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DEVELOPMENT OF PARENTING SELF-EFFICACY IN MOTHERS OF INFANTS WITH HIGH NEGATIVE EMOTIONALITY

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Abstract

Maternal parenting self-efficacy (PSE) is a potential target for infant mental health interventions because it is associated with a number of positive outcomes for children and mothers. Understanding the development of maternal PSE under conditions of increased parenting stress, such as parenting an infant who is easily distressed and difficult to soothe, will contribute to providing more effective interventions. This study examines the development of maternal PSE in mothers of infants with high negative emotionality (NE). The Neonatal Behavioral Assessment Scale (NBAS; T. Brazelton, 1973) was administered twice to 111 infants to select a sample of irritable ($n = 24$) and nonirritable ($n = 29$) infants for a prospective study comparing the development of PSE in mothers of infants differing in neonatal NE. Consistent with our hypotheses and previous research, at 8 weeks' postpartum, mothers of irritable infants have significantly lower domain-specific PSE than do mothers of nonirritable infants. Contrary to our predictions, mothers of irritable infants exhibit a significant increase in domain-specific and domain-general PSE from 8 to 16 weeks' postpartum. The implications of these results for infant mental health screening, infant mental health interventions, and research on self-efficacy theory are discussed.

In recent years, there has been a growing interest in factors influencing mothers' perceptions of their parenting abilities. The construct of parenting self-efficacy (PSE), parents' beliefs regarding their capabilities to perform the numerous and changing tasks associated with parenting, has provided a theoretical framework for much of this research (for reviews, see de Montigny & Lacharite, 2005 and Jones & Prinz, 2005).

The concept of PSE is informed by the broader self-efficacy literature. Bandura (1977) defined self-efficacy as individuals' beliefs in their ability to successfully perform specific behaviors needed to function effectively in a particular domain. PSE encompasses both level of perceived knowledge of appropriate child-rearing behaviors and degree of confidence in

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one's ability to perform parenting tasks. For a mother to perceive herself as efficacious in parenting, she must have (a) a repertoire of responses to typical child-rearing situations (e.g., methods of soothing a crying infant, ways to manage a toddler's disruptive behavior), (b) confidence in her ability to carry out these interventions, (c) beliefs that her child will respond to her efforts, and (d) beliefs that significant others will support her efforts (Coleman & Karraker, 1997).

Self-efficacy is considered a dynamic aspect of the individual that is hypothesized to change in response to a variety of influences. Specifically, Bandura (1997) described four factors that influences self-efficacy: enactive mastery experiences, affective states, vicarious experiences, and verbal persuasion. Enactive mastery experiences (i.e., situations where a skill is acquired) are considered to be the most important influences on self-efficacy. That is, successful acquisition of a skill (i.e., mastery) contributes to an increase in self-efficacy while failed attempts at acquiring a skill undermine self-efficacy. A self-perpetuating cycle may emerge when individuals low in self-efficacy avoid tasks they perceive as difficult and consequently fail to acquire additional knowledge and skills that could increase their competence (Bandura, 1997).

PSE is associated with a variety of positive outcomes for mothers and their children. In terms of maternal outcomes, mothers with greater PSE have fewer symptoms of postpartum depression and less psychological distress (Cutrona & Troutman, 1986; Halpern & McLean, 1997; Haslam, Pakenham, & Smith, 2006). Maternal PSE is positively associated with attentive, competent, sensitive, and positive interactions with infants (Bohlin & Hagekull, 1987; Hsu & Lavelli, 2005; Leerkes & Crockenberg, 2002; Teti & Gelfand 1991). In terms of child outcomes, maternal PSE is positively associated with infants' signaling capacity and interactive behavior during interactions with their mothers and toddlers' cognitive development (Bohlin & Hagekull, 1987; Coleman & Karraker, 2003).

In the postpartum period, the most salient feedback mothers receive during enactive mastery experiences is the infant's reactions. Specifically, the infant's emotional responses to caregiving tasks provide the mother with feedback regarding her caregiving success. For example, whether the infant fusses or cries during routine caregiving tasks and whether the infant stops crying in response to soothing attempts are hypothesized to influence the mother's PSE.

Considerable research has indicated that there are relatively stable differences between infants regarding how frequently they fuss and cry, the intensity of their fussing and crying, how much stimulation it takes for them to become distressed, and how much intervention it takes to soothe them (Bates, Freeland, & Lounsbury, 1979; Crockenberg, 1981; Kaye, 1978; Matheny, Riese, & Wilson, 1985; van den Boom, 1988, 1994). According to self-efficacy theory, differences between infants in negative emotionality (NE) should impact PSE by influencing the mother's enactive mastery experiences. Consistent with this hypothesis, mothers who describe their infants as crying frequently, crying intensely, prone to distress, and difficult to soothe have significantly lower PSE (Bond, Prager, Tiggemann, & Tao, 2001; Cutrona & Troutman, 1986; Hsu & Lavelli, 2005; Leerkes & Burney, 2007; Leerkes & Crockenberg, 2002; Papousek & vonHofacker, 1998; Porter & Hsu, 2003; Stifter & Bono, 1998; Teti & Gelfand, 1991).

There is some disagreement in the literature regarding how temperament and infant NE are conceptualized (Wachs & Bates, 2001). NE is considered one of the earliest aspects of temperament to emerge and is defined, generally, as the tendency to become distressed in response to stimulation, to respond with negative emotions, and to recover slowly from distress (Gartstein & Rothbart, 2003; Wachs & Bates, 2001). These tendencies are

considered the major component of difficult infant temperament by both Thomas, Chess, and Birch (1968) and Bates, Freeland, & Lounsbury (1979), who include the infant's response to parents' soothing attempts in their definition. Alternatively, Rothbart (1981) and Gartstein and Rothbart (2003) focused on two basic processes underlying infant's emotional reactions: reactivity and regulation. Tendency to respond negatively is considered an indication of reactivity while reduction of infant distress in response to soothing techniques is considered an indication of regulation.

Studies based on the broader definition of NE have found that mothers of infants who cry frequently and intensely, are easily distressed, and are difficult to soothe have lower PSE (Bond et al., 2001; Cutrona & Troutman, 1986; Papousek & vonHofacker, 1998; Porter & Hsu, 2003; Teti & Gelfand, 1991). In the initial study of infant NE and PSE, based on Thomas et al.'s (1968) conceptualization of difficult temperament, infant NE was negatively associated with PSE at 3 months' postpartum (Cutrona & Troutman, 1986). This finding was replicated in two subsequent studies based on Bates, Freeland, & Lounsbury's (1979) conceptualization of NE and including infants 1 to 13 months of age (Porter & Hsu, 2003; Teti & Gelfand, 1991). Not all empirical investigations have found an association between NE and PSE; a small study of 4-month-old term and preterm infants based on Bates, Freeland, & Lounsbury's (1979) conceptualization of NE failed to find a statistically significant association between NE and PSE (Halpern & McLean, 1997).

In one of the few studies to examine changes in postpartum PSE, Porter and Hsu (2003) found a small, but statistically significant, increase in PSE from 1 to 3 months' postpartum and a statistically significant decrease in maternal perceptions of NE. They argued that the normative decrease in infant crying is one of the factors associated with the increase in postpartum PSE. However, they did not examine changes in PSE in infants selected for high NE. We hypothesized that unlike mothers of typical infants, mothers of infants with high NE would exhibit decreases in PSE during the postpartum period due to the ongoing impact of caring for an infant who is easily upset and difficult to soothe.

Research based on Rothbart's (1981) conceptualization of NE has suggested that the parent of an infant who is prone to distress (a component of reactivity) but is easily soothed (a component of regulation) may have greater PSE than do other mothers due to the impact of mastering a difficult task on self-efficacy (Leerkes & Burney, 2007; Leerkes & Crockenberg, 2002). The hypothesis that mothers who perceive themselves as able to soothe a distress-prone infant have the highest PSE was supported in an initial study (Leerkes & Crockenberg, 2002). Consistent with research that has used a broader conceptualization of NE, the lowest PSE was seen in mothers whose infants were easily distressed and difficult to soothe. A subsequent study based on Rothbart's (1981) conceptualization of NE found infant distress-proneness was negatively associated with maternal PSE while infant soothability was positively associated with PSE (Leerkes & Burney, 2007). However, this study failed to replicate the previous finding of an interaction between distress-proneness and soothability in prediction of PSE.

When considering the breadth of research on PSE, research on infant colic and PSE is relevant to the current study because there is considerable overlap between colic and NE (Barr & Gunnar, 2000). Colic is defined as excessive, inconsolable crying that occurs for no identifiable medical reason (Taubman, 1988; Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Barr and Gunnar (2000) noted that "infants with colic are likely to be described as having difficult temperament 'by definition'" p. 43 since both are defined by frequency of crying. The main difference between the constructs of colic and NE is that colic is conceptualized as a transient phenomenon that resolves by 6 months while NE is conceptualized as a stable individual difference (Barr & Gunnar, 2000).

Three studies, conducted in different cultures, have found that mothers of infants with colic have significantly lower PSE than do mothers of infants without colic (Bond et al., 2001; Papousek & vonHofacker, 1998; Stifter & Bono, 1998). German mothers seeking treatment for their infant's excessive crying had significantly lower PSE than did a community comparison group (Papousek & vonHofacker, 1998). In an Australian community sample, mothers of infants with colic had significantly lower PSE than did mothers of infants who do not meet criteria for colic (Bond et al., 2001). In the only longitudinal study of colic and PSE, mothers of 3 to 5-week-old infants with colic had significantly lower PSE at 20 weeks than did mothers of noncolic infants (Stifter & Bono, 1998).

The association between infant NE and PSE in studies conducted in clinical and community settings in different countries lends considerable support to the hypothesis that mothers of infants who are prone to distress, cry frequently and intensely, and are difficult to soothe exhibit lower PSE. However, this support is tempered by three methodological issues; previous studies of PSE and infant NE are based on assessments of NE during the infant's interactions with the mother, rely primarily on maternal reports of infant NE, and have not examined changes in PSE in mothers of infants with high NE (Bond et al., 2001; Leerkes & Burney, 2007; Leerkes & Crockenberg, 2002; Papousek & vonHofacker, 1998; Porter & Hsu, 2003; Stifter & Bono, 1998; Teti & Gelfand, 1991). The potential problem with assessing NE during mother-child interactions is the possibility that the mother's PSE could affect her responsiveness to the infant's distress, leading the infants of mothers with low PSE to appear less soothable and fussier during interactions with their mothers. A potential problem with relying on maternal reports of infant NE is the possibility that the relationship between infant NE and PSE may result from using the same method to assess both constructs. Longitudinal studies that examine changes in PSE in mothers of infants with high NE are needed to better understand the relation between NE and PSE.

The conceptualization of NE in the current study is consistent with Bates', Freeland, & Lounsbury's (1979) conceptualization (i.e., proneness to distress, frequency of fussing and crying, intensity of fussing and crying, and soothability). To address methodological issues raised by previous studies (i.e., the possibility that basing infant NE assessments on maternal ratings of NE during mother-child interactions may inflate the relation between these two variables), assessment of NE was based on observer ratings of the infant's reactions during administration of a standardized procedure by an observer. Specifically, two administrations of the Neonatal Behavioral Assessment Scale (NBAS; Brazelton, 1973; Kaye, 1978) were used to select infants with high NE. Research on the NBAS has indicated that by administering the NBAS at least twice, infants with relatively stable individual differences in NE can be identified (Crockenberg, 1981; Kaye, 1978; van den Boom, 1989). The specific NBAS ratings included in this factor assess frequency of crying, intensity of crying, and soothability (peak of excitement subscale), the degree of stimulation it takes for the infant to become distressed (rapidity of build-up scale), and the number of specific NBAS items the infant responds to with at least 3 s of distress (irritability scale). Previous research has indicated that infants identified as "irritable" using this factor are rated by their mothers as having a more difficult temperament at 6 months of age (van den Boom, 1988). In our sample, infants identified as irritable using the NBAS were rated by their mothers as exhibiting greater NE than did nonirritable infants at 4, 8, and 16 weeks of age (Troutman, 2010).

In the current study, we extend previous research on NE and PSE in three ways: by using an observational assessment of NE, by using a longitudinal design that examines changes in post-partum PSE in mothers of infants with high NE, and by using domain-specific and domain-general assessments of PSE. The first extension addresses whether the moderate to large differences in PSE between mothers of infants with high and typical NE are due to

method variance. The second extension compares changes in PSE in mothers of infants with high and typical NE.

The third extension involves utilizing two different approaches to assessing PSE: domain-specific and domain-general assessments (Coleman & Karraker, 2003). In the domain-specific approach, information from task-specific items (i.e., parents' perceptions of their ability to carry out discrete parenting tasks such as soothing a crying child) is combined to create an index of domain-level PSE. The domain-general approach assesses global attitudes regarding parenting competence rather than parents' perceptions of their competence in specific parenting tasks. In the current study, we examine domain-specific and domain-general PSE in mothers of high NE and typical infants. Domain-specific PSE assessments are arguably more consistent with Bandura's (1977) definition of self-efficacy and perhaps more sensitive to differences in task difficulty (i.e., infant NE) (Coleman & Karraker, 1997). Thus, we posited that differences in PSE between mothers of irritable and nonirritable infants might be greater for the domain-specific PSE assessment. The primary aim of the current study was to compare the development of PSE in mothers of infants with high NE (i.e., irritable) to typical infants (i.e., nonirritable). Therefore, two specific hypotheses were formulated:

- H1** Mothers of irritable infants will have lower postpartum PSE than will mothers of nonirritable infants.
- H2** Mothers of irritable infants will exhibit a decrease in PSE from 8 to 16 weeks' postpartum whereas mothers of non-irritable infants will exhibit an increase.

These hypotheses were examined using domain-general and domain-specific assessments of PSE.

METHOD

Recruitment and Screening of Participants

Advertisements and local birth records were used to identify and recruit neonates and their mothers. Two initial evaluation sessions were conducted in the home at 3 and 4 weeks' postpartum with infants who had been discharged from the hospital within 10 days of birth. Assessments of infant irritability (irritability cluster of the NBAS; Kaye, 1978) were conducted at both sessions to select a sample of irritable infants and a comparison group of nonirritable infants.

During the initial evaluation sessions, mothers also were interviewed regarding demographic and basic health information (3 weeks' postpartum). Participants in the longitudinal study completed domain-general and domain-specific assessments of PSE at 8 and 16 weeks' postpartum. Assessments completed at 8 and 16 weeks' postpartum were administered in the home by research staff who were blind to the infants' initial irritability classification and the hypotheses being tested.

All irritable infants and 40% of infants who did not meet irritability criteria (randomly selected) were invited to participate in the longitudinal study. Mothers were informed that the assessments conducted with their infants were used to select a sample of infants with different behavioral characteristics, but were not informed of their infant's irritability classification (i.e., irritable vs. nonirritable).

A total of 111 infants and 109 mothers completed both screening sessions (Two sets of twins were screened.) Six infants completed only the initial assessment session due to infant illness or family emergency ($n = 3$), withdrawal from the study ($n = 1$), moving out of the

area ($n = 1$), or examiner illness ($n = 1$). There were no statistically significant differences between infants who completed both NBAS assessments and infants who completed only the initial NBAS assessment on the irritability score on the initial NBAS administration, $t(115) = .91$, n.s., gender, $\chi^2(1) = .54$, n.s., or ethnicity, $\chi^2(4) = 1.1$, n.s. Their mothers did not differ significantly on marital status, $\chi^2(1) = .23$, n.s., parity, $\chi^2(1) = 1.2$, n.s., or age, $t(113) = .89$, n.s.

Twenty-four percent of infants completing both NBAS assessments were classified as irritable, a rate comparable to previous studies with slightly younger neonates (Crockenberg, 1981; van den Boom, 1994). Eighty-eight percent of those invited to participate in the longitudinal study participated in at least one additional assessment (24 irritable infants, 29 nonirritable infants). Of the infants selected for the longitudinal study, those who continued did not differ from those who did not continue on NBAS irritability classification, $\chi^2(1) = .35$, n.s.; however, the infants who met criteria for irritability and did not continue had higher irritability scores at both assessments, $t(26) = 2.07$, $p < .05$; $t(26) = 3.04$, $p < .01$, respectively, than did the irritable infants enrolled in the longitudinal sample. Infants enrolled in the longitudinal study did not differ significantly on gender, $\chi^2(1) = .2$, n.s., from infants who were invited to participate and did not continue, but did differ significantly on ethnicity, $\chi^2(3) = 8.6$, $p < .05$. Specifically, they were less likely to be Asian, $\chi^2(1) = 7.7$, $p < .01$. Mothers who participated in the longitudinal study did not differ significantly on parity, $\chi^2(1) = .6$, n.s., socioeconomic status as assessed by the Hollingshead (1975) Four Factor Index, $\chi^2(4) = 1.6$, n.s., or age, $t(58) = 1.2$, n.s., from those who were invited to participate and did not continue. Mothers who agreed to participate in the longitudinal study were more likely to be married, $\chi^2(1) = 7.7$, $p < .01$.

Characteristics of Participants in the Longitudinal Study

Fifty-three percent of infants in the longitudinal study were male. Eight-five percent of infants were White, 7.5% were Black, and 7.5% were Hispanic. The ages of mothers in the longitudinal study ranged from 23 to 42 (M age = 31) years. All mothers were married, and the majority (83%) were from professional households (Class 4 or 5 according to Hollingshead's 1975 Four Factor Index of Social Status). Fifty-eight percent of mothers were primiparous. Among the multiparous mothers, the number of previous live births ranged from 1 to 3, and children's current ages ranged from 1 to 13 months.

Measures

Observer assessment of infant NE—The NBAS (Brazelton, 1973) was administered at 3 and 4 weeks' postpartum to identify irritable infants. Infants were determined to be irritable if their mean score on the irritability cluster identified by Kaye (1978) (peak of excitement, rapidity of build-up, and irritability) was 6 or greater on both NBAS administrations (Cutoff score was based on studies by Crockenberg, 1981, and van den Boom, 1994.) The NBAS was administered by the first author, who was trained and certified as reliable at the Brazelton Institute, Harvard University.

Domain-general PSE—The Parenting Sense of Competence (PSOC) PSE Scale was used to assess domain-general PSE (Gibaud-Wallston, 1977; Johnston & Mash, 1989). The PSOC is the scale used most frequently in previous studies of PSE (Coleman & Karraker, 1997; Jones & Prinz, 2005). It is considered a domain-general assessment of PSE since the focus is the parent's overall sense of efficacy in the parenting role rather than efficacy in particular parenting tasks (Coleman & Karraker, 1997; Jones & Prinz, 2005). The original PSOC contains 17 items rated on 6-point scales (from "strongly agree" to "strongly disagree") and has two rationally derived scales: the eight-item PSE scale (Skill/Knowledge) and the nine-item parenting satisfaction scale (Valuing/Comfort) (Gibaud-Wallston, 1977). A factor

analysis of the PSOC indicated that eliminating one item from the original PSE scale led to a more internally consistent scale (Johnston & Mash, 1989), and most subsequent research has used the seven-item PSE scale recommended by Johnston and Mash (1989). Cronbach's α s for the seven-item PSE scale used in the current study ranged from .75 to .76, which is comparable to α s in previous studies (.81–.88) (Coleman & Karraker, 2003; Erdwins, Buffardi, Casper, & O'Brien, 2001; Lovejoy, Verda, & Hays, 1997).

The construct validity of the PSOC PSE scale is demonstrated by a significant correlation ($r = .48$) with another PSE scale, the Self-Efficacy for Parenting Tasks Index–Toddler Scale (Coleman & Karraker, 2003). In terms of discriminant validity, the PSOC PSE scale is only weakly correlated ($r = .26$) with an assessment of self-efficacy in the work domain, indicating that it is assessing self-efficacy beliefs specific to the parenting domain (Erdwins et al., 2001). Furthermore, the PSOC PSE scale appears to discriminate between PSE and other types of parenting cognitions because it is only weakly correlated (r s = .09 and .14, respectively) with scales assessing parental locus of control (Lovejoy et al., 1997).

Domain-specific PSE—The Maternal Efficacy Questionnaire (MEQ; Teti & Gelfand, 1991) is a 10-item scale that was developed to assess PSE in mothers of infants. It is primarily a domain-specific measure of PSE because 9 of the 10 items address mothers' self-efficacy in specific parenting tasks (e.g., soothing the baby; feeding, changing, and bathing the baby) and one item assesses general PSE (Coleman & Karraker, 1997; Jones & Prinz, 2005). For the current study, the domain-general PSE item was excluded. In addition, one task-specific item was excluded (making the baby understand what you want her to do) because it was not developmentally appropriate for 8-week-old infants. Cronbach's α s for the eight-item scale used in the current study ranged from .62 to .74, which is comparable to those for the 10-item scale used in previous studies (.70–.86) (Leerkes & Burney, 2007; Leerkes & Crockenberg, 2002; Teti & Gelfand, 1991). The construct validity of the MEQ is demonstrated by a significant correlation ($r = -.75$) with perceived lack of parenting competence as assessed by the Parenting Stress Index Sense of Competence Scale (Teti & Gelfand, 1991).

RESULTS

Missing Data

Among those who participated in the follow-up study, the rate of missing data was 3%. Consistent with recommendations for imputing missing values when the amount of missing data is relatively small, missing responses to scales were replaced with the sample mean for the scale, and missing responses to items were replaced with the individual's mean response to other items on the scale (McCartney, Burchinal, & Bub, 2006).

Demographic characteristics and infant irritability—As shown in Table 1, irritable infants were slightly more likely to be male than were nonirritable infants. The mothers of irritable and nonirritable infants did not differ on parity, socioeconomic status, or age.

Demographic characteristics and PSE—A series of analyses was conducted examining the association of maternal age, socioeconomic status (Hollingshead, 1975), and parity with domain-general and domain-specific PSE. The only statistically significant relationship was a main effect of parity on domain-general PSE, $F(1, 51) = 5.3$, $p < .05$, with primiparous mothers scoring significantly lower on domain-general PSE than did multiparous mothers.

Infant irritability and PSE—The hypotheses that mothers of irritable infants will have lower PSE and exhibit a decrease in PSE were examined using repeated measures analyses, with neonatal irritability classification (determined by observer NBAS ratings at 3 and 4 weeks' postpartum) as the between-subjects factor, time of assessment (8 weeks or 16 weeks) as the within-subjects factor, and domain-general and domain-specific PSE as the dependent variables.

Since preliminary analyses indicated that parity was associated with domain-general PSE, a repeated measures analysis of covariance (ANCOVA) with parity as a covariate was used to examine domain-general PSE in mothers of irritable and nonirritable infants. The repeated measures ANCOVA, with irritability as the between-subjects factor, time of assessment as the within-subjects factor, and parity as a covariate, found that the Parity $\times$ Time interaction, $F(1, 50) = 0$, n.s., was not statistically significant. The Irritability Classification $\times$ Time interaction, $F(1, 50) = 4.8$, $p < .05$, was statistically significant. The main effect for irritability, $F(1, 50) = .8$, n.s., failed to reach statistical significance whereas the main effect for time was statistically significant, $F(1, 50) = 6.8$, $p < .05$. There was a nonsignificant trend for mothers of irritable infants to have lower domain-general PSE ratings than did mothers of nonirritable infants at 8 weeks, $t(51) = 1.8$, $p = .09$. Domain-general PSE ratings by mothers of irritable infants did not differ significantly from ratings by mothers of nonirritable infants at 6 weeks, $t(51) = .02$, n.s. Contrary to our hypothesis, mothers of nonirritable infants failed to exhibit a statistically significant change in domain-general PSE between 8 and 16 weeks, $t(28) = 1.1$, n.s., whereas mothers of irritable infants exhibited a statistically significant increase, $t(23) = 3.7$, $p < .01$. Mean domain-general PSE scores for mothers of irritable and nonirritable infants are displayed in Figure 1.

Results for the repeated measures ANOVA for domain-specific PSE indicated a statistically significant Irritability Status $\times$ Time interaction, $F(1, 51) = 8.4$, $p < .01$, a statistically significant main effect for irritability status, $F(1, 51) = 5.8$, $p < .05$, and a statistically significant main effect for time, $F(1, 51) = 33.3$, $p < .001$. Follow-up t tests indicated that our hypothesis that mothers of irritable infants would have lower PSE was confirmed at 8 weeks' postpartum, $t(51) = 3.4$, $p < .01$, but not at 16 weeks' postpartum, $t(51) = .9$, n.s. As predicted, mothers of nonirritable infants exhibited a statistically significant increase in domain-specific PSE, $t(28) = 2.9$, $p < .01$, from 8 to 16 weeks. However, contrary to our hypothesis, mothers of irritable infants also exhibited a statistically significant increase in domain-specific PSE between 8 and 16 weeks, $t(23) = 4.7$, $p < .001$. Mean domain-specific PSE scores for mothers of irritable and nonirritable infants are displayed in Figure 2.

Effect sizes—To compare our results to those of previous studies, effect sizes were computed using the formula for Cohen's d and were interpreted using his criteria for small, medium, and large effect sizes (Cohen, 1992). Effect sizes for studies that have examined PSE in mothers of infants selected for high NE are summarized in Table 2. As shown in Table 2, effect sizes for differences in PSE between mothers of irritable and nonirritable infants at 8 weeks' postpartum in our sample were medium to large. This is comparable to effect sizes in previous studies where group assignment was based on maternal report. Table 3 summarizes results for studies that have examined changes in PSE during the postpartum period. As shown in Table 3, effect sizes for postpartum changes in PSE in mothers of nonirritable infants in our sample are small, which is comparable to previous community samples. However, effect sizes for postpartum changes in PSE in mothers of irritable infants in our sample are medium to large.

DISCUSSION

Consistent with previous research, the current study provides partial support for our hypothesis that mothers with high NE have lower postpartum PSE. Specifically, at 8 weeks' postpartum, mothers of irritable infants have significantly lower domain-specific PSE. A unique aspect of this study is the use of an observer evaluation of infant NE (i.e., irritability cluster; Kaye, 1978) of the NBAS (Brazelton, 1973) to select a sample of infants who are more prone to distress and difficult to soothe than are other infants. Between-group differences in PSE in our study (effect size = .5–1.0) are comparable to between group differences where high NE is based on maternal report (effect size = .5–1.1) (Bond et al., 2001; Papousek & vonHofacker, 1998; Stifter & Bono, 1998). Thus, the current study suggests that previous findings regarding PSE in mothers of infants with high NE are not solely due to method variance.

The current study extends previous research by examining seen among the mothers of nonirritable infants in our sample or in changes in PSE associated with infant NE. Contrary to our hypothesis, mothers of irritable infants exhibit an *increase* in PSE. To make sense of these surprising findings, we turned to self-from 8 to 16 weeks' postpartum. Furthermore, the magnitude of efficacy theory's predictions regarding the impact of successfully change (effect size = .6–1.0) is greater than the increase in PSE mastering challenging situations with high task demand. Bandura (1997) argued that experiencing success in challenging situations is more likely to lead to increases in self-efficacy. Extending this to infant NE, Leerkes and Crockenberg (2002) and Leerkes & Burney (2007) argued that parenting an infant who is easily distressed can lead to an increase in PSE when mothers are able to soothe a distress-prone infant.

A similar argument was made by Porter and Hsu (2003), who argued that increases in postpartum PSE may be due to normative decreases in infant fussing and crying. Consistent with this view, both irritable and nonirritable infants in our sample exhibit a decrease in fussing and crying according to maternal ratings, although irritable infants continue to fuss and cry more than do nonirritable infants (Troutman, 2010). In constructing our hypothesis regarding changes in postpartum PSE, we focused on the continuing challenges posed by infants with high NE. However, it is possible that normative decreases in the baby's overall level of distress and increases in soothability may be more salient than is the baby's level of distress and soothability compared to other infants.

Although results for domain-specific and domain-general PSE are similar, differences support Coleman and Karraker's (2003) contention that domain-specific PSE assessments are more consistent with Bandura's (1977) conceptualization of self-efficacy. Specifically, the domain-specific assessment of PSE is more sensitive to differences in infant NE than is the domain-general assessment. In addition, having a previous child is significantly associated with domain-general, but not domain-specific, PSE. Thus, previous parenting experience appears to influence global assessments of parenting competence, but not ratings of ability to perform specific parenting tasks with a particular infant.

The current study illustrates the unique contribution of prospective designs utilizing within-subjects analyses to understanding the development of PSE. Our prospective design, while replicating previous findings that mothers of infants with high NE have lower domain-specific PSE, also found an unexpected increase in postpartum domain-specific and domain-general PSE in the mothers of infants with high NE. Since PSE has been negatively correlated with challenging child behavior past the postpartum period (Bogenschneider, Small, & Tsay, 1997; Coleman & Karraker, 2003; Hill & Bush, 2001), prospective studies at other ages where significant changes in children's functioning occur (e.g., toddlers,

adolescents) would indicate whether mothers coping with these parenting challenges also exhibit increases in PSE.

Limitations and Future Directions

The current study focused on only one of the four factors hypothesized to influence self-efficacy: enactive mastery experiences. Furthermore, enactive mastery experiences were not directly assessed but were inferred from task difficulty (i.e., differences between infants in NE). Other factors hypothesized to influence self-efficacy include affective states, vicarious experiences, and verbal persuasion (Bandura, 1997). These factors may have accounted for the changes in PSE either directly or by moderating the impact of NE on PSE. Additional prospective studies examining whether other risk factors associated with PSE (e.g., social support) are associated with changes in PSE would further contribute to our understanding of this concept.

Another limitation of the current study is attrition. Participants who were screened but chose not to participate in the longitudinal study were more likely to be unmarried. Furthermore, the irritable infants who participated in the longitudinal study had lower irritability scores than did the irritable infants who did not participate. The differential attrition of those who may be at greater risk for low PSE is especially relevant to interpretation of our finding that mothers of irritable infants exhibit an increase in PSE. It may be that mothers with greater stress (e.g., greater infant irritability) and fewer resources (e.g., unmarried) would not have coped so successfully with parenting an infant with high NE.

In experimental studies of self-efficacy, task difficulty has typically been treated as a static variable (e.g., Donovan, Leavitt, & Taylor, 2005; Lodewyk & Winne, 2005). Our results suggest that examining the impact of change in task difficulty may be a fruitful area for further research on self-efficacy. Although our study cannot address whether changes in the infant led to changes in PSE, this is an intriguing possibility for future research to explore.

Clinical Implications

The surprising finding that mothers with good resources perceive themselves as becoming significantly more efficacious in parenting infants with high NE as their infants age has implications for developing interventions to support mothers of challenging infants. Specifically, it reminds us that coping with a parenting challenge can lead to an increase in PSE and, perhaps, even if the infant continues to present more challenges than do other infants.

The importance of grounding early interventions in a developmental perspective is well-known to early interventionists. These results indicate the need for a developmental perspective to take into account the normal developmental trajectory of parents as well as the normal developmental trajectory of infants. The tendency of mothers of irritable infants to experience increases in PSE during the postpartum period needs to be better understood to ensure that interventions for infant fussing and crying support this normal development. For example, our study raises the possibility that interventions that tell mothers how to soothe their irritable infants could undermine the normal development of PSE. Conversely, self-efficacy theory would argue that pointing out positive changes in the infant's behavior and attributing these changes to the mother's efforts might enhance the normal development of PSE.

These findings also have implications for screening mothers at risk for parenting difficulties. The brevity and ease of administration of PSE scales make it possible to use them for periodic screening in a variety of settings. Since PSE tends to increase over time among

mothers of typical and challenging infants, declines in PSE may be a good indicator of the mother's need for additional consultation and support.

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Figure 1. Parenting Sense of Competence (PSOC) Parenting Self-Efficacy (PSE) scores ($M \pm SEM$) for mothers of irritable and nonirritable infants. Irritable and nonirritable classifications were determined at 3 to 4 weeks' postpartum using the Neonatal Behavioral Assessment Scale (NBAS).

Figure 2. Maternal Efficacy Questionnaire (MEQ) scores ($M \pm SEM$) for mothers of irritable and nonirritable infants. Irritable and nonirritable classifications were determined at 3 to 4 weeks' postpartum using the Neonatal Behavioral Assessment Scale (NBAS).

TABLE 1

Comparison of Irritable and Nonirritable Infants on Demographic Variables

	NBAS Irritability Classification			
	Irritable (N = 24)		Nonirritable (N = 29)	
	n	%	n	%
Infant Gender				
Male	16	.67	12	.41
Female	8	.33	17	.59
Maternal Parity				
Primiparous	11	.46	11	.38
Multiparous	13	.54	18	.62
Socioeconomic status ^a				
I	0	.00	2	.07
II	1	.04	2	.07
III	1	.04	3	.10
IV	10	.42	11	.38
V	12	.50	11	.38
Maternal Age	M	SD	M	SD
	31.1	5.1	31.2	4.5

NBSA = Neonatal Behavioral Assessment Scale (Brazelton, 1973).

^aFour Factor Index (Hollingshead, 1975).

TABLE 2
Summary of Studies Examining Parenting Self-Efficacy (PSE) in Mothers of Infants with High Negative Emotionally (NE)

Study	Groups	N	Infant Age at NE Assessment	Infant Age at PSE Assessment	Type of PSE Assessment	Effect Size(d)
Bond et al., 2001	colic	33	4–16 weeks	4–16 weeks	domain-general	.5
	comparison	83				
Papousek & von Hofacker, 1998	extreme criers	37	4–24 weeks	4–24 weeks	domain-general	1.0
	moderate criers	26				1.1
Stifter & Bono, 1998	comparison	49				
	colic	12	3–5 weeks	20 weeks	domain-general	.9
Troutman et al., 2012	comparison	72				
	irritable	24	3–4 weeks	8 weeks	domain-general	.5
					domain-specific	1.0
	comparison	29	3–4 weeks	16 weeks	domain-general	0
					domain-specific	.3

TABLE 3
Summary of Studies Examining Change in Postpartum Parenting Self-Efficacy (PSE)

Study	N	Description of Participants	Infant Age	Effect Size (d)
Hsu & Lavelli, 2005	16	U.S. community sample	1 month; 3 months	.2 (domain-general PSE)
Hsu & Lavelli, 2005	16	Italian community sample	1 month; 3 months	.4 (domain-general PSE)
Porter & Hsu, 2003	52	U.S. community sample	1 month; 3 months	.2 (domain-general PSE)
Troutman et al., 2012	24	U.S. mothers of irritable infants	2 months; 4 months	.6 (domain-general PSE) 1.0 (domain-specific PSE)
Troutman et al., 2012	29	U.S. mothers of nonirritable infants	2 months; 4 months	.2 (domain-general PSE) .4 (domain-specific PSE)