Parental acceptance, postpartum depression, and maternal sensitivity: Mediating and moderating processes

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Abstract:

Mothers (*n*=92), fathers (*n*=84), and their infants (60% male) participated in a longitudinal study of postpartum depression and maternal sensitivity. Mothers completed questionnaire measures of remembered parental acceptance, depressive symptoms, and infant distress to novelty and limits. Mothers and partners reported on marital aggression and avoidance. Maternal sensitivity was observed in the laboratory at 6 months. Characteristics of mothers, partners, and infants combined to predict postpartum depression and maternal sensitivity. Remembered parental rejection predicted postpartum depressive symptoms with prenatal depression controlled; self-esteem mediated this effect. Paternal acceptance buffered against postpartum depression when infants were highly reactive and when partners were aggressive. Paternal acceptance reduced the impact of postpartum depression on maternal sensitivity; having an aggressive marital partner exacerbated the effect.

Keywords: postpartum depression | maternal sensitivity | remembered parental acceptance & rejection | infant distress | marital aggression & avoidance | self-esteem | mothers | partners

Article:

Approximately 10% to 30% of mothers report clinical levels of depression during the postpartum period, depending on sample characteristics, timing of the assessment, and the depression criterion used (O'Hara & Zekoski, 1988). Both its incidence during this important transition period and evidence linking it concurrently with dysfunctional mother-infant interactions (see Murray & Cooper, 1997, and Seifer & Dickstein, 2000, for reviews) identify postpartum depression as a significant mental health issue for mothers and a potential risk factor for infants. It is important, therefore, to identify conditions that increase or reduce the likelihood of maternal postpartum depression and circumstances that alter the probability that postpartum depression will be associated with dysfunctional patterns of mother-infant interaction.

In this study, we had three goals: (a) to test a model that locates the origins of maternal postpartum depression in the internalized memories of parental acceptance-rejection during childhood through their impact on self-esteem and the marital relationship; (b) to test the

moderating effect of parental acceptance on risk associated with the marital relationship and infant temperament on postpartum depression; and (c) to determine whether mothers' memories of parental acceptance-rejection are linked with maternal sensitivity both directly and indirectly through postpartum depression and through their moderating effect on depression.

Postpartum depression is defined here as a mild to moderate mood disturbance occurring between birth and 6 months postbirth, rather than the less frequent, more severe postpartum psychosis, or the more prevalent but transient blues.

A Developmental Model of Postpartum Depression and Maternal Behavior

From an attachment theory perspective, children construct working models of self and attachment figures in the course of repeated experiences with caregivers, especially parents with whom they have enduring relationships (Bowlby, 1973). When children experience love and acceptance from parents, they view themselves as worthy, expect others to respond to them positively, and engage in behaviors that elicit care and acceptance. When instead they experience rejection, they view themselves as unworthy and unloved, expect others to treat them as such and behave in ways that elicit further rejection. In the absence of intervening events that counteract early experiences, childhood-based models of self and other continue to influence interpretations, emotional reactions, and behavior in adulthood (Sroufe & Fleeson, 1988).

Gotlib and Hammen (1992) incorporated attachment theory in their developmental model of adult depression. They theorized that adults who remember relationships with parents as rejecting or neglecting are at risk for depression because their internalized experiences prompt them to appraise events and to engage in behaviors that confirm their negative expectations and increase feelings of sadness. Numerous retrospective studies report correlations between childhood rejection and adult depression (Bemporad & Romano, 1992). Moreover, this link remains for postpartum depression after controlling for prenatal depression, the most reliable predictor of postpartum depression (Gotlib, Whiffen, Wallace, & Mount, 1991), strengthening the inference of causality from childhood history to maternal postpartum depression.

Mediating Roles of Relationship Behavior and Self-Esteem

From Gotlib and Hammen's (1992) perspective, early experiences of parental rejection predispose individuals to develop depression indirectly through its model-related impact on their current relationships. For adults, these remembered experiences should be especially salient in relationships with marital partners, typically the most intimate and interdependent relationships during this phase of life. Mothers with a childhood history of parental rejection and few expectations of having others respond to their needs may avoid expressing their desires and feelings with partners or engage aggressively to get what they want. As both approaches tend to be ineffective (e.g., aggression often elicits aggression), current experiences confirm their expectations and increase the likelihood of depression. Also, they may choose partners whose aggressive behavior they interpret as further evidence of their low self-worth (Feeney, 1999; Sroufe & Fleeson, 1988).

Associations between childhood experiences with parents, marital relationships, and depression in adulthood are well documented. Research linking negative childhood experiences with parents (or working models of attachment derived from those experiences) and the quality of marital relationships is scant but tends to show that such experiences are associated with problematic marital relationships (P. A. Cowan, Cohn, Cowan & Pearson, 1996; Das Eiden, Teti, & Corns, 1995; Truant, Herscovitch, & Lohrenz, 1987). Moreover, ratings of anger and derogation of parents correlate with independent ratings of anger and derogation of partners, with associations for women apparent exclusively in relation to fathers (Owens, Crowell, Pan, Treboux, O'Connor, & Waters, 1995). Additionally, marital conflict and dissatisfaction correlate positively with women's depressive symptoms (e.g., Campbell, Cohn, Flanagan, Popper, & Myers, 1992) and the marital interaction of depressed persons is characterized by avoidance and withdrawal as well as overt hostility, anger, and criticism (Kahn, Coyne, & Margolin, 1985). Directly relevant to this study, poor prenatal marital relationships predict postpartum depression (C. Cowan, Cowan, Heming & Miller, 1991; Gotlib et al, 1991; Whiffen, 1988). Taken together, these findings support the hypothesis that marital relationships explain in part how remembered childhood experiences influence postpartum depression, although the mediating effect has not been tested.

Childhood experiences with parents may contribute to maternal depression also through one's working model of self (Bowlby, 1973; Bretherton & Munholland, 1999) and the related construct of self-esteem. According toHarter and Marold (1994), self-esteem develops through positive regard from significant others and mediates between that regard and the development of depressive symptoms. There is substantial empirical support linking critical, disapproving, rejecting parental behavior to low self-esteem or poor self-concepts (Harter, 1990; Jaenicke, Hammen, Zupan, & Hiroto, 1987) and the latter to depression in children (Hammen & Goodman-Brown, 1990) and adults (Clark, Beck, & Stewart, 1990). To our knowledge, there have been no prior studies of the mediating role of self-esteem between parental rejection and maternal depression. Moreover, given that feelings of self-worth and relationship behaviors are interrelated constructs, they may act jointly to explain the link between remembered parental rejection and postpartum depression.

Moderating Effects of Remembered Parental Acceptance/Rejection on Postpartum Depression

For depression to occur, proximal conditions must exist that elicit the negative appraisals, emotions, and behaviors characteristic of depression (Gotlib & Hammen, 1992). Thus, current family context should exacerbate or modulate the effect of childhood experiences on postpartum depression. Specifically, new mothers are dependent on partners who bring their own, childhood-based representations and associated behaviors to the relationship, and they are confronted with infants whose behaviors they may interpret as rejection and feel helpless to control. When couples are not equipped to resolve the issues associated with caring for an infant or the infant is highly reactive, the eliciting conditions exist and increase the likelihood of postpartum depression for mothers so disposed. On the other hand, if mothers have loving partners and infants who cry little and soothe easily, they may remain nondepressed, despite a childhood-based predisposition to depression. To our knowledge, there have been no prior attempts to test the moderating effects of the current family context on the link between childhood rejection and maternal postpartum depression. However, there is evidence that both the partner relationship

and infant temperament increase the likelihood of postpartum depression when they coincide with other sources of risk (Murray, Stanley, Hooper, & King, 1996).

A mother's internalized memory of parental acceptance may serve also as a buffer against potential stressors associated with the transition to parenthood. According to Bowlby (1973), there is a strong tendency for individuals to ignore or reinterpret experiences that contradict extant working models. This process of *defensive exclusion* may allow mothers with positive childhood experiences to support their positive views of themselves under adverse conditions, diminishing the risk of postpartum depression. Owens et al.'s (1995) finding that a secure attachment in one partner increases the likelihood of a secure romantic attachment in a partner whose own attachment relationship with parents is insecure, rather than the reverse, is consistent with this thesis. On this basis, we hypothesize that mothers who remember parents as accepting will experience fewer depressive symptoms postpartum under conditions of current family risk than mothers who remember parents as rejecting.

Postpartum Depression and Maternal Behavior

Memory-based representations of childhood experiences are expected to contribute to insensitive maternal behavior in part through their impact on maternal depression. Depressed mothers are thought to interact less sensitively with their infants because their preoccupation with their own negative cognitions and feelings (i.e., self-focus; Pyszczynski & Greenberg, 1987) interferes with their ability to notice and respond contingently to infant cues, the essence of sensitive maternal behavior. Moreover, to the extent that maternal depression reflects mothers' working models of relationships, depressed mothers may interpret infant distress and slowness to calm as rejection and either withdraw or react angrily (Zeanah & Barton, 1989; Ungerer, Sygall, Dolby, & Marvin, 1999).

Associations between maternal depression and less adequate mother-infant interaction abound (see Seifer & Dickstein, 2000). During the first several months after birth, depressed mothers express less positive and more flat or negative affect, less frequently reciprocate positive affect, and are less sensitively responsive to their infants. As would be expected if depression were linked to childhood experiences, Lyons-Ruth (1992) reported that both childhood history and maternal depression predicted hostile-intrusive maternal behavior and that associations between depression and behavior were accounted for entirely by childhood history.

Others have suggested that depression interacts with other family risk factors to influence maternal sensitivity (e.g., Seifer, Sameroff, Anagnostopolou, & Elias, 1992). One such risk factor is an irritable temperament, which interacts with several risk factors to predict maternal behavior (see Crockenberg, 1986; Crockenberg & Leerkes, 2003). Depressed mothers with reactive infants may be at particular risk for insensitive parenting because their infants' characteristics create opportunities for ill-timed or mismatched interactions to occur and lend themselves to negative self-evaluations. A second family risk factor is a dysfunctional marital relationship. Depressed mothers with aggressive partners may be less sensitive because they are preoccupied with partner issues and experience anger that spills over into the mother-child relationship (Boyce, Hickie, & Parker, 1991; Dickstein et al., 1998). On this basis, we expected

postpartum depression to be negatively associated with maternal sensitivity when mothers have easily distressed infants or partners who pursue their own goals aggressively in the marriage.

From an attachment perspective, childhood-based models of self and other influence maternal behavior through the understanding of self and other they embody. Fonagy, Steele, Moran, Steele, and Higgitt (1993) maintain that secure parents are able to see a situation from the infant's perspective, empathize with the infant's emotions, and hence respond to the infant's signals with caring behavior. These model-based competencies may act also as buffers against the negative impact of depression on maternal sensitivity by compensating for the depressed mother's inclination to become absorbed by her depressive thoughts and feelings.

In sum, there is support for the model-based predictions linking mothers' memories of parental acceptance-rejection with postpartum depression and maternal sensitivity as well as evidence that depression mediates between relationships with parents and maternal behavior in a high-risk sample. There is limited support also for an interactive effect of infant reactivity on postpartum depression and maternal behavior. In contrast, there have been no studies of the cumulative and buffering effects of parental acceptance-rejection on the effect of other risk factors on depression or maternal sensitivity. In this study, we replicate extant findings and test model-based mediating and moderating effects. To control for parity, all mothers were primiparous.

Model and Hypotheses

The model of postpartum depression and maternal sensitivity is summarized in Figure 1.

1. Childhood memories of parental acceptance are associated positively with self-esteem and negatively with marital aggression and avoidance and maternal postpartum depression.
2. Self-esteem is associated negatively and marital aggression and avoidance are associated positively with postpartum depression; both mediate between memories of parental rejection and maternal postpartum depression.
3. Childhood memories of acceptance-rejection interact with partners' marital behavior and with infant reactivity to predict postpartum depression. Memories of parental acceptance buffer against risks associated with these factors; memories of rejection exacerbate them.
4. Mothers' memories of parental acceptance are associated positively and postpartum depression is associated negatively with maternal sensitivity. Direct effects of parental acceptance-rejection on maternal sensitivity as well as indirect effects through depression are expected.
5. Mothers' memories of parental acceptance/rejection interact with postpartum depression to predict maternal sensitivity. Memories of acceptance reduce the association between postpartum depression and maternal sensitivity; memories of rejection intensify it.
6. The negative association between postpartum depression and maternal sensitivity is intensified by other family risk factors (i.e., partner aggression and infant reactivity).

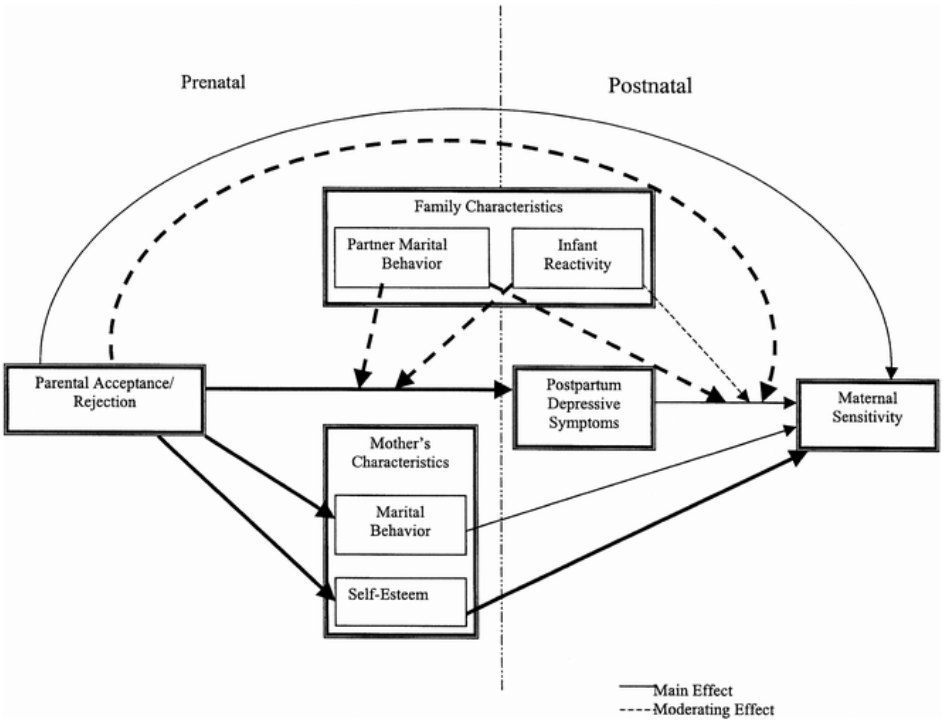

Figure 1. Developmental model of postpartum depressive symptoms and maternal sensitivity. Connecting lines and arrows in boldface indicate proposed pathways, confirmed by analyses.

Method

Participants

Couples were contacted through local birthing classes. Of 137 who agreed to participate, 105 completed all aspects of the study, and 92 met the inclusion criteria of primiparity. The final sample consisted of 92 mothers and 84 fathers, with a mean age of 29.1 (range = 20–41 years) and mean education level of 15.4 years (range = 11–20 years) for mothers and a mean age of 32.0 (range = 23–54) and mean education of 15.8 years (range = 12–20) for fathers. Fathers who did not participate did not differ significantly from participants on any demographic variable. Ninety-four percent of mothers and 93% of fathers were Caucasian;[1] 99% were married or living together. Mean family income was $61,000 (range = $8,000 to $200,000). Sixty percent of the infants were male.

Procedures

During their 7th or 8th month of pregnancy, couples provided demographic data by phone and completed measures of parenting history, depression, and marital relations, which they received and returned by mail. At 5 months postpartum, mothers responded to an infant temperament questionnaire by phone and completed a measure of depression; both parents completed a marital relations measure. To ensure that their responses were independent, mothers and fathers received

[1] No non-Caucasian participants were outliers, and thus all were included in analyses.

separate packets of questionnaires 1–2 months before and 5 months after the birth and were asked not to discuss their responses until they returned them. At 6 months postpartum, mothers and infants were videotaped during a laboratory assessment of maternal sensitivity.

Measures

Parental Bonding Instrument (PBI). The Care scale of the PBI (Parker, Tupling, & Brown, 1979) served as the operational measure of parental acceptance-rejection, reflecting mothers' memories of the extent to which they were accepted-rejected by each parent during childhood. The scale consists of 12 items (e.g., "spoke to me in a warm and friendly voice"; "appeared to understand what I needed or wanted"; "made me feel I wasn't wanted" [reverse scored]) rated on a 4-point scale indicating how well they describe the parent. Items were averaged to derive maternal and paternal acceptance-rejection variables (Cronbach's α = .92. and .94, respectively). These were retained as separate variables to test possible cumulative and buffering effects.

The PBI Care scale has test-retest reliability of .76 over 3 weeks and split-half reliability of .88 (Parker et al., 1979). Scores are stable over 3 years (Gotlib, Mount, Cordy, & Whiffen, 1988) and correlate with parents' self-reports (Parker, 1981). The Care scale also correlates significantly with postpartum maternal depression (Gotlib et al., 1991), cortisol responses to stress (Leucken, 2000), self-esteem (Herz & Gullone, 1999), and maternal behavior (Parker & Gladstone, 1996).

Marital Conflict Questionnaire (MCQ). The MCQ (Rands, Levinger, & Mellinger, 1981) was administered to couples prenatally. It consists of 15 items that assess conflict strategies and 14 items that assess resolution patterns that characterize marital conflicts. Partners rate how well each strategy and resolution pattern describes them on a 4-point scale. Factor scores for marital attack and avoidance correlated negatively with marital satisfaction (Rands et al., 1981), and composite measures of MCQ avoidance and aggression correlated significantly with comparable forms of dysfunctional parental behavior (i.e., permissiveness and coercion, respectively; Crockenberg & Langrock, 2001).

Principal-components factor analyses with varimax rotation were calculated on MCQ items separately for mothers and partners. This yielded three factors with eigenvalues greater than one: Verbal Aggression, Avoidance, and Adaptive Strategies.[2] Items with factor loadings >.50 on that factor, or >.40 if the item loaded at .50 or higher on the partner's scale, were included in each factor to create variables that included as many of the same, construct-appropriate items as possible for both partners. Verbal aggression consists of eight items for partners: "hurt other's feelings"; "get mad/yell"; "get sarcastic"; "the more I talk the madder I get"; "start disagreeing about one thing, end up arguing about many things"; "end up feeling annoyed"; "later use something said against partner"; and "feel hurt" (Cronbach's α = .80). For mothers, it consists of the same 8 items as for partners and three additional items: "get mad/walk out"; "get cool distant/give cold shoulder"; and "take a long time to get over being mad" (Cronbach's alpha = .85). Mother's marital avoidance consisted of three items: "come right out and tell how feeling" (loaded negatively); "clam up"; and "avoid talking about it" (Cronbach's α = .75). Partner

[2] Adaptive marital behavior correlated negatively with aggression and avoidance but did not correlate with either postpartum depression or sensitivity and thus was not considered further.

Avoidance consisted of three items also: “clam up”; “avoid talking about it”; and “go along with what she wants” (Cronbach's α = .54). Items were weighted by factor loadings and averaged to create prenatal mother and partner verbal aggression and avoidance scores.

Global Self-Esteem Scale. The Global Self-Esteem Scale (Messer & Harter, 1986) is a six-item scale that measures one's global sense of self-worth. Mothers rated which statement of a pair is most like them (e.g., “Some adults like the kind of person they are BUT other adults would like to be someone else”). The scale has good internal reliability in samples of adult women (range, .88–.92), and scores correlate positively with social support (Harter, 1990). Responses were averaged to obtain the measure of self-esteem (Cronbach's alpha = .88).

Table 1
Descriptive Statistics

Variable	*N*	*M*	*SD*	Range
Prenatal predictors				
Maternal acceptance	92	3.32	0.60	1.75–4.00
Paternal acceptance	92	3.10	0.73	1.33–4.00
Self-esteem	92	3.46	.55	1.55–4.00
Mother aggression	91	1.12	0.33	0.62–2.04
Mother avoidance	91	1.34	0.52	0.77–2.82
Partner aggression	84	1.02	0.29	0.61–1.95
Partner avoidance	84	1.09	0.27	0.71–1.97
Depressive symptoms (average)	92	1.47	0.35	1.00–2.95
Depressive symptoms (sum)	92	9.47	7.25	0.00–43.00
Postpartum predictors				
Infant distress to novelty	92	2.12	0.57	1.20–3.90
Infant distress to limits	92	3.00	0.69	1.32–5.20
Infant soothability	92	5.28	0.74	3.00–7.00
Mother aggression	90	0.61	0.33	0.00–1.31
Mother avoidance	90	0.62	0.36	0.00–1.65
Partner aggression	84	0.39	0.24	0.00–1.02
Partner avoidance	84	0.81	0.42	0.00–1.79
Outcome variables				
Depressive symptoms (average)	92	1.37	0.34	1.00–2.65
Depressive symptoms (sum)	92	7.36	6.98	0.00–38.00
Maternal sensitivity	92	3.80	0.77	1.33–5.00

The Center for Epidemiologic Studies—Depression Scale (CES-D). Depressive symptoms were assessed using the CES-D (Radloff, 1977), a 20-item checklist of moods, feelings, and cognitions associated with depression (e.g., “I felt depressed”; “I felt that people dislike me”) designed for use with community samples. Respondents indicate how often they felt a particular way during the previous week on a 4-point scale. The CES-D demonstrates convergent validity with the Research Diagnostic Criteria, a standardized psychiatric interview and with the Beck Depression Inventory (Spitzer, Endicott, & Robins, 1978) and predicts dysfunctional parenting (J. F. Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986), supporting its appropriateness for the purposes of this study. Nevertheless, the CES-D is not a clinical assessment, and results based on it might not replicate with an in-depth clinical interview. Items from the CES-D were averaged to derive measures of depressive symptoms for use in data analyses. The standard sum score and the item average are included in Table 1. High scores indicate greater and more persistent symptomatology. Mothers completed the CES-D prenatally and at 5 months postpartum (Cronbach's α = .88 and .90, respectively). Sixteen (17%) and 10 (11%) mothers met

the clinical cutoff for depression prenatally and at 5 months, respectively.

Infant Behavior Questionnaire (IBQ). In an effort to reduce demands on mothers associated with participation in the study, only the 3 IBQ subscales (Rothbart, 1981) used to assess negative emotionality were administered: Distress to Limitations (frustration; 20 items); distress and latency to approach sudden or novel stimuli (fear; 17 items); and soothability (11 items). Mothers indicate on a 7-point scale how frequently their infants responded to events (e.g., being placed in a car seat) in specific ways during the previous week (e.g., cried, clung to the parent, smiled, or laughed). Each subscale has good internal reliability (.75–.81), good interrater reliability (.54–.66) for 6-month-old infants (Rothbart, 1981) and good concurrent validity with observational assessments of infant temperament at 6 months (mean r = .40; Rothbart & Goldsmith, 1985). Subscale items were averaged to obtain measures of infant distress to novelty, distress to limits, and soothability (Cronbach's α = .68, .78, and .72, respectively).

Conflict and Problem-Solving Scales (CPS). The Conflict Strategies subscale of the CPS (Kerig, 1996) was administered postnatally because it included physical aggression items not included in the MPQ that we wished to assess. The scale assesses the extent to which partners use particular tactics during marital conflicts. Using a 4-point scale, partners rate the frequency with which both they and their partners engaged in 44 different strategies during the previous year. The CPS has good convergent validity with the Conflict Tactics and the Dyadic Adjustment scales and good test-retest reliability over three months (r = .63; Kerig, 1996).

Principal-components factor analyses with varimax rotation were calculated separately for mothers' and partners' responses. Eight items were not included because they had little or no variability (e.g., no one reported using physical violence toward partner). Three factors with eigenvalues greater than one emerged for mothers (verbal aggression, avoidance, and adaptive strategies; see Footnote 2) and two emerged for partners (aggression and avoidance). Items with factor loadings >.50 on that factor, or >.40 if the same item loaded at .50 or higher on the partner's scale, were included in each factor in an effort to create variables that included as many as possible of the same, construct-appropriate items for both partners. Verbal aggression included 11 items for partners: “complain,” “bicker”; “raise voice/yell”; “argue in front of baby”; “interrupt/don't listen”; “make accusations”; “name calling/cursing”; “hurt other's feelings”; “withdraw love/affection”; “throw objects/slam door”; “throw something”; and “argue where baby might overhear”. For mothers, verbal aggression included 14 items, the 11 items for partners and 3 others: “insist on own point of view”; “become sarcastic”; and “threaten to end relationship”. Cronbach's alphas for mothers' and fathers' verbal aggression were .89 and .82, respectively. Avoidance included six items for both partners: “talk it out”; “express thoughts/feelings openly” (reverse scored); “ignore problem/avoid talking about”; “change the subject”; “clam up/hold in feelings”; and “give in to other to escape argument”. Cronbach's alphas for mothers' and partners' avoidance were .76 and .82, respectively. Items were weighted by factor loadings and averaged to yield postnatal measures of marital verbal aggression and avoidance.

Maternal sensitivity. Maternal sensitivity was obtained from a videotaped laboratory assessment of infant temperament[3] similar to those used by others (Goldsmith & Rothbart, 1996; Stenberg & Campos, 1990). During a 5-min warm-up period, mothers were instructed to make themselves and their infants comfortable, to use any of the toys in the room, and to complete a brief form. They could hold their infants, place them on a blanket on the floor, or put them in an infant seat. During the arousing activities, infants were placed in an infant car seat with mothers initially seated approximately 3 feet (≈1m) away. During the infant's first exposure to the novel (fear-eliciting) or limiting (frustration-eliciting) task, we asked mothers not to engage with their infants. During the second exposure, we invited them to interact in any way they liked, except by intervening in the activity or removing their infant from the seat.[4]

A research assistant blind to other data rated maternal sensitivity during the warm-up period and each mother-involved phase of the temperament assessment by using a 5-point scale adapted from the Parent Caregiver Involvement Scale (Farran, Kasari, Comfort, & Jay, 1986). A rating of 1 indicated that the mother was consistently nonresponsive or responded inappropriately to infant cues; a rating of 5 indicated that the mother was consistently sensitive and responsive during the episode. The timing, appropriateness, and quality of the response (e.g., the mother's tone of voice, quality of touch—gentle or intrusive, and her affective tone—positive or negative) were considered in relation to infant cues in rating maternal sensitivity. The second author double-coded one third of the tapes at the beginning and again midway through coding to assess interrater reliability. Correlations between their ratings ranged from .77 to .95 for the seven contexts with mean interrater reliability = .88.

Three types of behavior were rated during the warm-up: (a) sensitive anticipatory behavior (e.g., “giving a toy to the baby prior to beginning the form”); (b) sensitivity to low-level cues (e.g., “shifting attention to the baby in response to a mild negative sound”); and (c) sensitivity to high-level cues (e.g., “putting aside the form to adjust the baby's position in response to a strong fuss or cry”). During the emotion-arousing tasks, only mothers' sensitivity to low-level cues (e.g., distracting the baby from the retracted toy in response to the baby's frown) and high-level cues (e.g., stroking and vocalizing softly in response to a strong fuss or cry) were rated because anticipatory periods were very brief. This yielded seven sensitivity ratings, with Cronbach's α = .90. Thus, scores were averaged to create a composite measure of maternal sensitivity.[5] Means, standard deviations, and ranges of variables are presented in Table 1.

Results

Data analyses proceeded in several steps. First, simple correlations were calculated between demographic variables, predictors, postpartum depressive symptoms, and maternal sensitivity to identify possible covariates, to determine whether measures could be combined, to test hypothesized main effects, and to determine whether patterns of correlations were consistent

[3] Observed measures of infant reactivity did not correlate with mothers' ratings of infant temperament or with any other variable of interest in the study

[4] Three mothers stopped an activity prior to its completion.

[5] Fourteen infants displayed high-level cues during the warm-up, 56 during the novelty task, and 65 during the limits task; 4 infants did not engage in the limits task because they fell asleep or were inconsolable before it began. In those cases, the infants' other scores were averaged.

with hypothesized mediating effects. Preliminary regression analyses were conducted in an effort to reduce the number of predictors when there were multiple measures of a construct and compelling reasons not to create composites. Hierarchical multiple regressions were used to test hypothesized mediating and moderating effects in relation to depressive symptoms and maternal sensitivity. To control for possible confounding by negative mood associated with prenatal depression, regressions on postpartum depression were recalculated including prenatal depressive symptoms on the first step. The residual measure of postpartum depressive symptoms obtained from this operation constituted "change in depressive symptoms." Interactive terms were created with centered variables, and regression lines were plotted to interpret significant interactions (Aiken & West, 1991).

Correlations Among Covariates, Predictors, and Outcomes

There were no significant correlations between the potential covariates (family income, maternal education, and maternal age) and postpartum depressive symptoms or maternal sensitivity. Correlations between and among predictors and outcomes are reported in Table 2.

Table 2
Zero-Order Correlations Between Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Prenatal predictors																
1. Maternal acceptance																
2. Paternal acceptance	.46**															
3. Self-esteem	.40**	.35**														
4. Mother aggression	−.19†	−.39**	−.27**													
5. Mother avoidance	−.18†	−.32**	−.24*	.21*												
6. Partner aggression	−.12	−.27*	−.10	.47**	.19†											
7. Partner avoidance	−.11	−.20†	−.33**	.13	−.03	.17										
8. Depressive symptoms	−.26*	−.35**	−.65**	.35**	.26*	.13	.37**									
Postpartum predictors																
9. Infant distress to novelty	−.10	.06	−.05	.03	.06	−.07	−.15	.06								
10. Infant distress to limits	−.16	−.07	−.14	.06	.24*	.05	.09	.18†	.11							
11. Infant soothability	.03	.01	−.09	−.23*	−.16	−.09	.10	.04	.07	−.29**						
12. Mother aggression	−.22*	−.32**	−.20	.66**	.01	.47**	.14	.19†	.04	.03	−.12					
13. Mother avoidance	−.17	−.26**	−.15	.24*	.58**	.31**	−.11	.29**	.16	.37**	−.19†	.19†				
14. Partner aggression	−.10	−.20†	.06	.44**	.17	.67**	.05	.02	−.05	−.07	−.15	.58**	.30**			
15. Partner avoidance	−.05	.02	−.02	.07	−.18	.03	.45**	.05	−.10	.02	−.06	.25*	−.01	.20†		
Outcome variables																
16. Depressive symptoms	−.38**	−.57**	.31**	.25*	.29**	.32**	.60**	.01	.14	.01	.31**	.30**	.16	.04		
17. Sensitivity	−.08	.22*	−.03	−.07	−.12	−.27*	.13	−.04	.00	−.04	−.05	−.13	−.18†	−.17	.15	−.24*

Note. Sample size for correlations between father marital variables and other variables was 84. Sample size for other correlations ranged from 91 to 92.
†$p < .10$. *$p < .05$. **$p < .01$ (two-tailed).

Correlations between predictors and outcomes. Consistent with Hypothesis 1, maternal and paternal acceptance/rejection correlated positively with mothers' self-esteem and negatively with their postpartum depressive symptoms. Paternal acceptance correlated negatively with mothers' pre- and postpartum marital aggression and avoidance. Maternal acceptance correlated negatively with mothers' postpartum marital aggression. Consistent with Hypothesis 2, mothers' self-esteem correlated negatively and their pre- and postpartum marital aggression and avoidance correlated positively with their postpartum depressive symptoms, identifying all five variables as potential mediators between childhood parental acceptance and postpartum depressive symptoms on the basis of Baron and Kenny's (1986) criteria.

Consistent with Hypothesis 4, paternal acceptance correlated positively and postpartum depression correlated negatively with observed maternal sensitivity. Paternal acceptance correlated also with postpartum depression, consistent with the hypothesized mediating effect.

Data reduction. In an effort to maintain an appropriate subject-to-variable ratio in the model-testing regressions, we used both conceptual and empirical criteria to determine whether to combine measures. First, we inspected the correlations of measures within constructs (i.e., among the eight measures of dysfunctional marital behavior and among the three measures of IBQ temperament) to determine whether they could be combined. Overall, the correlations did not support creating composite measures (e.g., marital variables correlated positively in some instances but not in others; temperament variables correlated weakly or not at all).

Next we considered eliminating redundant predictors. Although pre- and postpartum measures of marital aggression and avoidance correlated significantly for both mothers and partners, the postpartum marital variables added nothing to the prediction of postpartum depression after mothers' prenatal marital behaviors entered first into a hierarchical multiple regression.[6] Thus, only the four prenatal marital variables (mothers' and partners' marital aggression and avoidance) were included as predictors in the model-testing regressions.

In the next set of analyses we used hierarchical regressions to identify significant interactions when there was more than one measure of a construct and compelling conceptual or methodological reasons not to create composites. This occurred for infant temperament (distress to novelty, distress to frustration, and soothability) and for partner behavior (aggression and avoidance) as discussed above. For temperament, the distress and soothability variables were entered first, followed by maternal and paternal acceptance, and then the interactions between each temperament and each acceptance variable as predictors of postpartum depressive symptoms. Paternal acceptance and infant distress to novelty interacted to predict postpartum depressive symptoms, ($\beta = -.21$, $p < .05$). For the marital variables, partner aggression and avoidance were entered first, followed by maternal and paternal acceptance, and then the interactions of each acceptance and each marital variable. Paternal acceptance interacted with partners' aggression and independently with partners' avoidance to predict postpartum depression ($\beta = -.47$, $p < .01$ and $\beta = -.41$, $p < .05$, respectively). Of the 11 interactions tested, 3 were significant, more than expected by chance, and were included in the model-testing analyses.

We repeated the preliminary regression analyses for maternal sensitivity, testing first cumulative risk (i.e., interactions of depressive symptoms with the three temperament variables and separately with the two partner variables) and then potential buffering effects (i.e., interactions between maternal and paternal acceptance and between each acceptance variable and depressive symptoms. Of the eight interactions tested, two were significant, more than expected by chance alone. Postpartum depressive symptoms interacted with partner aggression ($\beta = -23$, $p < .05$) and with paternal acceptance ($\beta = .44$, $p < .01$) to predict maternal sensitivity; both were included in the model testing regressions. Contrary to prediction, the interactions of infant temperament and postpartum depression did not predict maternal sensitivity.

Hierarchical Multiple Regressions: Predicting Postpartum Depressive Symptoms

[6] With the appropriate prenatal marital variable controlled, associations between mothers' postpartum marital variables and depressive symptoms were not significant ($\beta = .19$ and .23 for aggression and avoidance, respectively). Partner postpartum marital variables did not correlate with maternal postpartum depressive symptoms (see Table 2).

Mediating effects. To test the mediating effects of self-esteem and marital aggression and avoidance, we used procedures recommended by Baron and Kenny (1986) and elaborated by Kline (1998). We established that the predictors correlated significantly with each other and with depressive symptoms (Table 2), demonstrated a reduction in the strength of the direct association after entering the mediating variable, as illustrated in Figure 2, and then tested the significance of the direct and indirect paths. The indirect effect of maternal acceptance through self-esteem is significant ($\beta = -.14$, $z = 2.33$, $p < .05$), the indirect effect of paternal acceptance through self-esteem is a trend ($\beta = -.10$, $z = 1.81$, $p < .10$), and the direct effect of paternal acceptance on mothers' depressive symptoms remains significant ($\beta = -.36$, $p < .01$). The latter finding establishes that the link between paternal acceptance and depressive symptoms is not a function of current self-esteem. Contrary to prediction, there is no indirect effect of paternal acceptance through mothers' marital behaviors independent of self-esteem.

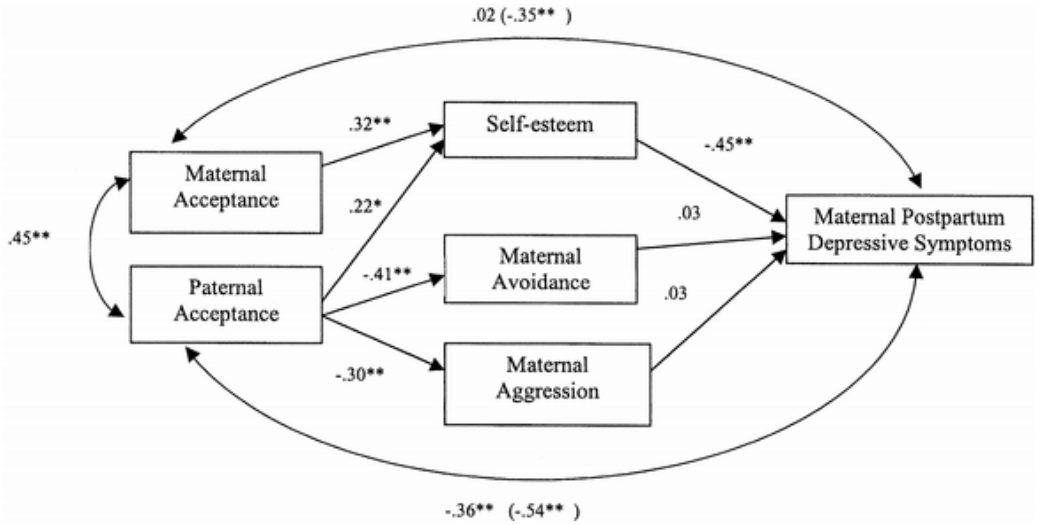

Figure 2. Indirect effects of maternal and paternal acceptance on maternal depressive symptoms. Values are the standardized betas from the hierarchical regressions. Values in parentheses are the betas for the simple associations of maternal acceptance and paternal acceptance with depressive symptoms prior to the entry of the mediating variables. *$p < .05$. **$p < .01$.

Full-model and moderating effects. To test the model of postpartum depression presented in Figure 1, and the moderating effects in particular, we regressed postpartum depressive symptoms on the predictors. Maternal and paternal acceptance were entered first as the most distal predictors, followed by self-esteem and the marital variables (mothers' aggression and avoidance, fathers' aggression and avoidance, in that order) entered simultaneously, infant distress to novelty, and the interactions (Paternal Acceptance × Infant Distress to Novelty, Paternal Acceptance × Partner Aggression, Paternal Acceptance × Partner Avoidance). In the second analysis, prenatal depressive symptoms were entered first, followed by the other predictors.

As shown in Table 3, maternal and paternal acceptance-rejection predicted postpartum depressive symptoms at entry, as did self-esteem. As expected, paternal acceptance predicted depressive symptoms interactively with distress to novelty and partners' marital aggression. The full model accounted for 61% of the variation (adjusted R^2) in postpartum depressive symptoms.

Table 3
Hierarchical Regressions Predicting Maternal Postpartum Depressive Symptoms

Predictor	Regression 1		β after predepressive symptoms	Regression 2	
	β	R^2		β	R^2
Prenatal depressive symptoms			.60**	.60**	
Maternal acceptance	−.35**		−.22*	−.22*	
Paternal acceptance	−.47**		−.37**	−.33**	
Mother self-esteem	−.43**		−.35**	−.26*	
Partner aggression	.16		.22*	.18†	
Partner avoidance	.10		.12	.05	
Mother aggression	−.04		.11	−.09	
Mother avoidance	.03		.10	−.00	
Infant distress to novelty	.01		−.03	.00	
Paternal Acceptance × Infant Distress	−.29**			−.25**	
Paternal Acceptance × Partner Aggression	−.21*			−.30**	
Paternal Acceptance × Partner Avoidance	−.12			−.12	
Total model		.61			.64

Note. Beta is the standardized regression coefficient at entry for main effects and after all main effects have been entered for the interactions; betas after prenatal depressive symptoms are associations between predictors and postpartum depressive symptoms, controlling for prenatal depressive symptoms. R^2 is adjusted, and $N = 83$.
†$p < .10$. *$p < .05$. **$p < .01$.

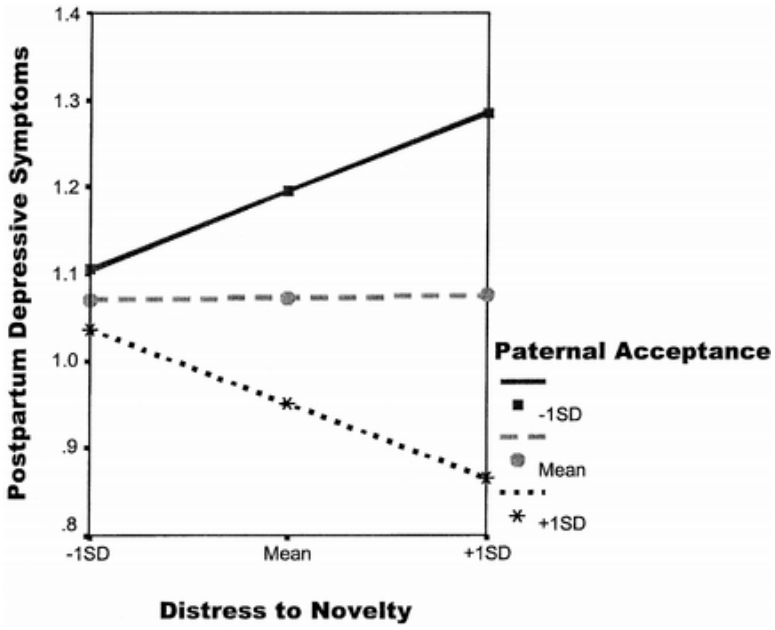

Figure 3. The interactive effect of paternal acceptance and infant distress to novelty on maternal postpartum depressive symptoms.

When prenatal depressive symptoms entered the equation first, maternal and paternal acceptance remained significant predictors, demonstrating that the association between remembered experience with parents and maternal postpartum depression is not an artifact of preexisting depression. Self-esteem and partner aggression were significant also at this step in the analysis, although only self-esteem was significant at entry. Although it is not apparent in the table, paternal acceptance remained a significant predictor of postpartum depressive symptoms after

entry of maternal self-esteem (β = −.31, p <.01), demonstrating again that the predictive power of remembered parental acceptance is not a function of current self-esteem. The same two interactions were significant after all main effects were entered and remained so after all the interactions were entered on the last step. Paternal acceptance interacted with infant distress to novelty and with partners' marital aggression to predict depressive symptoms. In Figure 3, when paternal acceptance was high, infant distress was not associated with maternal depressive symptoms, whereas when paternal acceptance was low (i.e., rejection high), there was a positive association between them. Similarly, only when paternal acceptance was low was partners' aggression positively associated with depressive symptoms. The full model explained 64% of the variance (adjustedR^2) in mothers' postpartum depressive symptoms.

Predicting Maternal Sensitivity

Mediating effects. We calculated the direct and indirect effects of paternal acceptance on maternal sensitivity through mothers' postpartum depressive symptoms using procedures described above. Contrary to prediction, there was no significant indirect effect of paternal acceptance on maternal sensitivity through depressive symptoms.

Moderating effects. Hierarchical multiple regression was used to test the full model and the hypothesized moderating effects. Variables were entered in the following order: paternal acceptance, postpartum depressive symptoms, and partner aggression, followed by the interactions (depressive symptoms by partner aggression to test the cumulative effect of multiple risk factors and paternal acceptance by depressive symptoms to test the hypothesized buffering effect).

Table 4
Hierarchical Regressions Predicting Maternal Sensitivity

Predictor	β	R^2
Paternal acceptance	.27*	
Postpartum depressive symptoms	−.16	
Partner aggression	−.20†	
Paternal Acceptance × Depressive Symptoms	.44**	
Depressive Symptoms × Partner Aggression	−.25*	
Total model		.19**

Note. Beta is the standardized regression coefficient at entry for main effects and after all main effects have been entered for the interactions. R^2 is adjusted, and N = 83.
†p < .10. *p < .05. **p < .01.

As shown in Table 4, paternal acceptance predicts maternal sensitivity at entry, but this main effect is qualified by the significant interaction of paternal acceptance and mothers' depressive symptoms. High postpartum depressive symptoms are negatively associated with sensitivity only when paternal acceptance is low (i.e., rejection is high). Consistent with the hypothesized buffering effect, when parental acceptance is high, there is no negative effect of depressive symptoms on maternal sensitivity. Postpartum depressive symptoms interact also with partner aggression after entry of all main effects but are no longer significant with both interactions entered into the equation. Partner aggression increases the negative association between postpartum depressive symptoms and maternal sensitivity. The full model explains 19% of the

variance (adjustedR^2) in maternal sensitivity. Findings consistent with the model are presented in boldface connecting lines and arrows in Figure 1.

Discussion

The data are largely consistent with the model-based hypotheses that identify mothers' memories of parental acceptance-rejection in childhood as predictors and likely influences on the development of depressive symptoms and maternal sensitivity in the postpartum period. They provide partial support also for the mediating and moderating processes thought to explain how remembered experiences with parents affect postpartum depression and maternal behavior.

Remembered Acceptance-Rejection and Maternal Postpartum Depression

Consistent with Gotlib et al. (1991), mothers who remembered their parents as highly accepting of them as children reported fewer depressive symptoms prenatally and during the postnatal period. These findings are congruent with the attachment-based conceptualization that children construct working models of self in relationship during childhood that continue to influence their emotional reactions to events in adulthood (Bowlby, 1973; Gotlib & Hammen, 1992). New mothers whose parents failed to convey to them that they were loved and valued reported sadness and hopelessness throughout the transition to parenthood.

That the association between remembered parental acceptance and postpartum depressive symptoms remains significant with prenatal depressive symptoms controlled effectively eliminates the possibility that depression-linked negative mood explains mothers' negative recollections of childhood experiences and hence the link between those memories and postpartum depression. Moreover, because the residual measure of postpartum depressive symptoms obtained by controlling prenatal depressive symptoms constitutes “change in depression” following the infant's birth, the finding lends credence also to Fraiberg's (1980) assertion that the experience of having and caring for an infant activates feelings and cognitions associated with mothers' internalized memories of the care they received from parents. If this were not the case, mothers' remembered acceptance-rejection would predict postpartum depression entirely through its impact on self-esteem, the marital relationship, and prenatal depression. In fact, paternal acceptance predicts postpartum depressive symptoms independently of all these measures and in conjunction with infant temperament, as expected if parenthood raises anew childhood-based issues mothers have with their parents.

Mediating Effects Through Marital Behavior and Self-Esteem

As would be expected if childhood-based expectations underlie adults' beliefs about their effectiveness in obtaining what they need through relationships, mothers who remembered their parents as rejecting were more avoidant and more aggressive with their partners during marital conflicts than mothers who remembered their parents as accepting. Either they inhibited expression of their own feelings and wishes, intensified them, asserting control verbally and feeling angry during and after conflicts, or alternated between the patterns as indicated by the positive correlation between mothers' marital aggression and avoidance. Also, the partners of mothers with rejecting fathers reported high marital aggression, which in turn predicted mothers'

postpartum depression and sensitivity. Considered together, these findings are consistent with the view that mothers' current family contexts are elicited in part by the expectations, choices, and interpersonal behaviors derived from their memories of childhood experiences.

Nevertheless, mothers' relationships with their marital partners do not explain the link between their memories of parental rejection and postpartum depression. Mothers' self-esteem, but not their marital behaviors, mediated between parental acceptance and postpartum depressive symptoms. We infer from this finding, and from the negative correlations between mothers' self-esteem and their marital aggression and avoidance, that mothers' working models of self and other are closely linked constructs, as Bowlby (1973) and Bretherton and Munholland (1999) theorize. However, it appears from the data that the construction of self, as reflected in mothers' self-esteem, may be more central to the development of maternal postpartum depression.

Moderating effects of remembered parental acceptance-rejection. Feeling accepted by fathers during childhood serves as a buffer against the potentially negative impact of partners' behavior on mothers' emotional well-being and mental health. Mothers whose own fathers were accepting reported fewer postpartum depressive symptoms when they had aggressive partners than mothers with comparably aggressive partners whose fathers were rejecting. Possibly mothers with accepting fathers are able to meet their partners' aggression effectively (i.e., to get what they want in the face of strongly expressed opposition) because they expect to have their needs met and to have developed interpersonal skills that improve their likelihood of doing so. Carmola Hauf's (2001) finding that mothers' memories of paternal acceptance correlate positively with their use of adaptive marital strategies is consistent with this possibility. Alternatively, mothers with accepting fathers may interpret their partners' aggression less as a reflection of their own self-worth than mothers with rejecting fathers and experience fewer depressive symptoms as a consequence (Gotlib & Hammen, 1992).

Regardless of their relationships with mothers, daughters' memories of fathers' acceptance-rejection predicted both their likelihood of marrying aggressive partners (or of eliciting that behavior in the relationship) and the emotional impact of the aggression when it occurred. If a person's sense of self in relationship develops in the course of experience with both parents, it is entirely plausible that relationship effects are gender-linked. On the basis of their experiences with fathers, girls may develop a sense of being loved and cared for by men and generalize those expectations to their adult romantic partners during the transition to parenthood. We consider other explanations of the moderating effects of paternal acceptance below.

Infant Temperament and Maternal Depression

As predicted, infant negative reactivity was associated with postpartum depression only when it occurred in conjunction with another risk factor. When infants were highly fearful, mothers reported more depressive symptoms when they remembered their own fathers as rejecting than when they remembered them as accepting. This interaction appears to reflect both the negative effect of cumulative risk (i.e., low paternal acceptance, high distress to novelty) and the buffering effect of a mother's belief that she was loved and accepted during childhood. Remembered parental acceptance may act as a buffer against the potentially negative emotional impact of caring for a reactive infant by shaping the lens through which mothers interpret events. Mothers

with accepting fathers may interpret their infants' negative reactivity benignly, rather than as a reflection of their own self-worth or as evidence of rejection, and experience less depression as a consequence. Ungerer et al.'s (1999) finding that mothers with insecure models of self interpreted their infants' behavior as rejecting is consistent with this explanation.

The absence of a comparable buffering effect of maternal acceptance requires some explanation. One possibility is that it is related to the strength of the mediating effect of mothers' self-esteem between maternal acceptance and postpartum depressive symptoms. If a mother's self-linked tendency to become depressed is influenced primarily by her childhood relationship with her mother, as the mediation data suggest, it is unlikely that mother-daughter acceptance would serve simultaneously as a buffer against depression. Thus, only an accepting relationship with a father could reduce her tendency to become depressed during the transition to parenthood.

Alternatively, the greater variability of paternal relative to maternal acceptance[7] in the current sample could explain the differential moderating effect by increasing the likelihood of detecting interactions between paternal acceptance and other variables. In a sample with a greater proportion of low maternal acceptance scores (i.e., a higher risk sample), the results might be different. Still another possibility is that the questionnaire format of the PBI may yield inaccurate data on mothers' memories of their early relationships. According to Main and Goldwyn (in press), a feature of a dismissive adult attachment is the tendency to idealize parental relationships (i.e., to describe them as exceptionally loving but to be unable to provide specific examples that confirm this global view), which could lead mothers to inaccurately describe their mothers as accepting on the PBI. However, this type of error should occur as frequently in relation to fathers as to mothers, and the moderately strong, conceptually based associations between maternal acceptance and self-esteem would seem to undermine this explanation.

Model-Based Predictors of Maternal Sensitivity

Research interest in postpartum maternal depression has been prompted by evidence that often depressed mothers are unable to maintain the degree of sensitive responsiveness necessary for optimal infant development (Seifer & Dickstein, 2000). Our data are consistent with that finding and also with the prediction that differences in maternal sensitivity are associated with mothers' memories of parental acceptance in childhood. Contrary to prediction, mothers' postpartum depressive symptoms did not explain (i.e., mediate) the association between remembered rejection and less sensitive maternal behavior. Instead, remembered paternal acceptance served as a buffer against the potentially negative impact of maternal postpartum depression on maternal sensitivity. When remembered paternal acceptance was high, depressive symptoms were unrelated to maternal sensitivity, whereas when paternal acceptance was low, there was a strong negative association between the two variables. As we proposed above, it may be that mothers' relationships with their fathers operate as buffers against the expression of depression in the mother-infant relationship when the source of the depression is the mother-daughter relationship. In families in which adult daughters remember both parents as rejecting, no such buffering effect would be expected, although a loving partner might serve a similar role.

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[7] Distributions of maternal and paternal acceptance differed significantly, $r(91) = -.21$, $p < .05$, following Snedecor and Cochran (1980).

It is noteworthy also that the expected interactive effect of infant temperament and maternal depression on maternal sensitivity was not observed. This may be explained by the finding that infant distress to novelty predicted depression interactively with parental acceptance, and therefore the resulting overlap in the two predictors may have precluded an interaction.

Implications for Application and Public Policy

With a low-risk community sample, we demonstrated associations between mothers' memories of childhood acceptance-rejection by parents, their postpartum depressive symptoms, and their observed sensitivity and confirmed both mediating and moderating effects. Nevertheless, variance associated with having mothers as the source of key measures (e.g., parental acceptance and depressive symptoms) could explain or partially explain the results, although controlling for prenatal depressive symptoms should have eliminated source as a factor in those analyses. In the future, investigators may wish to use standard diagnostic criteria to establish postpartum depression, both to reduce source variance and to determine whether results replicate in a clinical sample.

It would be useful also to administer both the PBI and the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996) as measures of parental acceptance-rejection to clarify the role of childhood experiences on postpartum depression and maternal sensitivity. Although childhood experiences with parents are thought to contribute significantly to adults' representations of self in relationship, both theory and research predict change in those representations as the result of new relationships and new understandings (e.g., adults may "forgive" their parents when they understand why they behaved as they did). Thus, the AAI-based categorizations of adult working models could provide a stronger test of the model linking childhood experiences with postpartum depression and maternal sensitivity.

Additionally, by identifying significant interactions through multiple preliminary regression analyses, we capitalize on chance, even though more interactions were significant than expected by chance alone. Replication will increase our confidence in these findings.

In view of these limitations, inferences for clinical practice and prevention must be tentative. However, we believe these data support considering both what women bring to the maternal role and their current family context, including infant negative reactivity, in understanding maternal postpartum depression and its effect on maternal sensitivity.

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