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*Article*

Journal of Social and
Personal Relationships
2020, Vol. 37(8-9) 2366–2385
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DOI: 10.1177/0265407520924124
journals.sagepub.com/home/spr
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# Understanding in transition: The influence of becoming parents on empathic accuracy

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## Abstract

Empathic accuracy (EA), the ability to understand a close other's thoughts and feelings, is linked to relationship satisfaction. Yet, it is unclear whether stress interferes with relationship partners' ability to be empathically accurate. The present study investigates whether a major life stressor, the transition to parenthood (TTP), interferes with EA between partners. In a daily diary study of 78 couples expecting their first child, couples reported on their own and their partners' daily mood for 3 weeks during three separate time periods across the TTP: pregnancy, infancy, and toddlerhood. Both mothers and their partners demonstrated EA across the TTP. However, there was evidence that the transition interfered with EA: Partners' ability to track mothers' negative mood dropped significantly during infancy and remained low in toddlerhood, whereas mothers' ability to track their partners' positive mood dropped significantly in infancy and recovered in toddlerhood. This suggests that one way in which a major life stressor, in this case, the TTP, may interfere with relationship functioning is by decreasing couples' understanding of each other's mood states.

## Keywords

Close relationships, empathic accuracy, mood states, stress, transition to parenthood

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The transition to parenthood (TTP) is generally associated with a sense of meaning and satisfaction, but is often one of the most challenging periods faced by couples (Huston & Holmes, 2004) who must cope with dramatic role changes, fatigue, excessive work, financial burdens, and other sources of stress (Belsky & Pensky, 1988). This significant stressor typically occurs within the first 5 years of marriage, a period that (not coincidentally) has also been shown to hold the highest risk for divorce (Bramlett & Mosher, 2001). The demands of a new baby have been shown to influence relationship functioning by disrupting communication (Demo & Cox, 2000; Pacey, 2004) and increasing conflict as well as leading to decreases in companionate activities, relationship-focused leisure time (MacDermid et al., 1990), and social support (Simpson, Rholes, et al., 2003).

Given the numerous changes and challenges during this transition, it may be particularly important for partners to track each other's emotional states in order to maintain emotional intimacy (Pistrang et al., 2001; Umberson et al., 2015). The ability to correctly infer the thoughts and feelings of other people, empathic accuracy (EA), has repeatedly been linked to positive relationship functioning (see meta-analysis; Sened et al., 2017). Being empathetic and understanding one's partner could not only serve to maintain intimacy but also help couples coordinate efforts to adapt to their new roles as parents (Kaźmierczak et al., 2015; Rosen et al., 2017) and the subsequent constraints on their time, finances, and individuality. However, during this stressful transition, individuals may be less attuned and aware of their partner's thoughts and feelings (i.e., less empathically accurate). In the current study, we examine whether daily EA, a mechanism that may help maintain healthy relationship functioning, changes within couples across a stressful life event, the TTP.

## *Empathic accuracy*

In general, people are motivated to understand those around them in order to successfully navigate their social world (Ickes, 1993, 2001; Simpson, Orina, & Ickes, 2003). The phenomenon of interpersonal accuracy is broadly defined as the degree to which an individual correctly understands the attributes of other people. EA entails more than just making correct inferences about an individual's disposition and long-term motives (Ickes, 1993, 2001; Simpson et al., 2003). It encompasses making accurate assumptions about people's changing states such as short-term goals and current feelings/mood (Ickes, 1993), which is why it is also known as everyday mind reading (Davis & Kraus, 1997).

## *EA in close relationships*

The study of EA began with an emphasis on how we understand others generally (including acquaintances or even strangers; Stinson & Ickes, 1992), but much of the research on EA in recent years has focused on this process as it unfolds within romantic relationships. The EA model argues that people in relationships are particularly motivated to better understand close others in order to progress and maintain their relationships (Ickes et al., 2005), as well as facilitate individual and dyadic goal pursuit. Mutual understanding should, through repeated reinforcement, become habitual as it can

reduce misunderstandings and keep major conflicts at bay. This, in turn, leads to the better understanding of a partner and through this reinforcement cycle, facilitates relationship satisfaction and closeness. Given these benefits, the model predicts that in healthy relationships, individuals should be motivated to be empathically accurate.

Research on EA in close relationships has primarily focused on partners' perception of relationship constructs such as commitment, satisfaction, perceived partner responsiveness, and closeness (Cohen et al., 2012; Cramer & Jowett, 2010; Flury & Ickes, 2006; Gagne & Lydon, 2004; Ickes et al., 2005; Kilpatrick et al., 2002; Papp et al., 2010; Rafaeli et al., 2017; Sened et al., 2017; Thomas & Fletcher, 2003). In general, couples tend to be accurate when they rate their partners on these relationship constructs (Gagne & Lydon, 2004), and greater EA between partners can increase feelings of closeness and other positive relationship constructs within relationships (Ickes et al., 2005; Rafaeli et al., 2017; Sened et al., 2017). For instance, postpartum mothers and fathers who reported having greater awareness of their partners' life experienced more stability in marital satisfaction (Shapiro et al., 2000), and individuals who were understood by their partners were more likely to engage in accommodation (i.e., help their partner and compromise) and reported having healthier relationships (Kilpatrick et al., 2002).

Although EA research in couples has focused on relational constructs, accurately reading a partner's mood has also been demonstrated to influence relationship behaviors. For instance, across two studies, one observational and one using a daily diary design, Howland (2016) found that partners who accurately reported their partner's mood were more likely to provide effective support to their partner. This tendency for empathically accurate partners to provide effective support held when accounting for general relationship quality, suggesting that EA and relationship quality are separable constructs.

While couples develop EA quickly on average (Thomas & Fletcher, 2003), it is clear that there is significant variability in EA across and within couples (Howland, 2016). One potential explanation for this variation was offered by Flury and Ickes (2006) who suggested that stressors may impair EA. And though the disruptive role of stressors to many aspects of relationship functioning has been widely studied, stressors' association with EA has not been directly investigated.

## *Stress in close relationships*

Stress potentially disrupts couples' functioning through two pathways (Karney & Bradbury, 1995; Karney & Neff, 2013; Randall & Bodenmann, 2009). First, stress impacts how couples spend their time together. Challenges outside of the relationship take time and effort to resolve and can influence how frequently couples focus on relationship maintenance behaviors such as engaging in physical intimacy. Thus, the time it takes to address a stressful issue takes time away from activities that might enhance the relationship, such as engaging in fun activities together or sharing thoughts and feelings (Buck & Neff, 2012; Hammond, 2000; McCubbin & Patterson, 1983). Second, stress gives rise to maladaptive relationship processing strategies, such that when an individual deals with higher levels of stress, they may react to events negatively as well as feel more negative within the relationship.

In the literature addressing stress within close relationships, the major life events studied are often direct dyadic stressors (e.g., moving homes, having a child, losing a family member) that influence both partners at the same time and require major behavioral change within a short amount of time (for reviews, see Randal & Bodenmann, 2009; Revenson et al., 2005; Thoits, 1995). Not surprisingly, such life events can directly affect relationship functioning, and partners' reports of relationship satisfaction tend to decline across the TTP (MacDermid et al., 1990). It seems likely that, similar to other relationship processes, EA may decline, on average, during major life transitions.

It is clear that EA is an important mechanism for healthy relationship functioning, as it can increase feelings of closeness as well as promote other positive relationship mechanisms such as accommodation, support, and satisfaction. However, the current literature has not yet examined how EA fluctuates during times of stress or changes across a transitional time period. Therefore, it is unclear if a major life event interferes with couples' ability to be empathically accurate. The current study will extend the EA literature by investigating whether EA within intimate relationships changes following a major stressor: the TTP.

## The current study

The TTP provides a useful context to study a joint stressor for two primary reasons. The majority of life stressors (e.g., losing a loved one, loss of job) are difficult, if not impossible, to anticipate. Researchers are often unable to assess baseline levels of individual and dyadic functioning before the event occurs (Miller, 2010). However, the birth of a new child is anticipated for months prior to the child's arrival. In addition, although partners may perceive and experience different stressors during the TTP, both undergo profound role and family structure changes, and both face the added demands of parenting a new baby. Therefore, examining the TTP will further our understanding of how an important relationship process, EA, is influenced by a life stressor.

The current study examines EA using a sample of 78 couples who completed 3 weeks of daily diaries at three separate time points: prior to the birth of their first child, during their child's infancy, and during their child's toddlerhood. First, we will attempt to replicate prior research showing that partners are able to track each other's mood across days. Second, we will investigate whether EA changes across this major life transition. Given that relationship skills are often depleted during times of stress, we hypothesize that EA will decline across the TTP, that is, from pregnancy to infancy. We do not have a prediction as to whether this decline in accuracy will continue from infancy into toddlerhood, so we consider the examination of change in EA from infancy to toddlerhood to be exploratory. It is possible that EA will follow a pattern similar to that found with relationship satisfaction, such that there will be a small but significant linear decline from pregnancy, through infancy, to the toddlerhood phase (Doss et al., 2009; Lawrence et al., 2008; Mitnick et al., 2009). However, we will allow for the possibility that EA does not change in a linear fashion across the transition by allowing the change between pregnancy and infancy and between infancy and toddlerhood to differ from one another.

## Method

### Participants

Seventy-eight couples[1] in their third trimester of pregnancy participated, all of whom were expecting their first child, were recruited through local newspapers, businesses, and websites targeting the immediate study area, an urban area in the Southwestern United States.[2] Participants were between 19 and 42 years old; the average age of mothers was 28.7 (standard deviation [*SD*] = 4.4) years old, and the average age of their partners was 30.2 (*SD* = 5.2). A majority of couples were married (87%) and had a median annual household income range of US$60,000–US$99,999. The sample identified as White (mothers, 79%; partners, 83%), Latina/o (mothers, 25%; partners, 17%), Asian (mothers, 8%; partners, 5%), and African-American (mothers, 1%; partners, 4%);[3] couples were heterosexual with the exception of one same gender (female) couple; pregnant partners are referred to as "mothers," while the nonpregnant partners are referred to as "np-partners" throughout the article.[4]

### Procedure

Participants were screened to ensure they met the following requirements: (a) they were over the age of 18 years old, (b) were expecting their first child within 3 months, and (c) did not have any children from a previous relationship. During the third trimester of pregnancy, couples attended a lab session where they completed a background survey and were given a general overview of the study. The survey assessed demographics and personality measures.[5] Following the lab session, couples were asked to complete a daily diary task for 21 consecutive days. This procedure (the completion of a background survey, followed by 21 daily diaries) was repeated when the couples' babies were approximately 10 weeks and 14 months old.

Participants completed the daily diaries on lab provided iPod touches (Apple Corp., Cupertino, CA) using the iForm data collection software (Zerion Corp., Herndon, VA) This device allowed couples to access the daily diary from 5:00 p.m. to 1:00 a.m. and only one diary could be completed in this time frame. When couples returned the devices, they were paid US$100 (US$50 per partner) for Phases 1 and 2 and US$150 (US$75 per partner) for Phase 3.

### Daily diary compliance

In the first phase of the diary, 90% (72 mothers, 68 np-partners) of participants completed at least 14 days of the diaries, and 98% (77 mothers, 76 np-partners) completed at least 7 days of the daily diaries. Pregnant women completed a total of 1,553 days of diaries and np-partners completed 1,445 days of diaries. Seventy-six couples (97%) participated in the second phase of the diary study. Diary completion rates are as follows: 81% (61 mothers, 62 np-partners) of participants completed at least 14 days of the diaries and 93% (72 mothers, 70 np-partners) of participants completed at least 7 days of the daily diaries. Overall, mothers completed a total of 1,376 days of diaries, and np-partners completed 1,295 days of diaries. Phase 3 was a late addition to the study and we were

only able to recruit 52 of the 78 couples, as well as four mothers without their np-partners (69%), to complete diaries in this phase. Of those who participated in Phase 3, diary compliance was as follows: 93% (50 mothers, 48 np-partners) completed at least 14 days of diaries, and 97% (50 mothers, 51 np-partners) completed at least 7 days of diaries. Across all three phases, mothers completed 4,020 days of diaries, and np-partners completed 3,774 days of diaries.

### Variables

*Partner daily mood.* To measure participants' perception of their partner's daily mood, participants were asked each evening during all three phases to answer the single-item question "Please rate your partner's overall mood today" on a 5-point Likert-type scale ranging from 0 (*very poor*) to 4 (*very good*).

*Daily mood.* Participants were asked to rate, on a 5-point Likert-type scale (0 = *not all* to 4 = *extremely*), how they felt each evening using a modified version of the Profile of Mood States developed for use in daily diaries (Cranford et al., 2006; Lorr et al., 1982). Composite positive and negative mood scores were computed to assess daily mood. Negative mood consisted of 9 items: anxious, on edge, uneasy, sad, hopeless, discouraged, angry, resentful, and annoyed; positive mood consisted of 3 items: cheerful, lively, and fulfilled. Negative mood scales had adequate within- and between-person reliability between .87 and .95, respectively. Additionally, positive mood scales had adequate within- and between-person reliability between .74 and .84, respectively, for mothers and partners, and were calculated using a method described in Cranford et al. (2006). Daily mood reports were used in two ways in the current study: to determine EA and to account for similarity bias.

*Phase.* Each phase in the current study represents a different period over the course of the TTP and, therefore, represents different contexts for the couples. Phase 1 took place during the third trimester of pregnancy (i.e., the pregnancy phase), Phase 2 took place when the infant was approximately 10 weeks old (i.e., the infancy phase), and finally, Phase 3 took place shortly after the child turned 1 year old (i.e., the toddler phase). Phase will be coded as −1, 0, and 1 in all analyses such that the referent phase is infancy.

*Day in study.* In order to adjust for the temporal effects of being in a longitudinal daily diary, we included day in the study in all analyses. For each phase, the first day of the diary period was coded as 0. If one individual started the diaries before the other, the day that the first partner started was coded 0 for both partners (i.e., for some individuals, their first day of diaries was not day 0 but day 1 or 2).

## Analytic approach

Because our data have a nested structure, with perceivers' and targets' multiple ratings of mood across all time points (Level 1) nested within person within dyad (Level 2), we conducted a series of multilevel models accounting for that dependency. The multilevel

models were dual intercept models (sometimes called "no-intercept" models), which allow the pregnant partner (mothers) and nonpregnant partner (np-partners) to be estimated simultaneously and separately. The MIXED procedure in SAS 9.4 (SAS Institute, 2017) was used to model both the within-individual level and the between-individual level. The covariance matrix of the residuals was structured such that same-day correlations allowed for residuals within each couple, and cross-day correlations with a first-order autoregressive pattern that allowed for residuals within each person, accounting for dependency within couples and across days. As recommended by Kenny et al. (2006), degrees of freedom in the analyses were determined using Satterthwaite approximations. Contrast analyses investigated whether the mothers' and partners' coefficients significantly differed from one another, and only those coefficients that showed significant differences are reported in the results section. As described above, not all participants completed all three phases of the study or all the days in any given phase. A strength of a multilevel modeling approach is that participants need not have completed the entire study in order to be included in analyses.

In the current study, we operationalized EA as the individuals' ability to track *changes* in their partners' moods above and beyond their own felt mood across the days of the diary study. As described above, target self-reported mood and perceiver reported mood were assessed on different scales. Negative and positive self-reported mood were measured separately on a scale that ranged from a lack of that particular mood to a high level of it. Perceivers rated targets' moods on a single item that ranged from high negativity to high positivity. Given these different scales, we operationalized EA as tracking changes in targets' mood by constructing our models such that within-person centered perceivers' ratings of the targets' mood[6] served as the outcome and the within-person centered targets' self-reported positive and negative mood served as predictors. Thus, the coefficient associated with target self-reported positive mood indicates EA for positive mood: Higher numbers indicate that when a target reports higher positive mood than they typically do, the partner also rates them as being more positive than they normally rate them as being. Given that the perceiver rating of target mood ranged from high negative to high positive, we included target-reported positive and negative mood in all models.

Additionally, we included the perceivers' self-reported mood to adjust for *similarity* between individuals' own mood and their perception of their partners' mood, an adjustment variable suggested by previous research (Howland & Rafaeli, 2010). Therefore, we examine EA while adjusting for similarity effects.

The following is the Level 1 equation used to investigate Hypothesis 1:

$$\begin{aligned} J_{hik} = (M_{hik}) * (&b_{0mi} + b_{1mi}\text{Tposmood}_{hik} + b_{2mi}\text{Tnegmood}_{hik} \\ &+ b_{3mi}\text{Pposmood}_{hik} b_{4mi}\text{Pnegmood}_{hik} + b_{5mi}\text{Day}_{hik} + e_{hik}) \\ &+ (\text{NP}_{hik}) * (b_{0npi} + b_{1npi}\text{Tposmood}_{hik} + b_{2npi}\text{Tnegmood}_{hik} \\ &+ b_{3npi}\text{Pposmood}_{hik} b_{4npi}\text{Pnegmood}_{hik} + b_{5npi}\text{Day}_{hik} + e_{hik}) \end{aligned}$$

In this equation, the dependent variable ($J_{hik}$) is an individual's ($h$'s) judgment (perception) of their partners mood (when $h = 1$, the outcome is for mothers and when $h = 2$, the outcome is for nonpregnant partners), in couple $i$, on day $k$. The equation

**Table 1.** Means and *SD*s of daily variables for mothers and partners in all three phases.

| | Pregnancy | | Infancy | | Toddlerhood | |
|---|---|---|---|---|---|---|
| | Mothers | NP-partners | Mothers | NP-partners | Mothers | NP-partners |
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) |
| Perception of partner's mood [a] | 2.96* (*0.47*) | 2.72* (*0.49*) | 2.75 (*0.59*) | 2.68 (*0.51*) | 2.86 (*0.54*) | 2.75 (*0.55*) |
| Daily negative mood | 0.41 (*0.34*) | 0.46 (*0.39*) | 0.53 (*0.41*) | 0.58 (*0.55*) | 0.48 (*0.36*) | 0.45 (*0.46*) |
| Daily positive mood | 2.26 (*0.60*) | 2.41 (*0.58*) | 2.24 (*0.62*) | 2.21 (*0.69*) | 2.31 (*0.58*) | 2.26 (*0.70*) |

*Note.* *SD* = standard deviation. The standard deviations are italicized.
[a]Higher values indicate a better mood. This variable was reverse-coded (higher values indicate worse mood) for negative mood analyses.
*$p < .05$ indicates that the mother and partner effects significantly differ.

includes two coefficients indicating EA (i.e., $b_{1i}$ and $b_{2i}$): the target's within-person centered report of positive and negative mood (i.e., $\text{Tposmood}_{hik}$ and $\text{Tnegmood}_{hik}$). The equation also adjusted for similarity using perceiver's own within-person centered positive and negative mood (i.e., $\text{Pposmood}_{hik}$ and $\text{Pnegmood}_{hik}$), day in study ($\text{Day}_{hik}$); and an error term. The intercept $b_{0i,}$ EA ($b_{1i}$ and $b_{2i}$), and similarity ($b_{3i}$ and $b_{4i}$) were allowed to be random, meaning that these effects could vary from individual to individual. When the outcome is for the mother, $M_{hik} = 1$ and $\text{NP}_{hik} = 0$, then the first part of the model is selected and all of the $b$ coefficients have the subscript $m$. When the outcome is for the np-partner, $M_{hik} = 0$ and $P_{hik} = 1$, the second part of the model is selected and all of the $b$ coefficients have the subscript $p$.

The between-level equations for both mothers' and np-partners' intercepts include the between-person centered averages of EA and similarity. Including the between-person centered averages allows us to fully disentangle within-person level effects of EA and similarity from between-person effects. Significant positive between-person effects of EA suggest that individuals are aware if their partners generally report more negative or positive mood than other partners in the sample (i.e., they are able to accurately locate their partners' average level of negative or positive mood); significant positive between-person effects of similarity suggest that individuals who are generally high in negative or positive mood report their partner as being higher in that mood too.[7]

## Results

### *Descriptive statistics*

The means and *SD*s of all variables for both mothers and partners in all three phases are presented in Table 1. To investigate whether there were mean differences between couple members and phases, we ran a series of multilevel models similar to those

**Table 2.** Basic model: EA for negative and positive mood.

| | Overall EA | | | | | |
|---|---|---|---|---|---|---|
| | Mothers | | | NP-partners | | |
| | *b* | *T* | *p* | *b* | *t* | *p* |
| Intercept | 1.17 [a] | 29.60 | <.001 | 1.33 [a] | 31.54 | <.001 |
| Neg daily EA | 0.20 | 4.40 | <.001 | 0.30 | 7.19 | <.001 |
| Pos daily EA | 0.24 | 8.09 | <.001 | 0.22 | 8.72 | <.001 |
| Neg avrg EA | 0.11 | 1.02 | .01 | 0.23 | 1.94 | .06 |
| Pos avrg EA | 0.09 | 1.33 | .19 | 0.13 | 1.59 | .12 |
| Neg daily similarity | 0.22 | 5.12 | <.001 | 0.17 | 4.25 | <.001 |
| Pos daily similarity | 0.26 | 10.84 | <.001 | 0.30 | 9.65 | <.001 |
| Neg avrg similarity | 0.43 | 3.86 | <.001 | 0.18 | 1.60 | .11 |
| Pos avrg similarity | 0.44 | 5.84 | <.001 | 0.32 | 4.52 | <.0001 |
| Day in study | −0.01 | −2.57 | .01 | −0.01 | −2.45 | .01 |

*Note.* EA = empathic accuracy; neg = negative; pos = positive; avrg = average. *Df* is based on Satterthwaite estimation and ranged from 49.90 to 1862.00.
[a]Indicates that the mother and partner effects differ at $p < .05$.

described above. Both mothers and np-partners showed a quadratic trend across phases for negative mood (mothers: $b = -.08$, $p < .001$; np-partners: $b = -.06$, $p = .006$) such that negative mood increased from pregnancy to infancy and then decreased in toddlerhood. NP-partners showed a quadratic pattern across phases for positive mood (mothers: $b = .03$, $p = .33$; np-partners: $b = .12$, $p < .001$) such that their positive mood decreased from pregnancy to infancy and recovered a bit in toddlerhood. Mothers showed a quadratic trend in their ratings of their np-partners mood (mothers: $b = -.10$, $p = .003$; np-partners: $b = -.04$, $p = .30$) such that they believed the np-partners mood to have worsened from pregnancy to infancy and improved from infancy to toddlerhood. In general, mothers and np-partners reported similar levels of negative and positive mood and rated each other similarly. However, mothers and np-partners differed on their ratings of partners' mood during pregnancy. Mothers reported that the np-partners' mood was more positive than np-partners reported the mothers' mood to be.

## *Overall EA*

As predicted, both mothers and their np-partners were empathically accurate such that they were able to accurately track each other's negative and positive mood (see Table 2). On a day that an individual (target) reported more negative mood than their average negative mood, their partner (the perceiver) also tended to rate them as experiencing more negative mood. This was also true for positive mood: On a day that an individual reported more positive mood, their partner also tended to rate them as being more positive. The between-person for negative mood or average level of negative EA was significant only for mothers, suggesting that mothers were aware of whether their partner was generally higher or lower than the average np-partner. The effect of perceivers' own

mood (i.e., similarity) was also significant for both mothers and np-partners, such that perceivers' own moods influenced how they rated the targets' moods. Perceivers rated the targets' mood as more negative on days when they, themselves, were in a worse mood and more positive on days when they, themselves, were in a better mood. The between-person effects or average levels of similarity were significant for mothers' negative and positive mood and np-partners' positive mood. This suggests that mothers who are generally positive or negative as compared to the sample as a whole will consistently rate their partner as being generally positive or negative. This was true only for positive mood for np-partners.

## *The moderating role of a life stressor*

To test the moderating role of a global stressor, the TTP, the main effects of phase (linear change) and phase-squared (quadratic change) were entered into the models described above and interacted with both daily negative and positive EA and similarity. We predicted that daily EA would shift across the transition, such that accuracy would decrease from pregnancy to infancy, but as discussed, we considered the question of the trajectory of EA from infancy to toddlerhood to be exploratory (including the quadratic term allows for the change pattern to vary between the phases).

As seen in Table 3, daily EA remains significant for both negative and positive mood across the TTP for mothers and np-partners; however, there is also evidence that EA is affected by this transition. The significant daily EA quadratic effect for positive mood indicates that mothers' daily accuracy regarding np-partners' positive mood dipped significantly during the infancy time period and recovered by toddlerhood. Mothers' daily EA for negative mood did not shift significantly over the transition. NP-partners' tracking of mothers' negative mood decreased linearly across the transition as indicated by the linear effect of negative daily EA (see Table 3). However, np-partners' daily EA for positive mood did not significantly shift over the transition. To help illustrate the changes in daily EA across the TTP, the estimated coefficients for daily EA for both negative and positive moods in all three phases of the study are shown in mothers in Figure 1 and np-partners in Figure 2.

It is important to note that although only np-partners' showed a linear effect for negative mood and only mothers showed a quadratic effect for positive mood, we did not find evidence that mothers and np-partners differed significantly from each other on these effects. This is illustrated by the fact that the 95% confidence interval (CI) for mothers' linear effect for negative mood ($b = -.05$, $SE = .04$; 95% CI: $-.13$ to .03) contained both the value of 0 and the value of the np-partners' linear effect ($b = -.09$, $SE = .04$; 95% CI: $-.17$ to $-.01$). Finally, daily similarity was significant across both negative and positive mood models and did not appear to change across the TTP.

Given that perception of targets' mood was measured using a bipolar scale and self-reported negative and positive mood were measured separately, there are multiple conceptualizations of how one should analyze the data. We also tested EA by examining negative and positive mood in separate models and a collapsed model (i.e., adding negative and positive mood into one item by reverse coding positive mood). Results were consistent for the separate models in that mothers again showed a significant quadratic

**Table 3.** EA for negative and positive mood across the TTP.

| | EA across the TTP | | | | | |
|---|---|---|---|---|---|---|
| | Mothers | | | NP-partners | | |
| | *B* | *t* | *p* | *b* | *t* | *p* |
| Intercept | 1.21 | 27.41 | <.001 | 1.30 | 27.78 | <.001 |
| Neg daily EA | 0.22 | 3.61 | <.001 | 0.27 | 4.41 | <.001 |
| Pos daily EA | 0.16 | 3.72 | <.001 | 0.17 | 4.39 | <.001 |
| Neg avrg EA | 0.11 | 1.07 | .29 | 0.24 | 2.05 | .04 |
| Pos avrg EA | 0.09 | 1.34 | .19 | 0.13 | 1.57 | .12 |
| Neg daily similarity | 0.20 | 3.35 | <.001 | 0.24 | 4.07 | <.001 |
| Pos daily similarity | 0.30 | 8.11 | <.001 | 0.27 | 6.09 | <.001 |
| Neg avrg similarity | 0.42 | 3.77 | <.001 | 0.16 | 1.47 | .15 |
| Pos avrg similarity | 0.44 | 5.92 | <.001 | 0.32 | 4.63 | <.001 |
| Day in study | −0.01 | −2.56 | .01 | 0.00 | −2.29 | .02 |
| Linear effects of phase | | | | | | |
| Main effect | 0.02 | 1.16 | .25 | −0.05 | −2.36 | .02 |
| Neg daily EA | −0.05 | −1.32 | .19 | −0.09 | −2.02 | .04 |
| Pos daily EA | 0.01 | 0.43 | .67 | 0.02 | 0.65 | .52 |
| Neg daily similarity | 0.03 | 0.61 | .54 | 0.05 | 1.08 | .28 |
| Pos daily similarity | 0.02 | 0.91 | .36 | 0.01 | 0.43 | .67 |
| Quadratic effects of phase | | | | | | |
| Main effect of phase | −0.05 | −1.54 | .12 | 0.03 | 1.01 | .31 |
| Neg Daily EA | −0.05 | −0.74 | .46 | 0.06 | 0.91 | .36 |
| Pos Daily EA | 0.13 | 2.77 | .01 | 0.05 | 1.12 | .26 |
| Neg Daily Similarity | 0.03 | 0.61 | .54 | −0.11 | −1.52 | .13 |
| Pos Daily Similarity | 0.07 | 1.65 | .10 | 0.05 | 0.95 | .34 |

*Note.* EA = empathic accuracy; neg = negative; pos = positive; avrg = average. *Df* is based on Satterthwaite estimation and ranged from 71.20 to 6108.00.

only for daily EA positive mood (negative mood linear: $b = -.05$, $p = .24$; negative mood quadratic: $b = .08$, $p = .23$; positive mood linear: $b = .01$, $p = .67$; positive mood quadratic: $b = -.10$, $p = .01$), while np-partners showed a significant linear and quadratic effect for daily EA negative mood (negative mood linear: $b = -.15$, $p < .001$; negative mood quadratic: $b = .16$, $p = .01$; positive mood linear: $b = -.04$, $p = .15$; positive mood quadratic: $b = .06$, $p = .17$). The collapsed mood also had similar findings, such that mothers still had a significant quadratic and np-partners had a significant linear trend (mothers linear: $b = -.03$, $p = .42$; mothers quadratic: $b = .14$, $p = .01$; np-partners linear: $b = -.08$, $p = .02$; partners quadratic: $b = .09$, $p = .11$).[8]

## Discussion

EA research suggests that understanding your partner may be important for relationship functioning (Ickes et al., 2005). In the current study, we sought to replicate previous work suggesting that relationship partners tend to track each other's daily mood with some EA (Howland, 2016; Howland & Rafaeli, 2010). We also sought to examine

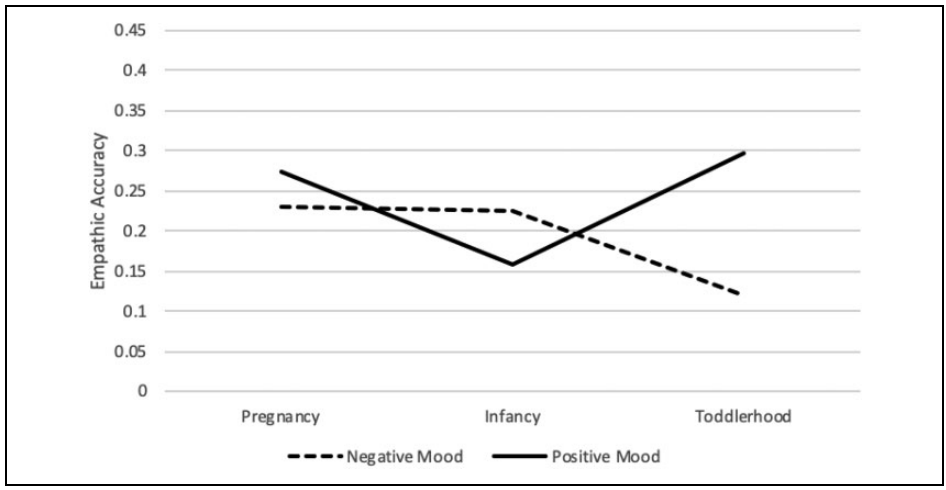


**Figure 1.** Mothers' EA for negative and positive mood across the TTP. EA = empathic accuracy; TTP = transition to parenthood.

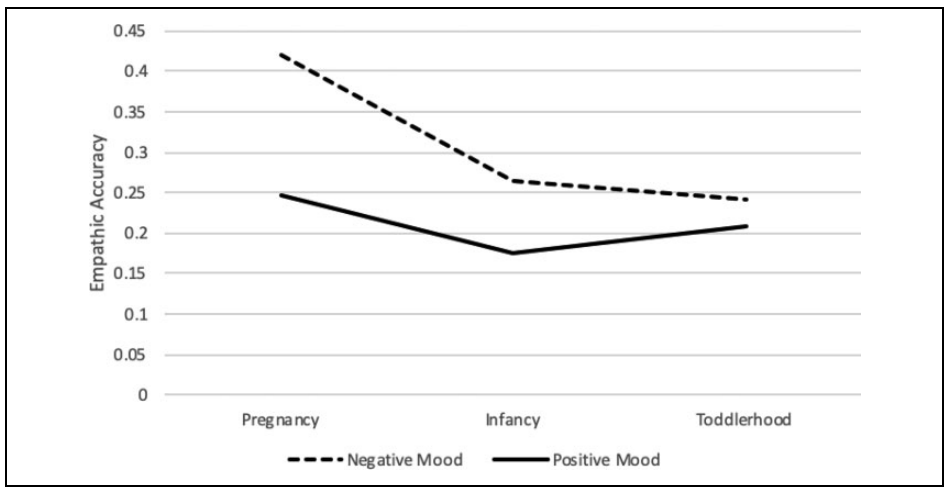


**Figure 2.** NP-partners' EA for negative and positive mood across the TTP. EA = empathic accuracy; TTP = transition to parenthood.

whether an individual's ability to be empathically accurate is altered by a major life stressor, the TTP.

The overall pattern of results supports the idea that the global stressor of the TTP influences couples' ability to be empathically accurate about their partners' daily mood. We found evidence that individuals are able to track their partner's daily negative and positive mood changes and are able to retain EA across the TTP. Additionally, we also found indication for changes in EA across the TTP. Mothers' accuracy regarding their

np-partners' positive mood significantly declined in infancy and recovered in toddlerhood, while np-partner's accuracy regarding mothers' negative mood significantly declined linearly across the transition. Contrast analyses did not suggest that the mothers' and their partners' patterns differed from one another, such that it is unclear whether mothers and np-parents actually differ in their tracking of negative and positive mood. Although we find evidence that the transition is changing EA, we want to emphasize that these findings should be considered preliminary. EA is present across this large transition and there is evidence to suggest that EA may change across this transition. However, given that the change in EA varied by mood and couple member, we want to emphasize caution in interpreting the results.

Although partners were able to accurately track each other's daily moods, they also appeared to use their own mood to determine how they think their partner is feeling on a given day. Specifically, on days when an individual experienced more of a certain type of mood, they judged that their partner also experienced more of that mood. Use of similarity to understand one's partner's mood did not shift across the TTP—couple members were equally likely to use this heuristic across the transition. Furthermore, if an individual generally reported higher or lower levels of positive mood and (for mothers) of negative mood, they also reported that their np-partner was generally higher or lower in that mood (e.g., the between-person (average) assumed similarity).

These findings have important implications for understanding the global stressor of the TTP in that they suggest that something is occurring during this transition that is impacting couples' ability to understand their partner. There are several possible reasons for this decline. We also considered whether stressors specific to the TTP, specifically daily sleep quality and infant/toddler daily temperament or daily perceptions of stress, would decrease daily EA. However, again, contrary to our hypotheses, these specific stressors did not appear to consistently influence EA.[9] Additionally, global satisfaction decreased for both mothers and np-partners from pregnancy to infancy and remained low in toddlerhood (see Ryon & Gleason, 2018), which is in line with np-partners EA but not mothers. Given the importance of EA for satisfaction (Sened et al., 2017), these shifts may be important for couples' well-being and life satisfaction, but the current findings do not speak directly to this idea.

As the TTP is associated with significant increases in time demands (Buddelmeyer et al., 2015), perhaps it is the loss of time spent with one's partner that leads to declines in EA. It is highly unlikely that couples are able to maintain the same amount of time spent together after the baby is born. For instance, tasks that were once executed as a couple may be divided once the baby is born, and couples may be less likely to have intentional time spent together focusing on their relationship. In turn, individuals may be less able to accurately assess their partners' moods when they interact with them less throughout the day.

Alternatively, declines in EA may be due to individuals experiencing changes to their self-concept and experiencing self-expansion during this transition (Aron & Aron, 1997). The birth of a first child can include disengagement from previous social roles and the creation of new roles and relationships (Antonucci & Mikus, 1988). As roles shift to include a new identity as a parent, new parents may be inwardly focused on themselves and not their partner. Although both mothers and np-partners are experiencing a new

identity change, they may not be able to understand or recognize this identity change in their partner. This may be because they themselves are not yet sure about their identity as a new parent; therefore, sending less clear signals to their partner, which in turn, is more difficult to interpret. In other words, experiencing self-expansion during a major transition may both pull one's focus to one's self and make one more likely to send mixed or new signals of psychological states to one's partner.

## Limitations

There are several limitations to the current study. The sample is limited in terms of cultural and socioeconomic status and may not generalize to couples with different backgrounds. Additionally, our sample was predominately heterosexual with only one same-sex couple. Future studies should include a more diverse selection of couples including couples adopting or using a surrogate to see whether these results are similar for all couples. Given the longitudinal nature of the study, we did have couples drop out of the study—particularly during the final phase of toddlerhood at 14 months. It is unclear how the decrease of couples in the third phase may impact these findings; however, couples who dropped out of the study largely did not differ in global relationship satisfaction, length of relationship, marital status, or income from those who remained in the study (see Ryon & Gleason, 2018).

Though we were able to investigate EA across the TTP, we do not have a baseline for couple's EA prior to pregnancy. It is possible that EA was higher or lower prior to pregnancy than what we found in the pregnancy phase. In contrast, it is also possible that partners' EA scores in pregnancy reflect uniquely high empathy levels, such that np-partners in particular may be more accurate in tracking mothers' mood in pregnancy as they are trying to pay attention to how mothers are doing so close to the birth of their first baby. Thus, post-partum EA may be returning to baseline levels that were not captured in this particular study.

It is important to note that our measurement of EA was based on scales measuring mood in different ways. There is no way to determine the equivalency of participants' rating of their own negative and positive mood compared to the single item provided for them to report their partners' mood. Own mood was rated using a variety of items with a scale ranging from 0 (*not at all*) to 4 (*extremely*) versus the single-item rating of partner mood, which ranged from a high level of negative mood to a high level of positive mood. Therefore, although we were able to examine EA by assessing participants' awareness of directional shifts in their partners' mood, we were not able to determine whether participants agree on how much negative or positive mood their partner is experiencing. Subsequent studies should measure own and partner mood using identical items and scales to address this limitation.

## Future directions

Understanding a partner's mood and how they are currently feeling may increase the success of offered support, the positivity of communication, and relationship satisfaction. Previous empirical research has largely focused on partner perception of

relationship constructs such as commitment, satisfaction, and closeness. However, accuracy regarding partner mood may be particularly influential in peoples' ability to give skillful support, navigate through conflict, and maneuver through other positive relationship mechanisms. Future studies should consider testing the connections between individual's ability to be empathically accurate to relationship mechanisms such as relationship satisfaction, specifically, in the context of major life transitions. In general, more research is needed to understand what is driving the decrease in EA from pregnancy to infancy.

Future research should explore what types of couples are being impacted by this and which couples or individuals are resilient to the decline of EA. For instance, one individual difference that may influence maintenance of EA is having an internal locus of control: a belief that events and experiences are due to one's own behavior (Ajzen, 2002). Having an internal locus of control may serve as a buffer during this transition, such that individuals who have a high internal locus of control may feel more in control of the nuances of having a new baby and may be more likely to maintain their ability to understand their partner across the transition.

Previous work has found that under certain circumstances, a lack of accuracy regarding a partner can be beneficial when being accurate is also likely to be threatening (i.e., knowing that one's partner is having doubts about the relationship; Ickes & Simpson, 2001). It is possible that because the TTP is a positive but anticipated stressor simultaneously, individuals may be motivated to ignore the negative states of their partners' mood because it is not always possible to attend to one's partner during this adjustment period. However, this revised EA model notes that motivated inaccuracy is more prevalent in highly threatening situations (Ickes & Simpson, 2001), and it is unclear whether the TTP would qualify as a highly threatening situation.

Although we see the decline of EA during the TTP, it is still unclear if the decrease of EA would translate to other life events and global stressors such as the losing a loved one, loss of job, or caregiving responsibility for aging parents. It is likely that other life transitions would also influence EA and possibly decrease it more drastically, given that the transition of having your first child is usually a positive and anticipated stressor, while other transitions may not be.

## Conclusions

The current study suggests that EA, a process that has demonstrated the importance of healthy relationship functioning, while consistently present, decreases across a major life event. Future research should address the lingering question regarding what is driving mothers and partners decrease in EA from pregnancy to infancy, why EA does or does not recover after infancy, and if this drop in EA has implications for relationship functioning.

### Authors' note

Conference presentation: Bornstein, J. X., & Gleason, M. E. (2018, July). Understanding under duress: The influence of a major life stressor and daily stressors on empathic accuracy. International Association for Relationship Research, Fort Collins, Colorado.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported under BSF Grant 2013324s and Population Research Center Grant P2CHD042849, awarded to the Population Research Center at The University of Texas at Austin by the Eunice Kennedy Shriver National Institute of Child Health and Human Development. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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## Open research statement

This research was pre-registered. The aspects of the research that were pre-registered were the first authors Master's thesis proposal (see more information about this in the cover letter). The registration was submitted to Open Science Framework. The data used in the research are available. The data can be obtained here or by emailing: jericax@utexas.edu. The code for the Master's thesis is available on OSF and more materials used in the research can be made available at reviewers request by emailing jericax@utexas.edu.

## Notes

1. Estimating power in multilevel models is complicated for many reasons and standard effect sizes have yet to be established for within-person MLM effects (Nezlek, 2012). However, Hox et al. (2017) suggested using at least 50 Level 2 units (partners/couples in our case) with at least 20 Level 1 units (days in our case) for each Level 2 unit for sufficient power to detect interactions with within-person effects. The current study largely meets these criteria when investigating differences across phases and surpasses these criteria when ignoring phase (see diary compliance for information on days within participants).
2. Data from the same sample have been analyzed for other purposes; see OSF for details.
3. Participants were asked to "please check all that apply" resulting in cumulative percentages greater than 100%.
4. We use the term np-partner to distinguish between these participants and the more generic use of "partner" to explain EA analyses within couples.
5. For a list of the measures assessed in this study at both the background and diary-level is available at OSF.
6. Both mothers and np-partners serve as perceivers and targets in the current study.
7. We tested for outliers and found two participants who had an average level of negative mood within a given phase that was more than two *SDs* outside of the average phase mean and a participant during the infancy phase who had a rating of partners' mood two *SDs* above the average phase mean. There is no evidence that these data were invalid. These outlier values appear to be high because participants completed less than 7 days of the diaries resulting in fewer days to average across to obtain their means. We conducted all analyses with these outliers removed and the pattern of results remained the same; given this and their apparent validity, the presented analyses include all cases.

8. These analyses, as well as additional robustness tests, the codebook for the full study, and the data used to answer the questions in this article are available here: OSF.
9. We only report the TTP as the main stressor in the current paper for space and simplicity reasons, but the analyses investigating specific daily stressors (i.e., sleep quality, baby temperament, and perceived stress) are available from the authors.

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