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ORIGINAL ARTICLE

The multifaceted role of empathy in the transmission of postpartum depressive symptoms between parents

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Abstract

Postpartum depression is a common challenge faced by mothers and fathers and can be transmitted between them. Despite the well-documented adverse effects of postpartum depressive symptoms (PPDS) on parents and children, not much is known about risk factors pertaining to the transmission of PPDS between parents. Guided by The Social Functions of Emotions theory, the current study tested the moderating effects of different forms of empathy, including perspective-taking, empathic concern, and personal distress on the transmission of PPDS between parents. Pairs of first-time Israeli parents ($N = 105$) completed self-report questionnaires assessing emotional (personal distress and empathic concern) and cognitive (perspective-taking) empathy during the third trimester and PPDS at three and six months postpartum. The results showed that in both parents, greater PPDS at 6 months were predicted by one's own greater personal distress. Also, lower perspective-taking and greater empathic concern of fathers predicted their own PPDS. Furthermore, the associations of PPDS at 3 months with PPDS at 6 months between parents occurred when fathers reported lower levels of personal distress and when mothers reported greater perspective-taking. Also, when mothers were lower in perspective-taking, greater PPDS at 3 months in fathers predicted lower levels of PPDS in mothers at 6 months. The study reflects the multifaceted role of empathy in the development of PPDS in new parents and highlights the potentially adverse effects of emotional and cognitive empathy on the development of PPDS in parents.

KEYWORDS
emotion transmission, empathy, postpartum depression, transition to parenting

INTRODUCTION

Despite the joy and happiness of becoming parents for the first time, the transition to parenthood can be a stressful period, during which parents adapt to new roles and responsibilities related to the provision of the child's needs for treatment, care, and protection (Belsky, 1986). Among the many challenges following childbirth, parents may experience postpartum depressive symptoms (PPDS) (Vesga-López et al., 2008), whose severity can range from postpartum "baby blues," a mild mood disruption lasting up to two weeks, to clinical postpartum depression (PPD), a severe mood disruption with significant impairment in functioning lasting two sequential weeks or longer (American Psychiatric Association, 2013). PPD is among the most common difficulties following childbirth, with estimated prevalence ranging from 6.5% to 12.9% in mothers (Howard et al., 2014; Munk-Olsen et al., 2006). Moreover, although research has been focused on PPD in mothers, a growing body of research indicates that about 7.2–9.6% of new fathers experience clinical PPD, with higher rates during the 3 to 6 months postpartum (25.6%) (Cameron et al., 2016; Paulson & Bazemore, 2010).

Depression in one partner poses a risk for depression in the other partner (Anding et al., 2016). Research has found significant midsize correlations between PPDS in mothers and fathers (Paulson & Bazemore, 2010; Wee et al., 2011), cross-sectionally, as well as in longitudinal studies (Anding et al., 2016). For example, a large-scale prospective study tracking couples from pregnancy to 24 months after childbirth found significant associations between men's and women's trajectories of PPDS (Kiviruusu et al., 2020).

Postpartum depressive symptoms may disrupt parental functioning (Paulson et al., 2006) and predict adverse developmental outcomes in children (Ramchandani et al., 2005). Moreover, having two parents with depression may result in even greater developmental problems in children (Foley et al., 2001). However, not much is known about risk of and protective factors for the transmission of PPDS between parents. Thus, the current study aimed to identify predictors of the transmission of PPDS between parents during the transition to parenthood. Specifically, we utilized a dyadic longitudinal design to examine the role of different forms of trait empathy in each of the parents in moderating the transmission of PPDS between them.

The role of empathy in the transmission of PPDS

Intimate relationships are characterized by interdependence, which refers to the ongoing and mutual influences of feelings, thoughts, and behaviors occurring between dyad members (Kelley et al., 1983). There is ample evidence that negative emotions transfer between intimate partners (for a review see Larson & Almeida, 1999), some of which (e.g., sadness, anger, feelings of worthlessness, guilt) are inherent components of depressive symptoms (Berenbaum et al., 2003). The Social Functions of Emotions theory points to *empathy* as a key factor through which the transmission of emotions occurs (Haidt & Keltner, 1999). Specifically, dyadic processes entail constant mutual verbal and nonverbal messages conveying information on each partner's emotional state related to the environment (e.g., threat), the relationship (e.g., rejection), and the partner's internal state (e.g., depression). These messages can evoke a complementary and reciprocal emotional response in the other partner, helping them to respond adequately to the event by, for example, experiencing and expressing sympathy to the distressed partner (Eisenberg & Fabes, 1990). Indeed, depressed partners tend to express negative emotions and feelings in marital interactions. For example, depressed intimate partners exhibit less frequent smiling, eye contact, and pleasant facial expressions than nondepressed partners (for a review,

see Rehman et al., 2008). The Social Functions of Emotions theory postulates that empathizing with individuals expressing such signs of negative emotions may induce similar emotions in the viewer, leading to the transmission of PPDS between new parents.

Empathy is broadly defined as a set of responses to the experiences of another person, which include processes that take place within the observer and the affective and nonaffective outcomes resulting from these processes (Davis, 2018). Empathy allows understanding the others' emotions, intentions, and behaviors, which can foster adaptive social responses (Leiberg & Anders, 2006), such as prosocial behaviors toward others (Eisenberg & Fabes, 1990). Empathy is considered a trait that is hardwired in the brain and develops through interactions with significant others (Decety & Jackson, 2004). Thus, there are individual differences in the capacity to empathize with others. Despite ongoing discussion and variability in its definition, there is recognition that empathy is a multidimensional construct, consisting of cognitive and affective components. Specifically, empathy includes not only an understanding of the emotional state of others, the cognitive component, but also an emotional experience of the other's actual or perceived emotional state, the affective component (Davis, 2018; Decety & Jackson, 2004).

The emotional component of empathy has two main dimensions: *personal distress* and *empathic concern* (Eisenberg & Eggum, 2009; Eisenberg, Shea, et al., 1991). Personal distress is a self-focused negative affective reaction provoked in response to the other's emotion (Batson, 1991; Eisenberg, Shea, et al., 1991). It is theorized to be activated through emotional contagion. Specifically, when observing the emotional state of others, individuals automatically mimic and synchronize with their expressed emotions (e.g., facial expressions, vocalizations, postures) and sequentially converge with their emotions (Hatfield & Cacioppo, 1994). It was also argued that in this unconscious process (Hatfield & Cacioppo, 1994; Preston & de Waal, 2002), observing emotions automatically activates the neural mechanisms through which individuals generate similar emotions (Decety & Meyer, 2008). Resonating with the negative emotions of others may induce negative emotions in the observer, which may motivate a self-focused response aimed to alleviate one's own distress (Eisenberg & Eggum, 2009; Eisenberg & Fabes, 1992).

Personal distress is associated with greater psychological distress (Eisenberg, Fabes, et al., 1991), including greater post-traumatic symptoms in men and women after deployment to war (Siegel et al., 2021). Furthermore, there is evidence that personal distress is involved in the transmission of psychological distress between intimate partners. A study on Israeli male soldiers and their wives after deployment to war showed that greater trait personal distress in wives predicted stronger associations between the men's post-traumatic distress and the wives' depressive symptoms (Dekel et al., 2018). These findings suggest that personal distress might intensify the transmission of PPDS between new parents.

Empathic concern is another emotional reaction to the emotional state of others, but unlike personal distress, it involves feelings of sorrow or concern toward others (Eisenberg & Eggum, 2009; Eisenberg, Fabes, et al., 1991). Empathic concern facilitates engagement in other-focused behaviors, such as expressing sympathy and prosocial behaviors (Eisenberg et al., 2006). Empathic concern is associated with lower levels of negative affect (Murphy et al., 2018), but higher levels of sympathy (Eisenberg et al., 1991). Also, a daily diary study tracking couples for 7 consecutive days found that greater empathic concern is associated with less interdependence of negative or positive feelings between intimate partners (Sels et al., 2016).

Empathic concern was shown to benefit everyday social interactions. However, given the caregiving associated with empathic concern (Eisenberg et al., 2006), the constant need to provide support to a depressed partner may eventually become a psychological burden and produce negative affect in the supporter (Coyne, 1976). Indeed, greater empathic concern was associated with greater post-traumatic symptoms in wives of Israeli soldiers after deployment to war (Siegel et al., 2021). These findings suggest that empathic concern may also intensify the transmission of PPDS between new parents.

Perspective-taking is considered a cognitive aspect of empathy, by which individuals take the perspective of others. It involves placing oneself in the situation or emotional state of another person (Decety & Lamm, 2011). Understanding the other's state of mind requires cognitive processing including emotion regulation, self-awareness (i.e., differentiation between one's own and the other's emotions), flexibility, and self-regulation (i.e., inhibiting one's perspective and appraising the perspective of another person) (Decety & Meyer, 2008; Wee et al., 2011). These capacities allow the viewer to understand the emotional condition of others without being emotionally flooded (Decety & Meyer, 2008; Leiberg & Anders, 2006).

Depression of a spouse may provoke relationship uncertainty, which may induce distress in the nondepressed partner (Knobloch & Knobloch-Fedders, 2010). However, greater perspective-taking may provide clarity about the condition of the partner, which may reduce relational uncertainty and its related distress. Research has shown that perspective-taking is linked with lower levels of negative affect (Murphy et al., 2018), but there is mixed evidence regarding its role in the transmission of psychological distress. Greater perspective-taking in wives of Israeli veterans buffered the positive associations between their partners and their own post-traumatic symptoms (Dekel et al., 2018). However, a daily diary study that followed intimate partners for 7 consecutive days showed that negative emotions of wives were associated with an increase in the negative emotions of husbands who reported greater perspective-taking. The same was not evident in women (Schoebi, 2008). Thus, the role of perspective-taking in the transmission of PPDS is not yet clear. Findings suggest that greater perspective-taking may predict a lower or a higher transmission of PPDS between new parents.

In sum, PPDS are prevalent mainly in mothers but also in fathers and may be transmitted between them (Paulson & Bazemore, 2010; Wee et al., 2011). Empathy was postulated as a possible factor through which the transmission of PPDS occurs (Haidt & Keltner, 1999). However, empathy is a multifaceted concept, with cognitive and affective components, each reflecting different responses to the emotional state of others (Davis, 2018). Theory and research suggest that personal distress may result in greater psychological distress in response to a partner's psychological symptoms (e.g., Eisenberg & Eggum, 2009; Eisenberg & Fabes, 1992). Empathic concern may facilitate engagement in supportive behaviors (Eisenberg et al., 2006), but over time may take its toll on the supporting partner and intensify distress (Coyne, 1976). Lastly, perspective-taking allows individuals to detect their partner's emotional state (Davis, 2018), but there is conflicting evidence about its role in the transmission of post-traumatic distress or negative emotions between partners (Dekel et al., 2018; Schoebi, 2008).

The current study

The goal of the current study was to examine the moderating effects of each type of empathy on the transmission of PPDS between parents during the transition to parenthood. Research in this area is relatively scarce and the existing studies did not examine specifically the emotional responses of parents following childbirth. Also, the existing research on PPDS has mostly focused on mothers. This limits our understanding of risk factors for PPDS in new fathers (Ansari et al., 2021) and the mutual influences of PPDS between new parents. The current study is focused on the transmission of PPDS, which both partners are prone to experience after childbirth (Paulson & Bazemore, 2010). The present study examined predictors of PPDS in both mothers and fathers and the reciprocal relations between them as they unfold over time. Specifically, it followed new parenting dyads prospectively from before childbirth to 6 months after childbirth and includes prenatal assessments of trait empathy and PPDS assessments 3- and 6-month after childbirth from both parents. We examined our research question in Israel, a "child-oriented" society in which couples are expected to have children and consider having children a top priority. Young Israeli mothers are expected to combine motherhood and work and are eligible for a 14-week maternity leave and monthly children's allowances and tax deductions (Lavee & Katz, 2003).

First, we hypothesized that (H1) PPDS levels of fathers and mothers 3 months after birth will predict their own and their partners' PPDS levels 6 months after childbirth. Second, we hypothesized that (H2) trait personal distress, empathic concern, and perspective-taking will moderate the effects of PPDS of one parent at 3 months on the PPDS of the other parent at 6 months. Specifically, we predicted that in parents with high levels of trait personal distress (H2a) or trait empathic concern (H2b), the positive relationship between their spouses' PPDS levels at 3 months and their own PPDS levels at 6 months will be stronger. In the case of trait perspective-taking, due to the conflicting findings in the literature, we did not form a directional hypothesis.

METHOD

Participants

The sample of the current study was drawn from a larger prospective study (see Appendix S1). The sample consisted of 105 pairs of first-time parents, all of whom were co-living heterosexual couples expecting their first child (55 boys and 50 girls). Recruitment took place during the third trimester of pregnancy (M = 29.7 weeks, SD = 2.55). Parents' ages ranged from 23 to 42 (M = 30.82, SD = 3.63 for women, M = 32.41, SD = 4.01 for men). Participates were mostly middle- to upper-class and college-educated (years of education: M = 16.30, SD = 2.10 for women; M = 15.36, SD = 2.41 for men). Family income ranged from below-average (25.5%) to average (15.3%), or above-average (59.2%). The average gross income for Jewish households with children in 2016, the year the data were collected, was about 22,537 ILS per month (~$6340) (Central Bureau of Statistics, 2016). None of the parents reported an at-risk pregnancy or any neurological, physiological, or mental illness.

Procedure

The sample was recruited through Internet advertisements, flyers, and medical centers. First-time expecting couples were invited to participate in a study on the transition to parenthood, parent–child relationship, and child development within a family context. A research assistant contacted couples who expressed interest in the study by phone, introduced the study, and verified that couples complied with the inclusion criteria: fluent Hebrew reading and writing, low-risk singular fetus, and first expected birth. In this phone call, couples were also given essential information on the study procedure. After obtaining their consent, each of the partners completed an online questionnaire using a personal code to enter the study's website. Couples completed validated Hebrew versions of the measures (for more details on the validation, see Bina & Harrington, 2016; Shamay-Tsoory et al., 2004) at each time point – the third trimester of pregnancy and 3 and 6 months postpartum. Couples received 250 ILS for participation in each wave. The study was approved by the Ethics Committee of the Academic College of Tel Aviv–Yaffo.

Measures

Postpartum depression

Each parent completed the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) in the 3-month and 6-month assessment waves. This widely used 10-item measure assesses depressive symptoms following delivery (e.g., "I have been so unhappy that I have had difficulty sleeping"). Parents indicated the degree to which each statement corresponded to how they felt during the past week on a scale ranging from 0 to 3. After recoding reverse-keyed items, EPDS scores were computed

by summing all items (αs = 0.74–0.81 and 0.83–0.86 for men and women, respectively). A total EPDS score of at least 10, which indicates possible depression (Cox et al., 1987), was found in 7.9% of men and 12.3% of women at 3 months and in 6.2% of men and 14.9% of women at 6 months.

Empathy

The Interpersonal Reactivity Index (IRI; Davis, 1980) is a 28-items scale consisting of four 7-item subscales, each tapping a different dimension of dispositional empathy, including (a) *perspective-taking*, which measures the tendency to spontaneously adopt the psychological point of view of others ("I sometimes try to understand my friends better by imagining how things look from their perspective"); (b) *empathic concern*, which measures the tendency to sympathize with others in need ("I often have tender, concerned feelings for people less fortunate than me"); and (c) *personal distress*, which assesses the tendency to experience discomfort when encountering distressed individuals ("Being in a tense emotional situation scares me"). In this study, we did not use the *fantasy* subscale, which measures the tendency to imagine oneself in fictional situations (e.g., in the scene of a movie), because it is not relevant to empathizing with distressed partners. The scale was administered during the third trimester. Each spouse was asked to rate each item on a 5-point Likert scale ranging from 1 (*Does not describe me well*) to 5 (*Describes me very well*). Greater mean scores indicated greater empathy. All subscales were found reliable in men (0.74–0.83) and women (0.68–0.82).

Analytic strategy

Preliminary statistics were computed with IBM SPSS 25. We then specified two path models using structural equation modeling (SEM) with IBM AMOS 25. First, we specified an Actor-Partner Interdependence Model (APIM) using the 3- and 6-month PPDS scores. The APIM allows the simultaneous testing of actor effects (the effects of an individual's PPDS at 3 months on their own PPDS at 6 months) and partner effects (the effects of an individual's PPDS at 3 months on their partner's PPDS at 6 months) while accounting for interdependence between dyad members (Kenny et al., 2006). Actor and partner effects were tested for each gender. Second, we specified a moderation model by adding to the basic APIM the empathy scores of men and women (three subscale scores each) and their interactions with men's and women's PPDS at 3 months (after mean-centering) as predictors of men's and women's PPDS at 6 months. Simple slopes were computed using a web utility for low (−1 SD) and high (+1 SD) levels of the moderator variable (Preacher et al., 2006). Because the dataset contained small amounts of missing data, we used FIML estimation, which uses all available information from the observed data to generate parameter estimates (Enders, 2010). Both models were saturated.

RESULTS

Means, standard deviations, and bivariate correlations for all study variables are presented in Table 1. Men's and women's PPDS at 3 months were positively correlated with their own PPDS symptoms at 6 months. Personal distress in men and women was associated with their own greater PPDS at 3 and 6 months.

We first tested the basic APIM model. Consistent with H1, men's (b = 0.70, SE = 0.23, p < 0.001) and women's (b = 0.60, SE = 0.34, p < 0.001) greater PPDS at 3 months predicted their own greater PPDS at 6 months. However, no partner effects were found in men (b = −0.03, SE = 0.34, *ns*) or women (b = −0.01, SE = 0.35, *ns*). The model explained 55% of the variance in men's PPDS and 35% of the variance in women's PPDS at 6 months.

TABLE 1 Means, standard deviations, minimum and maximum, and zero-order correlations of the study variables.

	1	2	3	4	5	6	7	8	9	10
1. Men's PPDS (T1)	—									
2. Men's PPDS (T2)	0.70**	—								
3. Men's Perspective Taking (T0)	−0.17	−0.25*	—							
4. Men's Empathic Concern (T0)	0.02	0.12	0.47**	—						
5. Men's Personal Distress (T0)	0.26*	0.44**	−0.26**	0.08	—					
6. Women's PPDS (T1)	0.18	0.11	−0.01	−0.09	−0.07	—				
7. Women's PPDS (T2)	0.09	0.09	0.01	−0.09	−0.10	0.59**	—			
8. Women's Perspective Taking (T0)	0.11	0.02	−0.01	−0.08	0.05	−0.05	0.19	—		
9. Women's Empathic Concern (T0)	−0.04	−0.06	−0.00	0.08	−0.10	−0.01	−0.01	0.23**	—	
10. Women's Personal Distress (T0)	−0.05	−0.08	−0.01	−0.06	−0.10	0.23*	0.36**	−0.23*	0.26**	—
M	5.19	4.48	19.06	19.23	11.67	5.94	5.90	19.69	21.50	13.73
SD	3.33	3.42	4.38	4.13	4.91	4.07	4.20	4.11	4.02	5.22
Min–Max	0–13	0–15	6–27	1–27	1–23	0–19	0–18	7–28	12–28	3–25

Note: *$p<0.05$. **$p<0.01$.

We then tested the moderation hypothesis (H2). As seen in Table 2, men's and women's personal distress predicted their own greater PPDS at 6 months. Also, greater empathic concern and lower perspective-taking in men predicted their own greater PPDS at 6 months. These effects were the same when the model was run without the interaction terms (see Appendix S1). There was a significant interaction between men's personal distress and women's PPDS at 3 months. Probing this interaction revealed that while men high in personal distress reported the highest levels of PPDS at 6 months, their partner's PPDS levels at 3 months were not associated with their own PPDS levels at 6 months ($b = -0.08$, $SE = 0.32$, *ns*). In contrast, in men low in personal distress, women's PPDS levels at 3 months predicted higher PPDS levels at 6 months ($b = 0.22$, $SE = 0.38$, $p < 0.05$). Thus, contrary to H2a, the associations between women's 3-month PPDS and men's 6-month PPDS occurred in men relatively low in personal distress (see Figure 1). Also, contrary to H2b, empathic concern did not moderate the associations of PPDS between parents across time.

The interaction between women's perspective-taking and men's PPDS at 3 months was also significant. When women reported high perspective-taking, the 3-month PPDS levels of men were positively associated with women's 6-month PPDS levels ($b = 0.30$, $SE = 0.50$, $p < 0.01$). In contrast, when women reported low perspective-taking, men's 3-month PPDS levels were negatively associated with women's 6-month PPDS levels ($b = -0.28$, $SE = 0.54$, $p < 0.05$). Thus, a positive link between men's PPDS at 3 months and women's PPDS at 6 months occurred in women higher in perspective-taking, but in women low in perspective-taking, men's greater PPDS at 3 months predicted *lower* PPDS at 6 months. In total, the moderation model explained 66% of the variance in men's PPDS and 49% of the variance in women's PPDS at 6 months.

TABLE 2 Structural equation modeling coefficients for actor and partner effects of postpartum depressive symptoms at 3 months and different forms of empathy prebirth on postpartum depressive symptoms at 6 months.

	b	*SD*	*p*-value
Men's PPDS at 6 months			
Men's PPDS at 3 months	**0.59**	**0.24**	**0.001**
Women's PPDS at 3 Months	0.07	0.24	0.323
Men's prebirth perspective-taking	**−0.25**	**0.27**	**0.001**
Women's prebirth perspective-taking	−0.05	0.25	0.254
Men's prebirth personal Distress	**0.22**	**0.24**	**0.002**
Women's prebirth personal Distress	0.18	0.26	0.524
Men's prebirth empathic concern	**0.17**	**0.28**	**0.034**
Women's prebirth empathic concern	−0.08	0.26	0.339
Men's prebirth perspective-taking X women's PPDS at 3 months	0.112	0.39	0.158
Men's prebirth personal distress X women's PPDS at 3 months	**−0.17**	**0.26**	**0.040**
Men's prebirth empathic concern X women's PPDS at 3 months	0.09	0.55	0.442
Women's PPDS at 6 months			
Men's PPDS at 3 months	0.08	0.36	0.935
Women's PPDS at 3 months	**0.57**	**0.34**	**0.001**
Men's prebirth perspective-taking	−0.03	0.38	0.713
Women's prebirth perspective-taking	−0.08	0.36	0.333
Men's prebirth personal Distress	−0.01	0.35	0.939
Women's prebirth personal Distress	**0.18**	**0.38**	**0.038**
Men's pre-birth empathic concern	0.01	0.40	0.952
Women's prebirth empathic concern	−0.02	0.37	0.811
Women's prebirth perspective-taking X Men's PPDS at 3 months	**0.29**	**0.38**	**0.001**
Women's prebirth personal distress X Men's PPDS at 3 months	0.15	0.25	0.095
Women's prebirth empathic concern X Men's PPDS at 3 months	−0.07	0.40	0.474

Note: Significant effects are bolded.

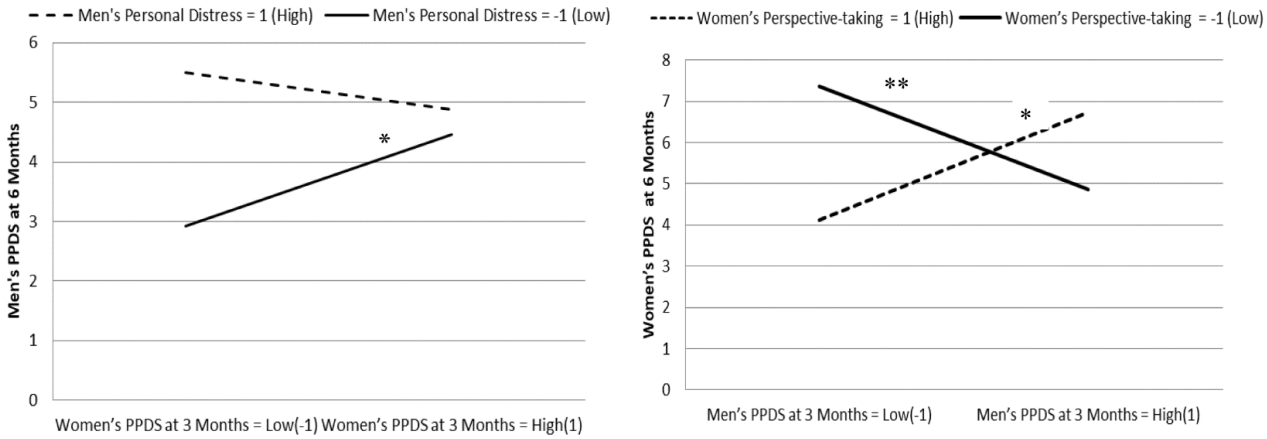

FIGURE 1 Postpartum depressive symptoms at 6 months after birth in men and women with high and low levels of pre-birth trait empathy as a function of their Partner's postpartum depressive symptoms at 3 months. *$p < 0.05$; **$p < 0.01$.

DISCUSSION

Postpartum depressive symptoms are common in new mothers and fathers and can cross over between parents (Paulson & Bazemore, 2010; Wee et al., 2011). The present study aimed to test whether different types of trait empathy are involved in the transference of PPDS between new parents from 3 to 6 months after childbirth. First, we examined whether the PPDS of each parent at 3 months is associated with the other parent's PPDS at 6 months. Contrary to our hypothesis and previous research (e.g., Anding et al., 2016; Kiviruusu et al., 2020), we did not find concurrent or longitudinal associations between the PPDS of mothers and fathers. Instead, we found that PPDS levels of each parent at 6 months are primarily predicted by their own PPDS levels at 3 months, suggesting that PPD is largely an intrapersonal and continuing process. Some associations of PPDS between parents, however, were revealed when we examined moderation by empathy types. Specifically, men's personal distress level and women's perspective-taking level determined whether their PPDS levels at 6 months were predicted by their partner's PPDS levels at 3 months. These findings are consistent with the Social Functions of Emotions theory (Haidt & Keltner, 1999), which postulates that spouses are affected by their partner's emotional state through their empathy.

In line with our second hypothesis, the interaction of men's personal distress with women's PPDS levels at 3 months predicted men's PPDS levels at 6 months. However, contrary to our prediction (H2a) and prior research (Dekel et al., 2018), women's PPDS at 3 months were positively associated with men's PPDS at 6 months only in men with lower levels of personal distress. The emotion contagion theory posits that because individuals automatically synchronize with verbal and nonverbal emotional expressions of others, they may correspond with the emotions of others (Hatfield & Cacioppo, 1994). In men with high personal distress, PPDS at 6 months were not predicted by their partner's PPDS at 3 months and were relatively higher than other men's PPDS. It could be that because individuals with high personal distress tend to be flooded by intense emotions and engage in self-soothing strategies (Eisenberg & Eggum, 2009; Eisenberg & Fabes, 1992), these fathers were so overwhelmed by their strong emotions that they remained self-focused with their distress, with no room for their partners' PPDS to affect them.

The cross-over effect of PPDS at low levels of personal distress was not found in mothers. However, in mothers like in fathers, greater personal distress predicted greater PPDS levels at 6 months above and beyond their own and their partner's PPDS levels at 3 months. This finding is consistent with research linking personal distress with general negative emotion and psychological distress (Eisenberg et al., 1991; Siegel et al., 2021). Personal distress is theorized to be a product of a contagion-like process (Hatfield & Cacioppo, 1994), which causes psychological over-arousal when viewing a distressed individual (Eisenberg et al., 2006; Eisenberg & Eggum, 2009). As such, it could be that in parents with greater personal distress, witnessing the other parent cope with birth-related strains, other than PPDS, is emotionally overwhelming, and over time it intensifies their PPDS regardless of their own and their partner's initial PPDS levels.

Our study also showed that the PPDS of women with higher levels of perspective-taking were positively predicted by their partner's PPDS. In contrast, in women with lower levels of perspective-taking, greater partner PPDS at 3 months predicted lower levels of PPDS at 6 months, suggesting a self-focused process by which women with a distressed partner benefit psychologically from not taking their perspective. Although this finding contradicts prior research showing that perspective-taking protects against the transmission of post-traumatic symptoms (Dekel et al., 2018), it is consistent with research showing that perspective-taking intensifies the daily transmission of soft negative affect (e.g., sadness) from women to men (Schoebi, 2008). It should be noted, however, that the present study was focused on a different situation wherein both parents are exposed to the transitional strains of becoming parents (Belsky, 1986) and are at risk for PPDS (Paulson & Bazemore, 2010; Wee et al., 2011). It also examined bi-directional PPDS associations over a longer period of 3 months.

After childbirth, mothers normally shift their primary focus to the newborn (Swain et al., 2014), which largely comes at the expense of their investment in their partner (for a review, see Kluwer, 2010). Having greater perspective-taking can facilitate better detection of the partner's PPDS, which can motivate engagement in supportive behaviors (Decety & Meyer, 2008; Leiberg & Anders, 2006). Perhaps in the period following childbirth, the combination of being invested in the new parental role, together with the need to support a depressed partner while not having them as a significant source of support, takes a toll on the emotional well-being of mothers with higher perspective-taking. In contrast, mothers with lower perspective-taking, who are less able to accurately detect their partner's PPDS and are less likely to understand their emotional distress and support them, can more easily focus on their new maternal roles. This self-focused attitude may ease their transition to motherhood and over time improve their mental health. These mothers might even compensate for their partner's reduced emotional state by enhancing their own emotional state, to be able to properly care for their children.

In men, greater perspective-taking did not predict links between women's PPDS at 3 months and men's PPDS at 6 months, but it did predict lower PPDS 6 months after birth. Research demonstrated the benefits of perspective-taking for reducing negative affect (Murphy et al., 2018) and post-traumatic symptoms (Siegel et al., 2021). Perspective-taking facilitates understanding of the mental state of others without being flooded by negative emotions (Decety & Meyer, 2008; Leiberg & Anders, 2006). Our findings suggest that during the transition to parenthood, when their wives are dealing with typical postpartum transitional strains (Belsky, 1986), the ability of men to understand their wives is a protective factor against their own PPDS. Given that women are still the primary caregivers of newborns (for a review, see Kluwer, 2010), understanding their emotional state may help fathers accept mothers' psychological distress as a normative response to childbirth. This awareness may foster certainty in an ambiguous transitional time (Knobloch & Knobloch-Fedders, 2010) and thereby protect against PPDS.

In contrast to our hypotheses (H2b), empathic concern did not moderate PPDS over-time associations between parents, but greater empathic concern predicted higher PPDS levels 6 months after childbirth in men. This finding is consistent with prior research showing a link between empathic concern and greater emotional distress in spouses of veterans (Siegel et al., 2021). Greater empathic concern allows individuals to respond to others' emotions with sympathy and compassion and is related to supportive behaviors (Eisenberg & Eggum, 2009). It could be that dealing with postpartum transitional stress while sympathizing with and supporting their wives is psychologically draining for men (Coyne, 1976) and over time amplifies their PPDS. The gender specificity of this finding may reflect the typical division of labor: Mothers are expected to focus on childrearing, while fathers are expected to support them (Kluwer, 2010).

Taken together, of the three forms of empathy, only personal distress in men and perspective-taking in women are used to predict PPDS associations from 3 to 6 months between parents. In contrast, we found that PPDS are predicted primarily by intrapersonal factors, namely, baseline levels of PPDS and different types of empathy, indicating that beyond one's own emotional distress, personality characteristics (i.e., empathy) play a central role in predicting PPDS. The fact that PPDS levels were predicted by different types of empathy, above and beyond the PPDS levels of the spouse, suggests that stressors other than the PPDS of the partner contributed to the development of PPDS over the first six months after birth. Given that the PPD rates in this sample were low (ranging from 6.2% to14.9%), it could be that empathizing with emotional distress related to postpartum challenges predicted PPDS levels at six months.

Our findings also point to differential effects of different types of empathy on PPDS in men and women. We found that all three types of empathy predicted PPDS at 6 months in men, but only personal distress predicted PPDS at 6 months in women. Previous research has also demonstrated discrepant links between empathy and depression across genders (Schreiter et al., 2013). These gender differences may be attributed to a greater tendency for emotional expression in women (Rehman et al., 2008), while men are expected to be attuned and supportive toward their wives after childbirth

(Kluwer, 2010). As such, it could be that women express more emotional distress, related to their new maternal role, while empathic men are more attuned to this distress. Thereby, men's empathic tendencies, perspective-taking and empathic concern, are more predictive of men's PPDS at 6 months.

Differences between men and women were also found in the associations of PPDS between them. Although similar gender differences were found in the transmission of negative emotions (Schoebi, 2008), because research on this topic is still lacking (Schreiter et al., 2013), these discrepancies remain inconclusive. Gender differences may be attributed to inherent biological differences, such as normal hormonal changes in the postnatal period that predict PPDS in mothers (Yim et al., 2015), or as discussed above, to different parental roles of men and women after childbirth (for a review see Kluwer, 2010). Future research may illuminate the role of gender in the links between empathy and PPDS or the transmission of PPDS between partners.

Although empathy is an important social skill involved in a range of positive outcomes in intimate relationships (e.g., Plopa et al., 2019), our findings indicate that some types of empathic tendencies can obstruct the observer's psychological well-being. These include greater personal distress and empathic concern in men and greater perspective-taking in women. Adverse effects of empathy have been documented in the past research (Simpson et al., 1999, 2003). Some scholars have argued that under threatening conditions, an accurate perception of the partner's emotions can generate distress in the observer (Ickes & Simpson, 2004; Simpson et al., 2003). Partner's PPDS can be a threatening situation because it generates uncertainty about the relationship (Knobloch & Knobloch-Fedders, 2010) and develops during a sensitive and tumultuous stage of becoming parents (Kluwer, 2010). As such, empathy in men and women has been shown to risk the observers' psychological well-being.

Clinical implications

Postpartum depressive symptoms is a common issue in new parents (Vesga-López et al., 2008). Given the adverse outcomes of PPDS in parents and their children, it is imperative to ameliorate PPDS in young parents. The present study shows that over 6 months after birth, PPDS in men and women is mainly a result of each parent's own mental state at 3 months after birth. However, different forms of empathy may place the couple at risk of exacerbating PPDS. These findings suggest that it is critical to provide interventions designed to treat PPDS not only in women but also in men and at an early stage after birth. It may also be beneficial to provide psycho-educational interventions to new parents focused on increasing awareness on how interpersonal process may affect their mental health. These interventions should be gender-sensitive. For example, interventions can foster perspective-taking in men, which was found to predict lower levels of PPDS. In contrast, given that greater perspective-taking may place women at risk for greater PPDS, women may need to be encouraged to focus on their new parenting role. The present study was able to predict even before birth the risk factors for the development of greater PPDS, suggesting that interventions should be provided before birth to prevent PPDS.

Limitations and future directions

The present study tested an original research question focused on the role of empathy in PPDS transmission between parents. However, several methodological limitations should be considered when interpreting the findings. First, our sample consisted of Israeli couples, mostly from a high socioeconomic status (SES), which may explain some of the discrepancies between the current findings and previous research, such as the relative absence of cross-partner PPDS associations. Israeli culture endorses traditional family values, one of which is the high involvement of grandparents in the lives of their children and their intensive support provision (Lavee & Katz, 2003). Also, high SES is inversely related to PPD, accounting for some of the discrepant PPD rates across countries (Hahn-Holbrook

et al., 2018). It could be that grandparent involvement combined with high SES is promotive resource against the adverse effects of partner PPDS or empathic tendencies on the mental state of parents. Therefore, our findings should be replicated in future studies using larger and more diverse samples in terms of SES and different cultural contexts.

Second, the study design enabled testing prospectively reciprocal over-time relations between parents. However, the timing of the assessments may be limited in several ways. First, given that prenatal depression is a significant risk factor for PPDS (Ansari et al., 2021), future research should assess and control it. Moreover, the current study assessed trait empathic tendencies prebirth, at an early stage of the transition to parenthood. This may aid in the development of prevention interventions against PPDS before couples become parents, based on their relatively stable personality characteristics. However, given that depressive symptoms may impede empathy (Gadassi et al., 2011), future research should explore whether changes in *state* empathy postpartum affect PPDS transmission.

CONCLUSION

The present study showed that PPDS in men and women at 6 months after birth were mainly predicted by their own PPDS levels at 3 months. However, different forms of empathy operated differently and distinctively in men and women in predicting PPDS levels and the associations of PPDS between parents from 3 to 6 months after childbirth. These findings emphasize the multifaceted role of empathy in the development of PPDS.

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