

# Baby Fever: Situational Cues Shift the Desire to Have Children via Empathic Emotions

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The desire to have children is often regarded as a deep, biologically driven desire or a rational decision based on weighing costs and benefits. Based on these assumptions, many people believe that the desire to have children is unchanging. However, the studies presented here indicate that the desire to have children is readily shifted by subtle situational cues, such as advertisements and social media feeds depicting positive images of parents and children. In four studies ( $N = 1,093$ ), we randomly assigned young adults (ages 18–35) without children to view images of parents and children or control images. We found that positive parent–child images led young adults to a greater desire to have children via increases in empathic emotions both immediately (Studies 1–4) and 3 days later (Study 3), but viewing negative parent–child images did not decrease the desire to have children (Study 2). The results of our studies suggest that portrayals of parents and children may temporarily influence young adults’ desires to have children. Given the abundance of parent–child images on social media and intense societal pressure to have children, small changes in the desire to have children may accrue over time to influence child-rearing decisions.

## Public Significance Statement

These studies suggest that when young adults see images of parents and cute children, they feel a greater desire to have children of their own, in part because those images make them feel affectionate, compassionate, and caring. Given the abundance of parent–child images on social media and intense societal pressure to have children, small changes in the desire to have children may have implications for actual child-rearing behavior and overall emotional well-being.

*Keywords:* baby fever, children, parenthood, fertility decisions, empathic emotions

Do you want to have children? For some young adults, the answer to this question may be a resounding “yes!” reflecting a deep-seated desire to have children dating back to childhood pretend play (e.g., playing “house”). Others, by contrast, may contemplate their careers, romantic relationships, and personal leisure before they determine whether they wish to have children. Moreover, changing workplace attitudes and public policies in developed countries allow women to have more control and fewer limitations over their reproductive decisions. Thus, the assumption holds that people in modern societies may choose for themselves the outcome of this major life decision. Furthermore, having children is a unique and consequential life event with implications for parents’ relationships, finances, time, and well-being for many years (Nelson et al., 2014). Biologists, sociologists, economists, and psychologists have all ventured to answer an important question: What motivates the decision to have children? Explanations include ticking biological clocks, societal pressures and social norms, practical cost-benefit analyses,

emotional fulfillment, personality, and personal points-of-view based on life stage and mental readiness (Fawcett, 1978; Hofer et al., 2018; Hutteman et al., 2013; Langdridge et al., 2005; Morgan & King, 2001; Newton et al., 1992; van Balen & Trimbos-Kemper, 1995). Such explanations are compelling because they focus attention on valid motivational and rational drivers of a highly consequential and increasingly personal decision. However, we argue that young adults’ desire to have children may also be shifted by seemingly subtle situational cues, such as advertisements or images on social media depicting positive moments shared among parents and children.

## Parental Care Motivation and the Desire to Have Children

Recent evidence from evolutionary psychology suggests that people prioritize familial motives (e.g., kin care) more than any other evolutionary motive (Ko et al., 2020). Among the familial motives, the parental care motivational system evolved to promote nurturance and protection of children (Buckels et al., 2015; Hofer et al., 2018). This motivational system is activated by the presence of children in need of care. Among parents, individual differences in parental care motivation predict positive child-rearing attitudes, and among nonparents, individual differences in the parental care motive predict the desire to have children (Buckels et al., 2015). However, few experimental studies have evaluated the activation of

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this parental care motivation system, nor have they considered the role of emotions in promoting the desire to have children.

As childbearing has increasingly become a personal decision rather than a foregone conclusion, understanding the psychological factors that predict desire to have children, as well as the extent to which that desire is malleable, is an important question for scientific inquiry. Shifts in reproductive behavior in recent decades have resulted in the postponement of childbearing (Berrington, 2004), as well as overall declines in fertility rates, resulting in smaller populations as fertility rates fall below replacement levels in some countries (Aarssen & Altman, 2006; Agrillo & Nelini, 2008; Caldwell et al., 2002). Meanwhile media has focused increased attention on celebrities and their childbearing (Grose, 2013). Given evidence that the desire to have children predicts subsequent child-rearing outcomes (Miller et al., 2004), understanding whether and the extent to which situational factors might alter the desire to have children would shed light on these broader changes in reproductive patterns.

Several studies suggest that situational cues, such as workplace dynamics, personal life, and mass media, might shift the desire to have children—in both directions. For example, one study found that coworkers' fertility decisions are correlated, such that office-wide fertility increases when one employee has a child (Hensvik & Nilssen, 2010). Additional work suggests that positive exposure to children correlates with greater self-reported desire to have children (Brase & Brase, 2012) and with mentions of “baby fever” on social media (Adair et al., 2014). Other studies have attributed negative attitudes toward having children and fertility rate declines to increased media exposure (e.g., television, radio, movies; Barber & Axinn, 2004; Hornik & McAnany, 2001), to materialism (Li et al., 2015), and to negative experiences with children (Brase & Brase, 2012). Yet, highlighting negative aspects of childcare did not decrease desire to have children (van Balen & Trimbos-Kemper, 1995). Together, these studies provide evidence that situational cues may influence seemingly personal fertility decisions.

Notably, however, each of these previous studies relied primarily on correlational methods. Accordingly, interpretations of the causal influence of situational cues on desire to have children are limited. For example, one interpretation may be that people who wish to have children seek out positive experiences with children, which would explain the correlation between positive exposure to children and desire to have children. Alternatively, could these situational influences actually *change* people's desire to have children? To better understand the extent to which the desire to have children is malleable, and to bolster the causal interpretations of such a finding, in the present studies we manipulated exposure to children and measured the subsequent desire to have children. In line with past evidence, we predicted that positive portrayals of parents and children would lead to subsequently greater desire to have children among young adults without children. Moreover, given the mixed evidence regarding negative situational cues (Brase & Brase, 2012; van Balen & Trimbos-Kemper, 1995), we tentatively predicted that negative portrayals would lead to less desire to have children.

### Empathic Emotions and the Parental Instinct

We contribute to this literature by investigating empathic emotions as a potential mechanism that might explain the association between exposure and desire to have children. We acknowledge empathy as “a

state of emotional arousal stemming from the apprehension or comprehension of another's affective state” (Zhou et al., 2003, p. 269) whether positive or negative; the act of feeling into another's affective experience (Eisenberg & Strayer, 1987). Empathic emotions are typically elicited after viewing another person, including children, in need (Batson, 1987, 1991), and include specific emotions such as tenderness, sympathy, compassion, and softheartedness (Lishner et al., 2011). Consistent with past research, we investigate empathic emotions as a set of emotions rather than empathy as an individual difference (Kalawski, 2010; Lishner et al., 2011).

Theory suggests that feelings of empathy evolved in humans as part of the parental instinct (i.e., the desire to nurture and care for infants; Batson, 2010; Bell, 2001; McDougall, 1908). Among parents, a desire to nurture and care for their infants is adaptive because it ensures the survival of their offspring. Interestingly, however, studies have shown that adults both with and without children respond to even unfamiliar infant and toddler faces at both a neural (activation of the medial orbitofrontal cortex; Kringlebach et al., 2008) and emotional (greater empathic emotions; Lishner et al., 2008, 2011) level. This work suggests that the parental instinct may not be specific only to parents or only to one's offspring. Rather, activation of the parental instinct may engender different attitudes and behaviors among parents and nonparents. Among parents, empathic emotions may influence caregiving behavior toward their own children (Brems & Sohl, 1995). Among nonparents, who are not in a position to care for their own children, empathic emotions may increase the desire to enter the parent role (Buckels et al., 2015). Indeed, feelings of tenderness—a hallmark of empathic emotions—are theorized as a characteristic and distinct emotion associated with parenting motivation (Beall & Tracy, 2017; Buckels et al., 2015); however, few studies have tested the link between empathic emotions and desire to have children empirically. This possibility is the focus of the current investigations.

Although studies indicate that children evoke empathic emotions, to our knowledge, empathic emotions have not been linked empirically to the desire to have children. However, theory and evidence support that empathic emotions are linked to caregiving in romantic relationships (Feeney & Collins, 2003) and altruistic motivations (i.e., placing the needs of others before the self; Batson, 1987, 1991). Because having children requires parents to place the needs of their children before themselves, we believe that experiencing empathic emotions may not only be associated with an established parental role but also could elicit desire to enter such a role. Moreover, if empathy evolved as part of the parental instinct (Batson, 2010; Beall & Tracy, 2017; Bell, 2001; McDougall, 1908), then empathic emotions could also enhance the parental instinct vis-a-vis the desire to have children.

### The Current Research

We conducted four experiments to determine whether situational cues (i.e., viewing positive or negative parent-child moments) evoke empathic emotions and greater desire to have children. First, we tested whether portrayals of positive parent-child moments in advertisements (versus adult-alone moments) lead to increases in the desire to have children via increases in empathic emotions. Second, we contrasted the effects of positive parent-child moments with negative parent-child moments. Our third study extends the context

of parent-child images to social media—namely, Instagram. In addition, we examined the durability of these effects with a 3-day follow-up. Finally, in our fourth study, we sought to replicate our findings in a large, well-powered investigation.

## Study 1

### Method

#### Participants

We recruited 122 adults (68 female) ages 18–34 ( $M_{\text{age}} = 24.25$ ,  $SD = 4.03$ ) without children using Amazon's Mechanical Turk (mTurk) online panel and compensated them \$0.50 for their time. To protect against any potential selection biases related to the topics of parenthood and children, respondents were recruited under the auspices of an "Advertising and Young Adult Life Survey." All participants who passed the eligibility requirements for age (i.e., 18–35) and nonparent status immediately participated in the study. The majority of participants were White (69.7%), followed by African American (11.5%), Asian American (9.8%), Latino(a) (3.3%), more than one (4.1%), and other (1.6%). No demographic differences in desire to have children or demographic differences in the effect of our manipulations were found across studies, so demographics will not be discussed further,  $ps > .28$ .

#### Procedure

At the beginning of the study, participants were told that we were interested in their impressions of advertisements for a variety of brands. After logging in to the study website, participants were randomly assigned to view advertisements depicting positive parent-child moments ( $n = 61$ ) or identical advertisements with the child removed ( $n = 61$ ).<sup>1</sup> This sample size would provide adequate power (78%) to detect a medium effect size. We estimated a medium effect size based on prior work examining how the depictions of relationships in advertisements influence consumer decision making and behavior (Cavanaugh, 2014), and research examining the effects of depictions of children on empathic emotions (Lishner et al., 2011). Data were not analyzed until all participants were collected. Across conditions, the layout was held constant, and each participant viewed eight advertisements. In the positive parent-child condition, parents and children were featured in each advertisement. To create an identical adult-only comparison condition, these same images were edited to remove the child originally pictured (see Figure 1 for sample advertisements). Data and study protocol are available on the Open Science Framework (OSF) at <https://osf.io/8kqsj>.

#### Measures

**Empathic Emotions.** Immediately after viewing the images, participants rated the extent to which the images elicited empathic emotions (i.e., tenderness, compassion, sympathetic, softhearted, caring, affection;  $\alpha = .95$ ; adapted from Lishner et al., 2008) on a scale from 1 (*not at all*) to 7 (*very much*).

**Desire to Have Children.** After viewing the advertisements, participants were asked to rate their desire to have children (i.e., "To what extent do you want to have children?") on a scale from 1

(*not at all*) to 7 (*very much*).<sup>2</sup> Desire to have children was positively correlated with empathic emotions,  $r(120) = .37$ ,  $p = .00004$ .

## Results

### Desire to Have Children

After viewing parent-child advertisements ( $M = 4.90$ ,  $SD = 2.14$ ), young adults reported a stronger desire to have children relative to viewing advertisements with only an adult ( $M = 4.00$ ,  $SD = 2.08$ ),  $t(120) = 2.36$ ,  $p = .02$ ,  $r_{\text{es}} = .21$ .

### Empathic Emotions

We also found a significant effect of advertisement condition on empathic emotions,  $t(120) = 4.80$ ,  $p < .001$ ,  $r_{\text{es}} = .40$ . Participants reported significantly greater empathic emotions after viewing the parent-child images ( $M = 4.51$ ,  $SD = 1.70$ ) than adult-only control images ( $M = 3.06$ ,  $SD = 1.65$ ).

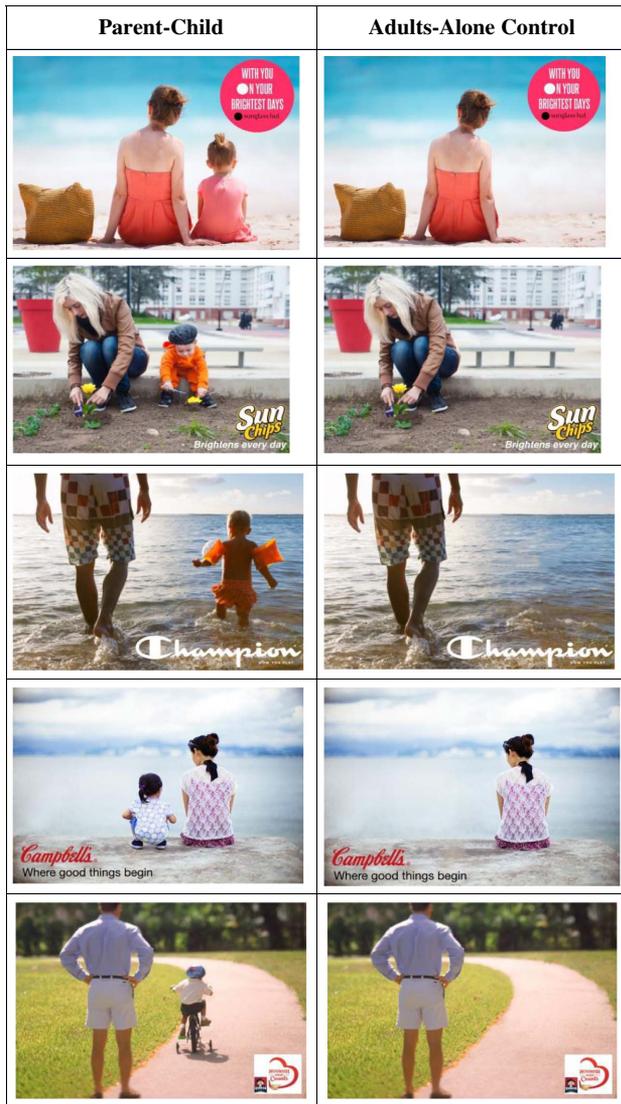
### Indirect Effects

Next, following Hayes' (2018) recommended procedures, we tested the indirect effects of condition (0 = *Adults-Only*, 1 = *Parent-Child*) on desire to have children via increases in empathic emotions. Using Hayes' (2018) PROCESS macro (Model 4) with 5,000 bootstrapped samples, we found a significant direct effect of condition on empathic emotions (a path),  $b = 1.45$ ,  $p < .001$ , and of empathic emotions on desire to have children (b path),  $b = 0.39$ ,  $p = .008$ . The direct effect of condition on desire to have children was significant in the unmediated model,  $b = .90$ ,  $p = .02$ . Most importantly, the indirect effect of empathic emotions was significant,  $b = 0.57$ ,  $SE = 0.20$ , 95% CI [0.24, 1.03]. In addition, the direct effect of condition on desire to have children was no longer significant when empathic emotions were entered into the model,  $b = 0.33$ ,  $p = .41$ . Together these results provide evidence that empathic emotions explain the effect of viewing portrayals of positive parent-child moments on desire to have children.

<sup>1</sup> To ensure that these control images were truly neutral, we also tested an advertisement depicting only the product (i.e., no people were pictured;  $n = 61$ ). No significant differences in empathy emerged when comparing these two conditions,  $t(120) = 1.51$ ,  $p = .13$ . People in the adult-alone condition reported lower desire to have children than the product-only condition,  $t(120) = 2.00$ ,  $p = .05$ . Finally, results were similar when comparing the parent-child condition to both control conditions (collapsed), for both empathy  $t(181) = 6.55$ ,  $p < .001$ , and desire to have children,  $t(181) = 1.63$ ,  $p = .11$ .

<sup>2</sup> Participants also completed measures of positive emotions; negative emotions; items regarding the value, importance, and likelihood of having children; obligations to partner, parents, and society to have children; parenthood contingencies of self-worth; and relationship satisfaction. Parent-child images elicited greater positive,  $t(120) = 3.50$ ,  $p = .001$ , but not negative,  $t(120) = 0.79$ ,  $p = .43$ , emotions. Results were similar when collapsing all items regarding the desire, importance, value, and likelihood of having children,  $t(120) = 2.03$ ,  $p = .04$ . Participants in the parent-child condition did not report greater obligation to partners or parents,  $ts < 1.01$ ,  $ps > .32$ , but they reported marginally greater obligation to society to have children than the adults-alone condition,  $t(120) = 1.79$ ,  $p = .08$ . Contingency of self-worth and relationship satisfaction did not moderate the effects presented here.

**Figure 1**  
Sample Advertisements Used in Each Condition in Study 1



Note. See the online article for the color version of this figure.

## Discussion

Our first study indicates that viewing images depicting positive parent–child moments leads young adults to report a stronger desire to have children. Moreover, viewing images depicting positive parent–child moments led participants to feel tenderness, sympathy, and compassion (i.e., empathic emotions), which in turn predicted greater desire to have children, relative to viewing images of adults alone. Although Study 1 provides initial process evidence via mediation, we designed Study 2 to further explore the psychological process influencing desire to have children by manipulating parent–child image valence. Accordingly, in our second study, we used positive images, negative images, as well as a product-only control with no people pictured to test our hypothesis. Because we were also interested in comparing positive and negative parent–child

moments, we needed to use images with interaction to convey valence. By virtue of the interactions depicted in the stimuli (e.g., adult coloring on floor with child; adult being fed by child), removing the child from the image (as we did in Study 1) was not a viable option. Thus, we included the product-only control for a more conservative test.

In Study 2, we examine whether the influence of parent–child moments on the desire to have children is specific to positive parent–child images, or whether the desire to have children is also influenced by negative parent–child images. Viewing negative parent–child images may lead to one of the two plausible outcomes. Viewing negative parent–child images may parallel negative exposure to children, which has been linked to decreased desire to have children in previous studies (Brase & Brase, 2012). Accordingly, we would expect the negative images to *decrease* the desire to have children. Alternatively, given past work indicating that images of children (Lishner et al., 2008, 2011) and people in need (Batson, 1987, 1991) elicit empathic emotions, we might expect that negative parent–child images could *increase* the desire to have children. Specifically, if negative parent–child images increase empathic emotions, and empathic emotions are a critical factor predicting increases in desire to have children, then negative parent–child images would increase the desire to have children. We pit these two competing hypotheses against one another in our second study.

## Study 2

### Method

#### Participants

We recruited 235 adults (110 female) ages 18–35 ( $M_{\text{age}} = 25.18$ ,  $SD = 3.98$ ) without children using the undergraduate student participant pool ( $n = 164$ ) and mTurk ( $n = 71$ ). Based on the estimated effect size of the influence of parent–child moments on the desire to have children discovered in Study 1, we increased our sample to provide adequate power (90%) to detect an effect size  $r = .20$ . The majority of participants were White (67.3%), followed by Asian American (11.9%), African American (10.2%), Latino(a) (6.6%), more than one (2.2%), other (1.3%), and Hawaiian/Pacific Islander (0.4%). Undergraduate student participants were slightly younger ( $M = 24.85$ ) than mTurk participants ( $M = 25.94$ ),  $t(233) = 1.95$ ,  $p = .053$ , but no significant differences between samples were detected for other demographics,  $\chi^2$ s  $< 2.24$ ,  $ps > .20$ . Sample recruitment strategy also did not moderate any of our hypothesized effects,  $ps > .25$ .

#### Procedure

Participants were recruited for an “Advertising Survey” and told that we were interested in how different types of advertisements influence their thoughts and feelings. After visiting the study website, participants were randomly assigned to view advertisements depicting positive parent–child moments ( $n = 78$ ), negative parent–child moments ( $n = 77$ ), or an advertisement depicting only the product ( $n = 80$ ). The layout was held constant across conditions; each participant viewed eight advertisements. In the positive and negative parent–child moment conditions, the parents and children pictured were held constant. No people were pictured in the product-only condition.

**Figure 2**  
Sample Advertisements Used in Each Condition in Study 2



Note. See the online article for the color version of this figure.

See Figure 2 for sample advertisements. Data and study protocol are available on OSF at <https://osf.io/3h5am>.

## Measures

**Empathic Emotions.** Participants also completed the same measure of empathic emotions (6 items) used in Study 1, which demonstrated good reliability in the current sample ( $\alpha = .93$ ).

**Desire to Have Children.** Participants completed the same measure of desire to have children used in the first study. The average rating for desire to have children was 4.25 ( $SD = 2.10$ ).<sup>3</sup> Desire to have children was positively correlated with empathic emotions,  $r(226) = .43, p < .0001$ .

## Results

### Desire to Have Children

We found a significant effect of advertisement condition on desire to have children,  $F(2, 225) = 3.38, p = .036$ . We conducted two planned contrasts to evaluate differences across conditions. First, we

tested the possibility that negative parent-child images ( $-1$ ) would lead to a decreased desire to have children, and that positive parent-child images would lead to an increased desire to have children ( $+1$ ) with the control group falling between the two conditions ( $0$ ). This contrast was not significant,  $t(225) = 1.67, p = .10, r_{es} = .11$ . Second, we tested the possibility that viewing negative parent-child images ( $0$ ) would lead to a greater desire to have children than the control condition ( $-1$ ), but not as great as the positive parent-child images condition ( $+1$ ). This contrast was significant,  $t(225) = 2.56, p = .01, r_{es} = .17$ .

<sup>3</sup> Participants also completed measures of positive emotions, negative emotions, value and likelihood of having children, and deservingness (4 items: To what extent do you feel you deserve to: indulge yourself a little, reward yourself, treat yourself to nice things, buy something special for yourself). Results were similar collapsing across items for the desire, likelihood, and value of having children,  $F(2, 225) = 2.64, p = .07$ . Negative parent-child images elicited greater negative emotions than positive parent-child images and control images,  $F(2, 225) = 20.154, p < .001$ . Positive parent-child images elicited greater positive emotions than control,  $F(2, 225) = 30.86, p < .001$ . No differences were detected across images in items measuring deservingness,  $F(2, 225) = 2.26, p > .10$ .

**Empathic Emotions**

We also found significant differences in empathic emotions across conditions,  $F(2, 225) = 19.32, p < .0001$ . To evaluate differences across conditions, we conducted the same planned contrasts as above. Both Contrast 1,  $t(225) = 4.02, p < .001, r_{es} = .26$ , and Contrast 2,  $t(225) = 6.11, p < .001, r_{es} = .38$ , were significant. Next, we conducted a third contrast to evaluate if our first two contrasts were significantly different from one another and determine which interpretation was a better fit to our data. Specifically, we calculated the contrast weights so that positive values would indicate that Contrast 2 was significantly better than Contrast 1 by subtracting Contrast 1 from Contrast 2 (Rosenthal et al., 2000), which resulted in the following contrast weights: positive parent-child images (0), negative parent-child images (1), control (-1). This contrast was significant,  $t(225) = 2.03, p = .04$ , suggesting that the second contrast is a better fit to our data than the first. Thus, our data suggest that parents in the positive parent-child condition reported significantly greater empathic emotions than those in the negative parent-child condition, who also reported greater empathic emotions than those in the control condition (See Table 1, Figure 3).

**Indirect Effects**

Using the recommended technique for testing conditional indirect effects (Hayes, 2018), we conducted process analyses (Model 4) entering empathic emotions as a potential mediator. We used 5,000 bootstrapped samples and examined indirect effects for empathic emotions.

Relative to product-only control images, positive parent-child images elicited greater empathic emotions (a path),  $b = 1.58, p < .0001$ , which in turn predicted greater desire to have children (b path),  $b = 0.52, p < .0001$ . The indirect effect of positive parent-child images on desire to have children via empathic emotions was significant,  $b = 0.83, SE = 0.19, 95\% CI [0.51, 1.28]$ . Moreover, the effect of positive parent-child images on desire to have children was significant in the unmediated model (c path),  $b = 0.86, p = .01$ , and was no longer significant when empathic emotions were entered in the model (c' path),  $b = 0.03, p = .93$ .

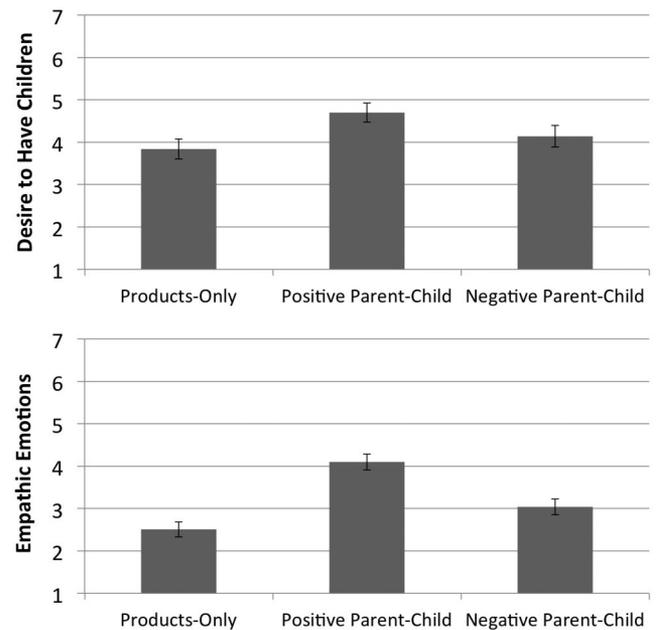
Results were similar when comparing the positive parent-child images to negative parent-child images. Relative to negative images, positive parent-child images elicited greater empathic emotions (a path),  $b = 1.05, p = .0001$ , which in turn predicted greater desire to have children (b path),  $b = 0.52, p < .0001$ . The indirect effect of empathic emotions was significant,  $b = 0.55, SE = 0.17, 95\% CI [0.26, 0.92]$ . The effect of positive parent-child images on desire to have children was marginally significant in the unmediated model (c path),  $b = 0.57, p = .096$ , and dropped

**Table 1**  
Mean Values (Standard Deviations) for Empathic Emotions and Desire to Have Children by Condition for Study 2

Dependent Variable	Positive Parent-Child	Negative Parent-Child	Products-Only Control
Empathic emotions	4.10 (1.66)	3.04 (1.60)	2.51 (1.56)
Desire to have children	4.70 (2.01)	4.14 (2.17)	3.84 (2.06)

**Figure 3**

Self-Reported Desire to Have Children (Top) and Empathic Emotions (Bottom) by Condition for Study 2



Note. Error bars represent standard error of the mean.

well below significance when empathic emotions was entered into the model (c' path),  $b = 0.02, p = .96$ .

Finally, findings comparing the effects of negative parent-child images to control images on the desire to have children support the critical role of empathic emotions. Relative to control images, negative parent-child images elicited greater empathic emotions (a path),  $b = 0.53, p = .04$ , which in turn predicted greater desire to have children (b path),  $b = 0.52, p < .0001$ . The indirect effect of empathic emotions was significant,  $b = 0.28, SE = 0.14, 95\% CI [0.03, 0.58]$ . The effect of negative parent-child images on desire to have children was not significant in the unmediated model (c path),  $b = .29, p = .39$ , but reduced in size when empathic emotions was entered in the model (c' path),  $b = 0.01, p = .96$ .

**Discussion**

These findings further indicate that the desire to have children is shifted by subtle situational cues, as well as the important role of empathic emotions in promoting desire to have children. Replicating our first study, we found that positive parent-child images predicted greater desire to have children via empathic emotions, relative to a product-only control. In addition, we found that negative parent-child images did not decrease the desire to have children, but instead indirectly predicted greater desire to have children via empathic emotions. This finding supports the critical role of empathic emotions in predicting the desire to have children.

One remaining question involves the durability of these effects. If these effects are short lived, then they may not translate into changes in motivation or actual decisions about having children. In addition, although the depictions of children are ubiquitous in advertisements,

these images may not reflect how people commonly view such portrayals in their daily lives. In our third study, we sought to overcome these limitations by examining the durability of these effects and by examining another mode of exposure that more closely mirrors how people encounter positive portrayals of parenthood in their daily lives—through social media. Given the brief nature of our situational cues via advertisements and social media, we did not expect their effects to last very long; however, we wanted to determine whether these effects are durable over the course of several days, so we included a 3-day follow-up in Study 3.

### Study 3

#### Method

##### Participants

We recruited 212 adults (94 female) ages 18–35 ( $M_{\text{age}} = 25.91$ ,  $SD = 3.94$ ) without children using mTurk in exchange for \$1.50. The majority of participants were White (71%), followed by Asian American (11.1%), African American (8.2%), Latino(a) (7.2%), other (1.5%), and more than one ethnicity (1%). Prior to data collection, we decided to recruit approximately 200 participants to maximize power and account for possible attrition. Of the 212 participants who began the study, 117 completed the focal follow-up measures collected 3 days later. Attrition was evenly dispersed across conditions,  $\chi^2(1) = 0.02$ ,  $p = .89$ ; ethnicity,  $\chi^2(7) = 5.74$ ,  $p = .57$ ; relationship status,  $\chi^2(4) = 5.30$ ,  $p = .26$ ; and did not moderate immediate effects of condition on any of our outcomes of interest,  $bs < 0.12$ ,  $ps > .85$ ; however, men,  $\chi^2(1) = 3.79$ ,  $p = .051$ , and younger participants,  $t(210) = 2.83$ ,  $p = .005$ , were less likely to complete follow-up measures than were women and older participants, respectively.

##### Procedure

Participants were recruited for a “Social Media Survey” and told that we were conducting a survey about people’s experiences using social media. After logging in to the study website, participants were randomly assigned to view Instagram images depicting positive parent–child moments ( $n = 106$ ) or identical images depicting only the adult ( $n = 106$ ). The layout was held constant across conditions; each participant viewed 12 images. The images included those used in Study 1 supplemented with additional images of the same type for more realism in the appearance of the social media feed (see Figure 4). Participants rated their desire to have children immediately after viewing the images and again 3 days later. They also completed a measure of empathic emotions. Data and study protocol are available on OSF at <https://osf.io/m9q3w>.

In summary, this study was designed to test whether exposure to positive parent–child moments would elicit empathic emotions immediately and result in a durable increase in desire to have children 3 days later. Provided that emotions, by definition, are short lived (Ekman, 1984), we did not expect empathic emotions to remain elevated after 3 days. However, we hoped to find evidence that the effect of the images and resulting empathic emotions at Time 1 would predict an enduring increase in desire to have children at Time 2.

#### Measures

##### Empathic Emotions

Participants completed the same measure of empathic emotions as was used in the first two studies. Cronbach’s  $\alpha$ s were .94 for the first time point and .95 for the second time point.

##### Desire to Have Children

Participants completed the same measure of desire to have children as was used in the first two studies. To minimize demand characteristics regarding the desire to have children, participants were asked to respond to three additional questions: “To what extent do you want to get married?”; “to what extent do you want to purchase a home?”; and “to what extent do you want to adopt a pet?”<sup>4</sup> See Table 2 for bivariate correlations of primary study variables.

#### Results

##### Empathic Emotions

Viewing parent–child images led to significantly greater empathic emotions immediately,  $t(210) = 4.37$ ,  $p < .001$ ,  $r_{es} = .29$ , and marginally greater empathic emotions at follow-up,  $t(114) = 1.76$ ,  $p = .08$ ,  $r_{es} = .16$ . See Table 3.

##### Desire to Have Children

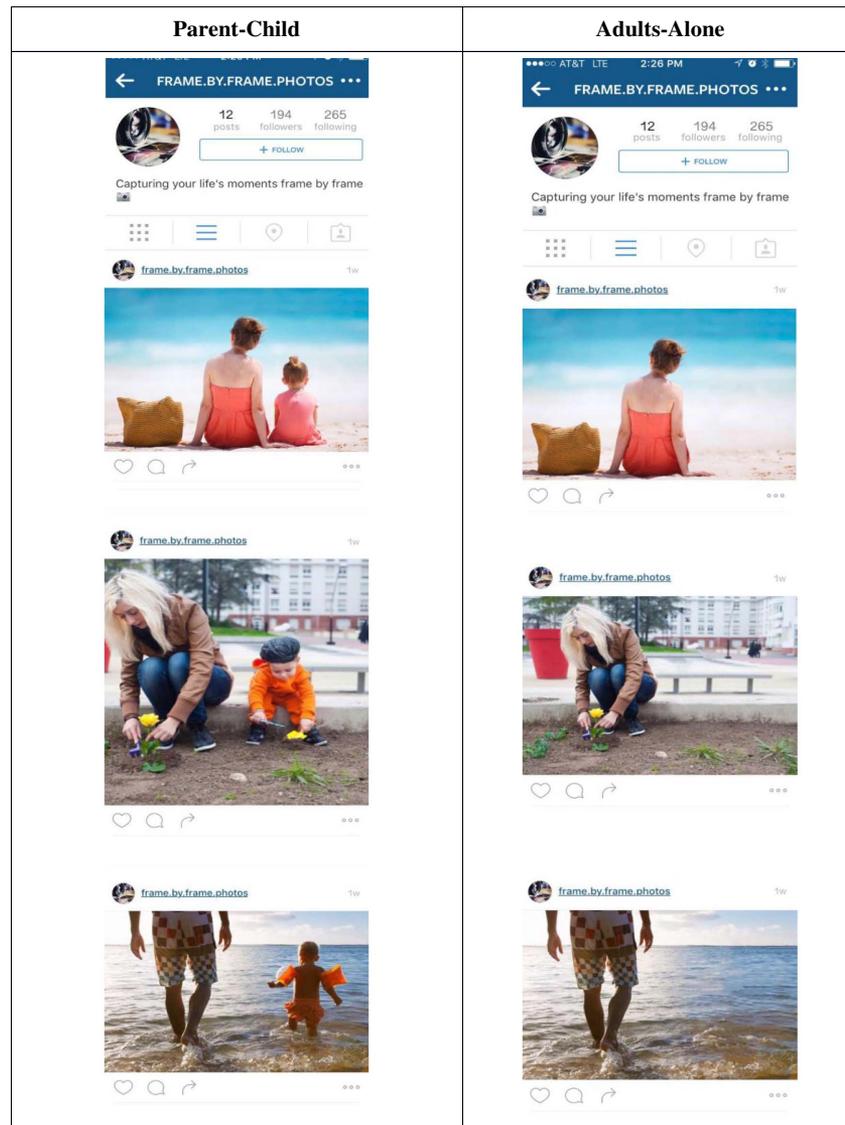
Viewing parent–child images did not directly lead to a greater desire to have children at baseline,  $t(210) = 1.13$ ,  $p = .26$ ,  $r_{es} = .08$  or follow-up,  $t(114) = 1.58$ ,  $p = .12$ ,  $r_{es} = .15$ . Viewing parent–child images did not lead to increases in the desire to get married, to purchase a home, or to adopt a pet, at either time point,  $ts < 1.29$ ,  $ps > .20$ . See Table 3.

##### Indirect Effects

Based on our planned analytic approach, we tested whether the effect of the images and resulting empathic emotions at Time 1 would predict greater desire to have children at Time 2. Accordingly, we examined whether viewing parent–child images on Instagram led to increases in the desire to have children both immediately and at follow-up via immediate increases in empathic emotions (i.e., empathic emotions measured at the first time point) using process analyses (Model 4) with 5,000 bootstrapped samples (Hayes, 2018). Although we did not detect a significant direct effect of viewing parent–child images on the desire to have children, current statistical recommendations suggest that indirect effects may exist in the absence of direct effects (Hayes, 2018; Rucker et al., 2011). Specifically, Rucker et al. (2011) argue that “overemphasizing the  $X \rightarrow Y$  relationship before or after controlling for a mediator can lead to misleading, or even false, conclusions in theory testing” (p. 360).

<sup>4</sup> Participants also completed a measure of positive and negative emotions (PANAS) at baseline and at follow-up. Participants in the parent–child condition reported greater positive emotions,  $t(210) = 2.20$ ,  $p = .03$ , and fewer negative emotions,  $t(210) = 2.12$ ,  $p = .04$ , at baseline, but not at follow-up  $ts < 1.10$ ,  $ps > .28$ .

**Figure 4**  
Sample Instagram Images for Each Condition in Study 3



*Note.* See the online article for the color version of this figure.

Based on these recommendations, we proceeded to test our hypothesized indirect effect.

Relative to adult-only control images, positive parent-child images elicited greater empathic emotions (a path),  $b = 0.99$ ,  $p < .0001$ , which in turn predicted greater desire to have children at the first time point (b path),  $b = 0.33$ ,  $p = .0003$ . The indirect effect of positive parent-child images on desire to have children via empathic emotions was significant,  $b = 0.33$ ,  $SE = 0.12$ , 95% CI [0.13, 0.62].

To test the durability of these effects, we tested whether the indirect effect of positive parent-child images on desire to have children via empathic emotions (immediately after viewing the images) was sustained at our 3-day follow-up. Relative to adult-only control

images, positive parent-child images elicited greater empathic emotions (a path),  $b = 0.97$ ,  $p = .002$ , which in turn predicted greater desire to have children 3 days later (b path),  $b = 0.42$ ,  $p = .001$ . The indirect effect of positive parent-child images on desire to have children via empathic emotions was significant,  $b = 0.41$ ,  $SE = 0.18$ , 95% CI [0.12, 0.86].

## Discussion

These findings indicate that the increase in empathic emotions as a result of viewing positive parent-child moments is not only associated with immediate increases in the desire to have children but also that this increase lasts for several days. Moreover, in this

**Table 2**

*Bivariate Correlations Among Empathic Emotions and Desire to Have Children (Study 3)*

Dependent Variable	1	2	3
1. Empathic emotions (Time 1)	—		
2. Empathic emotions (Time 2)	.46**	—	
3. Desire to have children (Time 1)	.26**	.33**	—
4. Desire to have children (Time 2)	.32**	.30**	.90**

Note. \*\*  $p < .01$ .

third study, we demonstrate the consistency of our core findings in a context that closely matches how people often view images of parents and children in their daily lives (i.e., on social media). In this context, our manipulation did not directly influence the desire to have children. One possibility may be that participants in this study did not spend as much time viewing the images, given the norm to scroll quickly through images on Instagram. Indeed, participants in our study only spent an average of 30 s viewing these images of unknown others (relative to approximately 50 s in Study 1 and Study 2), which may have minimized their influence. Notably, however, we found that viewing images of parents and children on an Instagram feed powerfully influenced empathic emotions, which in turn predicted a greater desire to have children. Furthermore, each of our three studies thus far are limited by their relatively moderate sample sizes. Thus, in our fourth study, we sought to replicate our findings in a larger sample ( $N = 600$ ).

## Study 4

### Method

#### Participants

We recruited 602 adults (50% female) ages 18–35 ( $M_{\text{age}} = 25.86$ ,  $SD = 4.02$ ) without children using mTurk in exchange for \$0.75. The majority of participants were White (72.6%), followed by Asian American (7.8%), African American (7.3%), Latino(a) (7.0%), other/more than one (4.2%), American Indian/Alaska Native (0.5%), Hawaiian/Pacific Islander (0.3%), and Middle-Eastern (0.3%). Prior to data collection, we decided to recruit approximately 600 participants, which would provide 95% power to detect a small effect.

#### Procedure

Participants were recruited for a study titled “Advertisement Survey for Young Adults” and told that we were conducting an academic survey about responses to advertisements. After following

**Table 3**

*Mean Values (Standard Deviations) for Empathic Emotions and Desire to Have Children at Time 1 and Time 2 by Condition for Study 3*

Dependent Variable	Parent–Child	Adults-Along
Empathic emotions (Time 1)	3.56 (1.75)	2.57 (1.53)
Empathic emotions (Time 2)	2.70 (1.84)	2.16 (1.46)
Desire to have children (Time 1)	4.20 (2.30)	3.86 (2.08)
Desire to have children (Time 2)	3.90 (2.38)	3.26 (2.19)

the link to the study website, participants were randomly assigned to view advertisements depicting positive parent–child moments ( $n = 300$ ) or identical images depicting only the adult ( $n = 302$ ), as in previous studies. The layout was held constant across conditions; each participant viewed eight images (from Study 1). Participants completed a measure of empathic emotions and rated their desire to have children immediately after viewing the images. Data and study protocol are available on OSF at <https://osf.io/nhfvv>.

### Measures

#### Empathic Emotions

Participants completed the same measure of empathic emotions as was used in the first two studies, which demonstrated high reliability ( $\alpha = .96$ ).

#### Desire to Have Children

Participants completed the same measure of desire to have children as was used in the first three studies, along with the distractor items regarding marriage, purchasing a home, and adopting a pet used in Study 3.

### Results

#### Empathic Emotions

As hypothesized, viewing parent–child images ( $M = 5.01$ ,  $SD = 1.45$ ) led to significantly greater empathic emotions,  $t(597) = 10.30$ ,  $p < .001$ ,  $r_{\text{es}} = .39$ , relative to viewing images of adults alone ( $M = 3.68$ ,  $SD = 1.70$ ).

#### Desire to Have Children

Viewing parent–child images did not directly lead to greater desire to have children,  $t(597) = 0.87$ ,  $p = .38$ ,  $r_{\text{es}} = -.04$ . Viewing parent–child images also did not lead to increases in the desire to get married, to purchase a home, or adopt a pet  $t_s < 0.55$ ,  $p_s > .60$ .

#### Indirect Effects

Based on our planned analytic approach, we tested whether the effect of the images and resulting empathic emotions would predict an increase in the desire to have children using process analyses (Model 4) with 5,000 bootstrapped samples (Hayes, 2018). We followed current statistical recommendations that indirect effects may exist in the absence of direct effects (Hayes, 2018; Rucker et al., 2011) and thus proceeded to test our hypothesized indirect effect, as in Study 3.

Relative to adult-only control images, positive parent–child images elicited greater empathic emotions (a path),  $b = 1.33$ ,  $p < .001$ , which in turn predicted a greater desire to have children (b path),  $b = 0.28$ ,  $p < .001$ . Furthermore, the indirect effect of positive parent–child images on desire to have children via empathic emotions was significant,  $b = 0.37$ ,  $SE = 0.08$ , 95% CI [0.21, 0.54].

## Discussion

In a large, well-powered experiment, we replicated our finding that viewing positive parent–child moments led to increases in the feelings of sympathy, tenderness, and compassion, which in turn predicted a greater desire to have children. Although we did not replicate a direct effect of parent–child images on the desire to have children, our mediation findings suggest that such portrayals may have an important influence on young adults' feelings and decisions. To better understand the results across our four studies, we conducted an internal meta-analysis to summarize our findings.

### Meta-Analysis of Studies 1–4

Across four samples with a total of 1,093 participants, we tested our hypotheses regarding the influence of situational cues on empathic emotions and the desire to have children. To gain a more accurate estimate of the effect size for the effect of our manipulations on empathic emotions, the desire to have children, and the association between the two, we meta-analytically combined the effect sizes from the four studies and conducted analyses using both fixed effects and random effects models (Goh et al., 2016). The fixed effects model is statistically powerful and appropriate for small sample meta-analyses (Goh et al., 2016; Rosenthal, 1995). For these analyses, one-tailed  $p$  values from each study were converted to  $Z$  scores and then combined using the Stouffer method (Rosenthal & Rosnow, 2008). The random effects model is notably less powerful, but allows for generalization to studies beyond this sample. For these analyses, one-sample  $t$  tests were conducted on the average Fisher  $Z_r$  effect sizes (Goh et al., 2016; Rosenthal, 1995).

### Empathic Emotions

In our studies, we found that viewing positive parent–child moments was robustly linked to increases in empathic emotions. The weighted mean  $r$  (.38) and the unweighted mean  $r$  (.38) were comparable in magnitude. Moreover, this effect size was significant using both the random effects model,  $t(3) = 10.07$ ,  $p = .002$ , and the fixed effects model,  $Z = 9.94$ ,  $p < .00000001$ .

### Desire to Have Children

Across all four studies, we found a small, but reliable, effect of situational cues on the desire to have children. The weighted mean  $r$  (.06) was smaller in magnitude than the unweighted mean  $r$  (.12). Moreover, this effect size was marginally significant using the random effects model,  $t(3) = 1.91$ , one-tailed  $p = .075$ , and significant using fixed effects,  $Z = 2.58$ , one-tailed  $p = .005$ .

### Association Between Empathic Emotions and Desire to Have Children

Finally, the association between empathic emotions and the desire to have children was also robust across our four studies. The weighted mean  $r$  (.28) and the unweighted mean  $r$  (.32) were comparable in magnitude. Moreover, this effect size was significant using both the random effects,  $t(3) = 5.60$ ,  $p = .011$ , and fixed effects,  $Z = 7.73$ ,  $p < .00000001$ , models.

## General Discussion

Prior work has often regarded the desire to have children as a deep, biologically driven desire or a rational decision based on weighing costs and benefits (e.g., Fawcett, 1978). Instead, we found that wanting to have children, which is often regarded as a personal, high-involvement decision, can actually be influenced by situational, low-involvement environmental cues, including advertising and social media. Both commercial (advertisements) and noncommercial (social media posts) depictions of positive parent–child moments appear to similarly increased young adults desire to have children. In four studies, we found that viewing positive parent–child moments led to greater desire to have children via empathic emotions. These findings remained consistent whether comparing to a neutral control condition or to negative parent–child moments.

To our knowledge, these are the first experiments demonstrating the malleability of the desire to have children. Although previous experimental evidence suggests that subtle cues in the environment can influence voting behavior (Todorov et al., 2005) and consumer purchases (Mandel et al., 2006), our research is among the first to experimentally investigate the unique and important decision to have children, which has long-term consequences for both parents and children (Nelson et al., 2014). Correlational studies have linked situational cues such as mass media (Barber & Axinn, 2004; Hornik & McAnany, 2001), social media (Adair et al., 2014), and childcare experiences (Brase & Brase, 2012) to the desire to have children, and the results of our studies indicate that such exposures may actually lead people to a greater desire to have children. Consistent with evidence that positive childcare experiences are associated with greater desire to have children (Brase & Brase, 2012), we found that even brief and impersonal exposure to positive depictions of children led to a greater desire to have children.

Moreover, we found that not only do positive exposures to children increase the desire to have children of one's own in the short-term but also these effects appear to persist for several days. In our third study, we found that viewing positive parent–child images on Instagram led to increases in empathic emotions, which in turn predicted greater desire to have children immediately and 3 days later. Given the abundance with which friends, neighbors, and colleagues post adorable images of themselves and their children on social media, many young adults may find themselves exposed to positive portrayals of children on a daily basis and spend significantly more time looking at them. These images are not only abundant but also omnipresent on most social media feeds, often portraying unrealistic positivity (Jordan et al., 2011) especially with regard to parenting and children (Tuttle-Singer, 2014). If each short exposure increases the desire to have children even a small amount, over the course of time, a young adult's desire to have children may be magnified a great deal.

### The Role of Empathic Emotions

We also found that this greater desire to have children was explained in part by empathic emotions. That is, viewing images of a parent sharing a positive moment with a child led young adults to feel greater tenderness, compassion, and sympathy, which in turn predicted greater desire to have children. Although theory suggests that empathy evolved as a generalization of the parental instinct (Batson, 2010; Beall & Tracy, 2017; Bell, 2001; McDougall, 1908)

and previous evidence indicates viewing images of children elicits empathic emotions (Lishner et al., 2011), to our knowledge, these studies are among the first to link empathy to the desire to enter the parental role. In addition, the findings regarding the role of empathy in the present studies distinguish this research from other studies demonstrating that situational cues influence other decisions in people's lives (e.g., voting behavior; Todorov et al., 2005).

Further bolstering the importance of empathic emotions in understanding the desire to have children, our results indicated that the depiction of negative parent-child moments also increases the desire to have children via empathic emotions. This finding suggests that the valence of parent-child images (i.e., that they are positive and sweet) may be less critical to the increased desire to have children. Instead, empathic emotions seem to be critical in predicting the desire to have children.

Alternatively, it may be surprising that negative parent-child images did not decrease the desire to have children. One explanation may be that the negative parent-child moments, which largely depicted children behaving badly, could be viewed as mildly amusing rather than especially negative. Indeed, although viewing negative parent-child moments elicited greater negative emotions than viewing control images, negative parent-child images also evoked greater positive emotions than control images. Future work implementing more powerful negative parenting experiences could be informative. For example, given evidence that marital discord, financial strain, and negative emotions all predict lower well-being among parents (Nelson et al., 2014), future work could aim to highlight these areas of strain as potential inhibitors of desire to have children. Alternatively, negative parent-child images may generate different psychological processes than positive parent-child images. For example, one study found that experiencing a stressor (i.e., a cold pressor task) led young women to report a younger desired age of first birth (Chipman & Morrison, 2015). This work suggests that if negative depictions of children and parents increase stress among young adults, they may have the surprising effect of increasing, rather than inhibiting, the desire to have children. More work is needed to fully understand the complex associations between negative experiences and fertility preferences.

### Limitations and Future Directions

Although these studies are among the first to depict the power of images and emotions for young adults' desire to have children, they should be considered in light of a few limitations. Our present studies relied on more intuitive rather than systematic processing and judgments about having children, which may be a boundary condition of these effects. Encouraging deeper processing may influence the extent to which individuals experience empathic emotions and the desire to have children. Similarly, the time of day in which individuals experience specific emotions can differentially influence processing style (Cavanaugh et al., 2011), and thus, potentially the strength of the influence of empathic emotions on the desire to have children.

In addition, we did not find a direct effect of our manipulation on the desire to have children in our third and fourth studies. Given the nature of the Instagram images used in Study 3 (i.e., a format for which scrolling through quickly is normative), our participants may have spent less time viewing the images in this format, thus rendering them less influential. Although these direct effect findings

were inconsistent with the findings from the first two studies, the meta-analytic combination of the effect sizes across the three studies was small, but statistically significant. Across all of our studies, we included the images of unfamiliar parents and children in advertisements and social media for greater experimental control. The impersonal nature of these images may be less powerful than viewing images of friends, family members, neighbors, and colleagues cherishing positive moments with their children. Future research examining whether viewing images of close friends, family members, or acquaintances spending time with their children more strongly influences the desire to have children would be informative. Under these circumstances, social comparison, along with the desire to be included, may also be important mechanisms predicting an increased desire to have children.

The longitudinal effects of viewing parent-child images on Instagram reported in Study 3 should be interpreted in light of participant attrition. Notably, however, attrition rates were evenly dispersed across conditions, and those who failed to complete the follow-up measures did not respond differently to our manipulation, which lends some confidence to the findings reported here. In addition, our attrition rates are comparable to other studies of family processes using mTurk and other methods of recruitment (Schleider & Weisz, 2015).

Furthermore, each of our studies covered a relatively short period of time. However, given the prevalence of children in media, as well as previous correlational evidence linking exposure to children and the desire to have children (Brase & Brase, 2012), exposure to positive or negative images may have long-term implications for fertility decisions and child-rearing behavior. Moreover, desire to have children has been linked to actual fertility (Miller et al., 2004), and positive emotions, such as tenderness and compassion, have enduring consequences for relationships and health (Fredrickson, 2013; Lyubomirsky et al., 2005), which further supports the potential durability of the effects presented here.

Although we focused on the role of images of parents and children in the present studies, given their prevalence in social media and advertisements, future investigations considering other types of exposure to parent-child "togetherness" would be interesting. For example, friends and colleagues may share stories of funny, frustrating, or stressful moments with their children. It would be informative to investigate whether such verbalized experiences have similar influences on the desire to have children via empathic emotions.

Finally, our studies do not address whether positive portrayals of parents and children increase the desire to have children for everyone, or whether these effects are especially pronounced among people who already wanted to have children. Longitudinal studies in which participants are asked whether and the extent to which they wish to have children prior to exposing them to positive portrayals of parents and children would be informative. In addition, future studies could consider whether our findings extend to actual fertility decisions and behaviour. Although we do not consider fertility behavior directly in the present studies, fluctuations in an individual's desire to have children may have important implications for their relationship behaviors and overall happiness. Given the abundance of parent-child images on social media and intense societal pressure to have children, small changes in a young adult's desire to have children may leave them feeling excluded from social circles, that they are missing out on an important life experience, or

frustrated that they are not in a position to have children at their current phase of life. Understanding the impact of exposure to such relationship imagery is important, particularly for young adults, who as digital natives rely heavily on social media for informational, social, and esteem needs.

## Concluding Remarks

Our results suggest that young adults facing childbearing decisions may be particularly influenced by their surroundings. In a world where relationship imagery is abundant and frequently shared, understanding how such portrayals influence young adults' emotions and desires to have children is important, particularly when those inclinations carry such substantial social and economic consequences for individuals and society.

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