of male sexual intent (Study 5). Finally, perceived sexual intent mediated the effects of low paternal investment (whether measured developmentally in terms of exposure to harsh-deviant paternal behaviors or experimentally in terms of primed reminders of father-related pain) on women's unrestricted sociosexuality. Together, these results provide evidence for an intervening psychological process—increased perceptions of male mating intent—in the pathway from low paternal investment to daughters' accelerated and unrestricted sexuality.

In addition to providing evidence that paternal behavior changes women's perceptions of men in ways that promote unrestricted

sociosexuality, the current work supports a key prediction from PIT: the specificity of the effects of *fathers* on daughters. Studies 2 through 5 tested for unique father- (vs. mother-) effects. Consistent with the theory, each of these studies documented unique effects of fathering. In Studies 2 through 4, primed paternal disengagement resulted in women perceiving significantly greater male sexual intent than did primed maternal disengagement. The developmental mediation models tested in Study 5 showed that harsh fathering, but not mothering, predicted: (a) daughters' father-related pain and, through it, their perceptions of male sexual intent; and (b) daughters' perceptions of male sexual intent and, through it, their unrestricted sociosexuality. Although it is mothers who often have more pronounced effects on adolescent development across domains than do fathers (e.g., drug use: Hemovich & Crano, 2009; social deviance: Waizenhofer, Buchanan, & Jackson-Newsom, 2004), PIT uniquely predicts targeted effects of fathering on daughters' sexual and reproductive outcomes independent of mothering effects (e.g., Ellis, 2004; Ellis et al., 2012). This posited specificity is consistent with our experimental and developmental findings. Further, the effects of paternal disengagement were specific to women's perceptions of *men's* mating intent. That is, we did not observe increases in women's perceptions of female sexual intent (Study 3) in response to primed paternal disengagement.

Although the overall pattern of results provides support for predictions derived from PIT, we found some inconsistent and null results across the five studies. For instance, among our university samples (Studies 1–4), more consistent effects of paternal disengagement were obtained when assessing perceived sexual intent in male faces relative to men's described actions. Further, based on theory and previous research, we predicted that women would perceive greater sexual intent (specifically) among men in the context of paternal disengagement. However, we found evidence that paternal behavior may simultaneously shift women's perceptions of men's romantic intent (Studies 1 and 4). Exploratory follow-up analyses (reported in supplemental materials—Appendix D) suggest that these results may derive from sexually inexperienced women conflating men's sexual and romantic intent (or sexual arousal and happiness). Finally, some individual studies may have been statistically underpowered because of relatively small sample sizes (e.g., Study 4). For these reasons, it was critical to test the reliability of the effects obtained across studies by conducting an internal meta-analysis, including both significant and null results. Consistent with our original hypothesis, this analysis revealed that paternal disengagement reliably predicted increases in women's perceptions of male *sexual* intent, and that this effect was small to medium in size. On the other hand, the overall effect of paternal disengagement on women's perceptions of male *romantic/commitment* intent across studies was smaller and nonsignificant. As a whole, these analyses support the hypothesis that paternal disengagement plays a causal role in shaping daughters' perceptions of men's sexual intent.

It is important to note that, although perceived male sexual intent was found to mediate the relationship between paternal harshness-deviance and women's sociosexuality in Study 5, we did not find evidence for these changes mediating observed flirting behavior in Study 4. There are several reasons why this discrepancy may have occurred. For example, it is possible that this difference emerged because of the differences in the nature of the dependent measures. Whereas the outcome measure in Study 5

captured more global attitudes and intentions regarding casual and uncommitted sex (an aggregate measure), the null mediational result in Study 4 was obtained within the context of an isolated lab-based interaction with a particular male confederate. Observed flirting is an imperfect index of sociosexuality/sexual motivation, as it reflects a thin slice of behavior and is not equivalent to sexual motivation among women (Henningsen, 2004; Henningsen, Braz, & Davies, 2008). Further, women's tendency to flirt in this situation could have been influenced by myriad factors, in addition to their perceptions of the man's mating interest (e.g., their desire to find a relationship partner, comfort during the recorded interaction, or individual levels of extraversion/intraversion). Assessing women's unrestricted sociosexual attitudes and intentions, as in Study 5, may therefore provide a more direct measure of women's sexual motivation than women's observed flirting during a single interaction. Another possibility is that these discrepant results are a byproduct of any of the observed differences between our university and community samples (as noted above and in supplemental materials—Appendix D). Though beyond the scope of the current project, future research would benefit from probing more deeply the contexts in which women's perceptions do (and do not) influence their observed behavior toward men.

Limitations and Future Directions

Although the current studies are among the first to investigate a potential psychological mechanism (changes in women's views toward men) through which low quality fathering may lead to unrestricted sociosexuality among daughters, future research will be needed to examine more precisely the cognitive changes that women experience in this context. Paternal investment theory posits that father absence provides women with information suggesting that the local mating ecology is relatively polygynous, and that men generally do not invest heavily in their partners or offspring (e.g., Belles, Kunde, & Neumann, 2010; Del Giudice & Belsky, 2011; Draper & Harpending, 1982; Ellis et al., 2012; James et al., 2012; Simpson & Belsky, 2008). Although the current experiments suggest that women experiencing paternal disengagement perceive greater mating intent among men, we did not test the extent to which these results are attributable to paternal disengagement activating evaluations consistent with a more generalized polygynous mating context. It is possible, for example, that priming states associated with paternal disengagement may lead women to perceive men as being more sexually motivated in general, as men typically compete more fiercely for access to short-term mating opportunities in relatively polygynous contexts (Del Giudice, 2009; Draper & Harpending, 1982; Ellis et al., 2012). Although we did not find priming effects on a measure of perceived male interest in another woman (see supplemental materials—Appendix A, Study 3), such findings would not be incompatible with PIT. Future work should more rigorously test whether the demonstrated effects are driven by women's perceptions of men's mating interest in them specifically, or if women might perceive men to be more interested in sex overall (i.e., with other women as well) in the context of paternal disengagement.

The results of Study 3 indicate that priming paternal disengagement increases women's perceptions of sexual intent among male targets specifically (between-conditions differences were not found for female targets). However, aside from including male

targets ranging in physical attractiveness, we did not systematically test which specific male features or traits (if any) women most prefer when male parental investment levels are low. According to the strategic pluralism model of mating (Gangestad & Simpson, 2000), women should focus on indirect fitness benefits ('good genes') in the context of low male investment. Although PIT posits a shift toward shorter-term mating strategies among daughters who receive low paternal investment, this shift may not entail women reducing their mating options by prioritizing the genetic quality of potential mates. Instead, paternal disengagement cues may function to direct women's attention to mating options that they would be less likely to notice or consider—including short-term sexual ones—when high quality male investment is readily available (i.e., opening up their mating opportunities by casting a wider net). Future research is needed to systematically examine to what kinds of potential mates women are most attracted in contexts characterized by low paternal investment.

Because we were interested in elucidating the targeted effects of paternal disengagement revealed in previous social psychological research (i.e., DelPriore & Hill, 2013) and in the developmental literature (e.g., Ellis et al., 2012; James et al., 2012), the current experiments focused exclusively on *women's* sexual perceptions. In general, men tend to be more oriented toward short-term mating opportunities than women across contexts (Buss, 2008). As such, we would not expect paternal disengagement to produce similar shifts in men's perceptions of women's sexual intent, as men's short-term mating psychology should be less sensitive to such cues. Indeed, research on the effects of fathering quality and father absence suggests that contextual factors related to fathering have a stronger influence on daughters' sexual decision-making than they do for sons (e.g., Coley et al., 2009; DelPriore & Hill, 2013). Instead, according to PIT, low quality fathering and father absence may promote aggression and dominance-striving behaviors among sons to facilitate successful male-male competition in polygynous contexts characterized by low male investment (e.g., Del Giudice, 2009; Draper & Harpending, 1982; Ellis et al., 2012). Future research should examine if and how paternal disengagement influences intrasexual competitive cognitions among men.

Finally, the results of Study 5 suggest important differences in how women responded to the priming procedure based on past experiences with their fathers. Women from our college samples, a majority of whom were from biologically intact families, were generally able to complete the priming procedure to which they were randomly assigned. However, participants in Study 5 (all of whom experienced parental divorce/separation while growing up), frequently conveyed some level of father-related pain regardless of their assigned writing prompt. As such, we needed to code and model the character of the experiences described by these women. In addition to their history of exposure to divorce, the sample of women in Study 5 differed from the college samples in other meaningful ways (e.g., they were: older; more likely to be married; less wealthy; more racially/ethnically diverse; and more sexually experienced as described in supplemental materials—Appendix D). Therefore, it is uncertain whether the null main effects obtained in response to the priming procedure are attributable to women's differential experiences with paternal absence/disengagement, or to other sociodemographic differences between the samples. Future investigations should consider the effectiveness of the current priming procedure among diverse samples, and the

extent to which this effectiveness is influenced by the content of women's prime responses (i.e., the amount of father-related pain evoked by the priming procedure). Research is also needed to examine how primed paternal disengagement interacts with women's developmental histories by including participants from both biologically intact and divorced/separated families within the same experiments.

Conclusion

Substantial evidence has accumulated regarding the critical role of fathers in shaping daughters' sexual and reproductive behaviors, including their interactions with men (e.g., Ellis et al., 2003; Hetherington, 1972; James et al., 2012; Quinlan, 2003). Although associations between low paternal investment and women's accelerated mating outcomes have been well established, the current studies extend this literature by demonstrating the causal impact of paternal disengagement (and associated thoughts and feelings regarding the father) on women's perceptions of men. In so doing, this work suggests a potential psychological pathway (increased perceptions of male mating intent) through which contexts characterized by low male investment may increase women's likelihood of entering into immediately available relationships, including short-term sexual ones.

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