

## Maternal Self-Efficacy Reduces the Impact of Prenatal Stress on Infant's Crying Behavior

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**Objective** To determine whether prenatal stress is associated with behavioral and emotional regulation problems (crying/fussing) in infants, after controlling for confounding factors. Furthermore, the study investigated the stress-buffering effect of maternal self-efficacy.

**Study design** Data were collected in 120 pregnant women ( $29 \pm 3.2$  weeks gestation) and their infants at 6 weeks of age. Expecting mothers completed a structured interview and self-report questionnaires on prenatal stress and self-efficacy. Crying/fussing data were obtained with a validated parental diary.

**Results** After controlling for confounding variables, multiple regression analyses show that prenatal stress and self-efficacy accounted for 20% of the variance of infant's fussing and crying behavior. Results suggest a mediating role of self-efficacy. Babies of mothers reporting high levels of prenatal stress cried less when their mother had high levels of self-efficacy compared with mothers with low self-efficacy. In addition, mothers of infants with excessive crying reported more symptoms of stress, depression, and anxiety in pregnancy.

**Conclusion** To foster the development of well-adapted parent-infant relationships and potentially to reduce infant crying in the early postpartum phase, health care professionals need special education about the effects of prenatal stress and interventions that promote self-efficacy. (*J Pediatr* 2012;161:104-9).

Unexplained crying in early infancy is a major stress and common to many parents. In Western Europe, estimates of infants exhibiting excessive crying range from 5% to 29%, depending on the study population.<sup>1</sup> Infant crying also has been linked to prenatal, perinatal, and/or postnatal stress and complications during childbirth.<sup>2-5</sup> Numerous animal studies suggest that repeated stress during pregnancy may produce long-term biologic and behavioral disorders in the offspring. For example, prenatal stress has been found to provoke structural changes in the hippocampus of juvenile rhesus monkeys.<sup>6</sup> Besides the hypothalamic-pituitary-adrenal-axis, other neurotransmitter systems may be modified in offspring of stress-exposed rat mothers: norepinephrine,<sup>7</sup> dopamine,<sup>8</sup> acetylcholine,<sup>9</sup> and serotonin.<sup>10</sup> These neuro-endocrine variations may result in increased stress vulnerability and enhanced emotional reactivity. In contrast to the well-controlled animal studies, prospective human studies are sparse.<sup>11</sup> Prenatal stress predicts restless/disruptive temperament, more behavioral problems, and more externalizing behavioral problems in 2-year-old children,<sup>12</sup> and perceived stress was associated with difficult behavior in 3-month-old infants.<sup>13</sup> There are a few prospective studies on infant crying focusing on psychosocial risk factors in the expecting mother.<sup>4,5,14</sup> However, studies considering maternal resource factors such as self-efficacy are sparse. Self-efficacy is defined as a person's beliefs about his/her own capabilities to perform in a certain manner to attain personal goals<sup>15</sup>; such expectation influences how one feels, thinks, or behaves. Thus, sufficient self-efficacy might play an important role in protecting mothers against heightened stress during the transition to motherhood.

We hypothesized that prenatal stress could impact behavioral and emotional regulation problems (crying/fussing) in infants. We also investigated whether maternal personality resources (self-efficacy) could buffer the effect of stress during pregnancy with positive effects on behavioral and emotional regulation in 6-week-old babies. In a final step, we investigated whether mothers of infants who meet the modified Wessel criteria<sup>16</sup> showed more symptoms of anxiety and depression in pregnancy to help explain findings.

### Methods

The study protocol was approved by the ethics committee of Basel and is consistent with the revised Helsinki Declaration of 1975. Expectant mothers were recruited from birth preparation classes ( $n = 163$ ). After giving informed consent, a structured interview on sociodemographic information was conducted by trained research assistants. Questionnaires on stress and self-efficacy were provided to the participants in their third trimester ( $29 \pm 3.2$  weeks gestation) in a single session. Six weeks after giving birth, mothers were asked to complete a 3-day behavior diary to obtain amounts of

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DASS-21 Depression Anxiety Stress Scales  
FKK Competence and Control Questionnaire