

First-Time Mothers' Perceptions of Efficacy During the Transition to Motherhood: Links to Infant Temperament

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This investigation examined associations between pre- and postnatal reports of 1st-time mothers' depression, anxiety, and marital quality and postnatal reports of infant temperament and changes in feelings of efficacy. Maternal efficacy measured prenatally was associated with concurrent measures of depression, anxiety, marital conflict, and levels of previous child-care experience. Mothers' perception of infant temperament postnatally accounted for a significant proportion of variance in postnatal reports of maternal efficacy. Although individual differences in women's feelings of efficacy were fairly stable, significant increases in maternal efficacy were also observed over time. Findings suggest that 1st-time mothers' beliefs about their ability to perform nurturing routines may change from a global sense of self-competence to more differentiated perceptions of nurturing efficacy.

An increasing amount of research extends descriptors of the parent–infant relationship to encompass the realm of parenting cognition (e.g., Goodnow, 1988; Sigel, McGillicuddy-Delisi, & Goodnow, 1992). Past research delineates parenting cognition using several categories, including attributions (e.g., Melson, Ladd, & Hsu, 1993), beliefs (Sigel, McGillicuddy-DeLisi, & Goodnow, 1992), attitudes (Goodnow, 1988), valuations (e.g., Mize, Pettit, & Brown, 1995), and efficacy (e.g., Cutrona & Troutman, 1986; Donovan & Leavitt, 1989; Gondoli & Silverberg, 1997; Teti & Gelfand, 1991). Although parenting cognition, in general, continues to garner needed attention, relatively little is known about how parenting cognitions are shaped over time (Sigel et al., 1992). The current investigation was designed to fill this gap in the literature by exploring antecedent and concurrent factors believed to be linked to first-time mothers' perceptions of efficacy in the nurturing role.

Bandura (1997) noted that *self-efficacy* pertains to personal judgments about one's ability to execute a future course of action. Moreover, self-efficacy encompasses feelings of competence about one's ability to perform a role or task and is thought to influence the amount of effort and persistence individuals will exert in the face of obstacles

(e.g., Bandura, 1982, 1989, 1997). In this respect, parenting efficacy is believed to be an important contributor in the development of parents' nurturing behaviors. Not surprisingly, maternal efficacy has been linked concurrently with nurturing behaviors observed both in the home (Teti & Gelfand, 1991) and in laboratory analogues (Donovan & Leavitt, 1989, 1992; Donovan, Leavitt, & Walsh, 1990).

According to Bandura, efficacy is influenced by a number of factors including task difficulty; effort expenditure; vicarious experiences; physiological and mood states; social or verbal persuasion; and outcome expectancies, which are believed to be shaped by ongoing success or failure experiences (Bandura, 1982, 1989, 1997). Past research examining maternal efficacy supports several of these links. Mood states, such as depression and anxiety, have been found to be negatively correlated with maternal reports of efficacy (Cutrona & Troutman, 1986; Donovan & Leavitt, 1989; Donovan et al., 1990; Gondoli & Silverberg, 1997; McCabe & Schneiderman, 1985; Teti & Gelfand, 1991). Bandura (1989) suggested that dysphoric moods act as a cognitive filter, resulting in a biased retention of previous failures and a recasting of personal events in a more negative light. Gross's work supports this notion, in that mothers with depressive symptoms tend to appraise their parenting abilities more negatively than mothers without such symptoms (Gross, 1989; Gross, Conrad, Fogg, & Wothke, 1994). Others (e.g., Cutrona & Troutman, 1986; Donovan et al., 1990; Teti & Gelfand, 1991; Teti, O'Connell, & Reiner, 1996) have similarly found both direct and mediated relationships between maternal depression–anxiety and mothers' perceptions of efficacy. Although the link between mood states and maternal efficacy appears fairly well established, what is not clear from the literature is whether the dysphoric mood–efficacy link remains stable over time, especially in the face of potentially changing moods and parenting appraisals.

In addition to mood states, direct relationships have been reported between social–marital supports/conflicts and ma-

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ternal efficacy. Social-marital supports are positively related to maternal efficacy, whereas marital conflict or lack of social supports has been shown to be negatively associated with maternal efficacy (Cutrona & Troutman, 1986; Teti & Gelfand, 1991). Self-efficacy theory would explain social-marital supports' influence on efficacy through processes involving social persuasion, verbal encouragement, and/or opportunities to observe significant others' parenting (vicarious experiences or modeling). Prior work examining marital quality over the transition to parenting reveals that first-time parents tend to report decreases in marital quality or satisfaction from prepartum to postpartum periods (e.g., Belsky, Rovine, & Fish, 1989; C. P. Cowan & Cowan, 1992). Given the changing dynamic of the marital support system over the transition to parenting (C. P. Cowan & Cowan, 1992; Frosch, Mangelsdorf, & McHale, 1998), it is likely that the relationship between maternal efficacy and social-marital supports might also change over time. For instance, given that past research has demonstrated positive concurrent links between marital support and maternal efficacy (e.g., Teti & Gelfand, 1991), it seems that declining marital satisfaction over the transition to motherhood may be related to increasingly more negative efficacy appraisals due to reductions in spousal social-verbal persuasion. At the same time, the possibility also exists that the potentially waning relationship between marital supports and efficacy may be offset by individual characteristics of the infant or by an increasing sense of importance and focus on the parenting role (C. P. Cowan & Cowan, 1995; P. A. Cowan & Cowan, 1988).

Previous research has demonstrated a fairly substantial link between observed and maternal reported infant characteristics and maternal reports of parenting efficacy (Cutrona & Troutman, 1986; Donovan & Leavitt, 1992; Teti & Gelfand, 1991). The relationship between infant temperament and maternal efficacy is likely explained in the context of what Bandura (1982) referred to as *perceived task difficulty* as well as *outcome expectancies* associated with self-perceived successes or failures in caregiving. Salient to parents are infant characteristics that are perceived as being "difficult" or negative (e.g., Bates, 1987; Hubert, 1989; Wachs & Kohnstamm, 2001). A constellation of infant characteristics such as fussiness, irritability, and frequent intense crying coupled with low soothability and manageability are typical hallmarks of a difficult temperament (e.g., Bates, 1980; Rothbart & Bates, 1998). When a new mother is successful in her attempts to soothe and comfort her infant, she is likely to gain a greater sense of efficacy in this endeavor, but if repeatedly unsuccessful, she may begin to feel less efficacious about her caregiving abilities (Cutrona & Troutman, 1986; Donovan & Leavitt, 1989; Donovan et al., 1990; Papousek & von-Hofacker, 1998; Stifter & Bono, 1998). Cutrona and Troutman demonstrated that maternal reports and observer and maternal in-home observations of temperament are related to mothers' reports of efficacy. Specifically, infants who were observed to be more irritable had mothers who reported feeling less efficacious. Whether the link between infant temperament and maternal efficacy is sensitive to the changing repertoire of infant behaviors

during the first few months postpartum has not been clearly demonstrated. Rothbart (1989) reported that infants go through a period of general negativity during the 1st month postpartum, which is followed by a period of increased sociability and manageability with the onset of social smiles and self-quieting abilities in the 2nd and 3rd months. Emde and Robin (1979) likewise argued that the first 2 months postpartum are a critical period of adjustment for parents' perceptions as new beliefs and attitudes are forming in the context of the developing parent-infant relationship (cf. Ruble et al., 1990). Given the salience of the first few months for the developing parent-infant relationship (C. P. Cowan & Cowan, 1992; Ruble et al., 1990) coupled with changes in infant behavior, it seems likely that new mothers may experience significant changes in their sense of parenting efficacy during the first few months postpartum.

In line with Bandura's (1997) emphasis on performance outcomes and expectancies, we also suspected that the amount of experience women had performing basic child-care routines prior to the birth of their baby may also influence feelings of efficacy. Specifically, we hypothesized that women who reported more experience in providing infant care (i.e., baby-sitting, caring for younger siblings) would report greater feelings of anticipatory efficacy prepartum than women with no or little infant care experience. Given that women who have more experience performing child-care routines might also have more opportunities to receive positive performance feedback, we expected these women to report feeling more confident performing familiar care routines prenatally. Whether prior infant care experience would predict maternal efficacy postpartum was not certain. A portion of the uncertainty was based on the notion that performance feedback and outcome expectancies may be dramatically reshaped by the immediacy of intimate care given with one's own infant, supplanting the more "distant" vicarious caregiving experiences and performance feedback associated with caring for another's child.

As noted by Cutrona and Troutman (1986) and again by Teti and Gelfand (1991), there is a need for prospective research to further explore influences on mothers' feelings of efficacy. The present study was designed to examine first-time mothers' sense of efficacy in the nurturing role over the transition to parenthood. As such, we had three goals. First, we sought to assess expectant women's anticipated sense of efficacy during the last trimester prepartum as well as concurrent reports of mood states (i.e., anxiety and depression), marital quality-support, and previous child-care experiences. On the basis of previous research using postnatal reports of maternal efficacy, we expected that women's reports of depression and marital support would be significantly related to expectant mothers' anticipated feelings of efficacy in the nurturing role. Given Bandura's (1997) notion of performance outcomes as they are tied to prior success or failure experiences, we also expected that women who had more successful experience in performing care routines prior to motherhood would feel more efficacious about their nurturing abilities than women

who had little or no opportunities to engage in child-care routines at this point in time.

The second goal of this investigation was to examine the predictive and concurrent associations between reports of psychological states, marital quality, and infant temperament and measures of maternal efficacy measured at 1 and 3-months postpartum. Given previous literature on the saliency of negative infant temperament for parents (e.g., Bates, 1980, 1987; Sanson, Hemphill, & Smart, 2002; Sanson & Rothbart, 1995; Sanson, Smart, Prior, Oberklaid, & Pedlow, 1994), we thought that mothers' perceptions of infant characteristics might be related to mothers' feelings of efficacy over time. We were especially interested in whether maternal perceptions of infant temperament, over and above the contribution of mood states, previous child-care experiences, marital supports, and prepartum feelings of efficacy, would explain the variance in postpartum levels of efficacy.

The third goal of this study was to examine the relative rank-order stability as well as possible mean level changes in mothers' feelings of efficacy from pre- to postpartum periods. We expected that women's prepartum feelings of efficacy would likely predict later postpartum levels of efficacy. We also recognized that mothers' perceptions of infant temperament might be associated with changes in maternal efficacy over time. In particular, mothers who had infants perceived to be difficult (e.g., less predictable, more fussy-irritable, less adaptable) might experience lower levels of efficacy than mothers with "easy" (e.g., more predictable, less fussy-irritable, more adaptable) infants. Consistent with Bandura's (1997) notion of performance outcomes and perceived task difficulty, it seemed likely that continuing exposure by mothers to their infants' temperament might result in changes in perceptions of efficacy.

Method

Participants

Sixty-one¹ first-time expectant women (mean age = 27.28 years, $SD = 5.51$) in their last trimester of pregnancy (30–34 weeks; $M = 32.29$, $SD = 1.89$) were recruited from prenatal education classes and obstetric practices. The participants were predominately White (98.1%), middle-class, well educated (mean number of years of education = 15.34, $SD = 2.24$), and married women from a midwestern community. A short telephone interview was conducted with potential participants, who were screened for complications in pregnancy (e.g., gestational diabetes, etc.). Fifty-two mothers continued the project when their infant reached 1 month of age, and 50 mothers completed the project when their infant was 3 months of age. Simple *t* tests revealed that women who dropped out of the study did not differ from those who remained on any of the demographic or dependent variables.²

Procedure

A short-term longitudinal design was used. During the last trimester of pregnancy and when the infants were 1 and 3 months of age, participants completed a demographic questionnaire and a psychological battery, which included measures of maternal efficacy, anxiety, depression, and marital quality. Mothers also com-

pleted an infant temperament measure at each postpartum assessment. The demographic questionnaire gathered information regarding age, marital history (length of marriage), employment status (part-time, full-time, or not employed), household income, health, and educational attainment (years of education received and last degree completed). Participants evaluated the amount of previous experience they had in child-care situations (e.g., baby-sitting for family or friends, caring for younger siblings, etc.) using a 4-point scale (3 = *a great deal of infant care experience [frequent baby-sitting and care routine opportunities]*, 2 = *less frequent infant care experience*, 1 = *little infant care experience*, 0 = *no previous infant care experience*).

Measures

Maternal efficacy. Maternal efficacy was assessed using the self-efficacy in the nurturing role scale, which was adapted by Pedersen, Bryan, Huffman, and Del Carmen (1989) from the parenting sense of competence scale developed by Gibuad-Wallston and Wandersman (1978). This scale contains 16 items rated on 7-point scales that pertain to mothers' perceptions of their competence on basic skills required in caring for an infant (e.g., "I feel confident in my role as a parent," "I can soothe my baby easily when he or she is crying or fussing," "Touching, holding, and being affectionate with my baby is comfortable and pleasurable for me"). The scale was modified for the prepartum assessment to reflect how women expected to do once their infant was born (e.g., "I look forward to becoming a parent with confidence in my role as a parent," "I expect to be able to soothe my baby easily when he or she is crying or fussing," "Touching, holding, and being affectionate with my baby will be comfortable and pleasurable for me"). Scores on the SENR were obtained by summing individual items to yield a total efficacy score, with higher scores reflecting greater feelings of efficacy. In the past, this scale has shown robust test-retest reliability and moderate to high internal consistency (Pedersen et al., 1989). The internal reliability (Cronbach's alpha) of the scale in the current study was found to be .91 during the prenatal assessment and .78 at both 1 and 3 months postpartum. Prior research has also demonstrated that higher scores on the SENR are related to greater levels of symmetrical interactions and shared positive affect during mother-infant dyadic play episodes (Porter & Porter, 1999).

Beck Depression Inventory. Participants also responded to the complete version of the Beck Depression Inventory (BDI; Beck, Ward, Mendelsen, Mock, & Erbaugh, 1961). The BDI is a 21-item questionnaire with items scored on a 4-point scale. Items consist of four graded statements, which describe the absence or presence and severity of depressed feelings and/or symptoms. Scores from this inventory have been shown to be consistent with clinical judgments (Beck et al., 1961), but it is widely used as a self-report measure of depression in research on nonclinical samples. The validity and reliability of this scale has been previously demonstrated (Beck, 1972).

Anxiety inventory. The State version of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) was completed by participating women. The State Anxiety subscale

¹ One participant was excluded from the sample because of extreme levels of self-reported depression, anxiety, and infant temperament ratings (more than 2 standard deviations above the remaining sample).

² A relatively liberal $p < .10$ criterion was used to evaluate potential selective attrition to compensate for the small number of women who dropped out of this study.

consists of 20 items responded to using a 4-point Likert-type scale. This scale assesses individuals' feelings of anxiety (e.g., worry, nervousness, tension, failure, etc.). It has demonstrated adequate psychometric properties (5-month stability for the current sample = .77, $p < .01$, with Cronbach's alphas of .91 for prenatal and 1-month assessments and .92 for the 3-month assessment) and has been found to correlate with mild postpartum depression (e.g., Field et al., 1985).

Marital quality. Braiker and Kelley's (1979) marital quality questionnaire was also administered to assess marital functioning and satisfaction. This 25-item questionnaire is scored on a 9-point scale. This scale yields four factors, of which the first two reflect marital activities (i.e., maintenance and conflict) and the remaining two, marital sentiments (i.e., love and ambivalence). The internal consistency for the factors is reported as ranging from .61 to .92 (Belsky et al., 1989). These marital factors have been shown to be sensitive to change in the quality of the marital relationship during the transition to parenthood (Belsky et al., 1989). Whereas conflict and ambivalence show a linear increase across the transition to parenthood, love and maintenance demonstrate a linear decrease (Belsky & Rovine, 1990). Also, because moderate to high correlations were found between marital conflict and ambivalence (all $ps < .001$) and between love and maintenance scores (all $ps < .01$) at three time points, following Volling and Belsky's (1991) strategy, these factors were aggregated separately to reflect marital "negativity" and marital "positivity" prenatally as well as at 1 and 3 months.

Infant temperament. Mothers completed the Infant Characteristics Questionnaire (ICQ) at 1 and 3 months (Bates, Freeland, & Lounsbury, 1979). The ICQ is based on individual differences in global and stylistic aspects of behavior. This scale has 24 items, each describing behaviors to be compared with those of the "average infant" and rated on a 7-point Likert-type scale. The ICQ yields four subscales that include difficult, unadaptable, dull, and unpredictable (a higher score on each of these subscales reflects a more negative rating). The validity and reliability of this scale has previously been demonstrated (for reviews, see Hubert, Wachs,

Peters-Martin, & Gandour, 1982; Slabach, Morrow, & Wachs, 1991). Given the moderate concurrent intercorrelations between the subscales, they were summed at each time period to yield a total temperament negativity score. The internal consistency of the composite negativity score was .64 and .66 at 1 and 3 months, respectively. In the present study, the stability of the composite temperament score from 1 to 3 months was .68 ($p < .0001$, $n = 50$). This cross-time stability is comparable to individual factors scores, which have been reported to range between .47 (unpredictable) and .70 (fussy-difficult) with a median reliability coefficient of .56 (Hubert et al., 1982). Past research has also demonstrated the adequacy of parent perceptions as a valid measure of children's temperament (Rothbart & Bates, 1998; Slabach et al., 1991).

Results

Preliminary Analyses

Preliminary analyses were conducted to explore potential relations between demographic variables and measures of maternal efficacy at each time period. Prenatal and 1- and 3-month maternal efficacy scores were not significantly associated with any of the demographic variables, including mother's age, employment status (full-time, part-time, not employed), household income, length of marriage, years of education, highest degree attained, or sex of child.

Prenatal Maternal Efficacy

The next set of analyses focused on the relationship between prenatal or anticipated maternal efficacy and concurrent prenatal psychological measures of maternal depression, anxiety, marital negativity and positivity, and amount of previous child-care experience (see Table 1). These analyses revealed concurrent relationships between prenatal

Table 1
Correlations Between Pre- and Postnatal Measures of Maternal Efficacy in the Nurturing Role and Mood States, Marital Supports, Child-Care Experience, and Infant Temperament

Measure	Prenatal anticipated maternal efficacy ($n = 60$)	One-month maternal efficacy ($n = 52$)	Three-month maternal efficacy ($n = 50$)
Prenatal maternal measures			
Depression	-.27*	-.30*	-.12
Anxiety	-.54**	-.48**	.25 [†]
Marital negativity	-.33**	-.40**	-.11
Marital positivity	.24 [†]	.26 [†]	.17
Child care experience	.26*	.18	.12
1-month maternal measures			
Depression		-.26 [†]	-.13
Anxiety		-.42**	-.15
Marital negativity		-.20	-.04
Marital positivity		.31*	.14
Infant temperament		-.32*	-.18
3-month maternal measures			
Depression			-.10
Anxiety			-.17
Marital negativity			-.14
Marital positivity			.15
Infant temperament			-.37*

[†] $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

self-efficacy and depression, anxiety, marital negativity, and previous child-care experiences ($r = .26, p < .05$) and a trend for marital positivity. A multiple regression analysis was also conducted to simultaneously evaluate the contribution of maternal mood states, marital negativity and positivity, and previous child-care experiences to anticipated maternal efficacy during the prenatal period. The overall regression model was significant, $F(5, 56) = 6.38, p < .01, R^2 = .38$. Of the five predictor variables, only anxiety scores and previous child-care experiences significantly contributed to the model, $B = -0.91, t = -3.61, p < .001$, and $B = 3.3, t = 2.48, p < .01$, respectively. Marital negativity, marital positivity, and depression scores did not contribute significantly to the model.

One-Month Maternal Efficacy

The next set of analyses explored relationships between maternal efficacy and maternal mood states, marital quality, prenatal childcare experience, and infant temperament at 1 month postpartum (see Table 1). Concurrent zero-order correlation analysis revealed that 1-month maternal efficacy was negatively correlated with 1-month anxiety scores and positively correlated with marital positivity. A nonsignificant negative trend also was found between 1-month efficacy and maternal depression, but maternal efficacy was no longer significantly correlated with marital negativity. One-month maternal efficacy was also found to be negatively correlated with maternal reports of infant temperament. Negative correlations were also found between 1-month maternal efficacy and prenatal reports of maternal depression, anxiety, and marital negativity. Prenatal reports of marital positivity and child-care experience, however, were not significantly related to maternal efficacy at 1 month.

To further isolate the unique contribution of infant temperament in explaining variance for maternal efficacy and after controlling for the other 1-month maternal psychosocial variables, we tested a hierarchical regression model using block entry with infant temperament entered in the last step of the model. Given the potentially large number of predictor variables to be entered in the model, an attempt

was made to reduce the number of variables by creating a maternal psychosocial distress index (MPD; Tabachnick & Fidell, 1996). The MPD comprised standardized scores from concurrent reports of depression, anxiety, and marital negativity (conflict and ambivalence) for each of the three assessment periods. Decisions for inclusion were made conceptually but were also based on the moderate to modest degree of interrelationship between the variables at each time point (prenatal maternal depression, anxiety, and marital negativity scores: $r = .39, p < .01$; $r = .19, p < .10$; and $r = .46, p < .001$, respectively; 1-month maternal depression, anxiety, and marital negativity scores: $r = .34, p < .01$; $r = .57, p < .0001$; and $r = .56, p < .0001$, respectively; 3-month maternal depression, anxiety, and marital negativity scores: $r = .67, p < .0001$; $r = .55, p < .0001$; and $r = .48, p < .001$, respectively).

In the 1-month model, maternal efficacy served as the dependent variable. To account for what was expected to be a substantial contribution of prior levels of maternal efficacy, we entered prenatal efficacy scores in the first step of the model. Given ambiguity regarding possible temporal effects (antecedent and concurrent links), prenatal and 1-month MPD scores were next entered as a block in the second step of the model. One-month infant temperament was then entered in the final step of the model to evaluate the unique contribution of infant temperament to maternal efficacy above and beyond the other antecedent and concurrent variables. Given that prenatal child-care experience was not predictive of either 1-month ($r = .18, p > .10$) or 3-month ($r = .12, p > .10$) maternal efficacy, we elected to exclude this variable from subsequent analyses in an attempt to preserve statistical power. Overall, the model was found to be significant, $F(4, 47) = 19.61, p < .0001, R^2 = .63$. As expected, prenatal maternal efficacy ratings accounted for the greatest proportion of explained variance. The prenatal MPD index accounted for a small but significant increase in variance, but the 1-month MPD index did not contribute significantly to the model. One-month infant temperament entered last revealed a trend approaching significance in explaining the variance of 1-month maternal efficacy (see Table 2).

Table 2
Summary of Hierarchical Multiple Regression Analyses Assessing the Unique Relationship Between 1-Month-Postpartum Maternal Efficacy (the Dependent Variable) and Infant Temperament

Variable	B	R ²	R ² increase	F for ΔR^2	p
Step 1: Prenatal maternal efficacy	0.50**	.57	.57	70.57	<.01
Step 2: MPD Index Block					
Prenatal MPD index	-0.39	.60	.03	4.12	<.05
1-month MPD index	-0.35	.60	.00	0.16	ns
Step 3: 1-month temperament	-0.19 [†]	.63	.03	3.61	.06

Note. MPD = Maternal Psychosocial Distress, which is a standardized index of self-reported depression, anxiety, and marital ambivalence and conflict.

[†] $p < .10$ (marginally significant). ** $p < .01$.

Three-Month Maternal Efficacy

The next set of analyses examined both concurrent and antecedent relationships between maternal efficacy and maternal psychosocial variables measured at 3 months postpartum. Concurrent zero-order correlational analyses revealed no significant relationships between 3-month maternal efficacy and maternal reports of depression, anxiety, or marital quality (see Table 1). Only infant temperament was found to be negatively correlated with maternal efficacy scores at 3 months postpartum. Correlational analysis revealed no significant relationships between the prenatal or 1-month maternal mood states, marital quality, or temperament scores with 3-month maternal efficacy scores. It is also interesting to note that prepartum measures of efficacy were not significantly correlated with mothers' perception of infant temperament at either 1 month ($r = .18$, ns) or 3 months ($r = .19$, ns) postpartum. Similarly, 1-month efficacy scores were not correlated with 3-month infant temperament ($r = .21$, ns).

To isolate the unique contribution of infant temperament in explaining variance of maternal efficacy at 3 months, after accounting for other concurrent and antecedent maternal efficacy and psychosocial variables, we tested a hierarchical regression model using block entry with 1- and 3-month infant temperament entered in the last block of the model. Again, given some ambiguity with respect to temporal ordering effects of the antecedent and concurrent variables in the model, maternal efficacy, maternal psychological distress, and infant temperament variables were entered as three separate blocks in the model. Because antecedent levels of maternal efficacy were suspected to be the largest contributors to the 3-month model, prenatal and 1-month maternal efficacy scores were entered in the first block. This was followed by prenatal, 1-month, and 3-month MPD scores in the second block, allowing 1- and 3-month temperament to be entered into the final block of the model (see Table 3). The overall model was again significant, $F(7, 49) = 9.69$, $p < .0001$, $R^2 = .62$. Similar to the 1-month analyses, prenatal maternal efficacy accounted for the largest proportion of the variance in

3-month maternal efficacy. One-month maternal efficacy scores also accounted for a modest yet significant increase in the explained variance. The prenatal MPD index likewise accounted for a significant increase in explained variance, whereas the contribution of 1- and 3-month MPD scores was not significant. One-month infant temperament scores did not significantly contribute to the model, whereas 3-month temperament did contribute significantly to the model (see Table 3).

Rank-Order Stability and Changes in Maternal Efficacy

The final set of analyses examined the temporal stability of maternal efficacy scores from pre- to postnatal periods and potential mean level differences across time. Analyses revealed high levels of rank-order stability with prenatal efficacy scores strongly correlated with 1- and 3-month postnatal efficacy scores ($r = .75$ and $.63$, $ps < .0001$), respectively. One and 3-month efficacy scores were also found to be highly correlated ($r = .68$, $p < .0001$). Next, we examined potential change in the group means of maternal efficacy scores across three assessment time points using a univariate repeated-measures analysis of variance (ANOVA). The ANOVA revealed a main effect of time (see Table 4), indicating significant mean differences in maternal efficacy across time. Post hoc Scheffé tests (all p values $< .05$) showed that maternal self-efficacy means increased significantly from the prenatal time point to 1 and 3 months postpartum (see Table 4). It is interesting to note that whereas maternal efficacy scores demonstrated significant increases over time, maternal reports of anxiety, depression, marital positivity, and mothers' perceptions of infant temperamental negativity were marked by significant declines in mean scores over the same time period (see Table 4).

Discussion

Prior research has highlighted the dynamic nature of the transition to parenthood (e.g., C. P. Cowan & Cowan, 1992;

Table 3
Summary of Hierarchical Multiple Regression Analyses Assessing the Unique Relationship Between 3-Month-Postpartum Maternal Efficacy and Infant Temperament

Variable	B	R ²	R ² increase	F for ΔR^2	p
Step 1: SENR block					
Prenatal self-efficacy	0.25 [†]	.39	.39	43.4	<.0001
1-month self-efficacy	0.64**	.48	.09	9.8	<.01
Step 2: MPD index block					
Prenatal MPD	1.83 [†]	.52	.04	4.1	<.05
1-month MPD	0.20	.52	.00	0.04	<i>ns</i>
3-month MPD	-0.93	.55	.03	2.9	<i>ns</i>
Step 3: Infant temperament block					
1-month temperament	0.18	.56	.01	0.7	<i>ns</i>
3-month temperament	-0.36*	.62	.06	6.5	<.01

Note. SENR = Self-Efficacy in the Nurturing Role; MPD = Maternal Psychosocial Distress, which is a standardized index of self-reported depression, anxiety, and marital ambivalence and conflict.
[†] $p < .10$ (marginally significant). * $p < .05$. ** $p < .01$.

Table 4
Score Differences in Maternal Efficacy, Mood States, Marital Factors, and Infant Temperament at Prenatal, 1-Month-Postpartum, and 3-Month-Postpartum Measurement Time Points

Maternal measure	Prenatal (<i>n</i> = 60)		1 month (<i>n</i> = 52)		3 months (<i>n</i> = 50)		Univariate <i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Maternal efficacy	88.3 _a	13.7	92.3 _b	10.5	95.0 _c	11.3	27.72**
Anxiety	32.6 _a	6.9	31.2 _a	6.8	29.3 _b	7.2	15.81**
Depression	5.8 _a	2.9	5.2 _a	3.5	4.5 _b	4.3	3.59*
Marital positivity	118.5 _a	9.1	115.8 _b	11.3	115.1 _b	11.6	4.35**
Marital negativity	25.4 _a	9.2	26.5 _a	9.7	26.5 _a	10.9	0.52
Infant temperament	—	—	49.7 _a	9.3	42.4 _b	10.5	38.84**

Note. Means in the same row that do not share subscripts differ at $p < .05$ using Scheffé's post hoc comparison.

* $p < .05$. ** $p < .01$.

C. P. Cowan & Cowan, 1988; P. A. Cowan & Cowan, 1988; Fleming, Ruble, Flett, & Van Wagner, 1990; Ruble et al., 1990). Past studies, typically using concurrent designs, have demonstrated that feelings of efficacy are linked to other important self-perceptions and personal relationships, including feelings of anxiety, depression, and marital satisfaction in the postpartum period (e.g., Teti & Gelfand, 1991). The current investigation was designed to extend the literature on maternal efficacy during parenting transition in several important ways.

First, this study extends the literature by offering insights on the nature of concurrent relationships between women's anticipated feelings of efficacy, self-reported mood states, and marital supports as measured during the prepartum period. Similar to research reporting on the postpartum period (e.g., Teti & Gelfand, 1991), we found that women who reported higher levels of depression, anxiety, and marital negativity had lower feelings of efficacy about the impending parenting role. In addition, consistent with Bandura's (1982) notions regarding outcome expectancies, which are based on prior success and failure appraisals (performance outcomes), we also found that the more child-care experience women have prior to motherhood, the more confident they feel about being able to perform nurturing routines in the future. We suspected (although this is not something we directly assessed) that women reporting greater levels of child-care experience prior to motherhood would likely have more success experiences in caregiving routines to draw upon in forming efficacy beliefs than would women who had little or no previous child-care experience. It is interesting to note that previous child-care experience did not predict mothers' sense of efficacy postnatally. The emerging relationship between mother and infant in a context of immediate and intimate care shows a more salient link to women's sense of nurturing efficacy in the postpartum period than increasingly distant child-care experiences occurring prior to motherhood. When examined simultaneously, anxiety and prior child-care experiences were found to contribute significantly to expectant mothers' sense of efficacy. These findings highlight the possibility that women's general sense of anxiety coupled with prior

experiences or the lack of experience in care routines are uniquely influencing women's feelings of efficacy with respect to their impending role as a mother. In general, mood states, marital supports, and previous experiences during the prenatal period may act as filters (Bandura, 1982) through which expectant women view the mothering role. At the same time, these findings might also reflect the general worries, anxieties, or possible doubts that expectant women feel about impending motherhood and their ability to fulfill potentially unfamiliar nurturing routines (Heinicke, 1984; Ruble et al., 1990).

Second, this study investigated possible links between maternal efficacy and psychosocial variables in relationship to infant characteristics over the parenting transition. Findings revealed that maternal efficacy measured at 1 month was concurrently related to self-reports of anxiety and marital positivity (love and maintenance) but no longer related to self-reported depression and marital negativity (ambivalence and conflict) as demonstrated during the prenatal period. By 3 months postpartum, maternal efficacy was no longer significantly related to any of the individual psychosocial variables or the composite psychosocial distress index. Our findings did not replicate prior research that has demonstrated links between maternal psychosocial variables, including maternal depression and marital quality, and maternal efficacy postnatally (e.g., Teti & Gelfand, 1991). Given the relatively low-risk and demographically restricted nature of the current sample, it could be that these women are exhibiting fairly high levels of adaptiveness to the parenting transition, leading to less anxiety and depressive mood states in comparison to what might be found among more representative populations. However, we speculated that postnatal perceptions of efficacy might be a "reality check" with respect to mothers' experience of success and failure in providing care for their infants. Therefore, maternal efficacy measured postnatally demonstrated a gradual disassociation from psychosocial variables, which were indicators of these mothers' general sense of well-being. This interpretation implies that mothers' sense of efficacy is becoming more differentiated and compartment-

talized (cf. Showers, 1992) over time and is less connected to internal mood states or marital supports.

Only mothers' perceptions of infant temperament were found to be associated with maternal efficacy at 3 months postpartum, suggesting that efficacious beliefs specific to nurturing are being shaped by the dynamic interplay between infant traits and mothers' opportunities for ongoing success in caregiving routines. This finding provides some supporting evidence for our speculation that postnatal maternal efficacy to some degree reflects a sense of success or failure in caring for infants. Although mothers' performance in ongoing caregiving routines was not directly assessed, our hypothesis appears to be supported by the finding that mothers with temperamentally easy infants feel more efficacious in their ability to perform basic caregiving routines than mothers with temperamentally difficult infants. It is likely that women in the current investigation, similar to those in prior research demonstrating a differentiation of new mothers' sense of self (Ruble et al., 1990), are experiencing a process of differentiating efficacy during the transition to motherhood. In essence, maternal efficacy may be emerging from a more global or undifferentiated sense of self-competence, helping to explain the direct correlations between anticipated feelings of efficacy and mood states (anxiety and depression) prenatally, into a domain-specific sense of control in the mothering role, in which mothers' reports of efficacy are no longer related to indices of general psychological well-being at 3 months postpartum.

It is important to point out that contrary to past research that has demonstrated links between prenatal reports of maternal characteristics and subsequent maternal perceptions of infant temperament (Vaughn, Joffe, Bradley, Seifer, & Barglow, 1987), maternal efficacy measured prenatally in this study was not found to be related to mothers' postnatal ratings of infant temperament. This suggests that women's perceptions of their infants' characteristics are not unduly influenced by feelings about their impending parenting abilities. It is also interesting to note that 1-month efficacy scores were likewise uncorrelated with 3-month temperament ratings, again suggesting that mothers' antecedent self-perceptions of efficacy are not being carried over into subsequent perceptions of infant temperament. Such findings point toward the possibility that despite the shared method of assessment, a mother's own efficacy and her perceptions of her infant's temperament are fairly independent (Rothbart & Bates, 1998).

A third contribution of this study is its examination of the short-term stability and mean level of changes in women's feelings of efficacy over the transition to motherhood. Consistent with our expectations, maternal efficacy demonstrated relatively high temporal stability over the three assessment periods. Although efficacy scores were found to have high temporal stability, we also found significant increases in perceptions of efficacy from the prepartum period to 1 and 3 months postpartum. These findings run somewhat contrary to past research that has demonstrated a decreasing or somewhat stable sense of self-esteem among new mothers (C. P. Cowan & Cowan, 1992). The discrepancy, though, is likely accounted for by the use of differing

self-constructs in these studies (i.e., self-esteem vs. self-efficacy) and the possibility that further compartmentalization (cf. Showers, 1992) and/or self-discrepancies (cf. Alexander & Higgins, 1993) are emerging among these self-systems. Specifically, self-esteem is believed to represent more global features of self-perceptions, whereas efficacy beliefs are thought to be specific to performance abilities (Bandura, 1997). In this case, it is possible that a new mother's general sense of self may remain fairly stable or even slightly decrease while her sense of nurturing efficacy increases; however, further research is needed to explicate these potentially diverging trajectories in self-systems.

Alternatively, observed increases in feelings of efficacy are potentially tied to repeated and ongoing opportunities for new mothers to perform various care routines. For instance, it is possible that new mothers are beginning to feel more comfortable and confident holding and being affectionate with newborns following repeated opportunities to engage in these activities. As a result, it seems likely that new mothers are gaining valuable performance outcome feedback with respect to their ability to adequately care for their newborn during the first few months of motherhood (Bandura, 1997). As new mothers repeatedly engage in the intensive process of caregiving, the routines are likely becoming familiar and comfortable, and thus new mothers begin to feel more efficacious in their abilities to nurture their infant. The fact that women's feelings of anxiety and depression significantly decreased over time might also indicate that many of the initial worries regarding the parenting transition are now being alleviated through continuing experiences with their infant. Not surprisingly, past research has similarly demonstrated that nearing the 3rd month postpartum, maternal mood states begin to improve perceptibly (Fleming et al., 1990). These findings likely point toward a growing sense of ease and comfortableness associated with emerging parenting activities.

It is also interesting to note that whereas efficacy steadily increased from pre- to 1 and 3 months postpartum, mothers' perception of their infants' temperamental negativity significantly decreased from 1 to 3 months. That temperamental negativity declined from 1 to 3 months mirrors previous research that has demonstrated a peak in infants' negative affectivity (i.e., crying, fussiness) around the 2nd month postpartum with marked decrements in negative infant affectivity thereafter (Barr, 1990). The changes in mothers' perception of infant temperament might likewise reflect normative changes previously observed in infants' positive affectivity. For instance, Fogel (1982) has shown that infants' social smiles increase fourfold from the 2nd to the 6th month of life. These normative changes in infants' emotionality are likely associated with a mother's ease of reading and responding to her infant's cues. At the same time, the onset of social cues allows parents an opportunity to observe firsthand their ability to positively influence their child's emotional state. With increasing social smiles, mothers may perceive this powerful new cue in light of a performance outcome and make assessments relative to their mothering effectiveness on the basis of their infants' positive affectivity (Fogel, Nelson-Goens, Hsu, & Shapiro,

2000). Such changes in mothers' perceptions of infant temperament also likely reduce perceptions about the "difficulty" of the task of caring for an infant, especially as the infant begins to appear more adaptable, predictable, and sociable over time (Rothbart & Bates, 1998).

Limitations of the Current Study

The fact that maternal self-appraisals were the focus of this investigation contributes also to one of its weaknesses, primarily a reliance on a common source of information. However, past research has demonstrated the utility of such assessments in understanding both infant temperament (Rothbart & Bates, 1998; Sanson et al., 2002; Slabach et al., 1991) and maternal self-appraisals (e.g., Ruble et al., 1990; Fleming et al., 1990) in relationship to the early parenting transition. To further understanding of the relationship between infant temperament and maternal efficacy, future researchers should be encouraged to include multiple measures of infant temperament, including both subjective and objective (e.g., observational and psychophysiological assessments of infant temperament such as fetal heart rate) measures pre- and postnatally during the parenting transition. Maternal behaviors should also be observed in the context of caregiving and social interactions. This would allow researchers to tease apart the features of infants' behavioral characteristics that are most likely to impact maternal sense of efficacy (e.g., effectiveness at soothing a crying-fussy baby, infants' quality of mood, etc.). Likewise, additional research is needed of a long-term nature beyond the first 3 months following birth (C. P. Cowan & Cowan, 1992) to further explore potential iterations of the patterns of relationships found in this study and to better understand the long-term effects of child traits on maternal efficacy. For instance, past research has demonstrated that nearing 6 months postpartum, married couples report significant alterations in perceptions of marital satisfaction, with satisfaction generally declining (C. P. Cowan & Cowan, 1992). It is important to know if such alterations then lead to further changes in maternal efficacy by means of lessening verbal or social persuasions from one's parenting partner.

Furthermore, given that the current sample is composed of a small number of fairly low-risk, middle-class, maritally intact, and well-functioning families, it is important to extend this research to explore potential alterations in the relationships to maternal efficacy with additional families under varied circumstances. However, even with restricted variance in these mothers' psychological profiles, it is interesting to note that results still demonstrate weakening associations between maternal psychosocial distress and maternal efficacy and strengthening links between maternal efficacy and infant temperament over the parenting transition. It is possible that a more diverse sample may have yielded even more pronounced effects.

Implications for Application and Public Policy

This study highlights the potentially dynamic relationships between mothers' perceptions of their infants' tem-

perament and augmented feelings of efficacy over the transition to motherhood. That mothers' increasingly more positive perceptions of their infant's temperament over the first 3 months postpartum appear to reflect positive changes in maternal feelings of efficacy lends indirect support to the idea that infants may help to form and transform parenting cognitions and self-appraisals.

Future research should be designed to directly measure the potentially changing nature of these dynamic self-systems through additional experimental manipulation of parents' perceptions of child-care performance (cf. Donovan & Leavitt, 1989) and by further delineation in measures of the developing self over the parenting transition (cf. Hooker, Friese, Jenkins, Morfei, & Schwagler, 1996). The results of this investigation provide further direction in understanding factors involved in the formation of efficacious beliefs in first-time mothers. Specifically, care should be given in helping new parents to better understand the unique relationship between their infants' characteristics and their own emerging sense of efficacy in the nurturing role (e.g., McDevitt, 1988; Teti & Gelfand, 1991). It would also be fruitful for future research to investigate the origin, developmental process, correlates, and outcomes of mothers' and fathers' possible selves, including a possible self-as-parent during the transition to parenthood (cf. Hooker et al., 1996).

In summary, this investigation found significant temporal stability between prenatal and postnatal maternal reports of efficacy in the nurturing role. In addition, we found that mothers' efficacious feelings increased across the pre- to postnatal periods. We also found that anticipatory feelings and 1-month efficacy were significantly associated with concurrent levels of psychosocial distress. It may be that during the prenatal period, women who experience lower efficacious beliefs about their impending mothering role may also experience heightened feelings of general anxiety during this period of uncertainty. Although we were not able to determine whether distress leads to low levels of efficacy or vice versa, it appears that women's prepartum psychosocial state is an important contributor to feelings of competency in the mothering role.

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