Emotion Differentiation During the Transition to Parenthood –
Concurrent and Prospective Positive Effects

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Abstract

Emotion differentiation, the extent to which same-valenced emotions are experienced in a distinct manner, has been found to be associated with various positive outcomes. However, little is known about its role in relational contexts. The present work examines couples in the transition to parenthood (TTP), a particularly emotionally demanding period, and explores the associations between emotion differentiation and both concurrent (3 months postpartum) and prospective (6 months postpartum) relationship quality. Both negative emotion differentiation (NED) and positive emotional differentiation (PED) were extracted from daily diaries completed over 21 days by both partners in 88 couples. They were then examined as predictors of relationship quality (relationship satisfaction and perceived partner responsiveness) using actor-partner interdependence models. NED was found to be concurrently associated with elevated relationship quality for one's self and for one's partner, but only when the partner's NED was low. Prospectively, partner NED was associated with greater perceived partner responsiveness and with relationship satisfaction when the actor's NED was low. PED was found to be concurrently associated with relationship satisfaction for one's self and one's partner; a similar association was found for one's own perceived partner responsiveness. Prospectively, partner PED was associated with greater relationship satisfaction. The findings suggest that NED functions as a compensatory or shared dyadic resource, and that PED, whose effects in previous studies have been mixed, may also be constructive. This suggests that individuals undergoing emotionally demanding periods (such as the TTP) may benefit from developing more nuanced emotional experiences.

Keywords: emotion differentiation, transition to parenthood, actor-partner interdependence models, relationship quality

Emotion Differentiation During the Transition to Parenthood – Concurrent and Prospective Positive Effects

Individuals experience their emotions in diverse ways. Beyond such basic characteristics as the emotions' valence and arousal levels, their intensity, or their variability, another aspect – emotion differentiation (ED) – has been gaining growing attention over the last two decades (e.g., Barrett, Gross, Christensen, & Benvenuto, 2001; Erbas, Ceulemans, Lee Pe, Koval, & Kuppens, 2019). ED is defined as the extent to which emotions are experienced in a specific or granular manner. Individuals with higher ED tend to describe their experienced emotions using discrete terms (e.g., “excited”, “anxious”, or “tense”), rather than abstract and general terms (e.g., “good” and “bad”), and tend to have less overlap (i.e., weaker associations) among same-valenced emotions across time.

Greater ED (or emotional granularity) may provide valuable information about the origin of any emotion and the optimal course for regulating it or adapting to it. It may also clarify relevant motivations, and consequently help allocate attentional and behavioral resources more efficiently (Kashdan, Barrett, & McKnight, 2015). These consequences of ED may be most pronounced in situations or contexts marked by intense emotions requiring processing and regulation. One such context is the transition to parenthood (TTP) – a period experienced by many adults which involves fundamental life changes as well as powerful emotional experiences, both positive and negative. In the present work, we sought to explore the role played by emotion differentiation in this exciting but challenging juncture.

Emotion Differentiation

Greater differentiation between emotions, particularly between negative ones, has been tied to various positive outcomes in numerous studies (for reviews, see Kashdan et al., 2015; Smidt & Suvak, 2015). For example, negative emotion differentiation (NED) has been

tied to greater effectiveness of negative emotion down-regulation strategies (Kalokerinos, Erbas, Ceulemans, & Kuppens, 2019), greater self-esteem, lower neuroticism, and less depressive feelings (Erbas et al., 2019; Willroth, Flett, & Mauss, 2020). Additionally, NED was found to serve as a protective factor in the face of various daily stressors (in a community sample; Starr, Hershenberg, Li, & Shaw, 2017), and of the negative outcomes of ruminations (in clinical samples; Seah, Aurora, & Coifman, 2020; Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013).

Emotion differentiation, especially NED, appears to be associated to positive processes and outcomes in a variety of life stages and social contexts. For example, among adolescents, NED was found to be tied to indices of well-being and to buffer against the impact of stressful life events on internalizing symptoms (Lennarz, Lichtwarck-Aschoff, Timmerman, & Granic, 2018). Similarly, among adult romantic couples, NED has been shown to predict greater empathic accuracy (Erbas, Sels, Ceulemans, & Kuppens, 2016) and to moderate the negative effects of relational conflict (Sened, Lazarus, Gleason, Rafaeli, & Fleeson, 2018). Additionally, Galili-Weinstock et al. (2019) found that psychotherapy clients who differentiated more among their negative emotions during psychotherapy sessions also had greater self-compassion.

Unlike the growing evidence linking NED to adaptive outcomes, findings regarding positive emotion differentiation (PED) have been less consistent. Whereas some studies (Dixon-Gordon, Chapman, Weiss, & Rosenthal, 2014; Selby et al., 2014; Tugade, Fredrickson, & Barrett, 2004) reported associations between PED and psychological well-being, others (e.g., Barrett et al., 2001; Demiralp et al., 2012; Kashdan & Farmer, 2014; Willroth, Flett, & Mauss, 2020) did not. Importantly, effects for PED have been documented only under specific conditions, such as among participants with sub-clinical eating disorders (Selby et al., 2014) or in conjunction with borderline personality features (Dixon-Gordon et

al., 2014). Notably, in much of the emotion differentiation literature PED and its effects have simply not been examined or reported (for review, see Kashdan et al., 2015). At the same time, several theoretical accounts highlight the merit of delineating clear functional distinctions between different positive emotions (Shiota et al., 2014; Weidman & Tracy, 2020), and appear to argue for the adaptive value in differentiated experience of these emotions. Thus, further research is clearly needed to better understand PED.

Most extant studies of emotion differentiation (and particularly of NED) document its cross-sectional association with indices of psychological health. Though suggestive, such findings fall short of demonstrating any *active role* for differentiation in changes or development of well-being. Taking steps to address this shortfall, recent work has begun to examine the predictive validity of emotion differentiation. In one such study, NED (but not PED) was shown to moderate the association between stressful life events and increases in adolescents' depression 18 months later (Starr, Hershenberg, Shaw, Li, & Santee, 2019). In contrast, Liu, Gilbert, and Thompson (2019) did not find direct prospective effect for NED, but did find it to interact with rumination to predict significant changes in depression; interestingly, a similar effect emerged for PED.

The Transition to Parenthood

The present study joins the efforts to explore the effects of emotion differentiation, by studying it during a specific and often dramatic juncture in individuals' lives: namely, the TTP (Doss & Rhoades, 2017). The TTP is typically a time of great joy and excitement, but also of great stress (Cowan & Cowan, 2000), replete with profound role changes, financial burdens, fatigue, and excessive work (Belsky & Pensky, 1988). Importantly, the nature of the TTP as a dynamic life-changing unfolding process affords both contemporaneous and prospective exploration of the associations between differentiation and a variety of outcomes,

including child outcomes, personal well-being, and relational quality. Of these, the latter outcome is particularly interesting and will be the focus of the present investigation.

Several large-scale studies support the idea that the TTP may be marked by a precipitous decline in partners' relationship satisfaction (e.g., Doss, Rhoades, Stanley, & Markman, 2009; Lawrence, Rothman, Cobb, Rothman, & Bradbury, 2008). Recent years have seen many attempts to identify factors that exacerbate or moderate this decline (for review see Nelson, Kushlev, & Lyubomirsky, 2014) including infant characteristics (e.g., Feeney, Hohaus, Noller, & Alexander, 2001), socio-economic aspects (e.g., Cox, Paley, Burchinal, & Payne, 1999), relational factors (e.g., Doss et al., 2009), and parental personality traits (e.g., Trillingsgaard, Baucom, & Heyman, 2014). To date, the manner(s) in which new parents experience and regulate their emotion and the roles that these play in relationship quality changes have received only limited attention.

Most affect-related TTP research has focused on mothers' (for review see O'hara & McCabe, 2013) and fathers' (Paulson & Bazemore, 2010) postpartum depression and/or anxiety; depression in particular is quite prevalent in this period for both mothers (around 17%; Shorey et al., 2018) and fathers (around 10%; Rao et al., 2020), and is very consequential for their infants' development (e.g., Feldman et al., 2009; for review see Aktar & Bögels, 2017). Much less work, however, has addressed the role of non-pathological emotional processes in the TTP, though several calls have been made to study emotions and their regulation in parenthood (e.g., Hajal & Paley, 2020; Rutherford et al., 2015).

A comprehensive and representative account of young parents' emotional experiences requires *repeated* and *ecological* measurement of their emotions as they go about their daily life in their natural environment. Methods such as daily diaries (Bolger et al., 2003) or experience sampling (Hektner, Schmidt, & Csikszentmihalyi, 2007) allow for such measurement and have become widely used in various fields of psychological research; to

date, however, only a small number of TTP studies have used such methods to explore affective processes (though see, for example, Murray, Seery, Lamarche, Kondrak, & Gomillion, 2019 which did explore other processes in the TTP). In one study that did collect intensive affect data, Hajal, Teti, Cole, and Ram (2019) used 4 daily phone interviews for six days to explore emotions in mothers of 14- to 24-month-old infants, finding certain maternal emotions to be more frequent targets of regulation.

The Present Study

We set out to examine the concurrent and prospective associations between NED or PED and young parents' relationship quality using the daily diary method. To address the dyadic nature of couples' well-being we used the Actor-Partner Interdependence Model (APIM, Kenny, Kashy, & Cook, 2006). The APIM is a data-analytic approach designed to simultaneously estimate actor effects (in the present case - the associations between the actor's NED or PED and their own relationship quality) and partner effects (i.e., the associations between the partner's NED or PED and the *actor's* relationship quality). Additionally, to account for possible interactive effects of actor and partner ED scores, we estimated their multiplicative interaction terms. These terms can represent the extent to which NED or PED function as a compensatory or shared couple resources – i.e., the extent to which their effect for one partner differ at varying levels of the effect for the other. The following hypotheses guided our work:

First, we expected the *actors'* NED to be associated with their own relationship quality ratings both concurrently (H1a) and prospectively (H1b). We reasoned that individuals better able to distinguish among their negative emotions will be able to harness adaptive emotion regulation processes (Kalokerinos et al., 2019) and thus buffer the effect of various stressors (Starr et al., 2017) in way that protect or even benefit their relationship, especially during the challenging TTP period. Second, we also expected that *partners'* NED

will be associated with the actors' relationship quality ratings both concurrently (H2a) and prospectively (H2b); though no partner effects for NED have been reported to date, poor emotion regulation techniques have been found to exert partner effects (e.g., Klein, Renshaw, & Curby, 2016; Parkinson, Simons, & Niven, 2016). Lastly, we expected that the association between the actors' NED and relationship quality will be higher for actors whose partners' NED is lower; we expected this shared resource pattern to be true both concurrently (H3a) and prospectively (H3b). We reasoned that low partner NED may exacerbate the emotional challenge, and thus render the role of the actor's NED as more central.

Alongside NED (whose relevance to the stressors of the TTP is clear) we also explored PED, as we reasoned that the TTP period may involve various rewarding, uplifting, and exciting events likely to generate positive emotions. However, unlike our strong expectations regarding the associations between actor/partner NED and relationship quality, our parallel predictions regarding PED were exploratory in nature, given the inconsistent findings obtained with this construct in the extant literature. Tentatively, we speculated that young parents who better differentiate among their positive emotions would also be better positioned to enjoy the rewards available in this period (H4a; Shiota et al., 2014). We did not expect any partner or interactive (shared resource) effects.

We estimated concurrent and prospective models for two outcome variables reflecting relationship quality: the Couples' Satisfaction Index (CSI; Funk & Rogge, 2007) which is a widely used measure of relationship satisfaction, and Perceived Partner Responsiveness (PPR; Reis, Clark, & Holmes, 2004) which is increasingly used as a measure of individuals' feeling of being understood, validated and cared for within their romantic relationship.

Method

Participants

A total of 108 heterosexual Israeli couples expecting their first child were recruited for a larger project on relational processes during the TTP¹, using social media, online advertising, and flyers posted around the university campus. Partners were required to be over 18 years old, cohabiting for at least one year. Couples expecting twins were excluded from the study. Five couples left the study after completing the background questionnaire, one additional couple left before beginning the post-partum daily diary portion, and two couples completed less than six diary entries, leaving 100 couples in the study for the pre-partum and 6-month post-partum phases. Participants ranged in age from 19 to 46 years old. On average, women were 28.7 (SD = 4.3) years old and men were 30.3 (SD = 4.1) years old. The average relationship length was 4.9 years (SD = 2.9), and 96.3% were married.

Measures

Person-level measures.

Couples' Satisfaction Index (CSI). Participants completed the shortened version of the CSI questionnaire (Funk & Rogge, 2007) at pre-partum, 3 months, and 6 months post-partum. This version includes 4 items: the first item asks to rate the level of happiness in the relationship on a 7-point scale, ranging from *extremely unhappy* to *perfect*, and the other 3 items address relational satisfaction (e.g., "how rewarding is your relationship with your partner?") and were rated on a 6-point scale ranging from *not at all* to *completely*. In our sample the scale was found to be highly reliable (Cronbach's alpha - 0.90 for the pre-partum measurement; 0.92 for the 3 months post-partum measurement; 0.92 for the 6 months post-partum measurement).

Perceived Partner Responsiveness (PPR). Participants' PPR, i.e., the extent to which they perceive their partner as understanding, validating, and caring, was assessed at the same time points as the CSI. It is a 10-item measure (Gable et al., 2006, adapted from Reis, 2006;

¹ For a broader description of the project and a full list of published studies to date, see <https://osf.io/z9v78/>

e.g., “My partner saw the ‘real’ me,” “My partner understood me,” “My partner expressed liking and encouragement of me”), rated on a 7-point scale, ranging from *not at all* to *very much*. In our sample the scale was found to be highly reliable (Cronbach's alpha - 0.94 for the pre-partum measurement; 0.96 for the 3 months post-partum measurement; 0.97 for the 6 months post-partum measurement).

Daily diary questionnaires.

Profile of Mood States (POMS). Participants completed an adapted and shortened daily diary version (Cranford et al., 2006) of Lorr and McNair's (1971) Profile of Mood States which included 17 items: 9 items assessing negative moods/states (e.g., Sad, Angry, Resentful), and 8 items assessing positive moods/states (e.g., Pleased, Content, Cheerful). Items were rated on a 5-point scale ranging from *not at all* to *very much*. The within- and between-person reliabilities for all daily diary questionnaires were computed using procedures outlined by Shrout and Lane (2012). For negative moods, the within- and between-person reliabilities were .85 and .82, respectively. For positive moods, the within- and between-person reliabilities were .87 and .90, respectively.

Procedure

Participants received a gift card (worth approx. 25 USD) for participating in a pre-partum meeting and completing a background questionnaire, and additional remuneration (worth approx. 150 USD) for taking part in a lab visit at 15-weeks post-partum and then completing a 21-day daily diary at home. They were contacted again and asked to complete online follow-up questionnaires at 6-months.

To recruit couples of various socio-economic levels, and to facilitate their participation, RAs traveled to participants' homes for the initial meeting (held in the third trimester of pregnancy) and to provide baby-sitting (for the 15-week lab visit). The recruited sample was indeed diverse in economic status: 9.6% of the couples had monthly family

income of less than \$1350; 21.1% of the couples had monthly family income ranges from \$1350 to \$2700; 34.2% of the couples had monthly family income ranges from \$2700 to \$4050; 15.8% of the couples had monthly family income ranges from \$4050 to \$5400; and 19.3% of the couples had monthly family income greater than \$5400.

The daily diaries were administered using the Qualtrics online platform. Participants were asked to complete an individual daily diary nightly (an hour before going to sleep) for a three-week period beginning 15-weeks post-partum. The daily variables of interest are noted below, though the diary included additional items as well (see <https://osf.io/z9y78/>). Each participant received a unique subject ID to ensure privacy. Questions were asked in the same order each day and took approximately 5-10 minutes to complete. Diary completion rates were quite high, with 63.5% of participants (N=66 mothers, N=61 fathers) completing all 21 days of diaries, and all but one participant (a father) completing at least 14 days of the diaries. In all, mothers completed a total of 2042 days of diaries and fathers completed 2025 days of diaries.

Analytic Approach²

Sample size and power. The sample size was determined based on prior similarly-designed research relevant to the aims of our broad TTP project (e.g., Overall, Hammond, McNulty, & Finkel, 2016; Sels, Ruan, Kuppens, Ceulemans, & Reis, 2020), while taking into account some attrition expected in relatively long-term longitudinal studies. The target N was 100 couples, which balanced funding constraints with the aim of having adequate statistical power to detect small to medium effects. This sample size is also comparable to that used in other recent ED studies (e.g., Starr et al., 2017, 2020). A priori power calculations were not conducted as dyadic designs that utilize multilevel would require assuming a large number of hypothesized parameter values regarding which we had no priors. However, and though we

² Data files and the SAS code used to perform our analyses is available at <https://osf.io/z9y78/>

are aware of their flaws (e.g., Hoenig & Heisey, 2001), we did calculate post hoc power estimates. Specifically, we used a specific calculator developed for APIM (Ackerman & Kenny, 2016), to which the necessary indices from our models were entered. The detected power for the significant effects of interest (i.e., the ED indices) in all models ranged between 0.71 and 0.90.

Calculating emotion differentiation. Negative and positive emotion differentiation indices for each participant were calculated using the average intra-class correlation (ICC; Shrout & Fleiss, 1979), which is common procedure (e.g., Starr et al., 2017; Erbas et al., 2019). To ease interpretation we subtracted the obtained ICCs from 1.00 so that higher ED values will represent greater differentiation. Because negative ICC values, which may be obtained when calculating differentiation scores, are uninterpretable (see Giraudeau, 1996), these were replaced by missing values (see also Erbas et al., 2019).

Main models. We used multilevel modeling (with the SAS MIXED procedure) to account for the nesting of individuals (level 1) within couples (level 2). Additionally, we centered all predictors around the sample means to ease the interpretation of intercepts and of interaction effects. Significant interactions were probed by assessing the simple slopes of the predictors while the moderator was set to one standard deviation above and below its mean. Both partners' mean affect across the diary period (i.e., negative and positive affect: NA and PA, respectively) were included in the model as covariates (see Erbas et al., 2019, for a similar approach). Lastly, Level 1 residuals were allowed to correlate within couples. The generic model equation was:

$$\begin{aligned}
 RQ_{ij} = & \beta_0 + \beta_1 + \beta_2 * Actor_NED_{ij} + \beta_3 * Partner_NED_{ij} + \beta_4 * Actor_NED_{ij} * \\
 & Partner_NED_{ij} + \beta_5 * Actor_NA_{ij} + \beta_6 * Partner_NA_{ij} + \beta_7 * Actor_PED_{ij} + \\
 & \beta_8 * Partner_PED_{ij} + \beta_9 * Actor_PED_{ij} * Partner_PED_{ij} + \beta_{10} * Actor_PA_{ij} + \\
 & \beta_{11} * Partner_PA_{ij} + e_{ij}
 \end{aligned}$$

where relationship quality (RQ, operationalized with any of the outcome indices tested in the current work) for person j of couple i was predicted by a fixed intercept (β_1), a random intercept (β_{0j}) quantifying the deviation of this couple RQ from the one predicted by the rest of the predictors, the fixed slopes (β_2 - β_{11}), and person's j deviation from the RQ predicted by these effects (e_{ij}). The prospective models also adjusted for prepartum levels of relationship quality.

We tested all variables of interest in all models for gender interactions. No significant gender interactions were obtained, and thus, gender and its interactions were omitted from the reported analyses. Effect sizes for specific predictors were based on Cohen's f^2 . These indices represent a ratio of the unique variance explained by a given predictor above and beyond all other predictors (ΔR^2) over the variance remaining after including all predictors in the model ($1-R^2$).

Results

Descriptive Statistics, Zero-order Correlations, and Preliminary Analyses

In keeping with the analytic approach, we began by computing NED and PED indices and removing those couples ($N=12$) for whom at least one ED (ICC) index was negative. The intercorrelations among the ED indices, affect means, and outcome/control variables, as well as these variables' means for the remaining couples are presented in Table 1. The paired correlations between men's and women's NED and PED were 0.27 ($p=.012$) and 0.23 ($p=.033$), respectively. No significant gender differences emerged for either NED or PED.

ED and Concurrent Relationship Quality.

The results of the model predicting concurrent CSI are presented in the left panel of Table 2. Actor and partner NED were marginally associated with greater CSI, but the actor-by-partner interaction for NED was significant. Probing this interaction (see Figure 1), we found that the association between actor NED and CSI was positive and significant for actors

whose partners were low in NED (-SD; $b=4.55$, $SE=1.67$, $p=.007$), but was non-significant for actors whose partners were high in NED (+SD; $b=-0.30$, $SE=1.40$, $p=.830$). Additionally, both Actor and Partner PED were positively and significantly associated with CSI.

The results of the model predicting concurrent PPR are presented in the right panel of Table 2. Both actor and partner NED were positively and significantly associated with PPR. Additionally, the actor-by-partner interaction for NED was significant. Probing this interaction (see Figure 2), we found that the association between actor NED and PPR was positive and significant for actors whose partners were low in NED (-SD; $b=1.94$, $SE=0.62$, $p=.002$), but was non-significant for actors whose partners were high in NED (+SD; $b=0.41$, $SE=0.52$, $p=.428$). Additionally, Actor PED was associated with greater PPR.

ED and Prospective Relationship Quality

The results of the model predicting prospective CSI are presented in the left panel of Table 3. Partner NED was only marginally associated with CSI, but the actor-by-partner interaction for NED was significant. Actor NED was not significantly associated with CSI for either high or low levels of partner NED. However, a simple slope analysis for *partner* NED (see Figure 3) showed that for couples with low actor NED, partner NED was positively and significantly associated with CSI (-SD; $b=4.11$, $SE=1.51$, $p=.008$), whereas for couples with high actor NED, partner NED was not associated with CSI (+SD; $b=-0.08$, $SE=1.22$, $p=.946$). Additionally, Partner PED was significantly associated with CSI.

The results of the model predicting prospective PPR are presented in the right panel of Table 3. Actor NED was associated with greater PPR.

Discussion

Growing evidence points to the positive role that ED (mostly of negative emotions) can play in individuals' psychological health. However, few studies have examined ED within relational contexts or during demanding periods, when emotions and their regulation

are likely to be particularly consequential. The present work sought to examine ED among couples going through the TTP, by exploring ED's associations with one's own and one's partner's relational well-being, both concurrently and prospectively.

In our concurrent models, the actors' NED was found to be associated with elevated levels of relationship quality, though this association was somewhat weaker with CSI vs. PPR. Importantly, for both CSI and PPR, this effect was qualified by an actor-by-partner interaction indicating a stronger association with these outcomes for actors whose partners are lower in NED. Additionally, partners' NED was found to be associated with elevated levels of relationship quality, though again this association was weaker with CSI vs. PPR. Again, this finding should be considered as qualified by the same actor-by-partner interaction; indeed, the association between partner NED and both relational outcomes was positive and significant only when actor NED was low. Thus, as expected, it seems that NED functions as a compensatory or shared dyadic resource: individuals benefit from their own (or their partner's) differentiation of negative emotions levels to a greater extent when their partner's (or their own) differentiation levels are lower.

These findings demonstrate that beyond the frequently-reported association between NED and personal well-being (e.g., Erbas et al., 2009), such differentiation is also tied to relational well-being, at least for partners in the TTP. Many of the challenging moments of the TTP, which are likely to give rise to negative emotions, occur within a relational context. For example, in the face of a fussy and inconsolable baby, new parents high in NED may be able to distinguish between frustration (with the situation) and anger (which may be mis-directed at their partner); by doing so, they may shield their relationship from unneeded tension. Importantly, our results indicate that relational well-being may be at a particular risk when both partners are low in NED; in other words, couples in which at least one partner is high in NED appear to fare better. This suggests that NED may be seen as a shared resource,

one in which one partner's lack can be compensated by the other partner's presence of NED (akin to a similar pattern found with emotional intelligence among couples; Brackett, Warner, & Bosco, 2005).

In our prospective models, the associations between NED and changes in relationship quality measured 6-mo post-partum were still present, though less robust. Specifically, partners' NED was only marginally positively associated with both outcome measures. The actor-by-partner interaction for NED was significant only in the model prospectively predicting CSI. The actors' NED was not significantly associated with CSI for either low or high partner NED. However, the partners' NED was associated with CSI for couples in which the actor NED was low. These findings should be interpreted cautiously, yet they may imply that partner NED can have long-term effects for relationship satisfaction. In particular, the temporal precedence and the inclusion of pre-partum relationship quality levels in the models can strengthen the case for a causal role of NED. Though such inference based on non-experimental design is always limited, manipulating NED in the lab will severely hamper ecological validity. In contrast, our design can be used to provide valuable insight regarding real-life causal processes.

With regards to PED, our concurrent models found the actors' index to be associated with elevated levels of concurrent relationship quality. Partner PED was found to be positively and significantly associated only with greater CSI. No significant interaction effects were obtained, suggesting that PED does not follow the same compensatory or shared resource pattern found for NED.

Though previous findings regarding PED's association with relational well-being have been mixed (e.g., Tugade, et al., 2004; Demiralp et al., 2012), our findings suggest a relatively robust association between the two in the TTP. Indeed, the TTP may occasion positive emotions quite frequently, as it affords a variety of uplifts and rewards (alongside its

many stressors). For example, parents are likely to feel excitement at witnessing the baby's first smile, amusement when at coming into greater contact with the baby's playfulness, and a sense of fulfillment in moments that highlight family cohesion or flow. According to a functional approach to positive emotions (Beall et al., 2017; Shiota et al., 2014), a differentiated or discretized experience of these positive emotions can help mobilize specific motivational, cognitive, physiological, and behavioral responses to prototypical eliciting situations. Young parents who are better able to experience positive emotions in such a differentiated manner may be better positioned to capitalize on the varied rewards that the TTP period provides. In contrast, non-TTP samples with whom PED was not found to play as adaptive a role may simple not have as many (or as diverse a set of) rewards and uplifts.

Finally, in our prospective models, the only association found between PED indices and subsequent changes in relationship quality was the one tying the partner's PED to greater actor relationship satisfaction. This association should be considered alongside the one tying partner's NED and both relational outcomes. These prospective partner effects for both PED and NED in the absence of counterpart actor effects may point to an inherently interpersonal function of ED within emotionally demanding dyadic situations. Prospectively, participants' ability to differentiate between their emotions served their partners more than it did themselves. These high ED participants may have a more nuanced emotional understanding of critical (negative and positive) situations and were thus better equipped to provide skilled social support (Rafaeli & Gleason, 2009) which may in turn increase their partner's relational well-being.

Broader considerations

The TTP is a critical period which may shape the development of physical and psychosocial health later in life (Saxbe, Rossin-Slater, & Goldenberg, 2018). The study of emotional processes occurring during this period is taking its baby steps, and is likely to grow

over time (Hajal & Paley, 2020). As we hope our analyses have demonstrated, the new parents' affect dynamics are one important target for such investigation. Although recent work has raised questions regarding the incremental predictive validity of affect dynamics (Dejonckheere et al., 2019; Wendt et al., 2019), our results do indicate that ED is tied, at least moderately (effect sizes were small), to relational well-being – even after controlling for mean affect levels.

The study of affect dynamics employs intensive repeated measurements to capture individual differences in how affect unfolds over time. It relies on self-reports but goes beyond them, and thus helps researchers allay the risk of “halo” or “glop” effects (e.g., Forgas & Laham, 2017; Gottman, Murray, Swanson, Tyson, & Swanson, 2002, pp. 9-10), in which global evaluations of an entity (e.g., relationship quality) exert undue influence on the evaluation of more specific attributes (e.g., affect). Affect dynamic measures are less transparent and can be interpreted while holding constant global evaluation (e.g., PA or NA) levels, as we do.

The study is among the first to explore intraindividual affect dynamics in a dyadic context (though see Erbas et al., 2016; Lazarus, Atzil-Slonim, Bar-Kalifa, Hasson-Ohayon, & Rafaeli, 2019). As affect is inherently interpersonal, studying its dynamics within an interpersonal matrix can be quite informative. For example, it permits us to explore both actor and partner effects, thus increasing our ability to speak to these constructs causal influence.

The present study is also quite unique in demonstrating associations between PED (rather than NED) and relational well-being. These findings join others emerging from a growing number positive affect studies, which depart from the customary treatment of this construct as unitary and monolithic construct, and instead argue for the utility of recognizing discrete positive emotions and their particular roles in individuals' lives (for review, see Shiota et al., 2017).

Limitations, strengths, and future directions

Several limitations of the present study should be acknowledged. First, like many relationship studies, our sample was biased towards relatively well-adjusted, satisfied couples. It would be important to examine similar processes among couples lower in relational adjustment. Second, to calculate our ED indices, we relied on a relatively small number of measurements per participant (namely, twenty-one), collected once daily. Additionally, the measured affective states were more diffuse (i.e., moods) than the ones usually used to calculate ED (i.e., emotions). It is important to determine whether these findings would generalize to datasets in which more time-limited and more frequent assessments are utilized. Third, the study's TTP context, though universally quite common, is nonetheless a circumscribed one. Future work examining other emotionally demanding contexts (e.g., periods of marital discord, or of coping with one partner's physical illness), could help clarify the breadth of ED's effects. Fourth, though our prospective models lend some support for ED as a causal agent, we cannot rule out other causal explanations. For example, the association between relationship quality and ED could obtain because young parents (who are typically quite satisfied, at least early in the TTP process) are able to maintain greater ED.

Conclusion

The present work showed that the ability to differentiate among emotions, both negative and positive, is tied to one's own and one's partners relational well-being in the transition to parenthood. For negative emotions, such differentiation appears to follow a compensatory or shared dyadic resource pattern – wherein couples for who at least one partner is characterized by high differentiation appear to fare better than those in which neither partner does. Our findings suggest that emotion differentiation may be a worthy target of intervention in this important life stage.

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Table 1. Zero-order Correlations Among the Study's Variables.

Variable	1	2	3	4	5	6	7	8	9	10
1. NED		0.20 [†]	-0.49***	0.26**	0.24*	0.37***	0.29**	0.35***	0.48***	0.35***
2. PED	0.34**		-0.26*	0.13	0.11	0.26*	0.12	0.23*	0.27**	0.19 [†]
3. Mean NA	-0.29**	-0.28**		-0.38***	-0.33**	-0.42***	-0.40***	-0.47***	-0.56***	-0.50***
4. Mean PA	0.37***	0.13	-0.40***		0.35***	0.39***	0.43***	0.32**	0.35***	0.34**
5. PrePartum CSI	0.31**	0.24*	-0.29**	0.34**		0.75***	0.64***	0.67***	0.62***	0.59***
6. 3-Month CSI	0.27*	0.31**	-0.32**	0.26*	0.74***		0.75***	0.66***	0.78***	0.68***
7. 6-Month CSI	0.26*	0.23*	-0.39***	0.36***	0.67***	0.77***		0.58***	0.66***	0.84***
8. PrePartum PPR	0.29**	0.25*	-0.32**	0.41***	0.75***	0.70***	0.61***		0.82***	0.68***
9. 3-Month PPR	0.31**	0.33**	-0.30**	0.30**	0.61***	0.82***	0.68***	0.78***		0.77***
10. 6-Month PPR	0.32**	0.34**	-0.49***	0.45***	0.66***	0.71***	0.85***	0.74***	0.78***	
Women Mean	0.31	0.31	0.37	2.26	18.82	16.58	16.00	8.05	7.68	7.41
Women <i>SD</i>	0.21	0.18	0.29	0.54	2.28	3.65	3.69	0.84	1.29	1.29
Men Mean	0.35	0.35	0.37	2.26	18.30	16.98	16.07	7.77	7.32	7.20
Men <i>SD</i>	0.23	0.21	0.39	0.60	2.76	3.66	4.06	1.08	1.50	1.57

Note. Men's correlations are below the diagonal; Women's correlations are above the diagonal.

NED = Negative Emotion Differentiation; PED = Positive Emotion Differentiation; NA = Negative Affect; PA = Positive Affect;

CSI = Couple Satisfaction Index; PPR = Perceived Partner Responsiveness;

N=88 couples

[†]*p*<.1. **p*<.05. ***p*<.01. ****p*<.001.

Table 2. Results of the Multilevel Models Predicting Concurrent Outcomes.

Predictor / Outcome	CSI				PPR			
	B(SE)	t(df)	p	E.S. ^a	B(SE)	t(df)	p	E.S. ^a
(Constant)	17.1 (0.28)	61.58 (81)	<.001		7.69 (0.1)	75.38 (81.1)	<.001	
Actor NED	2.12 (1.21)	1.75 (157)	.082	0.02	1.18 (0.46)	2.58 (155)	.011	0.04
Partner NED	2.07 (1.20)	1.72 (151)	.087	0.02	1.09 (0.44)	2.48 (135)	.014	0.04
Actor*Partner NED	-11.02 (4.31)	-2.55 (81)	.013	0.05	-3.47 (1.58)	-2.19 (80.8)	.031	0.03
Actor mean NA	-1.17 (0.80)	-1.46 (153)	.146	0.01	-0.82 (0.31)	-2.67 (163)	.008	0.02
Partner mean NA	-1.37 (0.78)	-1.77 (140)	.079	0.02	-0.42 (0.28)	-1.52 (121)	.131	0.01
Actor PED	2.94 (1.26)	2.33 (160)	.021	0.03	0.95 (0.48)	2.01 (159)	.047	0.03
Partner PED	2.86 (1.25)	2.3 (152)	.023	0.03	0.67 (0.45)	1.47 (135)	.143	0.02
Actor*Partner PED	1.58 (6.69)	0.24 (81)	.813	0.00	-0.95 (2.45)	-0.39 (80.5)	.701	0.00
Actor mean PA	1.1 (0.46)	2.38 (165)	.018	0.03	0.43 (0.17)	2.48 (155)	.014	0.04
Partner mean PA	0.39 (0.46)	0.84 (161)	.401	0.00	-0.16 (0.17)	-0.94 (143)	.347	0.00

Note. CSI = Couple Satisfaction Index; PPR = Perceived Partner Responsiveness; NED = Negative Emotion Differentiation; PED = Positive Emotion Differentiation; NA = Negative Affect; PA = Positive Affect.

^a Cohen's f^2

Table 3. Results of the Multilevel Models Predicting Prospective Outcomes.

Predictor / Outcome	CSI				PPR			
	B(<i>SE</i>)	t(<i>df</i>)	<i>p</i>	<i>E.S.</i> ^a	B(<i>SE</i>)	t(<i>df</i>)	<i>p</i>	<i>E.S.</i> ^a
(Constant)	16.28 (0.26)	61.51 (79.1)	<.001		7.36 (0.1)	77.41 (78.6)	<.001	
Actor NED	0.52 (1.05)	0.49 (132)	.624	0.00	0.18 (0.36)	0.50 (121)	.618	0.00
Partner NED	2.01 (1.03)	1.95 (121)	.053	0.01	0.72 (0.36)	1.98 (116)	.050	0.02
Actor*Partner NED	-9.53 (4.13)	-2.31 (79.8)	.024	0.03	-0.5 (1.48)	-0.34 (79.1)	.736	0.00
Actor mean NA	-1.19 (0.70)	-1.71 (139)	.090	0.03	-0.88 (0.24)	-3.69 (125)	<.001	0.09
Partner mean NA	-1.58 (0.66)	-2.4 (116)	.018	0.05	-0.45 (0.23)	-1.96 (115)	.053	0.02
Actor PED	0.64 (1.09)	0.59 (137)	.558	0.00	0.52 (0.38)	1.39 (126)	.166	0.01
Partner PED	2.5 (1.06)	2.36 (124)	.020	0.03	0.25 (0.37)	0.67 (120)	.504	0.00
Actor*Partner PED	1.72 (6.39)	0.27 (79.4)	.788	0.01	0.14 (2.29)	0.06 (78.4)	.950	0.00
Actor mean PA	1.26 (0.40)	3.17 (149)	.002	0.05	0.28 (0.14)	2.06 (143)	.041	0.04
Partner mean PA	-0.01 (0.38)	-0.03 (141)	.974	0.00	-0.15 (0.13)	-1.16 (136)	.249	0.00
Prepartum CSI/PPR	0.58 (0.09)	6.56 (158)	<.001	0.34	0.66 (0.07)	9.33 (124)	<.001	0.53

Note. CSI = Couple Satisfaction Index; PPR = Perceived Partner Responsiveness; NED = Negative Emotion Differentiation; PED = Positive Emotion Differentiation; NA = Negative Affect; PA = Positive Affect.

^a Cohen's f^2

Figure 1. The effects of actor NED on concurrent CSI for high (+1 *SD*) and low (-1 *SD*) partner NED.

Figure 2. The effects of actor NED on concurrent PPR for high (+1 *SD*) and low (-1 *SD*) partner NED.

Figure 3. The effects of partner NED on prospective CSI for high (+1 *SD*) and low (-1 *SD*) actor NED.