

**New Parental Positivity: The Role of Positive Emotions in Promoting Relational
Adjustment During the Transition to Parenthood**

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In Press at Journal of Personality and Social Psychology

Author Note

The data for Study 1 was supported by a grant to Kristin D. Mickelson from the Ohio Board of Regents. The data for Study 2 was collected in Bryan, Texas, from 2002 to 2006 and was funded by the National Institute of Mental Health under Award Number MH49599 to Jeffrey A. Simpson and W. Steven Rholes. Brian P. Don and Sara B. Algoe's work on this paper was supported by a grant from The John Templeton Foundation (ID: 61280) to Sara B. Algoe.

Abstract

The transition to parenthood can be a challenging time for new parent couples, as a baby comes with changes and stress that can negatively influence new parents' relational functioning in the form of reduced relationship satisfaction and disrupted partner social support. Yet, the transition to parenthood is also often experienced as a joyous time. In this research, we draw on the broaden-and-build theory of positive emotions to suggest that new parents' positive emotions are not merely an enjoyable distraction, but are instead central to their relational adjustment.

Specifically, we hypothesized that new parents who experienced greater positive emotions would report enhanced relationship satisfaction and partner social support across time. To test these ideas, we drew on two dyadic and longitudinal studies of new parents. In Study 1, 104 couples (208 individuals) completed surveys across the course of 1 year, and in Study 2, 192 couples (384 individuals) completed surveys and a laboratory-based social support interaction over the course of 2 years. At each wave of data collection, participants completed assessments of positive emotions, relationship satisfaction, and partner social support. We examined how actor and partner positive emotions longitudinally predicted relational adjustment across time. Results demonstrated that, even when controlling for baseline levels of each outcome variable, greater actor reports of positive emotions prospectively predicted greater subsequent actor a) relationship satisfaction, b) perceptions of social support from the partner, and c) enacted social support as rated by independent observers, a pattern that was especially prominent for fathers. These results suggest positive emotions may be a resource that fosters healthy relational adjustment during chronically stressful periods that threaten intimate relationships, including during the transition to parenthood.

Keywords: transition to parenthood, positive emotions, relationship satisfaction, social support

New Parental Positivity: The Role of Positive Emotions in Promoting Relational Adjustment During the Transition to Parenthood

For new parent couples, the transition to parenthood represents an inherent paradox: while the birth of a child is often a joyful event, it also comes with a host of new responsibilities, changes, and challenges that can threaten fundamental facets of new parents' relationships (Cowan & Cowan, 2000; Don & Mickelson, 2014; Doss, et al., 2009; Nelson, et al., 2014). Indeed, extensive research has documented that new parents tend to experience changes – often detrimental ones – to key relational outcomes across the transition to parenthood, including to relationship satisfaction and social support (Don & Mickelson, 2014; Doss et al., 2009; Kohn et al., 2012; Lawrence, et al., 2008; Mitnick, et al., 2009; Ryon & Gleason, 2018). Because new parental relationship functioning has a host of important consequences for (a) parents themselves (e.g., Cutrona, 1984; Rholes, et al., 2001) and (b) the development and well-being of their child (e.g., Davies & Cummings, 1994; De Wolff & Van Ijzendoorn, 1997; Horwitz et al., 2003), it is critical to understand the factors that enhance relational adjustment among new parent couples during the transition to parenthood.

In this research, we draw on the broaden-and-build theory of positive emotions (Fredrickson, 1998; Fredrickson, 2013) to hone in on the affective paradox identified above. We suggest that to the extent new parents experience positive emotions during the transition to parenthood, these states, although often subtle and fleeting, are not trivial or ancillary to relational adjustment during this challenging period. Instead, we propose that the degree to which new parents experience positive emotions functions to build consequential social resources across time, which manifests in enhanced relationship satisfaction and social support. Extending this idea, because relational adjustment during the transition to parenthood is an

inherently dyadic experience (e.g., Cowan & Cowan, 2000; Don, Biehle & Mickelson, 2013), we also draw on theory and research in affective and relationship science (e.g., Algoe et al., 2008; Algoe, 2019; Fredrickson, 2016; Rusbult & Arriaga, 1997; Rusbult & Van Lange, 2003) to suggest that a *partner's* positive emotion can contribute to enhanced relationship satisfaction and social support for individual couple members across time. To test these hypotheses, we utilize archival data from two dyadic and longitudinal studies of new parent couples – one that included 104 couples (208 individuals) assessed across 1 year, and one that included 192 couples (384 individuals) assessed across 2 years.

Relational Adjustment During the Transition to Parenthood

Feeding issues. Interrupted sleep. Struggling to sooth the unexpected cries of an infant. These types of added responsibilities and challenges associated with the birth of a new child can take a toll on new parental health and well-being (Cowan & Cowan, 2000). For instance, new parenthood is associated with increased stress (Reid & Taylor, 2015), changes in anxiety (Don, et al., 2014), and experiences of postpartum depression (Don & Mickelson, 2012; Paulson & Bazemore, 2010). Given the challenges associated with the transition to parenthood, this period has been described by researchers as a time of critical importance both for adult health (Saxbe, Rossin-Slater & Goldenberg, 2018) and for the development of newborn children (e.g., De Wolff & Van Ijzendoorn, 1997; Horwitz et al., 2003).

In addition to the mental and physical health challenges described above, the relationship between the new parent couple is at the center of this transition. The addition of the new child represents a fundamental reordering of the family unit; whereas before the baby's birth the couple was able to focus primarily on their relationship, with the addition of the child, fewer resources are available for the maintenance of the relationship. Indeed, early studies of the

transition to parenthood described this period as a “crisis event” for marriages (LeMasters, 1957), given the persistent care and demands that must be apportioned to the child that can no longer be invested in the relationship between the two parents (Belsky & Rovine, 1990; Cowan & Cowan, 2000).

Prior empirical research demonstrates that (a) new parents do tend to experience changes in their relationships during the transition to parenthood, and (b) these changes are often detrimental (Don & Mickelson, 2014; Doss et al., 2009; Kohn et al., 2012; Lawrence et al., 2008; Mitnick et al., 2009; Ryon & Gleason, 2018). Two key ways in which relationship outcomes and interactions change during the transition to parenthood involve relationship satisfaction and social support. With respect to relationship satisfaction, extensive research has examined how the transition to parenthood influences new parents’ relationship satisfaction (Doss & Rhoades, 2017). This understanding is crucial, because parental relationship quality influences not just the parents themselves, but also the health and development of their child (e.g., De Wolff & Van Ijzendoorn, 1997; Horwitz et al., 2003). Based on numerous longitudinal studies (e.g., Doss et al., 2009; Lawrence et al., 2008), a relatively consistent pattern has emerged: new parents tend to happily anticipate the birth of their new child, but then experience declines in relationship satisfaction during the postpartum period. For instance, in an 8-year longitudinal study, Doss et al. (2008) demonstrated that new parents tend to experience sudden declines in relationship well-being after the birth of their child, a pattern not observed in a demographically-matched comparison group of couples who did not undergo the transition to parenthood. Notably, there is considerable heterogeneity around this average trajectory, meaning that not all people necessarily experience this pattern in the same way (e.g., Doss et al., 2008; Don & Mickelson, 2014; Lawrence et al., 2009). Indeed, Belsky and Rovine (1990) found that although relationship

functioning declines for most new parents, up to 35% of new parents report modest improvements during the transition to parenthood in at least one domain of relationship functioning. It becomes imperative, then, to understand the factors that may promote better relational adjustment for new parents.

Another fundamental way new parents' relationships may change is in terms of patterns and perceptions of social support. Social support in intimate relationships has been operationalized in many ways in prior research. Here, we focused on three forms within the new parent intimate relationship specifically: *perceptions* of support from the partner, self-reports that an individual has *provided* support to their partner, and enacted support *behavior* (as rated by independent observers). First, we examined perceptions of partner social support because these perceptions are one of the most robust and consistent predictors of mental and physical well-being, both in general (Albrecht, et al., 2003; Monahan & Hooker, 1995; Talley et al., 2010) and during the transition to parenthood (e.g., Beck, 2001; Cutrona, 1984; Don & Mickelson, 2012). However, given the demands inherent to the transition to parenthood, new parents may experience changes in perceived partner social support, changes that most likely contribute to the mental, physical, and relational challenges that arise during this time (e.g., Crnic, Greenberg & Slough, 1986). Notably, we examined perceptions of positive and negative aspects of social support, because they both have important implications for relational and personal well-being outcomes. Whereas perceptions of positive social support refer to the sense that the partner is available to provide desired comfort, care, and reassurance, perceptions of negative support¹ refer to the sense that a partner tends to respond to requests for support with behaviors such as

¹ We note here that “negative support” has sometimes been described as “negative support responses” (e.g., Don et al., 2013) given that the term negative support has been viewed by some as oxymoronic. We use this term as it has been used in prior research: to describe perceptions that a partner tends to respond negatively to requests for support (e.g., Collins & Feeney, 2000).

blame, invalidation, or rejection (Don et al., 2013; Hammond & Overall, 2015; Overall et al., 2010).

Second, we examined the extent to which people reported *providing* social support to their partner during the transition to parenthood, which served two useful functions. First, examining social support provision is a useful outcome on its own, because reports of support provision are consistently associated with better mental and physical well-being for the support provider themselves (e.g., Brown, et al., 2003; Inagaki & Eisenberger, 2012). Second, examining social support provision allows for the corroboration of individual reports of perceived social support from the partner. For instance, suppose Ella and Louis are in a co-parenting relationship where Ella reports perceiving greater levels of social support from Louis. Examining support provision is useful in corroborating Ella's perceptions of social support, because when Ella reports perceiving greater support from Louis, Louis should also report *providing* more support to Ella.

In addition to self-reports of social support perceived and provided, extensive research has examined social support behaviors in the context of laboratory-based interaction paradigms (e.g., Collins & Feeney, 2000; Don, et al., 2019; Don & Hammond, 2017; Overall, Fletcher, & Simpson, 2010). In these paradigms, one member of the couple typically discloses a challenge, stressor, or personal goal, and the partner's behavior is then coded for key support provision variables, such as emotional support (providing care, comfort, and reassurance), instrumental support (providing tangible assistance or solutions to the problem), and/or negative support (responding to a request for support with criticism, blame, or invalidation). Although enacted support is not always associated with beneficial outcomes (Gleason & Iida, 2015; Rafaeli & Gleason, 2009), in general, emotional support and instrumental support tend to be linked to

better outcomes for both support recipients and support providers, such as reduced stress, enhanced relational outcomes, and improved mood. By contrast, negative support tends to be associated with maladaptive outcomes, such as increased negative mood, lower relationship quality, and decreased perceptions of the support provider's responsiveness (Collins & Feeney, 2000; Don et al., 2019; Don & Hammond, 2017; Overall et al., 2010). In addition to being robust predictors of mental and physical well-being for both partners (e.g., Don & Hammond, 2017), the inclusion of social support behaviors, as observed by independent coders, helps to enhance the methodological rigor of the current research by moving beyond self-reports (Anderson et al., 2019; Baumeister, et al., 2007).

Enhancing Relational Outcomes Among New Parents: The Role of Positive Emotions

In light of the relationship challenges that new parents face, an important question is which factors enhance relationship satisfaction and social support during the transition to parenthood? One framework for understanding individual and couple adjustment to any chronic life stressor is the vulnerability, stress, and adaptation (VSA) model, proposed by Karney and Bradbury (1995). The VSA model suggests that adjustment to major life events can be understood in terms of (a) pre-existing vulnerabilities, (b) the nature of the stressful event, and (c) adaptive processes that aid in the individual's ability to adjust to the stressor. Based on this model, several variables have been identified that influence the extent to which new parents experience negative relational changes in response to their transition to parenthood, including factors such as the baby's temperament (Belsky & Rovine, 1990), the parents' prenatal mental health (Don & Mickelson, 2014), their attachment orientations (Simpson & Rholes, 2019), and the family's socioeconomic status (Belsky & Rovine, 1990; Doss et al., 2008). In the current

research, we propose a novel and previously unexplored adaptive process variable: *positive emotions*.

Prior research demonstrates that, even though the transition to parenthood is a challenging phase of life, it is also a time when many new parents experience frequent positive emotions (see Nelson et al., 2013, for a review). Research has yet to examine, however, whether new parents' positive affective experiences predict their downstream relational adjustment during this time. That is, although some prior research has considered positive emotions as an *outcome* of healthy coping or adjustment during the transition to parenthood (e.g., Don, Biehle & Mickelson, 2013; Manzi, et al., 2010), no previous work in this area has examined whether positive emotions serve as an *adaptive resource* that prospectively promotes healthy relational adjustment. This possibility and gap in prior research is noteworthy considering the pivotal role that positive emotions can play in improving or sustaining healthy relationship functioning (Algoe, 2019; Fredrickson, 2013). Here, based on the broaden-and-build theory of positive emotions (Fredrickson, 1998; 2001; 2013), we proposed that the positive emotions new parents experience during their transition to parenthood are not merely an outcome of effective coping; rather, they represent an adaptive process that serves the function of building enduring and consequential social resources.

Why might positive emotions enhance relational adjustment during the transition to parenthood? Broaden-and-build theory (Fredrickson, 2001; 2013) suggests that, over millennia, positive emotions evolved a unique adaptive form (broaden) and function (build). The broaden component of broaden-and-build theory suggests that positive emotions, compared to negative or neutral affective states, widen the scope of cognitions and behaviors (Fredrickson, 2013). That is, when people experience positive emotions, they become open to a greater range of thoughts,

behaviors, and actions (Bolte, et al., 2003; Compton, et al., 2004; Fredrickson & Branigan, 2005; Johnson et al., 2010; Isen, et al., 1985; Waugh & Fredrickson, 2006). Because of this expanded thought-action repertoire, broaden-and-build theory suggests that positive emotions allow people to build resources that endure beyond the experience of positive emotions in a particular moment (Catalino & Fredrickson, 2011; Fredrickson et al., 2008; Fredrickson, 2013). Notable to the build portion of broaden-and-build theory is that it is explicitly longitudinal: while the experience of positive emotions in any particular instance may be fleeting, those fleeting moments of broadened awareness are hypothesized to have cumulative consequences, ultimately building an individual's consequential, enduring, and adaptive resources (Fredrickson, 2013).

Although empirical research has supported both components of broaden-and-build theory, in the current research, we focus on the *build* aspect of the model – the notion that positive emotions can build key resources across time. According to broaden-and-build theory, one of the evolutionary functions of positive emotions is that they encourage the building of *social* resources across time, and (in contexts other than the transition to parenthood) empirical research supports this proposition. For instance, Fredrickson et al. (2008) provided experimental evidence that increases in day-to-day positive emotions led to increases in perceived social support and social connectedness over months, and that the build effect of positive emotions was independent of negative emotions. Other studies have similarly supported the notion that people who experience a greater degree of positive emotions tend to experience benefits in terms of social outcomes across time (e.g., Kok et al., 2013; Mauss et al., 2011; Waugh & Fredrickson, 2006). This previous research provides the foundation for our prediction that, during the transition to parenthood, positive emotions may serve a similar relational building function.

Although some previous research demonstrates positive emotions generally promote the building of consequential social resources across time, the transition to parenthood is a major, commonly experienced life event characterized by significant change and stress. So, is there any evidence suggesting that positive emotions can be beneficial during periods of significant stress? Yes. Building on early findings examining positive emotions (a) in the context of caregiving and coping with HIV-AIDS (Billings, et al., 2000; Moskowitz, 2003), (b) as a buffer in adjustment to the 9/11 attacks (Fredrickson et al., 2003), and (c) in “undoing” acute physiological stress in a laboratory task (Tugade et al., 2004), a reasonable body of evidence has shed light on the value of positive emotions in long-term, chronically stressful contexts (Cohn, et al, 2014; Cheung et al., 2017; Moskowitz et al., 2019; Ong, et al., 2010). That is, even accounting for the negative emotions that people experience in times of chronic stress, positive emotions are valuable signals of adjustment during these periods (e.g., Ong et al., 2010). Yet – for understandable reasons – the vast majority of studies in this area focus primarily on outcomes such as depression, negative affect, antidepressant use, or outcomes related to a specific chronic illness (e.g., Cohn, et al., 2014; Moskowitz et al., 2017; Ong, et al., 2010). That is, when examining times of chronic stress, these previous studies do not address our key question about *building social resources*.² Indeed, although some prior research has examined how positive emotions broadly predict enhanced social outcomes across time (Kok et al., 2013; Mauss et al., 2011; Waugh & Fredrickson, 2006), no prior research has done so while examining the perspective of two individuals in an ongoing relationship in the context of a uniquely dyadic, chronically stressful situation such as the transition to parenthood. As such, this particular context is especially useful

² For an exception with preliminary evidence, see Algoe and Stanton (2012).

to test the build hypothesis as it relates to social resources, not only for its contribution to the transition to parenthood literature, but also for its contribution to the positive emotion literature.

Based on broaden-and-build theory, we predicted that new parents who reported greater positive emotions during the transition to parenthood would experience enhanced relational adjustment across time in the form of greater relationship satisfaction, increased perceptions of positive social support from their partner, decreased perceptions of negative social support from their partner, and increased reports of provision of social support to the partner. In addition, we predicted new parents who experience greater positive emotions during the transition would engage in more effective social support provision behaviors during a videorecorded, laboratory-based social support interaction task. Because broaden-and-build theory suggests that positive emotions cultivate enduring social resources *across time* (Fredrickson, 2013), our hypotheses were longitudinal. That is, we predicted that when a new parent reported greater positive emotions at one time period (e.g., at one-month postpartum), they would report enhanced social resources at a subsequent time period (e.g., at four-months postpartum), controlling for prior levels of each outcome variable.

The Dyadic Nature of Positive Emotions and Relational Outcomes During the Transition to Parenthood

The original formulation of broaden-and-build theory primarily addressed how an individual's own positive emotions build their own enduring social resources across time (Fredrickson, 2013). However, because we focus on social resources in the context of a fundamentally dyadic transition, we drew on theories within relationship and family science to additionally suggest that a *partner's* experience of positive emotions may also predict positive changes in the individual's enduring resources across time. For instance, interdependence theory

(Rusbult & Arriaga, 1997; Rusbult & Van Lange, 2003) suggests that individuals in a dyad are fundamentally interconnected, such that the experiences, attributes, and outcomes of one individual are linked to those of the other. Similarly, family systems theory (Cox & Paley, 1997; 2003) suggests that families are tight, interconnected systems in which each individual member can influence all other members, and changes within any one aspect of the family system can influence other members of the system.

Extensive research on the transition to parenthood provides support for these ideas. For instance, when mothers experience elevated levels of postpartum depression, fathers are also more likely to experience postpartum depression (Paulson & Bazemore, 2010), potentially through altered partner social support and relationship satisfaction (Don & Mickelson, 2012). Many other studies suggest that the emotions and experiences of new mothers are fundamentally tied to the outcomes of new fathers, and vice versa (Beck, 2001; Don & Mickelson, 2014; Eller, et al., 2019; Feeney, et al., 2003; Matthey, et al., 2000). Based on this theoretical and empirical work, we hypothesized that, not only would an individual's own experience of positive emotions promote enhanced relationship satisfaction and partner social support across time, but that a *partner's* positive emotions would also promote greater relationship satisfaction and social support for the individual across time. This novel hypothesis is concordant with an important extension of broaden-and-build theory known as positivity resonance theory (Fredrickson, 2016), which suggests that positive emotional states in the context of a dyadic relationship can promote increases in care, concern, and focus on the well-being of the partner.

The Role of Gender

When it comes to the transition to parenthood, important experiential differences exist between mothers and fathers (e.g., Nelson-Coffey, et al., 2019). In addition to their unique

biological role in terms of gestation, childbirth, and lactation, mothers have heightened societal expectations with regard to childrearing, which can enhance the extent to which they are expected to bear the brunt of numerous responsibilities during the transition (Katz-Wise, et al., 2010). As such, some studies have documented gender differences in the extent to which mothers and fathers experience relational changes across the transition to parenthood. For instance, after the birth of their first child, Doss et al. (2008) found that mothers experienced steeper declines than fathers in two of the six indicators of marital quality they examined. Notably, however, other studies have found that *fathers* are more susceptible to negative relational changes during the transition (e.g., Don & Mickelson, 2014), so the literature does not provide definitive conclusions as to whether mothers or fathers are more susceptible to relational disruptions.

Despite the potential for gender differences in relational outcomes during the transition to parenthood, we did not have a strong theoretical reason to suspect the build hypothesis – that positive emotions would predict enhanced relationship satisfaction and social support among new parents across time – would be significantly different for mothers and fathers. This is because broaden-and-build theory suggests that the adaptive evolutionary building function of positive emotions should occur for both men and women. Consistent with this, previous empirical research has typically found no gender differences in the build function of positive emotions (e.g., Fredrickson et al., 2008). Thus, even though mothers tend to experience additional challenges during the transition to parenthood, we expected the beneficial impact of positive emotions on relational outcomes across time would be relatively similar for both men and women. However, because mothers and fathers often report experiential differences during the transition to parenthood (e.g., Nelson-Coffey et al., 2019), we evaluated gender as a potential distinguishing factor with respect to the role of positive emotions in predicting relationship

satisfaction and social support among new parents across time. However, we did not have *a priori* predictions with respect to gender differences.

The Current Studies

In the current research, we drew upon broaden-and-build theory (Fredrickson, 2013) to test the proposition that individual and partner positive emotions each longitudinally promote enhanced relationship satisfaction and social support among partners during the transition to parenthood. Our primary prediction was that, at each wave of data collection in two different transition to parenthood samples (4 and 5 waves, respectively), greater individual and partner positive emotions would prospectively predict greater relationship satisfaction, greater perceptions of positive social support, lower perceptions of negative social support, increased provision of social support, and more effective enacted social support at the following wave of data collection, controlling for baseline level measures of these constructs.

To examine these hypotheses, we used archival data from two dyadic, longitudinal studies of new parent couples undergoing the transition to parenthood. Study 1 was the Baby T.I.M.E. Study (Biehle, & Mickelson, 2011; Don & Mickelson, 2014), which is a yearlong study of 104 new parent couples ($N = 208$ individuals), and Study 2 was a 2-year longitudinal study of 194 new parent couples (384 individuals). In both studies, participants completed self-report assessments during pregnancy and across the postpartum period. Moreover, during the postpartum period in Study 2 participants also completed a laboratory-based social support interaction.

STUDY 1

Method

Participants and Materials

All materials and data analytic syntax for both studies can be found the corresponding Open Science Framework page for this manuscript at the following link: https://osf.io/knv9r/?view_only=3589317023b2465fbf5a5f7b66a9fa70. Data for Study 1 were drawn from the Baby T.I.M.E. Study, which is a yearlong longitudinal study of new parent couples (see Biehle, & Mickelson, 2011 for more details). Additionally, in order to maintain confidentiality while still allowing interested readers to replicate key analyses, the sample mean centered versions of key variables (including positive emotions, relationship satisfaction, perceived partner positive support, perceived partner negative support, and negative affect) are provided on the OSF page for this study. All procedures described below were approved by the Institutional Review Board of Kent State University. To be eligible for the study, participants were required to speak fluent English and be employed at the first wave of data collection. Recruitment occurred at birthing classes in the Midwest of the United States, and through online message boards geared towards new parents. Wave 1 was collected when new parents were in the third trimester of pregnancy, Wave 2 was collected at one-month postpartum, Wave 3 was collected at four-months postpartum, and Wave 4 was collected at nine-months postpartum. At each wave of data collection, participants completed surveys online and via the phone. Participants were compensated \$25 for each wave of data collection they completed.

At Wave 1, the sample consisted of 104 heterosexual, first-time biological parent couples (208 individuals). On average, participants were 29.02 years old ($SD = 4.41$). The majority of the couples were married (89.6%), although some were not married and instead cohabitating (8.5%). The majority of people identified as non-Hispanic White (88.9%), with 3.4% identifying as Asian, 1.9% identifying as African-American, 1.9% identifying as Hispanic, and 3.8% identifying as another race. Because the study included heterosexual couples only, 50% of the sample was male, and 50% of the sample was female.

Of the 208 people who completed Wave 1 of the study, 48 people did not have complete data by Wave 4. To examine the possibility of differential attrition, we conducted a series of independent-groups t-tests and correlations to determine whether those who dropped out of the study were significantly different in their reports of positive emotions, relationship satisfaction, perceived positive partner support, or perceived negative support Wave 1, as well as on demographic characteristics, which included age, income, race, years married, and other factors. With respect to primary study variables, none of the primary study variables at Wave 1 with one exception: people who dropped out of the study reported greater negative support from the partner during pregnancy than those who did not drop out of the study ($t = -1.67, p = .05$). Additionally, those who dropped out of the study were also (a) younger ($t = -3.61, p < .001$), and (b) had been married fewer years ($t = -2.11, p = .04$) at baseline. Race and employment status at baseline were both not associated with dropping out of the study. In our substantive data analyses, we employed a multilevel modeling approach, which allows for inclusion of participants who have an unequal frequency of measurements across the course of time (West, Welch & Galecki, 2014). As such, participants were included in analyses even if they were missing data points during Waves 2, 3, or 4.

Positive emotions. At each wave of data collection, positive emotions were assessed using the short form of the Profile of Moods States vigor-activity sub-scale (McNair, Lorr & Droppleman, 1971), which is a well-validated and reliable scale (Pressman & Cohen, 2005). The scale included 6 positive emotions (*cheerful, in good spirits, happy, calm, satisfied, full of energy*)³, and participants reported how often they experienced these emotions over the course of the past 7 days on a scale ranging from 0 = *not at all* to 6 = *daily*. An average score was created

³ Two of these items come from the alternative POMS word list generated by Albrecht and Ewing (1989).

that demonstrated good reliability at all waves of data collection (men during pregnancy: $\alpha = .87$; women during pregnancy: $\alpha = .85$; men at 1-month: $\alpha = .86$; women at 1-month: $\alpha = .91$; men at 4-months: $\alpha = .91$; women at 4-months $\alpha = .92$; men at 9-months: $\alpha = .92$; women at 9-months: $\alpha = .92$).

Relationship satisfaction. At each wave of data collection, relationship satisfaction was assessed using the Relationship Assessment Scale (Hendrick, 1988).⁴ Participants completed 6 items (e.g., “*In general, how satisfied are you with your relationship?*”) on which they were asked to rate their relationship on a scale ranging from 1 = *unsatisfied* to 6 = *extremely satisfied*. An average score was created. The scale demonstrated adequate reliability at all waves of data collection (men during pregnancy $\alpha = .73$; women during pregnancy: $\alpha = .77$; men at 1-month: $\alpha = .82$; women at 1-month: $\alpha = .78$; men at 4-months: $\alpha = .82$; women at 4-months $\alpha = .81$; men at 9-months: $\alpha = .84$; women at 9-months: $\alpha = .82$).

Perceived positive social support from partner. At all waves of data collection, participants completed a measure of perceived positive social support from the National Comorbidity Survey (Kessler, et al., 1994), a measure of demonstrated reliability and validity in numerous prior studies (e.g., Bertera, 2005; Zlotnick, Kohn, Keitner & Della, 2000). Participants completed six items assessing the extent to which they perceived social support from their partner over the past month (e.g., “*How much did your spouse/partner understand the way you felt about things?*”; “*How much did your spouse/partner show you that s/he really cares about you?*”) on a scale ranging from 0 = *none* to 4 = *a lot*. An average score was created (men during pregnancy: $\alpha = .79$; women during pregnancy: $\alpha = .80$; men at 1-month: $\alpha = .82$; women at 1-

⁴ The seventh item from the Relationship Assessment Scale (“To what extent has your relationship met your original expectations?”) was removed due to the longitudinal nature of the study. We felt its meaning would be obscured by asking it repeatedly across the study.

month: $\alpha = .79$; men at 4-months: $\alpha = .76$; women at 4-months: $\alpha = .81$; men at 9-months: $\alpha = .71$; women at 9-months: $\alpha = .73$).

Perceived negative social support from partner. At all waves of data collection, perceived negative support from the partner was assessed using a sub-scale of the UCLA Social Support Inventory (Dunkel-Schetter, Feinstein & Call, 1986). Participants completed 4 items that assessed the extent to which they felt their partner behaved in an unsupportive manner during the past month (e.g., *How much did you feel that your spouse/partner did not understand what you were going through?*; men during pregnancy: $\alpha = .55$; women during pregnancy: $\alpha = .77$; men at 1-month: $\alpha = .69$; women at 1-month: $\alpha = .80$; men at 4-months: $\alpha = .80$; women at 4-months $\alpha = .79$; men at 9-months: $\alpha = .86$; women at 9-months: $\alpha = .71$)

Negative affect. Negative mood was assessed using the negative affect sub-scale of the Center for Epidemiologic Studies Depression (CES-D) Scale. The CES-D is a well-validated measure of depression, which includes a 7-item sub-scale assessing negative affect (Radloff, 1977; Moskowitz, 2003; e.g., “I felt sad”; “I felt depressed”). Participants reported how often they experienced negative affect during the past week on a scale ranging from 0 = *Rarely or none of the time* (less than 1 day) to 3 = *Most or all of the time* (5-7 days). The measure demonstrated adequate internal consistency at all waves of data collection: men during pregnancy: $\alpha = .79$; women during pregnancy: $\alpha = .80$; men at 1-month: $\alpha = .81$; women at 1-month: $\alpha = .83$; men at 4-months: $\alpha = .80$; women at 4-months: $\alpha = .84$; men at 9-months: $\alpha = .79$; women at 9-months: $\alpha = .78$.

Daily stress. Stress was assessed using a measure adapted from Bolger, DeLongis, Kessler, and Schilling (1989). Participants were presented with 12 possible stressors (“troublesome things”), and were asked to indicate how often these things occurred over the past

seven days. Example items included “a lot of demands at home”, “a lot of demands at your job”, “arguments with your parents”, and “financial problems”. Responses ranged from 0 = *not at all* to 6 = *daily*. A total daily stress scale was created by averaging scores from each item. Because stress in one domain is not necessarily related to stress in another domain, previous research has not calculated internal consistencies when using this measure (e.g., Bolger et al., 1989).

Parenting efficacy. Parenting efficacy was assessed using a measure adapted from the Self-Efficacy for Parenting Tasks measure, originally developed (Coleman and Karraker, 2003). During pregnancy, participants answered questions with respect to their expectations for parenthood, whereas during the postpartum period, participants reported how they actually felt as parentings. Participants completed 14 items (e.g., “I will/have difficulty determining what is and is not safe for my baby to do” and “I will be/am successful in getting my baby to eat on a fairly regular schedule.”) which assessed the extent to which they expected to feel or currently felt efficacious and capable as a parent. Responses were provided on a scale from 1 = *disagree strongly* to 6 = *agree strongly*, and internal consistencies were similar to those obtained in previous research (Coleman & Karraker, 2003; men during pregnancy: $\alpha = .65$; women during pregnancy: $\alpha = .70$; men at 1-month: $\alpha = .78$; women at 1-month: $\alpha = .68$; men at 4-months: $\alpha = .71$; women at 4-months $\alpha = .64$)

Analysis Plan

To examine the influence of actor and partner positive emotions in building social resources across time, we conducted dyadic, multilevel, cross-lagged regression models according to recommendations of Kenny, et al. (2006). Specifically, because individuals were nested within (a) couples and (b) multiple waves of data collection, it was necessary to account

for the hierarchical nature of the data. As such, we used a dyadic approach to multilevel modeling to examine whether there were lagged actor and partner associations for both mothers and fathers between positive emotions at the prior time point and relational outcomes at the subsequent wave of data collection, while controlling for levels of each outcome variable at the prior time point. Using the example of relationship satisfaction, after controlling for maternal and paternal relationship satisfaction at the prior wave, we examined whether (aggregating across waves): (a) maternal positive emotions from the prior wave predicted their own relationship satisfaction at the subsequent wave of data collection (actor effect), (b) paternal positive emotions predicted from the prior wave predicted maternal positive emotions from the subsequent wave (partner effect), (c) paternal positive emotions from the prior wave predicted paternal positive emotions at the subsequent wave (actor effect), and (d) maternal positive emotions predicted paternal positive emotions at the subsequent wave (partner effect). Because there was no *a priori* theoretical reason to assume different effects between the different longitudinal time lags, the analysis examined an overall association between prior positive emotions and subsequent relational outcomes across the different waves of data collection. There were four waves of data collection (pregnancy, 1-month, 4-months, and 9-months postpartum), meaning this resulted in three lags per couple. Each model was specified to account for the fact that mothers and fathers may have a unique (a) intercept, and (b) slope on the outcome variable of interest. Although our goal was not to examine differences in these slopes and intercepts (as is typical in growth curve analyses), we accounted for these trajectories while simultaneously examining the aggregated, lagged associations between positive emotions and each outcome variable of interest.

One important consideration in conducting these dyadic, lagged models is in the specification of random effects. As Kenny et al., (2006) point out, because of the complexity of these models, inclusion of random effects commonly creates issues with model convergence, meaning an iterative process is required with respect to specifying random intercepts and slopes, in order to find a model that converges. Thus, based on the recommendations of Kenny et al. (2006) and Kenny and Kashy (2011), in all models, we began by specifying random intercepts only for mothers and fathers. If the model converged with this random term, we proceeded to interpret that output, and used that model as the basis for all subsequent ancillary analyses. If the model with random intercepts only did not converge, we then proceeded to test a series of subsequent models, in the following order, until we found one that converged: one with (a) a random slope for prior wave levels of the outcome variable predicting subsequent levels of the outcome variable, (b) a random slope for prior wave positive emotions predicting the subsequent outcome variable, and (c) a random slope for the partner's prior wave levels of positive emotions predicting subsequent levels of the outcome variable. If none of these models successfully converged, we removed the partner effect of prior wave positive emotions on subsequent relationship outcomes, and began this iterative process again until we found a model that converged.⁵

Additionally, as per the recommendations of Kenny et al. (2006), all of the predictor variable variables in the model were sample-mean centered. This allows us to examine how being higher or lower in positive emotions at the prior wave of data collection, as compared to

⁵ Because of this trimming process, it was possible that some of the final models would contain different random effects than each other. For instance, one of the final models may successfully estimate with random intercepts for gender, whereas another model may successfully estimate with a random effect for the lagged prior outcome variable only. Despite these differences, results of these models paint a consistent portrait across all of our analyses.

the sample mean, predicts change in subsequent relational outcomes.⁶ All models were specified with a heterogeneous compound symmetry covariance structure (Kenny et al., 2006), but if the model failed to estimate, we switched to an unstructured covariance matrix. All of the models included slopes in each outcome variable for mothers and fathers, to account for the possibility that participants would demonstrate change across time in each outcome variable of interest. Above and beyond these general changes across time, we hypothesized positive emotions would predict better adjustment from each prior wave to the subsequent wave.

After conducting these primary analyses, we also conducted a series of ancillary analyses. First, we tested a set of ancillary models in which we controlled for potential confounds, and other well-known predictors of relationship satisfaction during the transition to parenthood. First, we controlled for new parents experience of negative affect: although prior research has extensively demonstrated the influence of positive emotions in building social resources and enhancing coping is distinct from the influence of negative emotions (Fredrickson, 2013), much of the work demonstrating the building influence of positive emotions on subsequent social outcomes has been conducted in relatively non-stressful contexts (e.g., Fredrickson, et al., 2008; Kok et al., 2013). The transition to parenthood is characterized by significant stress, and we therefore conducted ancillary analyses to examine whether the beneficial influence of positive

⁶ This (sample mean) centering strategy was appropriate not only because it is the one recommended by Kenny et al (2006), but also because it is the one that makes most theoretical sense given our hypotheses. For instance, an alternative approach is to center around the person mean, or to examine how a person's deviations in positive emotions at a particular wave from their own average level of positive emotion across the study predicts changes in their subsequent relationship outcomes across time. Based on broaden-and-build theory (Fredrickson, 1998; 2013) we felt person-mean centering was less appropriate, because the crucial contributor to one's building of key relational outcomes across time should be whether one experiences relatively low or high positive emotions (as compared to the rest of the sample) at a particular time point. As an example, even if a person were to experience a within-person, positive deviation from their typical level of positive emotions at one wave of data collection, if this person was still generally *low* in positive emotions as compared to the rest of the sample, their positive deviation from their typical level of positive emotion should have less of an influence with respect to building their social resources if they are still experiencing a low level of positive emotions overall. As such, we felt sample mean centering was the most appropriate form of centering for the current research on both theoretical and statistical grounds.

emotions on relational outcomes exists even when accounting for the negative emotions that may occur during this challenging transition. Similarly, prior research demonstrates stress has a detrimental influence on relationship outcomes (e.g., Neff & Karney, 2009), so we conducted an additional analysis in which we controlled for stress while examining the longitudinal association between positive emotions and relationship outcomes. Finally, because parenting-specific variables (such as parenting self-efficacy and childcare satisfaction) are key predictors of adjustment during the transition to parenthood (e.g., Biehle & Mickelson, 2011), in both studies we conducted an analysis in which we controlled for either parenting self-efficacy (in Study 1) or childcare satisfaction (in Study 2), in order to ensure positive emotions predicted subsequent relationship outcomes above and beyond the influence of these parenting-specific variables. All of these covariates were examined in separate analyses for the purpose of parsimony, considering the complicated nature of these analyses, and the potential for model estimation issues to arise (Kenny et al., 2006).

Second, to account for the possibility that missing data at later waves of data collection introduced bias into our estimates, we replicated our primary analyses using Full Information Maximum Likelihood (FIML) estimation. When including auxiliary variables that may contribute to differential attrition in the statistical model, FIML produces unbiased standard errors, and thus accurate inferential statistics (Schlomer et al., 2010). As such, in this second series of auxiliary analyses, we added a series of demographic variables that might have contributed to attrition, including factors such as age, race, income, education level, and employment states, and examined whether any focal coefficients were altered when these covariates were included in the model.

Third, some prior research suggests that, although the transition to parenthood is a long-term and chronic stressor, the biggest threat to new parents' relationships may occur early in the postpartum period (e.g., Doss et al., 2008). As such, to test whether positive emotions have a stronger building influence early versus later in the transition to parenthood, we examined whether the association between maternal and paternal prior positive emotions and subsequent relational outcomes was moderated by the wave in which positive emotions occurred. For instance, it is possible that the association between actor positive emotions and subsequent relational outcomes is stronger earlier in the transition to parenthood, as compared to later in the transition to parenthood. If this were the case, the interaction between prior positive emotions and wave of data collection would be statistically significant and negative, suggesting the link between prior positive emotions and subsequent relational outcomes is stronger earlier in the transition to parenthood. Based on broaden-and-build theory, we expected that the relational "building" influence would be relatively similar across the transition to parenthood, and thus, that these tests of moderation would be non-significant.

Finally, we examined an additional set of models in which we tested between- and within-person effects in the same model. Although our hypotheses were primarily focused on the between-person level (i.e., we predicted people who reported relatively high levels of positive emotions, as compared to the rest of the sample, would be especially likely to experience relational benefits across time), it is also common to examine within-person effects in multilevel modeling (Bolger & Laurenceau, 2013). In the current study, within-person effects refer the individual's experience of positive emotions at a particular wave, as compared to their own average level of positive emotions across the study. Consistent with the sample mean centering strategy in our primary analyses, we believed that high levels of positive emotion at the between-

person level would drive relational outcomes across time. For instance, if a person experiences higher than usual positive emotions at a particular wave of data collection (within-person effects), but still experiences low overall levels of positive emotion (between-person effects), that positive, within-person deviation is unlikely to have a strong influence on their subsequent relationship outcomes because of their low overall experience of positive emotions. Despite this, we were open to the possibility that there could be a within-person influence of positive emotions on relational outcomes across time, in addition to between-person effects.

Statistical Power

To examine statistical power, we followed the guidelines outlined by Lane and Hennes (2018) for computing post-hoc power for multilevel analyses using dyadic data. This method uses the estimates of the fixed and random effects for the parameters of interest, the number of participants (104 couples; 208 individuals), the number of time-points in the longitudinal data set (4 waves of data collection), and the means and variances for the variables of interest to calculate an estimate of observed power using Monte Carlo simulation with 20,000 replications. Results of these analyses demonstrated that the lagged association between paternal positive emotions and subsequent relationship satisfaction was nearly adequately powered at .75. The lagged associations between prior wave positive emotions and subsequent (a) paternal perceptions of positive partner support (observed power = .52), and (b) paternal perceptions of negative partner support (observed power = .47) were not adequately powered. Reflecting the small size of the coefficients, and the non-significant effects (see Table 3), all of the associations between prior wave maternal positive emotions and subsequent outcomes were poorly powered (observed power = less than .20 for all parameters).

Based on the intercepts, slopes, and random effects in our models, we conducted effect size sensitivity analyses for coefficients that were statistically significant but underpowered. Effect size sensitivity analyses allow for identifying the size of the coefficient that would be needed, based on the model tested, in order for the effect to be adequately powered. Results of these analyses demonstrated that in order for that lagged association between paternal positive emotions on their own subsequent relationship satisfaction to be adequately powered, a coefficient on 0.20 or greater would be required. In order for the lagged association between paternal positive emotions on their own subsequent perceptions of positive partner support to be properly powered, a coefficient of 0.19 or greater would be required. For the lagged association between paternal positive emotions on their own perceptions of negative social support to be properly powered, a coefficient of -0.25 or lower would be required.

Results

Descriptive statistics for the primary study variables are presented in Table 1, and bivariate correlations are presented in Table 2. At the bivariate level, positive emotions were moderately correlated with each outcome variable concurrently in the expected direction at every wave of data collection. Moreover, bivariate correlations provided initial support for our primary hypothesis, indicating that positive emotions at one wave of data collection were often positively associated with relationship outcomes at subsequent waves of data collection (e.g., prenatal positive emotions were positively associated with relationship satisfaction at one-month postpartum, $r = .21, p = .004$). Descriptive statistics also suggested that both mothers and fathers tended to report increasing levels of positive emotions from pregnancy to the early and mid-

Table 1*Descriptive Statistics for Primary Variables: Study 1*

Variable	Time Point	<u>Fathers</u>		<u>Mothers</u>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Positive Emotions	Pregnancy	4.48	0.91	4.42	0.86
	One-Month Postpartum	4.59	0.83	4.51	0.90
	Four-Months Postpartum	4.63	0.91	4.72	0.96
	Nine-Months Postpartum	4.45	1.05	4.66	0.87
Relationship Satisfaction	Pregnancy	5.03	0.51	5.02	0.53
	One-Month Postpartum	4.80	0.75	4.81	0.73
	Four-Months Postpartum	4.74	0.70	4.74	0.74
	Nine-Months Postpartum	4.39	0.79	4.46	0.75
Perceptions of Positive Social Support	Pregnancy	3.09	0.51	3.17	0.54
	One-Month Postpartum	2.92	0.61	3.05	0.61
	Four-Months Postpartum	3.06	0.58	3.06	0.56
	Nine-Months Postpartum	2.78	0.59	2.94	0.61
Perceptions of Negative Social Support	Pregnancy	0.72*	0.53	0.92*	0.70
	One-Month Postpartum	0.66**	0.59	1.04**	0.73
	Four-Months Postpartum	0.82*	0.67	1.08*	0.76
	Nine-Months Postpartum	0.97	0.66	1.14	0.84

Note. * Mothers and fathers were statistically significantly different at this wave at the $p < .05$ level. ** Mothers and fathers were statistically significantly different at this wave at the $p < .01$ level. When no asterisk is present, mothers and fathers were statistically significantly different at that wave.

Table 2

Bivariate Correlations for Primary Variables: Study 1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 PE Wave 1	.06															
2 PE Wave 2	.44**	.25*														
3 PE Wave 3	.40**	.46**	.23*													
4 PE Wave 4	.52**	.55**	.53**	.22*												
5 RS Wave 1	.29**	.20**	.30**	.27**	.24*											
6 RS Wave 2	.21**	.29**	.39**	.45**	.46**	.53**										
7 RS Wave 3	.14	.31**	.41**	.41**	.43**	.58**	.56**									
8 RS Wave 4	.22**	.29**	.36**	.54**	.46**	.60**	.64**	.47**								
9 SS Wave 1	.38**	.25**	.28**	.29**	.59**	.46**	.44**	.44**	.20*							
10 SS Wave 2	.11	.16*	.13	.25**	.22**	.39**	.32**	.36**	.19**	.33**						
11 SS Wave 3	.15*	.25**	.09	.22**	.21**	.24**	.43**	.32**	.24**	.58**	.38**					
12 SS Wave 4	.14	.19*	.07	.21**	.20**	.30**	.40**	.40**	.25**	.58**	.67**	.44**				
13 NS Wave 1	-.42**	-.20**	-.24**	-.20**	-.53**	-.35**	-.22**	-.23**	-.59**	-.22**	-.15*	-.17*	.42**			
14 NS Wave 2	-.01	-.09	-.16*	-.18*	-.16*	-.44**	-.33**	-.33**	-.013	-.53**	-.37**	-.28**	.15*	.38**		
15 NS Wave 3	-.05	-.16*	-.09	-.14	-.19*	-.33**	-.42**	-.32**	-.24**	-.37**	-.61**	-.42**	.21**	.66**	.34**	
16 NS Wave 4	-.02	-.11	-.11	-.27**	-.19*	-.38**	-.39**	-.46**	-.23**	-.30**	-.37**	-.48**	.19*	.56**	.60**	.57**

Note. PE = positive emotion, SS = perceived social support from partner, NS = perceived negative social support from partner. Wave 1 = prenatal period, Wave 2 = 1-month postpartum, Wave 3 = 4-months postpartum, Wave 4 = 9-months postpartum. Values presented on the diagonal, in bold text, represent the correlation between maternal and paternal levels of each variable at that wave ** $p < .01$. * $p < .05$.

Table 3

Results of Dyadic Multilevel Models Predicting Social Resources Across Time: Study 1

<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<u>95% CI</u>	
				<i>Lower</i>	<i>Upper</i>
Relationship Satisfaction	Paternal Intercept	5.32	<.001	5.07	5.57
	Maternal Intercept	5.27	<.001	5.01	5.53
	Paternal Slope	-0.24	<.001	-0.31	-0.16
	Maternal Slope	-0.22	<.001	-0.29	-0.14
	Paternal Lagged RS	-0.01	.87	-0.10	0.08
	Maternal Lagged RS	0.01	.80	-0.09	0.11
	Paternal Lagged Actor PE	0.17	.001	0.07	0.27
	Maternal Lagged Actor PE	0.04	.37	-0.05	0.14
	Paternal Lagged Partner PE	-	-	-	-
	Maternal Lagged Partner PE	-	-	-	-
<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<i>Lower</i>	<i>Upper</i>
Perceptions of PS	Paternal Intercept	3.12	<.001	2.89	3.35
	Maternal Intercept	3.08	<.001	2.87	3.29
	Paternal Slope	-0.07	.08	-0.14	0.01
	Maternal Slope	-0.04	.28	-0.11	0.03
	Paternal Lagged Perceptions of PS	0.49	<.001	0.36	0.62
	Maternal Lagged Perceptions of PS	0.68	<.001	0.58	0.79
	Paternal Lagged Actor PE	0.09	.01	0.02	0.17
	Maternal Lagged Actor PE	0.01	.78	-0.05	0.07
	Paternal Lagged Partner PE	-	-	-	-
	Maternal Lagged Partner PE	-	-	-	-
<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<i>Lower</i>	<i>Upper</i>
Perceptions of NS	Paternal Intercept	0.35	.009	0.09	0.60
	Maternal Intercept	0.88	<.001	0.61	1.15
	Paternal Slope	0.18	<.001	0.10	0.27
	Maternal Slope	0.04	.39	-0.05	0.13
	Paternal Lagged Perceptions of NS	0.40	<.001	0.26	0.54
	Maternal Lagged Perceptions of NS	0.53	<.001	0.38	0.69
	Paternal Lagged Actor PE	-0.10	.02	-0.19	-0.02
	Maternal Lagged Actor PE	-0.04	.39	-0.13	0.05
	Paternal Lagged Partner PE	-0.06	.11	-0.14	0.01
	Maternal Lagged Partner PE	-0.04	.39	-0.13	0.05

Note. PE = positive emotions. RS = Relationship Satisfaction. PS = positive support. NS = negative support. Statistically significant focal effects are highlighted in bold.

postpartum period.⁷

Dyadic Multilevel Analyses Predicting Social Resources from Positive Emotions Across Time

Results of lagged, dyadic multilevel models are presented in Table 3. With respect to relationship satisfaction, the model failed to estimate with random intercepts for gender, or with a random slope for prior wave relationship satisfaction, positive emotion, or partner positive emotions. We therefore removed prior partner positive emotion from the model, and the model then successfully converged with random intercepts for gender. This is the model presented in Table 3. Results demonstrated that both mothers ($B = -0.22, p < .001$) and fathers ($B = -0.23, p < .001$) experienced declines in relationship satisfaction across the transition to parenthood. Above and beyond these slopes, the actor's own relationship satisfaction from the prior wave was not associated with their own relationship satisfaction in the subsequent wave for both mothers ($B = 0.01, p = 0.87$) and fathers ($B = -0.01, p = .87$). Controlling for these factors, there was a significant actor effect for fathers ($B = 0.17, p = .001$), such that when fathers reported greater positive emotions at the prior wave, they tended to report greater relationship satisfaction at the subsequent wave. Maternal positive emotions did not predict their own subsequent relationship satisfaction. Because the model failed to converge with partner effects in it, we are unable to draw conclusions about the influence of partner positive emotions in promoting relational satisfaction for the individual.

⁷ Although not the primary focus of this research, to further explore patterns of change in positive emotions, we conducted multilevel growth curve analyses separately for mothers and fathers according to the recommendations of Bolger and Laurenceau (2013). Results demonstrated that both mothers (linear = $B = .07, p = .009$; quadratic = $B = -.004, p = .04$) and fathers (linear = $B = .05, p = .04$; quadratic = $B = -.004, p = .03$) demonstrated a curvilinear pattern of change in positive emotions, such that they tended to increase in positive emotions from pregnancy through the early postpartum period, increases which then tended to taper off later in the postpartum period (i.e., at nine-months postpartum).

Results of an ancillary model that controls for the influence of negative emotions are presented in Ancillary Table 1 in the OSM. Results demonstrate that, even when controlling for maternal and paternal negative emotions and relationships satisfaction at the prior wave, paternal positive emotions at the prior wave still positively and significantly predicted their relationship satisfaction at the subsequent wave ($B = 0.16, p = .003$). Additionally, as shown in Ancillary Table 2 on the OSM, the association between prior wave paternal positive emotions and subsequent relationship satisfaction remained statistically significant when controlling for prior wave maternal and paternal daily stress (paternal positive emotions $B = 0.16, p = .001$) and parenting self-efficacy (paternal positive emotions $B = 0.17, p < .001$). We next examined whether the influence of positive emotions and subsequent relationship satisfaction was moderated by the wave of data collection. The results, which are presented in Ancillary Table 3 in the OSM, revealed that for both mothers ($B = -.14, p = .23$) and fathers ($B = 0.003, p = .95$), the association between their own positive emotions at a prior wave of data collection and their own relationship satisfaction at a subsequent wave of data collection was not moderated by wave. This indicates that positive emotions had a similar influence on subsequent relationship satisfaction earlier versus later in the transition to parenthood.

Turning our attention to perceptions of positive social support from the partner, the model failed to converge with random intercepts for gender, or with a random slope for prior wave positive partner support, positive emotions, or partner positive emotions. We therefore removed prior partner positive emotions from the model. After doing this, the model still failed to converge with random intercepts for gender, but successful converged while including random slopes for prior positive partner support. This and all subsequent models therefore included random slopes for prior positive support. The results are presented in Table 3. Mothers and

fathers did not experience significant changes in perceptions of partner support across the course of the study. For both mothers ($B = 0.68, p < .001$) and fathers ($B = 0.49, p < .001$), prior wave perceived positive partner support was a strong predictor of subsequent wave perceptions of partner support. Even so, when fathers reported greater positive emotions at the prior wave of data collection ($B = 0.09, p = 0.01$), it predicted greater perceived partner support at the subsequent wave of data collection. For mothers, their own positive emotions at the prior wave did not predict their perceptions of positive social support at the subsequent wave of data collection ($B = 0.01, p = .79$). Once again, because the model failed to converge with partner positive emotions in the model, we are unable to draw conclusions about how partner positive emotions contribute to perceptions of positive support across time.

The results of an analysis that predicted perceived positive partner social support while controlling for negative affect are presented in Ancillary Table 1. Results demonstrated that, even when controlling for lagged negative affect, paternal positive emotions at the prior wave still significantly predicted greater perceptions of positive support at the subsequent wave ($B = 0.10, p = .02$). Although we attempted to examine how prior wave positive emotions predicted subsequent perceptions of positive partner support while controlling for daily stress and parenting self-efficacy, these models failed to converge, and so we were not able to draw conclusions from these models here. Additionally, as presented in Ancillary Table 3, the association between prior positive emotions and subsequent perceptions of positive partner social support was not moderated by the wave of data collection for either mothers ($B = -.01, p = .71$) or fathers ($B = -.07, p = .10$), suggesting that the association between positive emotions and subsequent perceptions of social support did not significantly differ earlier versus later in the transition to parenthood.

With respect to negative support from the partner, the model successfully converged on the first attempt, when including random intercepts for gender only. Results of this model demonstrated similar findings as the models predicting relationship satisfaction and positive social support. After controlling for lagged perceptions of negative support and changes across time, paternal positive emotions at the prior wave predicted lower paternal perceptions of negative support from the partner at the subsequent wave ($B = -0.10, p = .02$). For mothers, positive emotions at the prior wave were not associated with their own perceptions of negative support at the subsequent wave of data collection ($B = -0.04, p = .39$). Above and beyond these actor effects, maternal positive emotions did not predict *fathers'* subsequent perceptions of negative support from mothers, nor did fathers' positive emotions predict mothers' subsequent wave perceptions of negative support from fathers. None of the other focal predictors were significant.⁸

Unlike the other two ancillary analyses, as shown in Ancillary Table 1, the negative association between paternal lagged positive emotions and their subsequent negative support was rendered non-significant ($B = -0.08, p = .10$) when we included lagged maternal and paternal negative affect in the model. By contrast, as shown in Ancillary Table 4, the negative association between prior wave paternal positive emotions and subsequent wave perceptions of negative partner support remained statistically significant when controlling for daily stress (paternal positive emotion $B = -0.10, p = .03$) and parenting self-efficacy (paternal positive emotion $B = -0.11, p = .02$). As with relationship satisfaction and perceptions of positive support (and as

⁸ When we tried to re-conduct the Kenny et al. (2006) dyadic, aggregated, lagged, multilevel models while including within- and between-person components for both actor and partner positive emotions, they failed to produce estimates for 3 key parameters in all three of the models (regardless of which random slopes were included). Thus, because these models did not converge, we are unable to draw conclusions about between- vs. within-person parameters in Study 1.

shown in Ancillary Table 2), there was no interaction between maternal ($B = -.02, p = .67$) or paternal ($B = .003, p = .94$) positive emotions and wave in predicting perceptions of negative support at the subsequent wave of data collection.

Accounting for Missing Data using FIML Estimation

Having testing our primary hypotheses, we also conducted a set of analyses using FIML estimation to ensure that attrition did not bias estimates from our main analyses. Results of analyses using FIML estimation and accounting for employment status, education level, race, income, years married, and age are presented in Ancillary Tables 5-7 in the Online Supplemental Materials. As shown in those tables, even when accounting for all of the above demographic factors, the substantive conclusions of the model were identical to those presented in our primary analyses: prior wave paternal (but not maternal) positive emotions predicted their own subsequent relationship satisfaction, perceived partner positive support, and perceived partner negative support. As such, these results suggest that differential attrition did not substantially bias the estimates presented in Table 3.

Study 1 Discussion

The results of Study 1 provided partial support for our hypotheses. Although we did not have strong reason to suspect gender differences would emerge, our results demonstrated a consistent difference between mothers and fathers in the influence of positive emotions in predicting social outcomes across time. Using multilevel analyses that aggregated across the multiple waves of data collection, for fathers only, when they reported greater positive emotions at one wave of data collection, it was associated with greater relationship satisfaction, perceptions of positive support from their partner, and lower perceptions of negative support from their partner, even controlling for prior levels of each outcome variable. Moreover, almost all of these findings were robust when accounting for a series of theoretically relevant covariates,

including negative affect, stress, and parenting self-efficacy, suggesting that positive emotions have a unique influence on paternal relationship satisfaction and perceptions of partner support during the transition to parenthood, above and beyond their experience of these others contributors to adjustment during this stressful period.

Our goal in Study 2 was to replicate and extend these findings in numerous ways with a higher-powered study. In Study 2, therefore, we examined a larger sample of couples undergoing to transition to parenthood to further determine whether and how positive emotions predict relationship satisfaction and social support over time. In addition, although a strength of Study 1 was its dyadic longitudinal design, because parents stopped reporting on positive emotions on social outcomes at 9-months postpartum, it was not possible to examine longer-term adjustment across the transition to parenthood. In Study 2, participants reported their positive emotions, relationship satisfaction, and perceptions of social support until 24-months (2 years) after their first baby was born. Additionally, Study 1 was limited in that we were unable to examine partner effects in two of our three analyses, probably because of a smaller sample than is ideal when conducting these complicated analyses. In Study 2, we drew on enhanced power to better estimate the influence of partner positive emotions on individual relationship outcomes. Finally, Study 1 was limited to actor and partner reports of adjustment to the transition, reports that may be biased. In Study 2, in addition to self-reports, we also examined whether positive emotions longitudinally predict social support as observed by independent coders within a standardized laboratory support paradigm. This is noteworthy because no positive emotion studies to date have examined actual support behavior during a chronic, longitudinal stressor.

STUDY 2

Method

Participants and Materials

Data for Study 2 were drawn from a two-year longitudinal study of new parent couples (see Rholes et al., 2011 for more details). All procedures described hereafter were approved by the Institutional Review Board of Texas A&M. Because of confidentiality agreements made with participants during the consent process that explicitly forbid public sharing of the data, the data for Study 2 are not publicly available. The data for Study 2 may be requested from Jeffrey A. Simpson for the purpose of reanalysis, subject to ethics certification. In order to be eligible for the study, participants were required to be married or cohabiting and expecting their first biological child together. Recruitment occurred at birthing classes and obstetrician's offices in the Southwest of the United States. Of those who were approached and eligible, 45% agreed to participate. Wave 1 was collected when new parents were six-weeks prenatal, Wave 2 was collected at 6 months postpartum, Wave 3 was collected at 12 months postpartum, Wave 4 was collected at 18-months postpartum, and Wave 5 was collected at 24 months postpartum.

At Wave 1, the sample consisted of 192 cohabiting or married first-time parents. The characteristics of the sample were comparable to that of Study 1. On average, male partners were 28.4 years-old ($SD = 4.42$) and female partners were 26.7 years-old ($SD = 4.16$). The majority of the couples were married (95.0%) and the remaining ones were cohabiting (5.0%). The majority of people identified as non-Hispanic White (82.2%), with 9.1% identifying as Asian, and 8.7% identifying as Hispanic. Because the study included only heterosexual couples with biological children, 50% of the sample was male, and 50% of the sample was female. On average, married couples had been in a relationship for 3.3 years ($SD = 2.6$) and cohabiting couples had been in a relationship for 1.9 years ($SD = 2.2$). For more information about the sample characteristics, see (Rholes et al., 2011).

At each wave of data collection, participants completed paper surveys. Dyad members were mailed separate questionnaires and instructed to complete them and mail them back independently. At Wave 2, dyads were invited to the lab to complete videorecorded interactions. Each dyad (couple) completed two 8-minute support discussions (adapted from Pasch & Bradbury, 1998), one in which the female was the support recipient and one in which the male was the support recipient, with the order being randomly assigned. Each partner was asked to identify and discuss with their partner one major personal characteristic or mannerism that they wanted to change, without being told to either seek or provide support in either of the two discussions. Dyads were compensated \$50 for completing the first three surveys (6 weeks prenatal, 6 and 12 months postnatal), \$50 for completing the lab session (6 months postnatal), and \$75 for completing the last two assessments (18 and 24 months postnatal). Additionally, each dyad was entered into a raffle for two \$500 cash prizes if both dyad members completed all five surveys and the lab session.

One hundred thirty-seven dyads completed all of the assessments. To examine the possibility of differential attrition, we tested for significant differences between dropouts (e.g., participants who did not complete all waves of data collection) and completers at the prenatal assessment on all primary study variables (see measures below) and in basic demographic characteristics. Independent samples *t*-tests revealed that individuals who dropped out did not differ in all but one of our primary predictor and outcomes measures. The only exception was in relationship satisfaction, such that those who dropped out reported lower relationship satisfaction prenatally ($M = 41.79$, $SD = 6.95$) than those who completed the study ($M = 42.96$, $SD = 4.24$, $d = 0.20$, $t = 1.63$, $p = .013$). Additionally, those who completed the study tended to be older, more highly educated, had higher incomes, and had been in their relationship longer. Overall, this

suggests that participants who were in relatively more stable life positions prior to having their child were more likely to complete the entire study. Because multilevel modeling was also used in Study 2, individuals who were included at baseline who had missing data at subsequent waves of data collection were included in substantive analyses.

Positive emotions. At each wave of data collection, positive emotions were assessed using the positive affect sub-scale of the CES-D. Four items (“*I felt I was just as good as other people,*” “*I felt hopeful about the future,*” “*I was happy,*” “*I enjoyed life*”) from the CES-D form a sub-scale (Ross & Mirowsky, 1984; Sheehan, et al., 1995), which has been frequently used in prior research to assess positive affect (e.g., Moskowitz, 2003). Participants reported how often they experienced these emotions during the past week from 0 = *Rarely or none of the time* (less than 1 day) to 3 = *Most or all of the time* (5-7 days). The measure demonstrated adequate internal consistency at all waves of data collection (men prenatally: $\alpha = .71$; women prenatally: $\alpha = .80$; men at 6-months: $\alpha = .77$; women at 6-months: $\alpha = .86$; men at 12-months: $\alpha = .77$; women at 12-months: $\alpha = .82$; men at 18-months: $\alpha = .82$; women at 18-months: $\alpha = .87$; men at 24-months: $\alpha = .75$; women at 24-months: $\alpha = .83$).

Support perceptions. At each wave, support perceptions were assessed using the Social Support Questionnaire (Sarason, et al., 1983). Participants completed 7 items (e.g., “*How much can you count on your partner/spouse to console you when you are very upset?*”) that assessed perceptions of receiving support from one’s partner during the past month on a scale ranging from 1 = *not at all* to 7 = *very much*. An average score was created, and the scale demonstrated adequate reliability at all waves of data collection (men prenatally: $\alpha = .91$; women prenatally: $\alpha = .91$; men at 6-months: $\alpha = .92$; women at 6-months: $\alpha = .90$; men at 12-months: $\alpha = .93$;

women at 12-months: $\alpha = .91$; men at 18-months: $\alpha = .93$; women at 18-months: $\alpha = .94$; men at 24-months: $\alpha = .94$; women at 24-months: $\alpha = .93$).

Support provision. At each wave, support provision was assessed using the Social Support Questionnaire (Sarason et al., 1983). Participants completed 7 items (e.g., “*How much can your partner count on you to console him/her when he/she is very upset?*”) that assessed self-reported support provision to one’s partner during the past month on a scale ranging from 1 = *not at all* to 7 = *very much*. An average score was created, and the scale demonstrated adequate reliability at all waves of data collection (men prenatally: $\alpha = .89$; women prenatally: $\alpha = .89$; men at 6-months: $\alpha = .90$; women at 6-months: $\alpha = .88$; men at 12-months: $\alpha = .93$; women at 12-months: $\alpha = .90$; men at 18-months: $\alpha = .92$; women at 18-months: $\alpha = .89$; men at 24-months: $\alpha = .93$; women at 24-months: $\alpha = .91$).

Relationship satisfaction. At each wave of data collection, relationship satisfaction was assessed using the Dyadic Adjustment Scale (Spanier, 1976). Participants completed 10 items (e.g., “*In general, how often do you think that things between you and your partner/spouse are going well?*”) that assessed how satisfied they had been with their relationship during the past month on a scale ranging from 1 = *never* to 6 = *all of the time*. A cumulative score was created, and the scale demonstrated adequate reliability at all waves of data collection (men prenatally: $\alpha = .85$; women prenatally: $\alpha = .84$; men at 6-months: $\alpha = .81$; women at 6-months: $\alpha = .84$; men at 12-months: $\alpha = .81$; women at 12-months: $\alpha = .88$; men at 18-months: $\alpha = .86$; women at 18-months: $\alpha = .89$; men at 24-months: $\alpha = .89$; women at 24-months: $\alpha = .88$).

Negative affect. As in Study 1, negative affect was assessed using the negative affect sub-scale of the CES-D. The 7-item measure again demonstrated adequate internal consistency at all waves of data collection (men prenatally: $\alpha = .84$; women prenatally: $\alpha = .87$; men at 6-

months: $\alpha = .83$; women at 6-months: $\alpha = .83$; men at 12-months: $\alpha = .87$; women at 12-months: $\alpha = .87$; men at 18-months: $\alpha = .79$; women at 18-months: $\alpha = .84$; men at 24-months: $\alpha = .89$; women at 24-months: $\alpha = .88$).

Parenting Stress. At each wave of data collection, parenting stress was assessed using the Parental Stress Index (Abidin, 1983). Participants completed 33 items (e.g., “*My baby is so demanding that it exhausts me*”) that assessed how stressed they had been from their parenting responsibilities during the past month on a scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. An average score was created, and the scale demonstrated adequate reliability at all waves of data collection (men prenatally: $\alpha = .95$; women prenatally: $\alpha = .95$; men at 6-months: $\alpha = .88$; women at 6-months: $\alpha = .83$; men at 12-months: $\alpha = .88$; women at 12-months: $\alpha = .85$; men at 18-months: $\alpha = .89$; women at 18-months: $\alpha = .84$; men at 24-months: $\alpha = .89$; women at 24-months: $\alpha = .86$).

Childcare Satisfaction. At each wave of data collection, childcare satisfaction was assessed using the Childcare Satisfaction Inventory (Pistrang, 1984). Participants completed 12 items (e.g., “*My baby gives me a sense of accomplishment*”) that assessed how satisfied and competent they felt as a parent during the past month on a scale ranging from 1 = *never* to 5 = *very often*. An average score was created, and the scale demonstrated adequate reliability at all waves of data collection (men prenatally: $\alpha = .92$; women prenatally: $\alpha = .90$; men at 6-months: $\alpha = .94$; women at 6-months: $\alpha = .90$; men at 12-months: $\alpha = .94$; women at 12-months: $\alpha = .93$; men at 18-months: $\alpha = .94$; women at 18-months: $\alpha = .94$; men at 24-months: $\alpha = .94$; women at 24-months: $\alpha = .95$).

Observed support. Eight trained coders independently watched and rated each couple’s two support discussions that occurred at 6 months postnatal. Half of the coders watched and

coded only the male partners, and half watched and coded only the female partners. Coders rated the extent to which potential support providers (i.e., the partner *not* presenting something they wanted to change about themselves) engaged in various support behaviors. Specifically, they rated the extent to which potential support providers employed emotional, informational, and negative support on a scale ranging from 1 = *not at all* to 7 = *a great deal*. All coders were thoroughly trained and regularly monitored throughout the coding process to ensure reliability and accuracy. Each type of support was coded independently from the other types of support.

The coding schemes were developed based on social support theory, and the codes were also utilized and validated in previous research (Pasch & Bradbury, 1998). *Emotional support* was defined as displaying concern for the support recipient's feelings and attempting to alleviate emotional distress (e.g., "*Acknowledged their partner's beliefs, interpretations, or feelings*"). A two-way, random effects intraclass correlation coefficient for absolute agreement demonstrated excellent reliability ($ICC = 0.92$). *Informational support* was defined as providing concrete advice and information about the topic being discussed and offering practical solutions (e.g., "*Offered to develop or enact plans to help their partner solve the problem*"), and it also had excellent reliability ($ICC = 0.94$). Negative support was defined as displaying behaviors that were unsupportive, critical, or minimized the support recipient's feelings or problems (e.g., "*Criticized or blamed their partner*"), and it had very good reliability ($ICC = 0.86$).

Analytic Strategy

With respect to self-report outcomes, which examine actor and partner positive emotions for mothers and fathers across 5 waves of data collection (from pregnancy to 24-months postpartum), we use the same aggregated, dyadic, multilevel, lagged approach to data analysis

that we employed in Study 1 (Kenny et al., 2006)⁹, along with the same set of ancillary analyses.¹⁰ Additionally, one strength of Study 2 is that it includes the behavioral social support discussion task at the 6-month postpartum wave of data collection, in which the data needed to be analyzed differently. First, because there were only two data points relevant in this analysis (pregnancy and 6-months postpartum), we used a standard, multilevel APIM framework for distinguishable dyads to analyze these data (Kenny et al., 2006), because the aggregated approach is only needed when couples are assessed at more than two waves of data collection across time. Second, the observational data presented a unique data analytic challenge in another way: our general data analytic strategy across both studies was to control for prior levels of each outcome variable in order to examine whether and how positive emotions predict change in each outcome across time. For the observationally-coded social support variables in Study 2, however, it was not possible to control for prior levels of this variable, because participants did not complete a laboratory-based social support task at the prenatal wave of data collection. Because of this, we used a stand-in covariate: participants' self-reports of support provision during the prenatal period. We hypothesized that positive emotions would predict observer-rated support

⁹We note here that, prior to becoming aware of this dyadic, aggregated, lagged analysis approach, we pre-registered a different data analysis plan for Study 2. The pre-registration for this original analysis plan can be found at the following link: <https://aspredicted.org/aa5x5.pdf>. Our hypotheses and general goals for this previous analysis were identical to what we present in this paper. That is, we sought to examine how actor and partner positive emotions at each wave predicted outcomes at each subsequent wave of data collection. Originally, however, we planned to do so using a structural path model specified to test how lagged positive emotions predicted relational outcomes at each subsequent wave separately (e.g., how positive emotions influence outcomes from Wave 1 to Wave 2, and Wave 2 to Wave 3, and so forth). Subsequent to that pre-registration, however, we realized that the aggregated, dyadic approach outlined by Kenny et al. (2006) offered a stronger approach – both in terms of statistical power, and in terms of parsimony – to testing our hypotheses, particularly because we expected these findings would occur similarly across the course of the transition to parenthood. As such, we subsequently adopted the aggregated analytic approach in both studies, which is what we have presented here. For the purpose of transparency, we have included results of the original pre-registered analysis from Study 2 at the end of the OSM in Ancillary Tables 16-18.

¹⁰ Our original goal for both Studies 1 and 2 was to examine how positive emotions impact relational *and* psychological resources during the transition to parenthood. However, given the number of analyses we conducted, and after pre-registering the secondary data analysis for Study 2, we decided to limit the scope to examine how positive emotions predict only relational adjustment during the transition to parenthood.

provision behavior (i.e., greater emotional support, greater instrumental support, and lower negative support) in the lab at 6-months postpartum, controlling for participants' self-reports of support provision at the prenatal period.

Statistical Power

For Study 2, we calculated statistical power in the same manner as in Study 1, using the procedure outlined by Lane and Hennes (2018). All estimates were based on Study 2, which contained 192 couples (384 individuals) and 5 waves of data. Using 20,000 replications, results demonstrated that the lagged association between prior wave paternal positive emotions and their own subsequent relationship satisfaction (observed power = .93), positive partner support (observed power = .89), and support provision (observed power = .89) were all well-powered. For mothers, the smaller size of the coefficients revealed that the lagged associations prior wave maternal positive emotions and their own subsequent relationship satisfaction (observed power = .68), positive partner support (observed power = .64), and support provision (observed power = .40) were under-powered.

As in Study 1, we conducted effect size sensitivity analyses for coefficients that were statistically significant but underpowered. Results of these analyses demonstrated that for the lagged association between maternal positive emotions on their own subsequent relationship satisfaction to be adequately powered, a coefficient of 1.31 or greater would be required. For the lagged association between maternal positive emotions and their own subsequent perceptions of partner positive support to be adequately powered, a coefficient of 0.29 or greater would be required. For the lagged association between maternal positive emotions on their own support provision to be properly powered, a coefficient of 0.27 or greater would be required.

Results

Descriptive statistics for the primary study variables are presented in Table 4, and bivariate correlations are presented in Table 5. As in Study 1, positive emotion at each wave of data collection was positively associated concurrently with each outcome, and it was also positively associated with the outcome variable of interest at all subsequent points of data collection for almost every variable. Descriptive statistics suggested fathers experienced little change in their positive emotions across the course of the transition to parenthood, whereas mothers appeared to experience decreases in positive emotions across the transition to parenthood in Study 2.¹¹

Do positive emotions longitudinally predict enhanced relationship satisfaction during the transition to parenthood?

Results of dyadic, lagged models are presented in Table 6. All of the models in Table 6, as well as all subsequent ancillary models, successfully converged with random intercepts for gender (i.e., on the first attempt). With respect to relationship satisfaction, after controlling for paternal ($B = 1.53, p < .001$) and maternal ($B = 0.22, p < .001$) relationship satisfaction at the prior wave, and the wave of data collection ($B = -0.10, p = .09$), both paternal ($B = 3.10, p < .001$) and maternal ($B = 0.53, p = .01$) positive emotions at the prior wave were associated with them reporting greater relationship satisfaction at the subsequent wave. The partner effects for both mothers and fathers were not statistically significant. In ancillary models where we controlled for prior negative affect, parenting stress, and childcare satisfaction (presented in Ancillary Tables 8 and 9) paternal and maternal positive emotions remained significant

¹¹ We again conducted multilevel growth curve analyses to examine whether mothers and fathers experienced significant changes in positive emotions across the course of the transition to parenthood. Mothers experienced significant *decreases* in positive emotions earlier in the study (linear = $B = -.15, p = .005$), which then tapered off towards the end of the study (quadratic $B = .02, p = .02$), whereas fathers did not experience significant changes in positive emotions across the course of the study (linear = $B = .03, p = .65$; quadratic = $B = -.009, p = .34$). We note that these trajectories of change are not directly comparable to Study 1, because the phases of data collection are across different time periods

Table 4

Descriptive Statistics for Primary Variables: Study 2

Variable	Time Point	<u>Mothers</u>		<u>Fathers</u>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Positive Emotions	Pregnancy	3.59	0.53	3.48	0.57
	6-Months Postpartum	3.50	0.57	3.50	0.67
	12-Months Postpartum	3.46	0.59	3.44	0.63
	18-Months Postpartum	3.46	0.62	3.42	0.73
	24-Months Postpartum	3.48	0.60	3.36	0.73
Relationship Satisfaction	Pregnancy	43.20	4.30	42.62	4.75
	6-Months Postpartum	42.40	4.63	42.34	4.98
	12-Months Postpartum	42.52	4.70	41.64	6.72
	18-Months Postpartum	42.42	5.61	41.40	6.4
	24-Months Postpartum	41.60	6.79	40.84	6.98
Perceptions of Positive Social Support	Pregnancy	6.21*	0.76	6.03*	0.81
	6-Months Postpartum	6.10	0.88	5.93	0.96
	12-Months Postpartum	5.98	0.96	5.81	0.99
	18-Months Postpartum	5.93	1.02	5.84	0.98
	24-Months Postpartum	5.99*	0.96	5.73*	1.03
Social Support Provided	Pregnancy	6.21	0.76	6.23	0.64
	6-Months Postpartum	6.27*	0.70	6.08*	0.75
	12-Months Postpartum	6.22*	0.72	6.04*	0.86
	18-Months Postpartum	6.23*	0.73	6.04*	0.81
	24-Months Postpartum	6.22*	0.74	5.95*	0.96

* Mothers and fathers were statistically significantly different at this wave at the $p < .05$ level.

Table 5

Bivariate Correlations for Primary Variables: Study 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1 PE1	.20**																			
2 PE2	.30**	.24**																		
3 PE3	.35**	.46**	.20**																	
4 PE4	.47**	.56**	.61**	.26**																
5 RS1	.34**	.24**	.22**	.24**	.57**															
6 RS2	.20**	.38**	.33**	.29**	.58**	.53**														
7 RS3	.18**	.27**	.44**	.30**	.44**	.62**	.42**													
8 RS4	.15*	.26**	.28**	.32**	.36**	.60**	.63**	.50**												
9 RS5	.18**	.26**	.45**	.46**	.44**	.60**	.71**	.71**	.49**											
10 SS1	.22**	.26**	.22**	.22**	.49**	.35**	.30**	.27**	.39**	.23**										
11 SS2	.18**	.34**	.30**	.30**	.38**	.56**	.52**	.46**	.51**	.49**	.37**									
12 SS3	.24**	.23**	.43**	.31**	.33**	.46**	.60**	.44**	.55**	.47**	.64**	.39**								
13 SS4	.16**	.26**	.31**	.33**	.37**	.47**	.48**	.54**	.65**	.40**	.56**	.60**	.26**							
14 SS5	.29**	.30**	.28**	.39**	.34**	.46**	.46**	.66**	.60**	.47**	.54**	.60**	.68**	.42**						
15 SP1	.25**	.10	.08	0.11	.28**	.15**	.10	0.10	.18**	.28**	.21**	.20**	.15**	.25**	.19					
16 SP2	.10	.14*	.02	0.06	.17**	.23**	.09	.16**	.15*	.11*	.21**	.20**	.20**	.19**	.54**	.13				
17 SP3	.14*	.19**	.17**	.12*	.24**	.24**	.18**	.16**	.20**	.17**	.18**	.28**	.18**	.20**	.51**	.61**	.15			
18 SP4	.14*	.15*	.17**	.13*	.26**	.29**	.22**	.23**	.28**	.17**	.21**	.30**	.27**	.29**	.51**	.53**	.74**	.29**		
19 SP5	.14*	.15*	.15*	.15*	.19**	.23**	.19**	.32**	.29**	.16**	.24**	.24**	.33**	.32**	.32**	.42**	.59**	.60**	.26**	

Note. PE = positive emotions. RS = Relationship satisfaction, SS = perceptions of support from partner. SP = support provided to partner. The number next to each variable in the second vertical column refers to the wave of data collection from which that variable is derived (Wave 1 – 5). Values presented on the diagonal, in bold text, represent the correlation between maternal and paternal levels of each variable at that wave. ** p < .01. * p < .05.

Table 6

Results of Multilevel Models Predicting Relational Outcomes Across Time: Study 2

<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<u>95% CI</u>	
				<i>Lower</i>	<i>Upper</i>
Relationship Satisfaction	Paternal Intercept	32.62	<.001	29.19	36.04
	Maternal Intercept	39.27	<.001	36.83	41.70
	Paternal Slope	-0.22	.25	-0.59	0.16
	Maternal Slope	-0.03	.80	-0.26	0.20
	Paternal Lagged RS	1.53	<.001	1.44	1.62
	Maternal Lagged RS	0.22	<.001	0.16	0.27
	Paternal Lagged Actor PE	3.10	<.001	2.43	3.78
	Maternal Lagged Actor PE	0.54	.01	0.13	0.95
	Paternal Lagged Partner PE	-0.40	.20	-1.00	0.21
	Maternal Lagged Partner PE	0.37	.15	-0.14	0.87
<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<i>Lower</i>	<i>Upper</i>
Perceptions of PS	Paternal Intercept	3.94	<.001	3.35	4.53
	Maternal Intercept	5.91	<.001	5.32	6.50
	Paternal Slope	-0.03	.32	-0.08	0.03
	Maternal Slope	-0.03	.23	-0.07	0.02
	Paternal Lagged Perceptions of PS	0.69	<.001	0.61	0.77
	Maternal Lagged Perceptions of PS	0.19	<.001	0.11	0.27
	Paternal Lagged Actor PE	0.49	<.001	0.37	0.62
	Maternal Lagged Actor PE	0.10	.054	0.00	0.20
	Paternal Lagged Partner PE	0.06	.26	-0.05	0.17
	Maternal Lagged Partner PE	-0.04	.52	-0.17	0.08
<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<i>Lower</i>	<i>Upper</i>
Support Provision	Paternal Intercept	4.54	<.001	3.99	5.08
	Maternal Intercept	5.64	<.001	5.24	6.03
	Paternal Slope	-0.02	.46	-0.07	0.03
	Maternal Slope	-0.001	.99	-0.03	0.03
	Paternal Lagged Support Provided	0.94	<.001	0.84	1.04
	Maternal Lagged Support Provided	0.10	.003	0.04	0.16
	Paternal Lagged Actor PE	0.43	<.001	0.32	0.54
	Maternal Lagged Actor PE	0.09	.01	0.02	0.15
	Paternal Lagged Partner PE	-0.002	0.96	-0.10	0.10
	Maternal Lagged Partner PE	0.09	0.03	0.01	0.17

Note. RS = relationship satisfaction. PE = positive emotions. ** $p < .01$. * $p < .05$.

predictors of their own relationship satisfaction at the subsequent wave of data collection even when controlling for these covariates.

With respect to perceptions of positive support from the partner, controlling for prior wave perceptions of positive support for both fathers ($B = 0.95, p < .001$) and mothers ($B = 0.38, p < .001$), and the wave of data collection ($B = -0.01, p = .47$), paternal ($B = 0.58, p < .001$) but not maternal ($B = 0.10, p = .054$) positive emotions at the prior wave predicted greater perceptions of positive support from the partner at the subsequent wave of data collection. Partner effects for both fathers and mothers were not significant. Ancillary Tables 8 and 10 present results of analyses where we re-estimated our primary models while controlling for prior wave negative affect, parenting stress, or childcare satisfaction. Results of these models remained consistent with those presented in Table 6: paternal but not maternal positive emotions significantly predicted greater perceptions of positive support from the partner at the subsequent wave of data collection even when controlling for prior wave negative affect, parenting stress, or childcare satisfaction.

With respect to participants' self-reports of support provision, after controlling for paternal ($B = 0.99, p < .001$) and maternal ($B = 0.25, p < .001$) support provision at the prior wave, maternal ($B = 0.09, p = .01$) and paternal ($B = 0.43, p < .001$) positive emotions both significantly predicted their own reports of support provision at the subsequent wave of data collection. Additionally, there was a partner effect for mothers only, such that when fathers reported greater positive emotions at the prior wave, mothers reported providing greater support at the subsequent wave of data collection. We again examined whether the association between maternal and paternal positive emotions and their subsequent reports of support provision remained significant

after controlling for the influence of prior wave negative affect, parenting stress, and childcare satisfaction. Results (presented in Ancillary Table 8 and 11) show that even after accounting for negative affect, parenting stress, and childcare satisfaction, paternal positive emotions were still associated with reports of support provision at the subsequent wave of data collection, although maternal positive emotions became non-significant predictor of the own support provision at the subsequent wave of data collection in each of these models. The partner effect was still significant in the model that controlled for prior wave negative affect (such that mothers reported providing more support when *fathers* reported greater positive emotions at the prior wave of data collection, $B = 0.08, p = .04$), although it was not significant in the models that controlled for parenting stress or childcare satisfaction.¹²

Accounting for Missing Data using FIML Estimation

As in Study 1, having tested our primary hypotheses, we re-estimated these models using FIML estimation, and while statistically controlling for variables likely to contribute to differential attrition, including age, race, education level, and income. The results of these analyses are presented in Ancillary Tables 12-14 in the OSM. As shown in Ancillary Tables 12-14, results remained identical to those presented in Table 6: greater positive emotions predicted greater levels of all three outcomes for both mothers and fathers, suggesting that differential attrition did not substantially bias these results.

¹² As in Study 1, we estimated models that included between- and within-person effects. The between-person effects for maternal and paternal positive emotions were significant in positively predicting relationship outcomes in all three analyses. For fathers only, there was also a within-person effect of their positive emotions predicting their own relationship outcomes, such that greater than usual levels of positive emotions at the prior wave (as compared to their typical level of positive emotions across the transition to parenthood) predicted greater relationship satisfaction, positive support, and support provision at the subsequent time point. Surprisingly, the between-person effects of partner positive emotion were *negatively* associated with relationship satisfaction and support provision (but not perceived positive partner support) across time for both mothers and fathers. Notably, when we re-estimated a model which included only between- and within-person partner effects, these findings became non-significant. Thus, we suspect they are spurious, and do not interpret them any further.

Do Positive Emotions Predict Social Support Behaviors in the Postpartum Period?

We next examined whether positive emotions in the prenatal period predicted observer-rated emotional, informational, and negative support behaviors, controlling for prenatal self-reports of support provision. The results of multilevel models for distinguishable dyads are presented in Table 7. After controlling for self-reported support provision at the prenatal period ($B = 0.20, r = .14, p = .02$), the association between actor positive emotions and observed emotional support at 6-months postpartum was not statistically significant, however it was trending towards significance in the hypothesized direction ($B = 0.19, r = .11, p = .054$). This association was not moderated by gender ($B = -0.05, p = .60$). In addition, after controlling for prenatal support provision ($B = -0.12, r = .13, p = .04$), greater actor positive emotion in the prenatal period significantly predicted lower observed negative support provision at 6-months postpartum ($B = -0.16, r = -.13, p = .02$). While controlling for prenatal support provision ($B = 0.17, r = .12, p = .04$), the association between prenatal positive emotions and instrumental support was not significant ($B = 0.14, r = .12, p = .13$).

Ancillary Analyses: Accounting for Negative Mood

For each of these outcomes, we tested ancillary models in which we included the actor's prenatal negative affect as a control, to see if it altered the association between actor positive emotions and observed social support at 6-months postpartum. The results are presented in Ancillary Table 15. When including negative affect in the model, actor positive emotions still significantly predicted lower observed negative support behavior ($B = -0.16, r = -.13, p = .02$). The association between actor positive emotion and (a) greater observed emotional support behavior ($B = 0.19, r = .11, p = .055$) and (b) observed instrumental support remained non-significant when controlling for negative affect ($B = 0.14, r = .08, p = .16$).

Table 7

Results of Multilevel Models Examining Prenatal Positive Emotions Predicting Social Support Behaviors at 6-months postpartum: Study 2

<i>Outcome</i>	<i>Predictor</i>	<i>B</i>	<i>p</i>	<u>95% CI</u>		<i>r</i>
				<i>Lower</i>	<i>Upper</i>	
Observed Emotional Support at 6-Months	Intercept	2.44	<.001	1.20	3.68	-
	Prenatal Support Provision	0.20	.02	0.03	0.36	.14
	Prenatal Actor PE	0.19	.054	-0.003	0.39	.11
	Prenatal Partner PE	-0.03	.79	-0.22	0.16	.01
	Gender	-0.16	.68	-0.90	0.59	.03
	Prenatal Actor PE x Gender	-0.05	.60	-0.26	0.15	.03
	Prenatal Partner PE x Gender	0.09	.39	-0.11	0.29	.05
Observed Instrumental Support at 6-Months	Intercept	2.51	<.001	1.32	3.69	-
	Prenatal Support Provision	0.20	.02	0.04	0.36	.14
	Prenatal Actor PE	0.15	.16	-0.06	0.35	.09
	Prenatal Partner PE	-0.01	.92	-0.20	0.18	.01
	Gender	-0.29	.48	-1.08	0.51	.06
	Prenatal Actor PE x Gender	0.07	.52	-0.14	0.27	.04
	Prenatal Partner PE x Gender	-0.01	.95	-0.20	0.19	.00
Observed Negative Support at 6-Months	Intercept	5.21	<.001	4.31	6.10	-
	Prenatal Support Provision	-0.12	.04	-0.24	-0.01	.13
	Prenatal Actor PE	-0.16	.02	-0.30	-0.02	.13
	Prenatal Partner PE	-0.01	.93	-0.14	0.13	.01
	Gender	0.14	.57	-0.36	0.65	.04
	Prenatal Actor PE x Gender	-0.01	.93	-0.15	0.14	.01
	Prenatal Partner PE x Gender	-0.02	.75	-0.17	0.12	.02

Note. Focal effects that were statistically significant are highlighted in bold.

Study 2 Discussion

The results of Study 2 partially replicated those of Study 1, and extended them in several ways. With respect to self-report outcomes, results of Study 2 replicated those in Study 1 for fathers, as paternal positive emotions significantly predicted their own enhanced relationship satisfaction, support perceptions, and support provision at the subsequent wave of data collection. In contrast to Study 1, where maternal positive emotions were not significantly associated with their own outcomes across time, in Study 2 we found that maternal positive emotions predicted enhanced self-reported relationship satisfaction and support provision. Additionally, we found one partner effect: corroborating fathers' perceptions of partner support, mothers were more likely to provide support fathers experienced greater positive emotions at the prior wave of data collection. The majority these findings remained statistically significant when accounting for negative affect, parenting stress, and childcare satisfaction, suggesting the longitudinal influence of positive emotions are unique, and not attributable to these other potential confounds.

Additionally, results of Study 2 expand on Study 1 by demonstrating that the beneficial relational influence of positive emotions during the transition to parenthood was not limited to participants' self-reports. We examined whether positive emotions predicted participants' independently-coded social support behaviors, and we found that participants who reported greater positive emotions in the prenatal period engaged in greater fewer negative support behaviors at 6-months postpartum, even accounting for their self-reports of support provision during the prenatal period. This finding was not moderated by gender, suggesting this pattern tended to occur similarly for both mothers and fathers. Moreover, this finding remained significant when accounting for the influence of negative affect.

GENERAL DISCUSSION

The transition to parenthood can bring frequent experiences of joy and other positive emotions, but also can be one filled with stress and challenges that can threaten the quality of new parents' relationships. In this research, we drew on broaden-and-build theory to propose that the positive emotions new parents experience during the transition to parenthood may "build" two types of important social resources across time: relationship satisfaction and social support among partners. Using two dyadic, longitudinal studies of new parent couples, we investigated whether positive emotions prospectively predict relationship satisfaction, perceptions of social support, social support provision, and observer-rated social support behavior across time. For new fathers, we found consistent evidence across both studies that their own positive emotions prospectively contributed to their own enhanced relationship satisfaction, perceptions of social support, and their own support provision. For new mothers, we found evidence that their positive emotions prospectively contributed to these same outcomes in Study 2 only. The implications of these results are discussed below.

Positive Emotions and Relationship Outcomes During the Transition to Parenthood

Despite prior research and theory providing strong reason to suggest that positive emotions may foster relational resilience in response to chronically stressful life events, no prior research had examined whether new parents' positive emotions influence their adjustment during this major life transition. Across both studies, we found relatively consistent evidence that positive emotions are not merely an outcome of better adjustment to the transition; instead, they directly predict better social adjustment to it. These results are notable because, to ensure that our methodological approach aligned with the "build" portion of broaden-and-build theory (Fredrickson, 2013), we employed a rigorous longitudinal design, which allowed us to

statistically control for prior levels of each outcome variable in every analysis. Our analyses, therefore, provide a good indicator of the longitudinal association between positive emotions and subsequent increases in each outcome variable across time, irrespective of the concurrent correlation between positive emotions and the outcome variable at each previous time-point.

Our results cohere with recent theorizing in relationship science, which emphasizes that healthy relationship functioning relies not only on the prevention of negative emotions, conflict, and stress, but also on the cultivation of positive emotions and positively valenced-relational moments (e.g., Algoe, 2019). As such, these results provide suggestive evidence for future research to explore how *positive* aspects of the transition to parenthood promote enhanced relational adjustment. Cast another way, although the transition to parenthood is usually stressful, it also provides many opportunities for growth and positive experiences. Indeed, prior research examining how positive emotions may build social resources (e.g., Fredrickson et al., 2008) had not examined this building function during a time as socially stressful or diagnostic as the transition to parenthood. Even when we statistically accounted for new parents' negative affective experiences, their positive emotions contributed to better social adjustment across time.

One notable aspect of our results is that across both studies, positive emotions appeared to be more relationally beneficial for fathers. That is, in Study 1, positive emotions predicted beneficial relationship outcomes *only* for fathers, and in Study 2, although the associations between positive emotions and subsequent relational outcomes were statistically significant for both mothers and fathers for most outcomes, the coefficients for fathers appeared substantially larger than they did for mothers. Why might this be the case? One plausible explanation relates to differing levels of *self-efficacy* among new mothers and fathers. Self-efficacy theory (e.g., 1977) emphasizes the importance of expectations of success in a particular situation or domain.

With respect to parenthood specifically, prior research has confirmed that *parenting self-efficacy* – or confidence in one’s ability to raise a child successfully – is an important predictor of new parental well-being (Biehle & Mickelson, 2011; Gross & Marcussen, 2017; Pinto et al., 2016). Yet, gender differences exist in parenting self-efficacy: presumably because of societally-constructed gender roles, which tend to emphasize that mothers are the primary caregiver (Eagly & Wood, 1999; Katz-Wise et al. 2010), new fathers tend to report lower levels of parenting self-efficacy, which can create challenges for their personal and relational well-being (Biehle & Mickelson, 2011).¹³ We suspect this prior work helps to explain why positive emotions were especially beneficial for fathers: because fathers often feel ill-prepared for parenthood, our results suggest that positive emotions provide the boost that new fathers especially need in order to maintain their relationships, even when they are struggling to decipher how to be a father.

An important and related follow-up question is: why were maternal positive emotions associated with subsequent relational outcomes in Study 2 only? Although we think positive emotions have a stronger influence on paternal relational outcomes during the transition to parenthood for the reasons described above, we also believe that (a) maternal positive emotions *do* contribute to their relational outcomes during the transition to parenthood, but that (b) the size of this effect is smaller, and that methodological differences might explain why the associations were significant in Study 2 but not Study 1 for mothers. For instance, Study 2 included a greater number of new parent couples and a larger number of time lags, both of which contributed to increased power. Study 1 also focused on the early transition period (it ended at 9-months

¹³ We do not mean to suggest that the transition to parenthood is easier for mothers. Extensive research indicates that mothers face greater demands than fathers in terms of caretaking, housework, balancing work and family life, etc. (e.g., Yavorsky et al., 2015). From the perspective of self-efficacy theory, however, new mothers often feel better prepared to succeed in the face of these many demands, because societal gender roles can encourage women to prepare for life as a parent.

postpartum, whereas Study 2 ended 24-months after the birth of the child, all of which could have contributed to the difference in results between studies. One other possible methodological reason why this difference emerged is that we used two different assessments of positive emotions in Studies 1 and 2. Even though both measures of positive emotions are well-validated and reliable, it is possible that the differences in our patterns of findings between Studies 1 and 2 are partly a result of the differences in how we assessed positive emotions.

Although broaden-and-build theory primarily suggests that positive emotions build resources for the individual (Fredrickson, 2013), based on theory in relationship science (Rusbult & Arriaga, 1997; Rusbult & Van Lange, 2003), we also explored the possibility that when actors experienced positive emotions, their partners would report benefits. Contrary to these hypotheses, we only identified one significant partner effect across all of our analyses: mothers were more likely to report providing support to their partner when the father experienced greater positive emotions at the prior wave. Despite this finding, most of the partner effects we examined were not significant. Does this mean that an individual's positive emotions primarily influences their own experience of the relationship during the transition to parenthood, and has little relevance for their partner? We believe the answer to this question is no. Consider the example of fathers: although paternal positive emotions had no direct, prospective influence on the mother's relationship satisfaction or perceptions of support from the father, an extensive body of research suggests that relational outcomes in intimate relationships tend to be interdependent, such that a father's beneficial outcomes tend to be linked to enhanced outcomes for the mother (Rusbult & Arriaga, 1997; Rusbult & Van Lange, 2003). If positive emotions contribute to better relational outcomes for fathers, it may contribute to paternal relationship maintenance (Ogolsky & Bowers, 2013) and commitment (Le & Agnew, 2003), among

numerous other benefits, all of which should have beneficial implications for the mothers. As such, while this research suggests actor positive emotions may not directly contribute to better partner relational outcomes, it is likely that actor positive emotions have an indirect influence on their partner's relational outcomes, via their beneficial influence on actor relational outcomes (e.g., Don, et al., 2020).

Another question we explored was whether positive emotions would have a particularly beneficial influence on relationship outcomes at certain periods during the transition to parenthood. For instance, some prior research suggests that the transition to parenthood tends to be particularly challenging to relationships *early* in the postpartum period (e.g., Doss et al., 2008), and so we tested whether the wave of data collection moderated the prospective association between positive emotions and new parents' subsequent relationship outcomes. Based on Broaden-and-Build Theory (Fredrickson, 2013), we expected positive emotions would prospectively predict enhanced relational adjustment regardless of the wave of data collection. Results from both studies supported this idea: when we examined whether the wave of data collection moderated the association between prior positive emotions and subsequent relational outcomes, results were not statistically significant across all analyses in both studies for both mothers and fathers. This suggests that positive emotions similarly predicted subsequent relational outcomes regardless of whether the lag between waves of data collection occurred early or late in the transition to parenthood.

Implications for Understanding how Positive Emotions Influence Adjusting to Major Life Events

In addition to the transition to parenthood literature, our results also have implications for the literature examining how positive emotions contribute to adjustment to major life events and

stressors. The transition to parenthood is a chronic and long-term stressor that is inherently social. While an extensive literature had previously examined how positive emotions enhance mental and physical health outcomes in response to other types of stressors (e.g., Cohn, et al., 2014; Cheung et al., 2017; Moskowitz et al., 2019; Ong, et al., 2010), no prior work had focused on the *social* building function of positive emotions in the context of a chronic stressor like the transition to parenthood. Our results suggest that, in addition to enhancing mental and physical outcomes in the context of chronic stress, positive emotions also contribute to enhanced relationship perceptions and behaviors during challenging moments for relationships. Although our two studies focused specifically on the transition to parenthood, this work provides suggestive evidence that positive emotions may enhance relational resilience during all types of challenging moments that threaten relationships. For instance, financial strain is a chronic stressor that (a) frequently occurs in the context of intimate relationships, and (b) exerts a significant and detrimental burden on intimate relationships (e.g., Vinokur, Price & Caplan 1996). Extrapolating our results to this other context, our results suggest couples who are able to maintain positive emotions during hard financial times will also tend to maintain better relationships.

Additionally, our results contribute to this literature by suggesting the possibility of *upward relational spirals* during challenging times, such as during the transition to parenthood. Prior research examining the longitudinal influence positive emotions has demonstrated that they tend to reciprocally influence key outcome variables across time, such as coping during stress (Fredrickson & Joiner, 2002), physical well-being (Kok et al., 2013), and enhanced relationships (Algoe, 2012). Prior research has extensively demonstrated that the relationship outcomes examined here also contribute to increased positive emotions (Feeney & Collins, 2015; Proulx et al., 2007). By establishing that positive emotions contribute to enhanced relationship outcomes during a time of

chronic, relational stress, our results suggest that – even during challenging times – positive emotions may contribute to an *upward relational spiral*, whereby healthy relationships and positive emotions mutually influence each other in a cyclical, beneficial fashion.

Strengths and Limitations

A key strength of this research is that it is the first to draw on *two* longitudinal, dyadic studies of new parents undergoing the transition to parenthood. In doing so, we were able to provide evidence for our hypotheses using a robust, multi-method approach, which included self-reports, and a well-established behavioral observational paradigm. The current research, however, has some limitations. First, although Studies 1 and 2 both used well-validated assessments of positive emotions, they used different measures, which may be considered a limitation. Most of the findings across both the studies remained statistically significant, however, even after controlling for the influence of negative mood, which helps to ensure confidence in the reliability of our findings. Relatedly, although these measures are well-validated, that do not capture the full range of distinct positive emotions that new parents may experience, such as joy, awe, inspiration, gratitude, and hope. Future research should, therefore, seek to replicate these findings with measures of positive emotions that better encapsulate the full scope of positive emotions new parents may experience. Second, both samples were relatively homogenous in terms of participants' race, ethnicity, sexual orientation, and socioeconomic status. For instance, both studies included only heterosexual couples. The fact that these samples were homogenous is important to note given that all of these demographic factors could influence either the experience of positive emotions or stress during the transition to parenthood (Brown, et al., 2012; Nelson et al., 2013; Özcan, et al., 2010). Similarly, although we focused on the inherently dyadic nature of the transition to parenthood among couples, many individuals undergo the transition to parenthood as single parents. Single parents' positive

emotions may also influence their building of social resources (e.g., social support from friends and family) during the transition to parenthood, however because our two studies exclusively sampled two-parent dyads, our work is unable to speak to the single parent population. Thus, future research should replicate and extend these findings by drawing upon more diverse samples of new parents.

Conclusion

Although the transition to parenthood tends to be challenging, it can also be joyous and fulfilling. Based on broaden-and-build theory, we suggest that the positive emotions that new parents experience are not merely a distraction or respite from the difficulties of the transition, but are instead an adaptive process that builds consequential social resources during this challenging phase of life. Given the importance of healthy adjustment during this time, future research should attempt to identify ways for new parents to foster positive emotions during one of life's most important transitions: the birth of one's first child.

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