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Links between paternal depressive symptoms, parental sensitivity and children's responsiveness: A study on Israeli children with feeding disorders

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This study examined mechanisms by which paternal depressive symptoms are related to children's responsiveness to their fathers and mothers among children with feeding disorders (FD). Participants included 28 children diagnosed with FD and their parents and 27 children and parents in non-FD families. Measures included paternal reports of depressive symptoms and videotaping of parents' sensitivity and children's responsiveness, as exhibited during play and feeding interactions. Analyses revealed that in both groups, paternal sensitivity mediated the link between paternal depressive symptoms and children's responsiveness to their fathers. However, crossover effects of paternal depressive symptoms on the mother-child relationship were evident only among the FD group. Specifically, paternal depressive symptoms were linked to lower maternal sensitivity, which in turn, was linked to children's reduced responsiveness to their mothers. The paper discusses the role of paternal depressive symptoms in the parent-child relationship, especially in families having children with FD, as well as different mediation processes for mothers and fathers.

Keywords: depression; father-child interaction; mother-child interaction; feeding disorders; mediation model; parental sensitivity

The present study examines the role of paternal depressive symptoms in parent-child interactions among families of children with nonorganic-based feeding disorders (FD). The study's theoretical framework is conceptually grounded on the cumulative risk perspective (Rutter, 1983, 1993) and the family system theory (Minuchin, 1985). According to the cumulative risk perspective (Rutter, 1983, 1993), multiple factors influence the parent-child relationship in a cumulative manner (e.g., Atzaba-Poria, Pike, & Deater-Deckard, 2004; Sameroff, 1998). Rutter (1990) postulated that parental depression should be understood along a continuum of risk factors. Supporting this idea, it was found that when parental depression is accompanied by additional risk factors such as psychopathology, family conflict, or child illness, the risk for negative parent-child interactions may be intensified (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001). The current study addressed this issue by examining the *manner* by which factors originated at the child (i.e., FD) and parent levels (i.e., paternal depressive symptoms) act together in putting families at greater risk for exhibiting difficulties in the parent-child relationship (i.e., less sensitive parenting and less responsive children). Another theoretical framework guiding this research is the family system perspective (Minuchin, 1985). It is suggested that the family should be seen as an organized system and the individual as a

contributing member and as part of a process that creates and maintains the patterns that regulate his or her behavior. Parke and Tinsle (1982) highlighted mutual effects inside the family system among families of high-risk infants. They pointed out that characteristics and behaviors of individuals in a family affect other family members and shape the quality of their relationships (Parke & Tinsley, 1982). One of the main implications of these theoretical concepts is the investigation of *crossover effects*, defined as "the transfer of affect or behavior between people" in the family system (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009, p. 3). An example of a crossover effect is when depressive symptoms experienced by one partner are detrimental to the other partner's relationship with a child.

Child feeding disorders

Childhood FDs have been defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM IV; American Psychiatric Association, 1994) as "persistent failure to eat adequately with significant failure to gain weight or significant loss of weight over at least one month", without evidence of any other general medical conditions or mental disorders that may account for the feeding problem and onset before the age of six years (American Psychiatric Association, 1994, p. 98). Failure

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to thrive (FTT), a term often used in the diagnoses of FDs, refers to children below the 5th growth percentile or children who exhibit weight loss of more than two major growth percentiles (Bauchner, 2007). The pediatric literature distinguishes between *Organic FTT*, marked by an underlying medical condition, and *Nonorganic FTT (NOFTT)* without any known medical condition explaining the growth deficiency (Bauchner, 2007). The current study focused on children who exhibit NOFTT, meaning children with a significant growth deficiency, not explained by any underlying medical condition.

Aiming to understand the nature of this disorder, research has focused primarily on the quality of the mother-child relationship when raising children with FD (e.g., Lindberg, Bohlin, & Hagekull 1996; Sanders, Patel, Le Grice, & Shepherd, 1993). Studies demonstrated that mothers of children with FD showed less sensitivity, more coercion and tended to implement more aversive instructions while interacting with their children compared to mothers of children without FD (Sanders et al., 1993). Correspondingly, children with FD expressed more non-compliance and oppositional behavior toward their mothers (Sanders et al., 1993), and were described as more apathetic and difficult than were healthy children (Chatoor, Ganiban, Hirsch, Borman-Spurrell, & Mrazek, 2000). Specific maternal and child factors associated with the dysfunctional interactions among children with FD and their mothers were found. For example, maternal depressive symptoms (Ammaniti, Lucarelli, Cimino, D'Olimpio, & Chatoor, 2010) as well as children's difficult temperament (Chatoor et al., 2000) were positively correlated with negative mother-child feeding interactions.

We recently reported that not only the mother-child interaction is at-risk in families having FD, but also the father-child interaction (Atzaba-Poria et al., 2010). Specifically, father-child dyads of children with FD were characterized by lower levels of paternal sensitivity as well as lower levels of child responsiveness compared to parent-child dyads from a healthy control group (Atzaba-Poria et al., 2010). However, to the best of our knowledge no research has investigated the paternal factors (e.g., paternal depressive symptoms) associated with the negative interactions between fathers and children with FD.

Paternal depression

Depression is a frequent and often disabling psychiatric disorder which is considered a major public health concern (Blazer, Kessler, McGonagle, & Swartz, 1994). Although depression is less prevalent among men than women (Eaton et al., 1997; Nolen-Hoeksema, 1987) research indicates that a substantial number of men experience depressive symptoms, particularly during the child-rearing years (Kane & Garber, 2004). Still, most research focused on the association between, maternal depressive symptoms

and the mother-child relationship, whereas, little is known about the effects of paternal depressive symptoms on young children. The few studies focusing on fathers indicate that paternal depressive symptoms are associated with less optimal father-child interactions (Paulson, Dauber, & Leiferen, 2006; Zaslow, Pederson, Cain, Suwalsky, & Kramer, 1985) and have harmful effects on child outcome (Ramchandani et al., 2008). The elevated levels of stress associated with the upbringing of a child with a disability places fathers at high risk for experiencing depressive symptoms (e.g., Mu, 2004; Olsson & Hwang, 2001; Veisson, 1999). Child FD is considered to be highly stressful for parents, in particular due to children's refusal to eat and their low weights (Chatoor et al., 2000). Parental stress may also be increased by the behavior problems and difficult temperament often characterizing children with FD compared to non-FD children (e.g., Ammaniti et al., 2010; Chatoor et al., 2000). Indeed, child FD has been associated with elevated levels of depressive symptoms among mothers (e.g., Ammaniti et al., 2010). However, most studies focused on mothers and have neglected fathers.

Links between parental depressive symptoms, parental sensitivity and child responsiveness

One of the main parenting behaviors put at-risk when fathers experience depressive symptoms is their parental sensitivity. The current research examines sensitivity using the Emotional Availability Scales (EA) (Biringen, Robinson, & Emde, 1998). The definition of sensitivity in the EA is inspired by the conceptualization proposed by Mary Ainsworth (Ainsworth, Blehar, Waters, & Wall, 1978) emphasizing parental qualities such as accurate perception and response to child's signals and communications, as well as awareness of timing and flexibility. However, Biringen and her colleagues' (Biringen et al., 1998) definition of sensitivity is broader, emphasizing the affective claimant of the interaction and the ability to negotiate conflict with the child (Biringen, 2000). Parental depressive symptoms, such as sadness, fatigue, irritability, and emotional withdrawal, may compromise the parent's emotional availability to their children and their ability to interact with them in a sensitive manner (Cummings & Cicchetti, 1990). Research on the effect of depressive symptoms on parental sensitivity has focused mainly on mothers. Maternal depression has been linked to lower ability to provide effective emotional regulation (e.g., Martins & Gaffan, 2000) and higher levels of intrusiveness and negativity in mother-child interactions (e.g., Cummings & Davies, 1994). Similarly, maternal depressive symptoms have been found to be associated with less sensitivity to infants' cues (Murray, Fiori-Cowley, & Hooper, 1996). Furthermore, maternal depressive symptoms were also negatively associated with maternal sensitivity as measured by the EA scales (Easterbrooks,

Biesecker, & Lyons-Ruth, 2000; Lok & McMahon, 2006; Trapolini, Ungerer, & McMahon, 2008). To the best of our knowledge, no research exists that examines possible links between paternal depressive symptoms and paternal sensitivity. However, the few studies which investigated associations between paternal depressive symptoms and general caregiving behaviors reported inconclusive results. On the one hand, studies suggested that higher levels of paternal depressive symptoms were associated with less positive interactions with the infant, such as reading and singing (Paulson et al., 2006) and less engagement in infant touching and caregiving (Zaslow et al., 1985). In addition, recently, using a nationally representative sample Cabrera, Hofferth, and Chae (2011) reported that fathers' depressive symptoms were significantly associated with less caregiving and physical play, but only among African American fathers, and not among White and Latino fathers (Cabrera et al., 2011). On the other hand, there is research to suggest that fathers with depressive symptoms do not differ in their interactions with their children in aspects such as physical activity, facial expressions, vocalizations, and affect from fathers without depressive symptoms (Field, Hossain, & Malphurs, 1999). These inconsistent findings may be a result of methodology differences between studies. Each of these studies focused on different aspects of the parent-child relationship. Furthermore, while two of the studies used a self-report questionnaire to assess the father-child relationship (Cabrera et al., 2011; Paulson et al., 2006), the other two studies utilized observational measures (Field et al., 1999; Zaslow et al., 1985). As opposed to previous research focusing on general caregiving behaviors, the current study addresses the link between paternal depressive symptoms and sensitivity, a specific interactional quality measure, which has been shown to be associated with maternal depressive symptoms (Easterbrooks et al., 2000; Lok & McMahon, 2006; Trapolini et al., 2008).

Having a parent experiencing depressive symptoms may greatly affect children's interactional behavior with their parents. Children may adopt cognitions, behavior, and affect that resemble those exhibited by their depressed parents (Goodman & Gotlib, 1999). Indeed, it was found that children of mothers with depression exhibited lower levels of responsiveness than children of nondepressed mothers (e.g., Field, 1995). For example, they looked at their mothers less often, engaged less with objects, showed less positive affect and had lower activity levels compared to infants of mothers without depression (Field, 1995). Furthermore, research shows that the low responsiveness and high-negative affect that characterizes infants of mothers with depression are generalized to the infants' interactions with unfamiliar adults (Field et al., 1988; Weinberg & Tronick, 1998). This finding suggests that maternal depression may affect the infant's broader interactional behaviors (Weinberg & Tronick, 1998). To date, to the best of our knowledge, there has not been any research examining the

links between paternal depressive symptoms and child's responsive behavior in the first years of life. Evidence of the effect of paternal depression on children's behavior arises from research on school aged children and adolescents. These studies suggested that fathers' depressive symptoms are specifically associated with negative emotional and behavioral problems among children (Kane & Garber, 2004; Spector, 2006), over and above the effects of maternal depressive symptoms (Marchand & Hock, 1998).

One mechanism by which parental depressive symptoms may affect children's behavior is through parental sensitivity. Previous research using the EA scales found positive associations between maternal sensitivity and child responsiveness (e.g., Aviezer, Sagi, Joels, & Ziv, 1999; Kogan & Carter, 1996). The less sensitive parental behavior of depressed parents may be negatively arousing for children, interfering with their emerging capacities to regulate emotion (Tronick, 1989). Over time, children of depressed parents may withdraw and be unresponsive while interacting with the parent in order to avoid an aversive state of dysregulation associated with less sensitive or less responsive parenting (Cummings & Davies, 1994).

Finally, previous research on parental depressive symptoms has focused mainly on the child's relationship with the depressed parent (e.g., Field et al., 1999; Murray et al., 1996). However, guided by the family system theories emphasizing crossover mechanisms and the mutual influences between family subsystems (Nelson et al., 2009), it is proposed that parental depressive symptoms have not only direct impacts on their own relationship with their children, but also indirectly influences on the mother-child relationship. For example, previous research found that parental depression (among mothers and fathers) is associated with low affective expression across all family interactions, including interactions between the nondepressed parent and the child (Jacob & Johnson, 1997). In addition, father-infant interactions were less optimal in cases when fathers had a depressed spouse, in comparison to fathers without a depressed spouse (Goodman, 2008).

The current study

Our examination of paternal depressive symptoms and its links to the parent-child interaction is novel in a couple of ways. First, this research focuses on the paternal, rather than maternal, depressive symptoms, when studying the process of risk. Second, the study examines the mediation models in both high-risk (FD) and low-risk (Non-FD) families. Specifically, we hypothesized that:

- (1) Paternal sensitivity will mediate the link between paternal depressive symptoms and children's responsiveness to their fathers. Specifically, fathers with

depressive symptoms will be less sensitive while interacting with their children, who in turn will be less responsive.

- (2) Paternal depressive symptoms will have a crossover effect on the mother-child relationship. Specifically, when fathers experience depressive symptoms, their spouses will show lower levels of sensitivity while interacting with their children. Children, in turn, will be less responsive to their mothers.
- (3) Considering the cumulative risk perspective (Rutter, 1990), indicating that high- and low-risk groups may be differently affected by parental depressive symptoms (e.g., Carter et al., 2001), it is hypothesized that the effects of paternal depression will differ for the two groups (FD vs. Non-FD). That is, paternal depression will be more strongly related to parental sensitivity and children's responsiveness among the FD group than among the comparison group.

Methods

A priori power calculations were conducted using the G*power program (Faul, Erdfelder, Buchner, & Lang, 2009). Based on previous findings in pediatric clinical samples, large effect sizes were expected (e.g., Dufton, Dunn, & Compas, 2009; Huss, Derefinco, Milich, Farzam, & Baumann, 2009). It was found that as a large-effect size (.35) was expected, and regression analyses were planned to involve not more than two predictors (i.e., first & second hypotheses), when $\alpha = .05$ and 80% power was desired, the minimum number of participants required was 20.

Sample

Fifty-five 1- to 3-year-old children ($M = 1.87$, $SD = .77$), their mothers and fathers participated in the study. All mothers were married to the child's biological father. Twenty-eight children (68% girls; Mean age = 1.86, $SD = .83$) diagnosed with nonorganic-based feeding problems were recruited from the Psychiatric Infant Unit and the Pediatric Day Care Unit at the largest medical center in the area (i.e., FD group). Children in the FD group were below the 5th percentile or had rapidly dropped two major percentile lines on the growth chart. No physiological reasons were found for their difficulties to gain weight. Twenty-seven children (49% girls; Mean age = 1.88, $SD = .70$) were recruited from mainstream daycares and matched to the FD group for age, gender, birth order and maternal education (i.e., comparison group). These children exhibited no feeding problems or developmental difficulties.

Demographic information regarding the children and their parents is presented separately for each group in Table 1. As can be seen, all children as well as the vast majority of the mothers and fathers were born in Israel. The mothers' age ranged from 22 to 42 years of age ($M = 30.93$, $SD = 5.19$), and fathers' age ranged from

24 to 47 years ($M = 33.67$, $SD = 5.42$). The number of children in the family was between one and five, with most participating children being the first or second born. Older mothers and fathers had more children ($r = .68$, $p < .001$ and $r = .60$, $p < .001$, for mothers and fathers, respectively). No significant differences were found between the FD group and the comparison group in terms of parental age, child's birth order and number of children in the family.

The sample was diverse in terms of parental years of education, with most mothers and fathers in the FD and comparison groups having at least completed high-school (Table 1). No significant differences were found in terms of parental education between the FD and the comparison groups.

Procedure

The study received Helsinki Review Board approval. Two researchers visited all recruited families at home during afternoon snack time. The same researchers visited both groups and were blinded to the sample details. The home visits lasted 2–3 hours. Parents signed informed consent forms and both parents separately completed questionnaire booklets. Parent-child interactions were filmed in two different contexts:

Parent-child feeding interaction

The feeding interaction included a light meal (e.g., snack) or dinner, according to the child and parents' preferences. The parent was asked to feed the child a typical meal. Parents and children were encouraged to eat as long as necessary and in their usual manner. On average, feeding interactions lasted 12 minutes.

Parent-child playing interaction

The play session included two different play contexts (structured and unstructured play) in order to obtain a broad range of behaviors. In the structured play episode (5 minutes), parents and children were instructed to build together a train/tower using blocks, to find a hidden duck under cups and to read a story. In the free (unstructured) play episode, parents and children received various toys (dolls, building blocks, cars, books, puzzles, etc.) and were asked to play as they usually do. After five minutes there was a short clean-up session, in which they were asked to organize the toys together (two minutes). Combined, the play sessions lasted approximately 12 minutes. All parents reported the interactions to be enjoyable for the children and for themselves.

Once the initial interactions were completed, parents swapped roles and the child played with the second parent. The home visit concluded with a dinner in which the second parent fed the child. In 50% of the cases, the fathers were videotaped first with the children.

Table 1. Demographic information by group.

		FD group N = 28	Non-FD group N = 27
<i>Child variables</i>			
Age (years)	Under 2 years	61%	69%
	Over 2 years	39%	31%
Gender	Male	9 (32.1%)	14 (51%)
	Female	19 (67.9%)	13 (49%)
Gestational age at birth (weeks)	M(SD)	38.88 (1.55)	39.54 (2.37)
Birth weight (grams)	M(SD)	2892.27 (479.05)	3268.31 (502.20)
Birth order	1 st	13 (46.4%)	9 (33.3%)
	2 nd -3 rd	12 (42.8%)	16 (59.3%)
	4 th -5 th	3 (10.7%)	2 (7.4%)
Number of children in the family	1	9 (32.1%)	9 (33.3%)
	2-3	15 (53.6%)	17 (59.2%)
	4-5	4 (14.3%)	2 (7.4%)
<i>Maternal variables</i>			
Age (years)	M(SD) total	31.55 (5.70)	30.28 (4.64)
	20-30 years	40%	52%
	30-40 years	52%	44%
	Over 40	8%	4%
Education	Less than 8 years of studies	None	None
	8-12 years of studies	12 (42.9%)	14 (48.1%)
	Higher National Certificate	6 (21.4%)	1 (3.7%)
	Academic education	10 (35.7%)	13 (48.1%)
<i>Paternal variables</i>			
Age (years)	M(SD) total	34.75 (5.30)	32.63 (5.43)
	20-30 years	32%	32%
	30-40 years	52%	60%
	Over 40	16%	8%
Education	Less than 8 years of studies	-	-
	8-12 years of studies	11 (39.3%)	14 (51.8%)
	Higher nonacademic qualification	6 (21.4%)	4 (14.8%)
	Academic education	11 (39.3%)	9 (33.3%)

All play and feeding sessions were videotaped and coded separately. High correlations were found between the playing and the feeding interactions for the parental sensitivity ($r = .66$ for fathers and $r = .62$ for mothers) and child's responsiveness ($r = .65$ for fathers and $r = .67$ for mothers). Therefore, a mean score of the two interactions was calculated as a composite score.

Measures

Socio-demographic information

Mothers completed a demographics questionnaire, which included questions about parental education and occupation, familial medical history and children's developmental history.

Parental depression symptomatology

Fathers and mothers completed the Center for Epidemiologic Depression (CES-D) Scale (Radloff, 1977). The CES-D is a widely used self-report scale designed to measure level of depressive symptoms in the

general population. Scores range from 0 to 60 with high scores reflecting higher levels of depressive symptoms in the past week. Fathers and mothers were asked to describe their feelings and behaviors during the last week (e.g. "I felt lonely"). Items were rated on a four-point Likert scale, ranging from 0 = rarely or none of the time (Less than 1 day) to 3 = most or all of the time (5-7 days). A score of 16 or higher in the CES-D is indicative of high risk for depressive symptomatology. Internal reliability for this 20-item questionnaire was high ($\alpha = .83$ and $\alpha = .90$, for paternal and maternal reports, respectively).

Parent-child interaction

Paternal and maternal sensitivity, as well as children responsiveness to their mothers and fathers, were coded using the third edition of the EA Scale developed by Biringen et al. (1998). Each of the variables was coded on a Likert scale. *Parental sensitivity* (nine-point scale) involves an integrated assessment of the parent's affect, accessibility, perceptual clarity, appropriateness of

responses and timing, flexibility, variety, and creativity in the interaction, acceptance of the child, amount of interaction and style of conflict negotiation. High scores (7–9) refer to sensitive parenting in which the parent successfully reads the child's emotional cues and is emotionally responsive to the child. Midrange scores (4–6) refer to apparent sensitivity, in which the parent seems generally warm, but the relationship sometimes lacks a real connection that is in the best interests of the child. Low scores (1–3) refer either to passive or harshly disconnected ways of interacting. *Children's responsiveness* (7-point scale) reflects the children's eagerness to engage with the parent, following a bid for exchange, and the children's ability to display pleasure during the interaction. High scores (7) refer to children that are consistently responsive to parental bids and seem eager to engage with their parents. Midrange scores (5–6) refer to children who accept a moderate degree of parental bids, and show a moderate degree of pleasure within the interaction. Low scores (1–3) refer to children who accept only few or none of the parent's bids and express little or no positivity within the interaction. Neutrality or negativity may be the dominant affective state among these children.

Three trained research assistants, who did not participate in the data collection and were blinded to any information about the families, coded the videotapes. For reliability purposes 20% of the videotapes were randomly selected and rated by all coders. Interclass coefficients were calculated for each of the interaction scales, and all scales showed excellent interrater reliability (ranging from .95 to .97).

Results

Preliminary analyses

Normal distribution of all variables was first examined. As indicated by the skewness and kurtosis values (ranging between 1 and -1) all study variables were normally distributed. Next, the distribution of paternal depressive symptoms as well as paternal and maternal sensitivity and children's responsiveness to their mothers and fathers were explored. As can be seen in Table 2, most fathers in both groups did not report having high levels of depressive symptoms ($CES-D < 16$). Furthermore, most parent-child dyads in both groups exhibited midrange levels of parental sensitivity and child responsiveness during parent-child interactions (parental sensitivity > 3 ; child responsiveness > 3). Next, mean-level differences between FD and comparison groups for all variables were examined using *t*-tests. As can be seen in Table 3, only paternal sensitivity and children's responsiveness to their fathers and mothers significantly differed between the groups. That is, FD fathers showed lower levels of paternal sensitivity ($t(53) = 2.47, p < .05$) than fathers in the control group, and their children exhibited lower levels of

responsiveness to them ($t(53) = 3.63, p < .001$) and to the mothers ($t(53) = -3.44, p < .001$). No significant group differences were revealed for paternal depressive symptoms ($t(53) = -1.10, ns$), maternal depressive symptoms ($t(58) = -.78, ns$) or for maternal sensitivity ($t(53) = .59, ns$). Finally, links between study variables and all demographic variables (i.e., child's age and gender, parental age and education) were examined. No significant associations were found.

Next, Pearson correlations were conducted for each group among the model variables. As shown in Table 4, in both groups paternal depressive symptoms were negatively associated with paternal sensitivity. In addition, paternal and maternal sensitivity were positively associated with children's responsiveness to their mothers and fathers. Furthermore, children's responsiveness to their mothers and fathers were positively linked. However, a different pattern of correlations was seen for the two groups, with paternal depressive symptoms being significantly linked to maternal sensitivity and to children's responsiveness to their mothers but *only* in the FD group.

Next, following the distinct pattern of correlations revealed for the two groups, a full-sample analysis was conducted examining whether the mediation models can be tested together for the whole sample or whether they should be examined for each group separately. All analyses were conducted after controlling for maternal depressive symptoms. First, we conducted a multiple regression analysis in which the variables paternal depressive symptoms, group (FD vs. Non-FD) and group \times paternal depression were the independent variables and children's responsiveness to fathers was the dependent variable. As can be seen in Table 5, paternal depressive symptoms and group significantly predicted children's responsiveness to fathers. However, the interaction variable (group \times paternal depression) did not significantly predict children's responsiveness to their fathers, suggesting similar processes in both groups. Accordingly, the mediation model via paternal sensitivity (hypothesis 1) was tested for the whole sample together ($n = 55$). Second, we conducted a multiple regression analysis in which the variables paternal depressive symptoms, group (FD vs. Non-FD) and group \times paternal depression were the independent variables and children's responsiveness to mothers was the dependent variable. Paternal depressive symptoms and group significantly predicted children's responsiveness to mothers (see Table 5). However, the interaction variable (group \times paternal depression) significantly predicted children's responsiveness to their mothers ($\beta = -.25, p < .05$), indicating a different pattern for the two groups. Furthermore, because there were no direct effects between paternal depressive symptoms and maternal sensitivity and children's responsiveness to mothers in the comparison group, the mediation analysis via maternal sensitivity was calculated only for the FD group ($n = 28$).

Table 2. Distributions of paternal depression, parental sensitivity and child responsiveness by group.

		FD group	Non-FD group
Paternal depression	High risk (>16)	7 (25.2%)	4 (14.8%)
	Low risk (<16)	21 (74.8%)	23 (85.2%)
Paternal sensitivity	High score (7–9)	1 (3.6%)	2 (7.6%)
	Midrange score (4–6)	22 (78.7%)	23 (88.3%)
Maternal sensitivity	Low score (1–3)	5 (15.6%)	1 (3.8%)
	High score (7–9)	2 (6.9%)	4 (15.3%)
Child responsiveness to father	Midrange score (4–6)	24 (82.7%)	19 (73%)
	Low score (1–3)	3 (10.3%)	3 (11.5%)
Child responsiveness to mother	High score (7)	–	–
	Midrange score (4–6)	19 (67.7%)	27 (96.4%)
Child responsiveness to father	Low score (1–3)	9 (32.3%)	1 (3.6%)
	High score (7)	–	–
Child responsiveness to mother	Midrange score (4–6)	21 (72.7%)	29 (96.7%)
	Low score (1–3)	8 (27.3%)	1 (3.3%)

Table 3. Means, (standard deviations) of study variables by group.

Measure	FD group (N = 28) M(SD)	Non-FD group (N = 27) M(SD)
Paternal depressive symptoms	.54 (.38)	.44 (.30)
Paternal sensitivity	4.98 (1.07)	5.64 (.86)
Maternal sensitivity	5.41 (1.41)	5.64 (1.35)
Children's responsiveness to fathers	4.29 (.96)	5.14 (.79)
Children's responsiveness to mothers	4.44 (1.17)	5.33 (.78)

Table 4. Correlations among research variables by groups.

	1	2	3	4	5
1. Paternal depressive symptoms	–	–.53**	–.02	–.23	–.06
2. Paternal sensitivity	–.49**	–	.35t	.74***	.42*
3. Maternal sensitivity	–.48*	.27	–	.47*	.75***
4. Child's responsiveness to father	–.50**	.83***	.42*	–	.57**
5. Child's responsiveness to mother	–.57***	.51**	.67***	.66***	–

Note: Figures below the diagonal represent correlations among the FD group, whereas those above the diagonal represent correlations among the Non-FD group.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5. Regression weights (β) and explained variance (R^2), for paternal depressive symptoms, group (FD vs. Non-FD) and children's responsiveness to fathers and mothers.

Step	Variables	Children's responsiveness to fathers $R^2 = .38^{***}$		Children's responsiveness to mothers $R^2 = .37^{***}$	
		β	ΔR^2	β	ΔR^2
1	Paternal depressive symptoms	–.32**	.34***	–.30*	.29***
	group (FD vs. Non-FD)	–.41**		–.35**	
2	Paternal depressive symptoms x group (FD vs. Non-FD)	–.11	.01	–.25*	.06*

Note: These analyses were conducted while controlling for maternal depressive symptoms.

* $p < .05$; ** $p < .01$; *** $p < .001$.

A mediation model of paternal depressive symptoms and children's responsiveness by parental sensitivity

The two mediation models were tested using a set of multiple regressions. In the first model, paternal depressive symptoms was the independent variable, paternal sensitivity was the mediator and child responsiveness to the father was the dependent variable. This analysis indicated that paternal sensitivity fully mediated the link between paternal depressive symptoms and children's responsiveness to their fathers (see Figure 1). Specifically, paternal depressive symptoms were related to paternal sensitivity (i.e., the more depressed fathers were, the lower the sensitivity levels demonstrated while interacting with their children), which, in turn, was related to children's responsiveness to their fathers (i.e., the lower paternal sensitivity, the lower the children's responsiveness). In this model, paternal depressive symptoms significantly predicted child responsiveness to the father ($\beta = -.40, p < .01$) when the mediator was not included in the model. However, this beta dropped to .00 (ns) upon the addition of paternal sensitivity, indicating full mediation ($R^2 = .67, F(3,45) = 30.60, p < .001$). The decrease in the beta weight once paternal sensitivity was included indicates that the link between paternal depressive symptoms and children's responsiveness to fathers was fully explained by lower paternal sensitivity (see Figure 1). A Sobel test for significance revealed that this mediation was significant ($Z = -3.66, p < .001$). These results were obtained after controlling for maternal depressive symptoms.

In the second mediation model, paternal depressive symptoms was the independent variable, maternal sensitivity was the mediator and child responsiveness to the mother was the dependent variable. As mentioned above, the mediation model via maternal sensitivity was tested only among the FD group. It was found that maternal sensitivity partially mediated the link between paternal depressive symptoms and children's responsiveness to their mothers (see Figure 2). That is, paternal depressive symptoms predicted children's responsiveness to their mothers ($\beta = -.41, p < .01$) when the mediator was not included in the model. However, this beta dropped to $-.30$

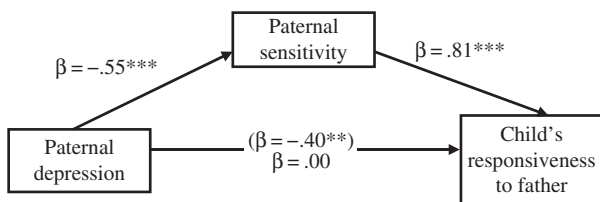


Figure 1. Paternal sensitivity fully mediates the link between paternal depressive symptoms and children's responsiveness to their fathers.

Note: Mediation analyses were conducted while controlling for maternal depression; Beta coefficients in parentheses are prior to the insertion of the mediator; ** $p < .01$; *** $p < .001$.

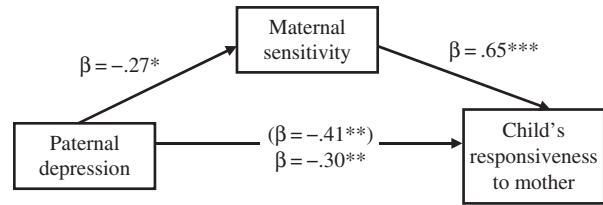


Figure 2. Maternal sensitivity partially mediates the link between paternal depressive symptoms and children's responsiveness to their mothers.

Note: Mediation analyses were conducted while controlling for maternal depression; Beta coefficients in parentheses are prior to the insertion of the mediator; ** $p < .01$; *** $p < .001$.

($p < .05$) upon the addition of maternal sensitivity, suggesting a partial mediation ($R^2 = .53, F(3,25) = 10.51, p < .001$). The decrease in the beta weight once maternal sensitivity was included indicates that paternal depressive symptoms had a direct as well as indirect effect on children's responsiveness to their mothers (see Figure 2). Finally, a Sobel test for significance revealed that this mediation was significant ($Z = -2.00; p < .05$). These results were found after controlling for maternal depressive symptoms.¹ As the study is cross-sectional, results should be interpreted with caution.

Discussion

This study examined mechanisms by which paternal depressive symptoms are related to children's responsiveness to their fathers and mothers in the context of children with FD. Different mechanisms linking paternal depressive symptoms and parent-child interactions were revealed for the two groups (FD and non-FD) and for fathers and mothers, suggesting distinct processes. Results are discussed in light of previous research on parental depression and parenting, while considering the particularly stressful situation of raising children with FD.

Paternal depressive symptoms, paternal sensitivity and child responsiveness

Paternal sensitivity mediated the link between paternal depressive symptoms and children's responsiveness to their fathers. Specifically, elevated paternal depressive symptoms were linked to lower levels of paternal sensitivity which, in turn, were related to decreased children's responsiveness to their fathers. This mediation process was evident throughout the entire sample. These results are in line with previous research indicating links between maternal depressive symptoms and maternal sensitivity (Easterbrooks et al., 2000; Lok & McMahon, 2006; Trapolini et al., 2008) as well as links between maternal depression and child responsiveness (Field, 1995; Weinberg & Tronick, 1998). These findings also support

the model for understanding effects of parental depression on children suggested by Goodman and Gotlib (1999). Goodman and Gotlib (1999) suggested that one mechanism that may explain the transmission of risk between depressed parents and their children is through exposure to negative cognitions, behaviors and affect exhibited by the parent. These behaviors turn the parent into an inadequate social partner for the child, failing to meet the child's social and emotional needs and negatively affecting the child's development of social skills.

Crossover effects of paternal depressive symptoms among the FD group

Supporting family system theory stressing mutual influences between family subsystems (Cox & Paley, 2003; Nelson et al., 2009) and crossover effects of paternal depression (Jacob & Johnson, 1997, 2001), paternal depressive symptoms had a crossover effect to the mother-child relationship – but only among the FD group. Specifically, only in the FD context, higher paternal depressive symptoms were linked to lower levels of maternal sensitivity, which in turn were linked to decreased children's responsiveness to their mothers. This pattern of correlations was not evident in the comparison group. We note that these effects were small.

It is noteworthy that maternal sensitivity only *partially* mediated this link. That is, paternal depressive symptoms also had a *direct effect* on children's behavior to their mothers, over and above the effect of maternal sensitivity. These results are in line with the finding that parental depression may affect the children's broader interactional behaviors, beyond the relationship with the depressed parent (Field et al., 1988). Specifically, it was found children of mothers who experienced depressive symptoms exhibited similar interactional difficulties (e.g., less positive affect and lower activity level) whether they were interacting with their mother or a stranger (Field et al., 1988), suggesting that children's affect and behavior are not simply immediate by-products of the adult partner's interactive style, but possibly reflect broader representations of interactions that develop among children exposed to parental depressive symptoms (Weinberg & Tronick, 1998). The findings from the present study imply children's interaction style is affected not only by maternal depressive symptoms, but also by exposure to paternal depressive symptoms. However, additional research is required in order to establish causal effects.

The stronger correlations seen among the FD group, as well as the crossover effect of paternal depressive symptoms on the mother-child relationship evident only among the FD group, support the risk perspective (Rutter, 1990) suggesting that parental depression should be understood in context, while considering other family risk factors, such as child FD. That is, child FD, in particular children's

refusal to eat and their FTT, may increase parental stress. Furthermore, parental stress may also be intensified by the increased behavior problems and difficult temperament often characterizing children with FD compared to non-FD children (e.g., Ammaniti et al., 2010; Chatoor et al., 2000). Consequently, when another major stressor, such as elevated paternal depressive symptoms is evident, parental function may be compromised (Belsky, 1984) and all family subsystems may be susceptible to the negative aspects associated with these multiple stressors.

Study limitations and future directions

Several limitations should be noted. First, the current study employed a cross-sectional research design. We presumed that paternal depressive symptoms led to lower levels of paternal and maternal sensitivity which, in turn, led to children's negative responsiveness to their parents. Longitudinal designs are required in order to determine the direction of these links. Second, the small sample size employed in the current study limits its statistical power. Although significant moderation and mediation pathways were found, replicating this study with a larger sample size would strengthen the results and may reveal additional smaller (though systematic) effects. Moreover, the selective nature of the study limits the ecological validity and narrows down our ability to draw conclusions regarding the general population of children suffering from FD. An additional limitation refers to the way parent-child feeding interactions were measured. In order to systematically evaluate the feeding relationship, each parent was asked to feed the child alone. This instruction may differ from the normal setting of family meals, where both parents and all children sit together. Nonetheless, all parents confirmed that although the meal's setting may have been different than their norm, the children's feeding interaction was typical. Finally, due to the possible contribution of unique child characteristics to the parent-child relationship, future research should explore how child factors (e.g., temperament, behavior problems) interact with paternal depressive symptoms, and their combined effect on the father-child and mother-child relationship.

Clinical implications

This study focused on two prominent risk factors that may negatively affect family functioning: paternal depressive symptoms and child FDs. Findings from the current study draw attention to two main clinical implications. First, clinicians should acknowledge the adverse consequences that paternal depressive symptoms may impose on the father-child relationship. Traditionally, clinicians have focused on prevention and treatment of *maternal* depression, neglecting fathers' mental state. The findings of this study indicate that elevated paternal depressive

symptoms reduce fathers' sensitivity while interacting with their children, placing the father-child relationship at-risk for negative father-child interactions. Second, the crossover effect among families of children with FD highlights the importance of including fathers in intervention programs. Mother-child interactions may be negatively influenced directly and indirectly by paternal depressive symptoms. Therefore, a triadic (mother-father-child) intervention program may be particularly efficient in the case of children with FD.

Note

1. It should be noted that there may be other third variables operating that could not be controlled due to the relatively small sample size.

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