

The development of maternal self-efficacy and its influence on maternal behavior

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Abstract:

A developmental model of the origins of maternal self-efficacy and its impact on maternal sensitivity was tested. Participants were 92 primiparous mothers and their 6-month-old infants. Mothers completed questionnaires about remembered care from their own parents and self-esteem prenatally, satisfaction with support, infant temperament, and maternal self-efficacy postnatally, and they participated in a laboratory observation with their infants. Maternal self-efficacy was predicted by remembered maternal care as mediated by global self-esteem. Infant soothability predicted maternal self-efficacy independently and in conjunction with distress to novelty and in conjunction with both distress to limits and satisfaction with support. Maternal self-efficacy interacted with distress to limits to predict maternal sensitivity during emotionally arousing activities. High infant distress was associated with less sensitive maternal behavior when maternal self-efficacy was moderately low and extremely high, but was positively associated with sensitive maternal behavior when self-efficacy was moderately high. Implications for future research are discussed.

Keywords: infant distress | infant reactivity | maternal self-efficacy | infant soothability

Article:

Although several investigators have identified maternal self-efficacy as a predictor of parenting (Donovan & Leavitt, 1989; Donovan, Leavitt, & Walsh, 1990; Teti & Gelfand, 1991), little is known about its development or the process by which it influences maternal behavior. In this study, we test a model of maternal self-efficacy that locates its origins in remembered experiences with caregivers thought to influence mothers' feelings of self-worth (Bowlby, 1973) and in characteristics of the infant and context that affect the difficulty mothers experience in caring for their infants (Bandura, 1977). We also test the association between self-efficacy and maternal sensitivity in settings that vary by task difficulty.

The Development of Maternal Self-Efficacy

Self-esteem and self-efficacy. Self-efficacy refers to one's belief in his or her ability to successfully perform the behavior necessary to achieve a desired outcome (Bandura, 1977, 1982). Bandura argued that the strength of individuals' self-efficacy determines whether they will try to cope with certain situations, how much effort they will expend, and how long they will persist. Individuals with lower self-efficacy are less likely to take on challenging tasks and more likely to give up prematurely, which further decreases their sense of efficacy because they are unable to successfully attain their goals. Self-efficacy differs from self-esteem in that it is based on evaluations of abilities in specific domains, whereas self-esteem refers to a global evaluation of self (Harter, 1993) that influences expectations for success in a wide variety of situations (Brockner, 1988). As such, global self-esteem should predict maternal self-efficacy, a mother's belief in her ability to meet her infant's needs, although the two constructs are not coincident.

Developmental history and maternal self-efficacy. A mother's developmental history refers to her remembered experiences with her own parents that conveyed the sense that she was loved and accepted, or alternatively rejected and devalued. According to Bowlby (1973), children develop a sense of self in the context of their relationships with important others during childhood that they carry with them into adulthood. Children whose parents are accepting, affectionate, and sensitive develop models of themselves as competent, worthy, and lovable and expect others will be responsive to them. This cognitive-emotional appraisal serves as a lens through which they perceive and interpret events, forecast future events, and plan behavior in relation to goals.

Considerable research supports the claim that children raised in conditions of love and acceptance have higher self-esteem and confidence (Coopersmith, 1967; Erford, 1995). To the extent that global feelings of worth persist into adulthood and generalize across contexts, mothers' self-esteem should predict their confidence in their ability to parent. Thus, childhood experiences that promote a positive sense of self should influence maternal self-efficacy indirectly. Direct effects of developmental history on maternal self-efficacy are anticipated also. Having an effective model of parental behavior provides opportunities for the vicarious experience of efficacy (Bandura, 1977). Observing parents' successful parenting may convey to children that they are capable of successfully meeting the needs of their own children. It also provides them with a model of parental behavior that may be reflected in their interactions with their own children, enhancing their feelings of efficacy through performance attainment.

The parenting context and maternal self-efficacy. Contextual characteristics such as infant temperament and social support are expected to influence mothers' feelings of efficacy through their impact on task difficulty. According to Bandura (1977), task difficulty impacts the likelihood that people will attain their goals and how they interpret the outcomes of their behavior, thereby influencing efficacy formation. Bandura argued further that mastering difficult tasks has a greater positive impact on efficacy formation because it offers stronger evidence of competence than mastering easy tasks that require no additional skills. Thus, task difficulty may undermine self-efficacy by reducing the likelihood of success, but bolster self-efficacy when individuals are successful at difficult tasks.

Task difficulty for mothers is determined largely by infant characteristics (i.e., temperament) and characteristics of their social environments that maximize or minimize the challenge of responding to those characteristics (e.g., social support). Thomas and Chess (1977) and Goldberg (1977) proposed that mothers of easy children (i.e., those who are predictable, communicate their needs effectively, and easy to soothe) were likely to feel that their child's positive response to them indicated that they were adequate parents, whereas mothers of difficult children (i.e., those easily distressed, distressed for long periods, or under high-intensity distress) were likely to feel threatened or anxious in response to their child's behavior. Similarly, Cutrona and Troutman (1986) suggested that difficult infants might erode a mother's feelings of competence. Consistent with this view, Gross, Conrad, Fogg, and Wothke (1994) found that mothers who perceived their toddlers as difficult had lower feelings of parenting self-efficacy. However, an infant's ability to be soothed may also impact a mother's self-efficacy to the extent that it reduces the difficulty of caring for a particular infant. Presumably, an infant who is both easily distressed and easily soothed is less threatening to a mother's confidence and may in fact enhance her self-efficacy, because consistent with Bandura's (1977) views, she is able to succeed at a difficult task.

Social support may bolster self-efficacy through instrumental support with caregiving and other tasks that reduce the difficulty of caregiving. Social support may also operate by enhancing mothers' recognition of performance attainment through feedback that they are doing a good job and information that some failed interactions may be attributable to the infants' characteristics. According to Bandura (1977), this focus on external factors as the cause of poor performance may buffer self-efficacy from the negative impact of failures. Cutrona and Troutman (1986) observed this positive association between social support and maternal self-efficacy in mothers of young infants. Moreover, social support may have the greatest impact on mothers of easily distressed infants who are more likely to meet with failure in their attempts to soothe their distressed infants, and therefore are in greater need of respite and reassurance than other mothers. Although research supports this buffering effect, sometimes support is more beneficial when mothers experience less stressful conditions because social support may be insufficient to serve as a buffer under certain circumstances (see Crockenberg, 1988). Thus, we expect social support to be a particularly strong buffer of infant distress when infants are soothable. In this study, we focus on support from partners because there is evidence that partner or spousal support is more predictive of maternal adjustment and has greater impact on mother-infant interaction than other sources of support (Levitt, Weber, & Clark, 1986; Longfellow, Zelkowitz, Saunders, & Belle, 1979).

Maternal Self-Efficacy and Maternal Behavior

Even under the best of conditions, parenting is a challenging task, and differences in maternal self-efficacy should affect how mothers face this challenge. Consistent with Bandura (1977), highly efficacious mothers should persist when their infants are distressed and try different soothing strategies when they are initially unsuccessful, thereby enhancing their sensitivity. Teti and Gelfand (1991) reported such a positive association between maternal self-efficacy and parenting competence. Feeling efficacious may be particularly important for mothers who have the challenging task of caring for a reactive baby.

Infant reactivity is a risk factor by virtue of the demands reactive infants place on mothers, although mothers of reactive infants are both more and less responsive to their infants, depending on other maternal characteristics and their social circumstances (Crockenberg, 1986; van den Boom, 1991). Efficacy is one maternal characteristic that likely moderates the impact of infant reactivity on maternal sensitivity. Less efficacious mothers with reactive infants should be more threatened by their inability to soothe their infants than highly efficacious mothers, and therefore may give up more quickly when their initial attempts to soothe their infants are unsuccessful. As a result, we expect high maternal self-efficacy to reduce the negative impact of infant reactivity on maternal sensitivity and low self-efficacy to exacerbate the negative effect.

Although the argument that high self-efficacy should positively impact maternal behavior is compelling, Bandura (1977) posited further that this effect would not be apparent if efficacy beliefs were based on tasks that were considerably easier than the current task. It follows that mothers whose feelings of efficacy are based on such experiences expect to be able to soothe their infants easily, become discouraged, and display little persistence and adaptability when they encounter difficulty doing so. Donovan's findings (Donovan & Leavitt, 1989; Donovan et al., 1990) regarding illusory control are consistent with Bandura's (1977) predictions about efficacy expectations that are incongruent with task demands. Mothers who believed they had high control over infant crying when they did not make few attempts to stop it, particularly if their own infants were temperamentally reactive. Donovan et al. (1990) interpreted the mothers' unrealistically high sense of control as a mask for low self-efficacy. Alternatively, as we proposed earlier, a mother's belief in a high degree of control may accurately reflect her experiences in other settings in which it was relatively easy to attain desired outcomes. Her lack of responsiveness to the cry in the experimental setting reflects the irrelevance of such efficacy expectations for guiding behavior when the current task is substantially more difficult or less controllable than the tasks on which they were formed.

This Study

In this study, we test the model of maternal self-efficacy just described and examine the impact of maternal self-efficacy in conjunction with infant distress on maternal sensitivity. Two features of this study distinguish it from previous research. First, information about maternal developmental history and self-esteem were collected prenatally to control for possible effects of infant temperament on mothers' memories of childhood experiences and global feelings of self-esteem. Second, mothers were observed interacting with their infants in both a nonarousing and an emotionally arousing context designed to elicit infant distress. This allowed us to examine the impact of maternal self-efficacy on maternal sensitivity in contexts that varied in task difficulty, as defined by the probability of infant distress.

Hypotheses

1. Remembered maternal and paternal care, self-esteem, satisfaction with support, and infant soothability are positively associated with maternal self-efficacy, whereas infant distress to novelty and limits are negatively associated with maternal self-efficacy.
2. Self-esteem mediates the association between remembered care and maternal efficacy.

3. Infant soothability moderates the impact of infant distress to novelty and to limits on maternal self-efficacy. High infant soothability reduces the negative impact of infant distress to novelty and limits on maternal self-efficacy; low soothability exacerbates the negative impact.

4. Satisfaction with support moderates the association between infant distress to novelty and to limits and maternal self-efficacy. High satisfaction with support reduces the negative impact of infant distress on maternal self-efficacy; low satisfaction with support exacerbates the negative impact. Further, moderating effects of soothability on the association between distress to novelty or limits and efficacy is greater when satisfaction with support is high versus low.

5. Remembered parental care and maternal self-efficacy are positively associated with maternal sensitivity, and maternal self-efficacy partially mediates the association between parenting history and maternal sensitivity.

6. Maternal self-efficacy moderates the association between infant distress to limits and to novelty and maternal sensitivity. High self-efficacy reduces the negative impact of infant distress to novelty and limits on sensitivity; low self-efficacy exacerbates it.

7. Extremely high self-efficacy increases the negative impact of infant distress to novelty and to limits on maternal sensitivity during the emotionally arousing (i.e., difficult) tasks only, because mother's self-efficacy expectations are likely to be illusory in this context.

METHOD

Participants

The sample consisted of 92 primiparous mothers with a mean age of 29.1 (range = 20-41 years), a mean education level of 15.4 years (range= 11-20 years), and mean family income of \$61,000 (range= \$8,000-\$200,000). Ninety-four percent of mothers were White, and 99% were married or living with their partner. Sixty percent of infants were boys. Mothers were contacted through birthing classes as part of a longitudinal study of the development of infant emotional reactivity and regulation.

Procedure

During the prenatal period, mothers completed a demographic questionnaire by phone and a set of questionnaires, including measures of self-esteem and remembered parental care, which they received and returned by mail. When infants were 5 months old, a maternal report of infant temperament was administered by phone, and mothers completed measures of maternal self-efficacy and social support. At 6 months postpartum, mothers and infants visited the research playroom for a videotaped observation of maternal sensitivity.

Measures

Parental Bonding Instrument (PBI). The care subscale (Parker, Tupling, & Brown, 1979) of this self-report measure assessed the acceptance and warmth mothers received from their own parents during childhood (i.e., parenting history). Twelve specific parental behaviors (e.g., "made me feel I wasn't wanted" [reverse coded]) are rated on a 4-point scale indicating how much each statement describes the parent. Mothers scored every item in regard to both mothers and fathers. The PBI has acceptable test-retest reliability over a 3-week period (.76 for the care scale) and good split half reliability (.88 for the care scale; Parker et al., 1979). In subsequent studies, PBI scores were stable over a 3-year period (Gotlib, Mount, Cordy, & Whiffen, 1988) and correlated with parents' self-reports (Parker, 1981). Responses about both mothers and fathers were averaged to derive scores of remembered maternal and paternal care with Cronbach alphas of .92 and .94, respectively.

Global Self-Esteem scale. This six-item scale (Messer & Harter, 1986) 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"). This scale has good internal reliability in samples of full-time working women, part-time working women, and homemakers (range = .88-.92), and scores have correlated positively with adequacy as a provider and social support (Harter, 1990). Responses were averaged to obtain the measure of self-esteem. Cronbach alpha in this sample was .88.

Maternal Self-Efficacy scale. This 10-item scale (Teti & Gelfand, 1991) was originally designed to measure maternal self-efficacy in mothers of 3- to 13-month-old infants and was revised to make some items more appropriate for mothers of younger infants. Mothers rate how good they feel they are at various childcare activities on a 4-point scale. Nine of the items refer to specific behaviors (e.g., feeding, bathing, soothing, etc.), and the 10th item is a global evaluation of mothering ability. In its original form, the scale had a standardized Cronbach's item alpha of .79 to .86 and demonstrated concurrent validity ($r = .75$) with the Parenting Sense of Competence scale (Teti & Gelfand, 1991). The internal consistency reliability of the modified scale was comparable (Cronbach $\alpha = .70$). Items were averaged to obtain the measure of maternal self-efficacy.

Infant Behavior Questionnaire (IBQ). Three IBQ subscales (Rothbart, 1981) were administered to assess mothers' perceptions of their infant's temperament: distress to limitations (20 items), distress and latency to approach sudden or novel stimuli (17 items), and soothability (11 items). Mothers indicated on a 7-point scale how frequently their infants responded to specific events in a particular fashion during the previous week (e.g., when introduced to a stranger, clung to the parent or approached the stranger at once). Each subscale has good internal reliability (.75-.81) and good interrater reliability (.54-.66) when completed in regard to 6-month-old infants (Rothbart, 1981). IBQ scores have good concurrent validity with home observation assessments of infant temperament in a sample of 6-month-olds, mean $r = .40$ (Rothbart & Goldsmith, 1985), and with the negative emotionality and approach-sociability subscales of both the Revised Infant Temperament Questionnaire and the Infant Characteristics Questionnaire ($r_s = .61-.73$; Goldsmith, Rieser-Danner, & Briggs, 1991). The items from each subscale were averaged to obtain measures of distress to novelty, distress to limits, and soothability (with Cronbach $\alpha = .68, .78, \text{ and } .72$, respectively).

Social Support Questionnaire (SSQ). This four-item scale was designed by the authors to assess the satisfaction mothers feel with their social support from partners (e.g., the amount of help they get, the quality of help they get, the amount of support they need to give in return, and the amount of positive feedback they receive about their mothering). Mothers rated each item on a 5-point scale ranging from *not at all satisfied* to *extremely satisfied*. Responses were averaged to yield an internally consistent measure of partner support (Cronbach's $\alpha = .79$).

Maternal behavior. Maternal behavior was observed during a videotaped laboratory assessment of infant temperament that consisted of a warm-up period and four potentially arousing activities related to distress to novelty and distress to limits similar to those used by other researchers to assess infant temperament and reactivity (Goldsmith & Rothbart, 1996; Stenberg & Campos, 1990). During the warm-up period, mothers and infants were left alone in the playroom for 5 min. Mothers were instructed to make themselves and their infants comfortable, to use any of the toys in the room, and to complete a brief informational form. They could hold their infants, place them on a blanket on the floor, or put them in an infant seat. When the experimenter returned, she explained the next set of activities and helped mothers settle their infants into an infant seat. Mothers sat in a chair approximately 3 feet away, situated so that with some effort infants could make eye contact with them.

First, two novel and potentially fear-eliciting toys (a noisy, moving plastic ball and a fire engine with similar characteristics) were introduced to assess distress to novelty. This was followed by a 5-min break to reduce carryover effects into the next emotion context. Then two potentially frustrating situations (arm restraint and toy retraction) were introduced to assess distress to limitations. Mothers were instructed to remain neutral during the first task in each emotion context so we could observe the infant's independent response to the activity. During the second task within each emotion, mothers were instructed to interact with their infants in any way they liked, but not to intervene directly in the activity (e.g., touch the novel toy) or remove their child from the seat unless they wished to end the activity.¹ This resulted in two mother-involved tasks and two mother-uninvolved tasks similar to those used by Diener and Mangelsdorf (1999). The order of presentation of the two novelty tasks and the two limitations tasks were counterbalanced in an effort to control for task effects on maternal behavior.

Maternal sensitivity during the warm-up period and the two mother-involved tasks was rated on a 5-point scale adapted from the Parent Caregiver Involvement scale, a frequently used measure of maternal sensitivity (Farran, Kasari, Comfort, & Jay, 1986). The timing, appropriateness, and quality of the response (e.g., the mother's tone of voice, quality of touch-gentle vs. rough, and her affective tone-positive, neutral, negative) were considered in relation to the infant's cue in rating the sensitivity of maternal behavior. Examples of insensitivity include not responding to infant cues, responding slowly, responding harshly, and responding with mismatched affect. A score of 1 indicates that the mother was consistently nonresponsive or responded inappropriately, whereas a score of 5 indicates that the mother was consistently sensitive and responsive throughout the episode. Three types of behavior were rated during the warm-up: (a) sensitive anticipatory behavior, including what the mother did to engage her baby in an activity or to make her baby comfortable before beginning the informational form; (b) sensitivity toward low-level cues, including responses to infant interest, pleasure or mild discomfort; and (c) sensitivity to

¹ Three mothers stopped an activity prior to its completion.

high-level cues, including responses to infant crying or fussing. Only the latter two were coded during the emotion tasks.² The rating was based on the mother's characteristic sensitivity during the entire period. This procedure yielded seven maternal behavior ratings (anticipatory, low level, and high level during the warm-up period, and low-level and high-level for the mother-involved novelty and limitations tasks) for mothers whose infants completed all activities and displayed all ranges of cues.³

A research assistant blind to other data on mothers and infants rated maternal behavior using this scheme. The first author double-coded one third of the tapes both at the beginning and midway through coding to assess interrater reliability. Correlations between the ratings of the two independent coders ranged from .77 to .95 for the seven behavioral domains ($M = .88$). Ratings were combined to create two variables: warm-up behavior (average of anticipatory, low-level, and high-level scores from warm-up; $\alpha = .90$) and emotion task behavior (average of low-level and high-level scores from the novelty and limitations tasks; $\alpha = .88$) that reflect maternal behavior in situations that vary by degree of task difficulty.

RESULTS

Preliminary Analyses

All variables were inspected for skewness, kurtosis, and outliers. Several variables were modestly skewed in the expected direction for a nonrisk sample (e.g., self-esteem was mildly negatively skewed); thus no transformations were conducted. Descriptive statistics on all predictor and outcome variables are displayed in Table 1. Simple correlations were calculated between primary variables and three demographic variables: maternal age, income, and education. Of these 27 correlations, only one (between income and partner support, $r = -.25, p < .05$) was significant. As this one may have been due to chance and there was no consistent pattern of correlations, demographic variables were not controlled in the primary analyses.

Primary Data Analysis Plan

First, simple correlations were computed to determine the strength of association between all variables in the model, to test simple effects, and to identify collinearity. These are displayed in Table 2. Then the independence of proposed main effects on maternal self-efficacy were tested using a simultaneous multiple regression. This was followed by a series of multiple regressions to assess the hypothesized mediating and moderating effects. Finally, maternal sensitivity was regressed on maternal self-efficacy, infant distress to novelty and to limits, and each of the distress-by-efficacy interaction terms. Mediating effects were tested using procedures recommended by Baron and Kenny (1986) and Kline (1998), and moderating effects were tested

² Sensitivity toward low- and high-level cues was coded separately due to the interest in task difficulty and the belief that in conjunction with efficacy it may impact maternal behavior; that is, we expected mothers to differ in sensitivity toward infant distress versus infant pleasure or neutral cues. However, low- and high-level scores correlated highly (r s ranged from .73–.77) and therefore were combined in a single measure.

³ Of the 92 infants, only 14 displayed high-level cues during the warm-up, 56 displayed high-level cues during the novelty task, and 65 displayed high-level cues during the limitations task. Four infants did not engage in the limitation task because they fell asleep or were inconsolable prior to beginning the task. In these cases, the remaining sensitivity scores were summed and averaged as described.

using procedures outlined by Aiken and West (1991; i.e., variables were centered to create interaction terms, and regression lines were plotted at fixed values of the predictors).

Table 1. Descriptive Statistics of Major Variables

	<i>M</i>	<i>SD</i>	Possible Range	Actual Range
Developmental history variables				
Remembered maternal care	3.32	.60	1–4	1.75–4.00
Remembered paternal care	3.10	.74	1–4	1.33–4.00
Self-esteem	3.46	.55	1–4	1.55–4.00
Contextual variables				
Satisfaction with support	3.75	.78	1–5	2.25–5.00
Infant distress to novelty	2.12	.57	1–7	1.20–3.90
Infant distress to limits	3.00	.70	1–7	1.32–5.20
Infant soothability	5.28	.74	1–7	3.00–7.00
Maternal self-efficacy	3.63	.25	1–4	2.90–4.00
Maternal sensitivity variables				
Sensitivity–warm-up	3.74	1.05	1–5	1.00–5.00
Sensitivity–emotion tasks	3.81	.91	1–5	1.25–5.00

Note. *N* = 92.

Table 2. Zero-Order Correlations Between Predictor Variables and Maternal Self-Efficacy

Variables	1	2	3	4	5	6	7	8	9	10
1. Remembered maternal care		.40***	.46***	.20*	-.10	-.16	.03	.27***	-.08	-.08
2. Remembered paternal care			.35***	.25**	.06	-.07	.01	.16	.23**	.15
3. Self-esteem				.06	-.05	-.14	-.09	.38***	-.04	-.07
4. Satisfaction with support					-.25**	-.14	.26***	.28///	-.02	-.09
5. Infant distress to novelty						.11	.07	-.25**	.10	-.05
6. Infant distress to limits							-.29***	-.29***	-.03	.02
7. Infant soothability								.28***	-.02	-.09
8. Maternal self-efficacy									-.11	-.16
9. Maternal sensitivity–Warm-up										.24**
10. Maternal sensitivity–Emotion tasks										

Note. *N* = 92.

p* < .10. *p* < .05. ****p* < .01, two-tailed.

Predicting Maternal Self-Efficacy

When each of the proposed main effects on efficacy was entered in a simultaneous regression, only self-esteem and infant soothability emerged as significant predictors over and above the others, as illustrated in Table 3. Remembered maternal care and self-esteem correlated significantly with one another and with maternal self-efficacy, meeting the necessary requirements to test the proposed mediating effect. A series of regressions demonstrated that the direct effect of remembered maternal care on maternal self-efficacy became nonsignificant after self-esteem entered the equation, as illustrated in Figure 1. Further, the indirect effect of remembered maternal care on maternal self-efficacy through self-esteem was significant ($\beta = .13$, $p < .05$) and accounted for half of the total effect of remembered maternal care on maternal self-efficacy. Thus, the effect of remembered maternal care on maternal self-efficacy was mediated by self-esteem, explaining why it was not significant in the simultaneous regression.

Table 3. Simultaneous Regression Testing the Main Effects of Maternal Self-Efficacy

	β	R^2
Remembered maternal care	.12	
Remembered paternal care	-.07	
Self-esteem	.36**	
Satisfaction with support	.12	
Infant distress to novelty	.11	
Infant distress to limits	-.16	
Infant soothability	.23*	
Total model		.29**

Note. β is the standardized regression coefficient. $N = 92$.

* $p < .05$. ** $p < .001$.

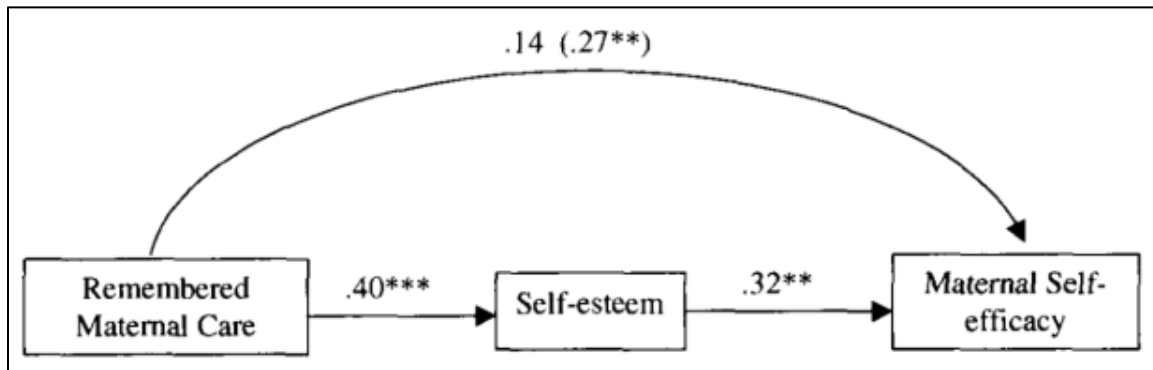


Figure 1. Mediating effect of self-esteem between remembered maternal care and maternal self-efficacy. Model includes standardized β s. ** $p < .01$. *** $p < .001$. Value in parentheses illustrates the direct association prior to entry of the mediating variable.

Next, two hierarchical regressions were utilized to examine the proposed moderating effects of infant temperament and satisfaction with support. The first regression examines the associations between infant distress to novelty, soothability, and satisfaction with support. The second examines the parallel associations with infant distress to limits. Testing the interactions in two regressions was deemed necessary to ensure a sufficient participant to predictor ratio. In both cases, self-esteem was entered in the first block as a covariate (the care variables were dropped, as they did not predict efficacy independent of self-esteem) along with the main effects on which interaction terms were based, the second block consisted of the distress by soothability interaction, then the distress by satisfaction with support interaction in Block 3, then the soothability by satisfaction with support interaction in Block 4, and finally the three-way interaction among infant distress, soothability, and satisfaction with support. Results are illustrated in Table 4. Infant distress to novelty and soothability interacted to predict maternal self-efficacy. Consistent with the hypothesis, infant distress to novelty was negatively associated with maternal self-efficacy when infant soothability was low; when soothability was high, infant distress to novelty was mildly positively related to maternal self-efficacy. Infant distress to limits, infant soothability, and satisfaction with support also interacted significantly to predict maternal self-efficacy. Consistent with the hypothesis, the buffering effect of high infant soothability on the association between infant distress to limits and maternal self-efficacy was greater when satisfaction with support was high (see Figure 2).

Table 4. Hierarchical Regressions Testing the Moderating Effects on Maternal Self-efficacy

	<i>Distress to Novelty</i>			<i>Distress to limits</i>		
	β	<i>B</i>	<i>R</i> ² Change	β	<i>B</i>	<i>R</i> ² Change
1. Self-esteem	.39**	.18		.37**	.16	
Satisfaction with support	.11	.04		.08	.03	
Infant distress	.08	.04		-.16	-.06	
Infant soothability	.27*	.09	.24**	.23*	.07	.25**
2. Distress \times Soothability	.21*	.11	.04*	.17	.07	.02
3. Distress \times Satisfaction With Support	.02	.01	.00	-.10	-.04	.01
4. Soothability \times Satisfaction With Support	.10	.05	.01	.10	.04	.01
5. Distress \times Soothability \times Satisfaction With Support	.07	.05	.00	.27*	.10	.05*
Total model			.29**			.34**

Note. β is standardized regression coefficient at entry; *B* is unstandardized regression coefficient at entry. *N* = 92.

p* < .05. *p* < .001.

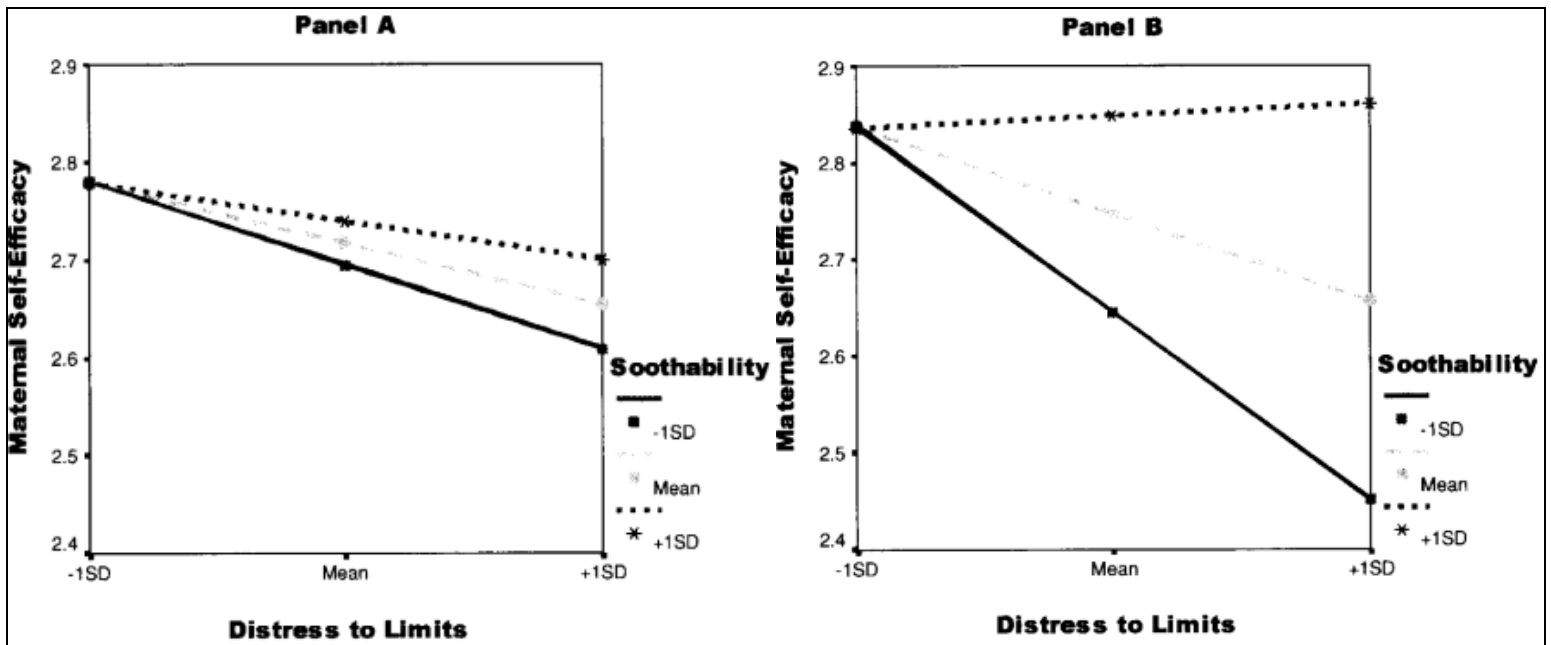


Figure 2. The interactive effect of infant distress to limits, soothability, and satisfaction with support on maternal self-efficacy. Panel A illustrates the moderating effect of infant soothability on the association between infant distress to limits and maternal self-efficacy when satisfaction with support is low. Panel B illustrates the moderating effect of infant soothability on the association between infant distress to limits and maternal self-efficacy when satisfaction with support is high.

Predicting Maternal Behavior

As shown in Table 2, paternal care correlated positively with maternal sensitivity during the warm-up; maternal self-efficacy did not. No variables significantly predicted maternal sensitivity during the emotion tasks. Thus, the proposed mediating effect of remembered care between efficacy and sensitivity was not demonstrated.

To test the proposed moderating effect of efficacy and infant distress on maternal sensitivity, maternal sensitivity was regressed on maternal self-efficacy and infant distress to novelty, and to

limits followed by their interaction terms for both the warm-up and the emotion tasks. Results are displayed in Table 5.

Table 5. Hierarchical Regressions Predicting Maternal Sensitivity

	Warm-Up			Emotion Tasks		
	β	<i>B</i>	<i>R</i> ² Change	β	<i>B</i>	<i>R</i> ² Change
1. Maternal self-efficacy	-.14	.57		-.17	-.62	
Infant distress to novelty	.11	.21		-.05	-.08	
Infant distress to limits	-.09	-.13	.03	-.02	-.03	.03
2. Efficacy × Distress to Novelty	-.03	-.26	.00	.03	.18	.00
3. Efficacy × Distress to Limits	-.15	-1.10	.02	.26*	1.56	.06*
Total model			.05			.09

Note. *N* = 92. β is standardized regression coefficient at entry; *B* is unstandardized regression coefficient at entry.

**p* < .05.

Interaction terms did not predict sensitivity during the warm-up period. In contrast, there was a significant Efficacy x Distress to Limits interaction on maternal sensitivity during the emotionally arousing tasks. The interaction is displayed in Figure 3. Consistent with the hypothesis, infant distress to limits was negatively associated with sensitivity only when efficacy was low. When efficacy was moderately high, infant distress was mildly positively associated with maternal sensitivity. As shown on the right side of the figure, when infant distress was high, sensitivity did not vary as a function of efficacy. This was contrary to the hypothesis that mothers with extremely high self-efficacy and easily distressed infants would be less sensitive during the emotionally arousing tasks.

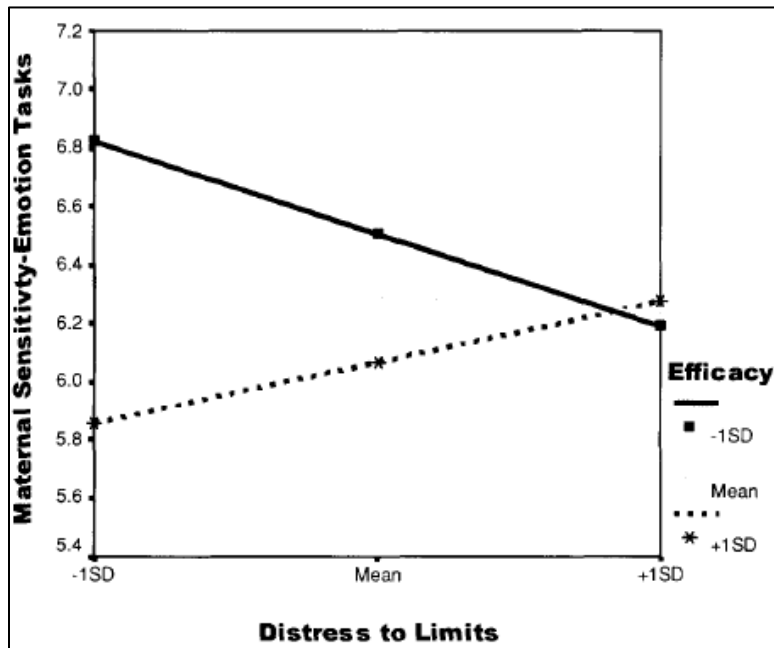


Figure 3. The moderating effect of maternal self-efficacy on the association between infant distress to limits and sensitive maternal behavior during emotion tasks.

To investigate this a priori hypothesis further, we created two maternal self-efficacy groups: a moderate group consisting of the majority of mothers (range = 2.9–3.8) and an extremely high group, consisting of mothers with the highest efficacy scores (range = 3.9–4);⁴ frustration groups were created using a median split. This resulted in four groups, but we were interested primarily in comparing mothers with moderate efficacy and infants high on distress to limits ($N = 39$, $M = 3.79$, $SD = .83$) and mothers with extremely high efficacy and infants high on distress to limits ($N = 5$, $M = 3.00$, $SD = .32$). Consistent with the theory of illusory control, mothers who perceived their infants as easily distressed were significantly less sensitive if they had extremely high maternal self-efficacy than if they had moderately high self-efficacy, $t(42) = 2.10$, $p < .05$. Thus, infant distress to limits has a negative impact on maternal sensitivity during difficult tasks when maternal self-efficacy is low and when it is extremely high.

DISCUSSION

The full model of maternal self-efficacy, including interaction terms, predicted 29% to 34% of the variability in maternal self-efficacy. This supports the thesis that maternal self-efficacy is rooted both in mothers' own developmental histories (as mediated by self-esteem) and in the current family contexts in which they parent. Maternal self-efficacy moderated the impact of infant distress to limits on maternal sensitivity during emotionally arousing activities, but not during the warm-up, consistent with the proposition that self-efficacy functions differently depending on the congruence between the difficulty of the tasks on which efficacy expectations are based and the difficulty of the current task.

Origins of Maternal Self-Efficacy

Consistent with attachment theory (Bowlby, 1973), mothers who reported high levels of maternal care had higher self-esteem and higher maternal self-efficacy. These data support the hypothesis that early childhood experiences, particularly care from mothers, influence the development of a positive view of self, and further that global feelings of self-worth generalize to the behavioral domain of mothering. In fact, global self-esteem was the strongest single predictor of maternal efficacy. Both parenting history and self-esteem were assessed prenatally, before infant characteristics could have influenced them, establishing that the associations between these variables and maternal self-efficacy were not an artifact of infant characteristics.

That infant temperamental characteristics, both independently and in conjunction with social support, contributed significantly to variation in maternal self-efficacy beyond that explained by parenting history and self-esteem confirms that the family context of parenting plays a role in the development of maternal self-efficacy. The combined influence of both infant distress and soothability as important predictors of maternal self-efficacy complements Rothbart's theory of temperament, which posits reactivity and regulation as the two primary dimensions of temperament (Rothbart & Bates, 1998) and supports the view that each contributes to how

⁴ Given the restricted range of maternal self-efficacy, a conceptually meaningful grouping of low-efficacy mothers could not be created. Mothers were included in the extremely high self-efficacy group if they rated themselves perfectly on all items or on all but one of the items on the efficacy measure. The size of the extremely high efficacy group in this sample ($N = 15$ [10 easy, 5 difficult infants]) is consistent with the high illusory-control groups used by Donovan et al. (1990; $N = 10$ [5 easy, 5 difficult infants] 1989; $N = 20$ [12 easy, 8 difficult infants] 1990).

mothers experience their unique infants. Infant distress to novelty had a negative impact on maternal self-efficacy only when soothability was low. Further, mothers had the highest self-efficacy when their infants were both easily distressed to novelty and highly soothable. These mothers are more likely to experience positive contingencies in which they are ultimately able to soothe their infants, an atmosphere that Goldberg (1977) predicted would enhance efficacy. According to Bandura (1977), this is the ideal situation for developing self-efficacy in that mothers succeed at a difficult task.

Although satisfaction with partner support strengthened the buffering effect of soothability for distress to limits, alone it did not buffer mothers with easily distressed infants. Possibly, partners are unable to offer sufficiently useful emotional or instrumental support to mothers when their infants are both easily distressed and less soothable. Consistent with this interpretation, mothers were more satisfied with partner support if their infants were easily soothed. Mothers of particularly challenging infants may need more frequent and consistent support, from a variety of sources, possibly including professional support, as Cutrona and Troutman (1986) suggested. They observed a positive association between social support and maternal efficacy using a measure that included guidance from authoritative figures.

Maternal Self-Efficacy and Maternal Behavior

As predicted, a history of loving care from parents (i.e., fathers) was positively associated with maternal sensitivity during the warm-up period. Contrary to prediction and Teti's and Gelfand's (1991) findings, maternal self-efficacy did not predict maternal sensitivity as a main effect. This discrepancy may be a function of sample characteristics. Their sample, 56% of whom were clinically depressed, likely included more mothers with low efficacy and few or none with extremely high efficacy, enhancing their odds of observing a positive linear association between maternal self-efficacy and behavior.

Although there was no main effect of maternal self-efficacy, distress to limits and self-efficacy interacted to predict maternal behavior during emotionally arousing tasks. Infant distress to limits impacted maternal behavior negatively primarily for mothers with low self-efficacy. This finding is consistent with Crockenberg's (1986) view that maternal characteristics alter the association between infant temperament and maternal behavior, and with Bandura's (1977) proposition that low-efficacy individuals are less likely to persist during difficult tasks. Infant distress was mildly positively associated with maternal sensitivity when mothers had moderately high self-efficacy, possibly because infants who are easily distressed display cues that provide moderately efficacious mothers more opportunities to respond sensitively (e.g., increase proximity, vocalizations, calming) than infants who display few negative cues.

That a very small group of mothers with extremely high self-efficacy were also less sensitive toward their easily distressed infants than mothers with moderate efficacy is consistent with the theory of illusory control. According to this view, mothers with an unrealistic (illusory) sense of control over infant behavior fail to respond sensitively and appropriately to infants' cues because their belief that they are in control is violated (Donovan & Leavitt, 1989; Donovan et al., 1990). Consistent with Bandura's (1977) views, it may be that self-efficacy is associated with sensitive maternal behavior when mothers' expectations about the task and her abilities are congruent, but

when those expectations are violated in challenging situations, extremely high efficacy is dysfunctional. This extreme group may warrant additional investigation because mothers face this type of situation in daily life (e.g., reactive infants will be exposed to novel sounds, people, objects, etc.).

Conclusion and Directions for Future Research

Global self-esteem was the single largest predictor of maternal self-efficacy. Nevertheless, contextual characteristics contributed to variation in maternal self-efficacy also, implicating them as possible points of intervention. That satisfaction with partner support did not predict efficacy directly or in combination with infant distress (in the absence of soothability) further suggests that partners may be unable to provide sufficient support, particularly under difficult circumstances. Efforts should be made to identify the sources of support that do enhance maternal self-efficacy in families with easily distressed infants. Although associations between infant temperament and maternal self-efficacy operated as expected, these associations may be somewhat inflated by method variance, as both measures relied on maternal report.

The interaction between efficacy and distress to limits, although significant, accounted for only 6% of the variance in maternal sensitivity. Nevertheless, the results of this study, in conjunction with research by Donovan (Donovan & Leavitt, 1989; Donovan et al., 1990) and Teti and Gelfand (1991), suggest a curvilinear association between efficacy and maternal behavior in which there is an optimal, moderately high level of self-efficacy, at least in contexts in which actual control is at best moderate. To address this possibility, investigators should examine the impact of efficacy on maternal behavior in contexts that vary by task difficulty as a function of infant emotionality and degree of maternal control in samples of mothers that display the full range of efficacy.

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