

# Chapter 2

## Prenatal Changes in Parenting Self-Efficacy: Linkages With Anxiety and Depressive Symptoms in Primiparous Women

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## ABSTRACT

The aim of the study was to examine parenting self-efficacy in relation to depressive and anxiety symptoms during pregnancy. Five hundred thirty-three first-time pregnant women completed questionnaires at 12, 22, and 32 weeks of pregnancy that measure parenting self-efficacy, anxiety, and depressive symptoms. Parenting self-efficacy increased slightly but significantly over the course of pregnancy. Higher levels of depressive symptoms as well as state and trait anxiety symptoms were related to lower expectations of parenting self-efficacy at all time points, but only anxiety symptoms uniquely predicted parenting self-efficacy. Higher levels of anxiety symptoms in the first trimester predicted less positive change in parenting self-efficacy over the course of pregnancy, but depressive symptoms did not when anxiety levels were taken into account. The findings highlight the role of antenatal anxiety symptoms as a predictor of suboptimal preparation for the parenting role in first-time-expecting mothers. Possible explanations and implications for clinical practice are briefly discussed.

Several studies have indicated that anxiety and depressive symptoms are common in pregnancy (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; Grant, McMahon, & Austin, 2008; Heron et al., 2004; Lee et al., 2007; Teixeira, Figueiredo, Conde, Pacheco, & Costa, 2009). The occurrence of anxiety or depressive symptoms during pregnancy is associated with increased risk for perinatal morbidity (Goedhart et al., 2010), postpartum anxiety and depression (Grant et al., 2008; Heron et al., 2004; Milgrom et al., 2008), and child developmental and behavioral problems (O'Connor, Heron, Golding, Glover, & Team, 2003; Van den Berg, 2006; Van den Bergh & Marcoen, 2004). Although mood symptoms, stress, and fearfulness in pregnancy have been shown to be related to negative attitudes toward pregnancy (Delmore-Ko, Pancer, Hunsberger, & Pratt, 2000; Hart & McMahon, 2006), the effects of depressive and anxiety symptoms on the preparation to motherhood and parenting self-efficacy have received less attention.

Parenting self-efficacy has been recognized as an important contributor to competent parenting behavior and subsequently to the socioemotional and cognitive development of children (Jones & Prinz, 2005; Teti & Gelfand, 1991; Williams et al., 1987). It is broadly defined as “the expectation caregivers hold about their ability to parent successfully” (Jones & Prinz, 2005, p. 342). Based on the self-efficacy concept of Bandura (1982), it reflects beliefs about one’s capability to meet the demands of parenthood and to positively influence the child’s development (Coleman & Karraker, 1998).

According to Bandura (1989), several factors (e.g., mood symptoms and distress) can influence self-efficacy. Depressive moods activate a selective recall of negative cognitions and past failures which impair adaptive capacities (Bandura, 1989). Women with depressive or anxious mood states experience lack of control over intrusive, stressful cognitions, which results in negative judgments about their ability to cope with the challenges of motherhood. In line with this notion, postnatal depression has been consistently associated with lower parenting self-efficacy in a variety of studies (Cutrona & Troutman, 1986; Haslam, Pakenham, & Smith, 2006; O’Neil, Wilson, Shaw, & Dishion, 2009; Teti & Gelfand, 1991); the same seems to hold for postpartum anxiety (Barnett & Parker, 1985; Barnett, Schaafsma, Guzman, & Parker, 1991). While the topic of parenting self-efficacy has received increased attention in research, most studies have focused primarily on the postnatal period (for a review, see Jones & Prinz, 2005). Data on parenting self-efficacy during pregnancy are scarce and have yielded somewhat inconsistent results. Porter and Hsu (2003) reported significant negative correlations between antenatal anxiety and depression in the last trimester of pregnancy and parenting self-efficacy in a group of 60 first-time-expecting women. Zayas, Jankowski, and McKee (2005) also found antenatal depressive symptoms to be associated with a low sense of parenting efficacy in two urban minority groups consisting of

182 pregnant women whereas Leerkes and Burney (2007) did not find this association in a low-risk group of 134 first-time-expecting women.

The present study focuses on women's parenting self-efficacy over the course of their first pregnancy, explores relationships with depressive and anxiety symptoms, and examines the unique contribution of depressive and anxiety symptoms to changes in parenting self-efficacy. First, the development of parenting self-efficacy during pregnancy is assessed prospectively to examine stability and change in parenting self-efficacy. Second, concurrent associations between levels of anxiety and depressive symptoms and parenting self-efficacy are examined at three time points during pregnancy. On the basis of Bandura's (1989) study and the few available antenatal data (Porter & Hsu, 2003), we expect depressive as well as anxiety symptoms to be related to lower parenting self-efficacy over the course of pregnancy. The third goal of the current study is to investigate the longitudinal relationship between levels of depressive and anxiety symptoms in relation to parenting self-efficacy over the course of pregnancy. We hypothesize that higher levels of depressive or anxiety symptoms in the first and second trimesters are predictive for lower parenting self-efficacy at the end of pregnancy.

## METHOD

### Procedure and Participants

For the current study, data were used from a large, ongoing longitudinal study on the transition to parenthood. After gaining ethical approval from the medical-ethical board for the longitudinal study at VU University Amsterdam, different methods of recruitment were employed. Participants were recruited from midwifery practices in the region of Amsterdam, The Netherlands. Cooperating midwives distributed recruitment materials to all women who came to their practice for a first visit. In addition, women were recruited via a Web site and at a pregnancy fair. After women provided written informed consent, questionnaires were sent to them by mail with the request to complete them at home and return them in postage-paid envelopes. When women did not return their questionnaires within 2 weeks, they were contacted by e-mail or telephone. Some women were called several times. Women also were contacted by telephone when the questionnaires they filled out were incomplete. In those cases, the missing items were read to them, and the correct answer was filled out by the researcher. For the current study, questionnaires on parenting self-efficacy, depressive symptoms, and anxiety symptoms were used at 12, 22, and 32 weeks of pregnancy.

The inclusion criteria of the current study were: first-time pregnancy and a sufficient command of the Dutch language to complete the questionnaires.

Six hundred forty-seven first-time-expecting women agreed to participate in the ongoing longitudinal study and did send back at least one set of questionnaires. Of these participants, 114 women were not included in the current study because of nonresponse at particular time points ( $n = 84$ ), they had a miscarriage or an abortion ( $n = 11$ ), or they wanted to withdraw from the study ( $n = 10$ ). Nine participants were not included because they had more than 20% of the items missing on one of the questionnaires. Women who were not included differed from included women on age,  $t(645) = -2.44, p < .05$ . Included women were, on average, somewhat older ( $M = 30.47, SD = 4.01$ ) in comparison to women who were not included ( $M = 29.46, SD = 4.10$ ). Women who were not included did not differ from included women on nationality (based on their parents' country of birth),  $\chi^2(2, n = 647) = 0.46, p = .793$ , level of education,  $\chi^2(3, n = 642) = 5.88, p = .118$ , marital status,  $\chi^2(3, n = 646) = 5.57, p = .115$ ,<sup>1</sup> and employment status,  $\chi^2(1, n = 646) = 0.64, p = .425$ .

Women who were included ( $N = 533$ ) were predominantly Dutch based on their parents' country of birth (87%), 46 of the non-Dutch women (9%) had a Western background and 25 women (5%) a non-Western background. Women's age varied from 18 to 42 ( $M = 30.47, SD = 4.01$ ) years. Only 10 (2%) of the women were single, 232 (44%) were married, 284 (53%) were cohabiting, and 7 (1%) were living apart. The majority of women were well-educated, with 379 women (71%) who finished a master's or bachelor's degree in tertiary education, 112 women (21%) who finished tertiary vocational education, and 39 women (7%) who finished secondary education or lower. Information on education was missing for 3 women. The majority (93%) of women in the current sample worked.

## Instruments

Questionnaires were used to assess parenting self-efficacy, depressive symptoms, and anxiety symptoms as well as demographic data such as nationality, maternal age, gestational age, marital status, level of education, and employment status.

**Self-Efficacy in the Nurturing Role Questionnaire** (SENR; Pedersen, Bryan, Huffman, & Del Carmen, 1989). Parenting self-efficacy was measured with the prenatal version of the SENR. This self-report questionnaire consists of 16 items rated on a scale of 1 (Not at all representative of me) to 7 (Strongly representative of me), and measures mothers' expectations about their parenting competence. It contains questions such as: "I look forward to becoming a parent with confidence in my role as a parent," "I feel unprepared in becoming a parent," and "I imagine myself in most circumstances,

even when I am tired, able to cope well with meeting my baby's needs." Negatively formulated items were reverse-scored so that higher scores mirrored higher levels of parenting self-efficacy. After reverse-scoring, individual item scores were summed to obtain a total score on the SENR. Sum scores range from 16 to 112, with higher scores indicating more parenting self-efficacy. Porter and Hsu (2003) reported that the scale showed robust test-retest reliability and reported good internal reliability. In the current study Cronbach's  $\alpha$ s were .85 at 12 weeks of pregnancy ( $n = 532$ ) and .89 at the measurements at both 22 ( $n = 531$ ) and 32 weeks ( $n = 532$ ) of pregnancy.

**Beck Depression Inventory, second edition** (BDI-II; Beck, Steer, Ball, & Ranieri, 1996; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Van der Does, 2002). Depressive symptoms were assessed with the Dutch version of the BDI-II. The BDI-II consists of 21 items measuring emotional, cognitive, motivational, and physical symptoms. Items consist of four graded statements indicating the absence or presence and severity of depressive symptoms. Each item is scored on a scale value of 0 (e.g., I do not feel sad) to 3 (e.g., I am so sad or unhappy that I can't stand it). Sum scores range from 0 to 63, with higher scores corresponding with more depressive symptoms. Severity of depression can be determined by standard cutoffs, with sum scores of 0 to 13 indicating no or minimal depression, scores of 14 to 19 indicating mild depression, scores of 20 to 28 indicating moderate depression, and scores of 29 to 63 indicating severe depression (Van der Does, 2002). In the current study, we used a sum score of 14 or above, which is considered as indicative for minor (and major) depression in pregnancy (Ji et al., 2011). The BDI-II has established validity and reliability for use in antenatal and postnatal populations (Holcomb, Stone, Lustman, Gavard, & Mostello, 1996; Ji et al., 2011) and has been validated in the Dutch population (Van der Does, 2002). In our sample, the BDI-II demonstrated good internal consistency, with Cronbach's  $\alpha$ s of .81 at 12 weeks ( $n = 530$ ), .82 at 22 weeks ( $n = 529$ ), and .83 at 32 weeks ( $n = 529$ ) of pregnancy.

**State-Trait Anxiety Inventory** (STAI; Spielberger, Gorsuch, & Lushene, 1970; Van der Ploeg, Defares, & Spielberger, 1980). Anxiety symptoms were assessed with the Dutch adaptation of the STAI. It consists of two subscales. The State Anxiety subscale consists of 20 items that measure current anxiety, and the Trait Anxiety subscale consists of 20 items that evaluate anxiety tension and nervousness in general. Items are scored on a Likert scale of 1 (Not at all) to 4 (Very much so). Positively formulated items were reverse-scored so that higher scores represent higher levels of anxiety. Sum scores on each subscale range from 20 to 80. A sum score above 40 on either subscale is considered to be indicative of high anxiety (Barnett & Parker, 1985; Meades & Ayers, 2011). The STAI has been shown to be a reliable and valid measure in both pregnancy and the postpartum period (Meades & Ayers, 2011) and has been validated in the

Dutch population (Van der Ploeg et al., 1980). We found adequate reliability in our study, with Cronbach's  $\alpha$ s of .93 at 12 weeks ( $n = 528$ ), .94 at 22 weeks ( $n = 528$ ), and .94 at 32 weeks ( $n = 529$ ) of pregnancy for the State subscale; and .92 at 12 weeks ( $n = 528$ ), 22 weeks ( $n = 515$ ), and 32 weeks ( $n = 523$ ) of pregnancy for the Trait subscale.

### Statistical Analyses

Several methods were utilized to analyze the data of the current study. First, preliminary analyses were conducted to explore possible associations between demographic data (age, nationality, level of education, marital status, and employment status) and measures of parenting self-efficacy and depressive and anxiety symptoms. Demographic variables were added as covariates in subsequent analyses when they were significantly associated with the dependent variable (parenting self-efficacy) and with (one of) the independent variables (depressive symptoms, anxiety symptoms, or both). Correlations between depressive scores, anxiety scores, and parenting self-efficacy were calculated for each time point (12, 22, and 32 weeks of pregnancy). To analyze stability and change in the trajectories of parenting self-efficacy, depressive and anxiety symptoms during pregnancy, repeated measure analyses of variance (ANOVAs) were used. Hierarchical regression analyses were performed to investigate the contribution of symptom levels to concurrent parenting self-efficacy at each time point. Finally, hierarchical regressions were conducted to examine the unique longitudinal contributions of depressive and anxiety symptoms on the trajectory of parenting self-efficacy from the first to the last trimester of pregnancy.

## RESULTS

### Preliminary Analyses

To examine whether demographic variables needed to be included as covariates in subsequent analyses, correlations were calculated with dependent and independent variables at each time point, and ANOVAs were conducted for noncontinuous demographic variables (education, marital status, nationality, and employment status). Age of the mother was the only variable significantly associated with both depressive symptoms at 22 weeks,  $r = -.11$ ,  $p < .05$ , and 32 weeks,  $r = -.13$ ,  $p < .01$ , and parenting self-efficacy at 22 weeks,  $r = -.11$ ,  $p < .01$ , and 32 weeks,  $r = -.10$ ,  $p < .05$ . Therefore, age of the mother was included as a covariate in the regression analyses. Note that separate analyses excluding age as a covariate yielded similar results.

### Descriptive Statistics

Descriptive statistics and Pearson correlations of all the instruments are reported in Table 1. Moderate correlations were found between parenting self-efficacy and anxiety and depressive symptoms across pregnancy. To obtain some insight about levels of symptoms in the current sample, individual scores for depressive and anxiety symptoms were compared to cutoff criteria. Seventy women (13%) had a score of 14 or higher for depressive symptoms at 12 weeks of pregnancy, 54 women (10%) at 22 weeks, and 73 (14%) women at 32 weeks. Eighty-eight women (17%) had scores higher than 40 for state anxiety symptoms at 12 weeks of pregnancy, and 70 (13%) and 78 (15%) did so at 22 and 32 weeks, respectively. Seventy-three women (14%) had a sum score higher than 40 for trait anxiety symptoms at 12 weeks, and 65 (12%) and 64 (12%) did so at 22 and 32 weeks, respectively. Overall, 37% of the entire sample ( $n = 195$ ) scored above the cutoff value for depressive and/or anxiety symptoms (state and/or trait) at least at one assessment during pregnancy.  $T$ -tests revealed that these women scored significantly lower on parenting self-efficacy,  $p < .001$ ,  $d = -.58$ – $.66$ , and higher on depressive and anxiety symptoms (state and trait) at 12, 22, and 32 weeks in comparison to women who did not reach a cutoff value at any point during pregnancy ( $n = 338$ ),  $p < .001$ ,  $d = 1.17$ – $1.55$ .

### Trajectories of Parenting Self-Efficacy and of Depressive and Anxiety Symptoms

Univariate repeated measures ANOVAs showed significant main effects of time with regard to trajectories of parenting self-efficacy,  $F(1.97, 1045.99) = 16.94$ ,  $p < .001$ ,<sup>2</sup> depressive symptoms,  $F(1.94, 1033.25) = 22.17$ ,  $p < .001$ ,<sup>2</sup> state anxiety,  $F(2, 1064) = 7.59$ ,  $p < .001$ , and trait anxiety symptoms,  $F(1.96, 1041.72) = 18.83$ ,  $p < .001$ .<sup>2</sup> Repeated contrasts revealed that parenting self-efficacy scores increased significantly during pregnancy from 12 weeks to 22 weeks,  $F(1, 532) = 4.73$ ,  $p < .05$ ,  $r = .09$ , and from 22 to 32 weeks,  $F(1, 532) = 14.21$ ,  $p < .001$ ,  $r = .16$ . Means for depressive and state anxiety symptoms significantly decreased from 12 weeks to 22 weeks, respectively, for depressive symptoms,  $F(1, 532) = 20.82$ ,  $p < .001$ ,  $r = .19$ , and for state anxiety symptoms,  $F(1, 532) = 15.08$ ,  $p < .001$ ,  $r = .17$ , and significantly increased again from 22 to 32 weeks, respectively, for depressive symptoms,  $F(1, 532) = 49.82$ ,  $p < .001$ ,  $r = .29$ , and for state anxiety symptoms,  $F(1, 532) = 6.38$ ,  $p < .05$ ,  $r = .11$ . Trait anxiety symptoms decreased significantly from 12 to 22 weeks,  $F(1, 532) = 29.85$ ,  $p < .001$ ,  $r = .23$ , but remained stable from 22 to 32 weeks of pregnancy,  $F(1, 532) = 0.00$ ,  $p = .981$  (for  $M$ s and  $SD$ s, see Table 1).

**Table 1.** Descriptive Statistics and Correlations for Parenting Self-Efficacy (SENr), Depressive Symptoms (BDI) and Anxiety Symptoms (STAI)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Parenting self-efficacy-1	-											
2. Depressive symptoms-1		-.20***										
3. State anxiety symptoms-1			-.37***									
4. Trait anxiety symptoms-1			.62***	-.36***								
5. Parenting self-efficacy-2				.63***	-.18***							
6. Depressive symptoms-2					.78***	-.18***						
7. State anxiety symptoms-2						.63***						
8. Trait anxiety symptoms-2							.63***					
9. Parenting self-efficacy-3												
10. Depressive symptoms-3												
11. State anxiety symptoms-3												
12. Trait anxiety symptoms-3												
M	90.15	8.47	32.13	32.12	90.81	7.69	30.83	30.80	91.97	8.78	31.67	30.79
SD	10.45	4.58	8.96	8.16	10.71	4.61	8.93	8.19	10.80	4.74	9.06	8.01
Range	57-112	0-34	20-67	20-65	57-112	0-34	20-64	20-66	34-112	0-34	20-68	20-67

Note. 12 weeks of pregnancy: 1 - 4; 22 weeks of pregnancy: 5 - 8; 32 weeks of pregnancy: 9 - 12.

\*\*\*  $p < .001$ .

### Concurrent Associations

Small to medium associations were found between parenting self-efficacy and depressive symptoms ( $d = -.41-.63$ ) and medium to large associations between parenting self-efficacy and anxiety symptoms ( $d = -.77-1.15$ ; for correlations, see Table 1). Higher levels of anxiety and depressive symptoms were associated with lower parenting self-efficacy at all three time points during pregnancy. Multiple hierarchical regression analyses were conducted to examine the contribution of depressive and anxiety symptoms to the levels of parenting self-efficacy (dependent variable) at each time point. Separate regression analyses were performed with depressive and state anxiety symptoms and subsequently with depressive and trait anxiety symptoms as independent variables to decrease the risk of biased regression parameters due to high inter correlations between the anxiety measures (see Table 1). In each analysis, age was entered as a covariate in Step 1, depressive symptoms in Step 2, and state or trait anxiety symptoms in Step 3. As shown in Table 2, at 12 weeks of pregnancy, only state anxiety scores significantly and uniquely predicted parenting self-efficacy, accounting for 9.7% of the variance in parenting self-efficacy. At 22 and 32 weeks, both maternal age and state anxiety scores predicted parenting self-efficacy, with state anxiety explaining 17.7 and 15.5%, respectively, of the variance in parenting self-efficacy adjusted for maternal age and depressive symptoms. Women who had higher scores for state anxiety had lower scores for parenting self-efficacy.

The  $B$  values as reported in Table 2 indicated that for a 1-value increase on the questionnaire of state anxiety, parenting self-efficacy decreased with .46, .63, and .60 at 12, 22, and 32 weeks, respectively, of pregnancy. Depressive symptoms were not a unique predictor for parenting self-efficacy at any of the time points if anxiety symptoms were taken into account.

The hierarchical regression analyses with depressive and trait anxiety symptoms as independent variables showed similar results as those of the analyses with state anxiety symptoms (see Table 2). Trait anxiety symptoms significantly and uniquely predicted parenting self-efficacy at 12 weeks of pregnancy (accounting for 8.6% of the variance), and age and trait anxiety symptoms at 22 and 32 weeks (with trait anxiety explaining 17 and 15.7%, respectively, of the variance). The  $B$  values indicated that a 1-value increase in trait anxiety symptoms was related to a decrease of .48, .69, and .72 in parenting self-efficacy at 12, 22, and 32 weeks, respectively, of pregnancy (Table 2). Step 2 of the hierarchical regression analyses, with only age and depressive symptoms, revealed that depressive symptoms were negatively associated with parenting self-efficacy at all time points, with depressive symptoms explaining only 4.3% of the variance of parenting self-efficacy at 12 weeks, and 7.3 and 10.0% at 22 and 32 weeks, respectively.

**Table 2.** Summary Table of Hierarchical Regression Analyses Assessing Concurrent Associations of Depressive and Anxiety Symptoms With Parenting Self-efficacy at Each Time Point During Pregnancy

Variable	12 weeks of pregnancy			22 weeks of pregnancy			32 weeks of pregnancy		
	B	SE (B)	$\beta$	B	SE (B)	$\beta$	B	SE (B)	$\beta$
Step 1									
Age	-.19	.11	-.07	-.29	.12	-.11*	-.26	.12	-.10*
Step 2									
Age	-.23	.11	-.09*	-.37	.11	-.14***	-.37	.11	-.14**
Depressive symptoms	-.47	.10	-.21***	-.63	.10	-.27***	-.73	.09	-.32***
Step 3 with state anxiety									
Age	-.19	.11	-.07	-.26	.10	-.10**	-.31	.10	-.11**
Depressive symptoms	.09	.12	.04	.09	.11	.04	.00	.11	.00
State anxiety symptoms	-.46	.06	-.40***	-.63	.06	-.52***	-.60	.06	-.51***
Step 3 with trait anxiety									
Age	-.19	.11	-.07	-.33	.10	-.12***	-.30	.10	-.11**
Depressive symptoms	.07	.12	.03	.15	.11	.06	.09	.12	.04
Trait anxiety symptoms	-.48	.07	-.38***	-.69	.06	-.53***	-.72	.07	-.53***

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### Longitudinal Associations

Hierarchical regression analyses were performed to explore the longitudinal contributions of depressive and (state or trait) anxiety symptoms at 12 weeks to the prediction of change in parenting self-efficacy from 12 to 32 weeks of pregnancy. Maternal age was entered in Step 1 of the regression, parenting self-efficacy at 12 weeks was entered in Step 2, and depressive and state or trait anxiety symptoms was entered in Step 3 (Table 3). The results indicated that age and parenting self-efficacy at 12 weeks were significantly associated with parenting self-efficacy at 32 weeks. Furthermore, state anxiety and not depressive symptoms contributed uniquely to the predicted changes in parenting self-efficacy from 12 to 32 weeks of pregnancy,  $\beta = -.13$ ,  $t(528) = -3.38$ ,  $p < .001$ , explaining 1% of the variance. Including trait anxiety symptoms in the model instead of state anxiety symptoms yielded similar results,  $\beta = -.18$ ,  $t(528) = -4.76$ ,  $p < .001$ . Adjusted for age of mother, parenting self-efficacy at 12 weeks, and depressive symptoms, trait anxiety symptoms explained 1.9% of the variance.

**Table 3.** Hierarchical Multiple Regression Analysis Assessing the Longitudinal Contribution of Depressive Symptoms and State Anxiety Symptoms in the First Trimester Predicting Parenting Self-Efficacy (PSE) in the Third Trimester

	B	SE (B)	$\beta$
Step 1			
Age	-.26	.12	-.10*
Step 2			
Parenting self-efficacy-1	.75	.03	.73***
Step 3			
Depressive symptoms-1	-.05	.09	-.02
State anxiety symptoms-1	-.16	.05	-.13***

Note.  $R^2 = .01$  for step 1;  $\Delta R^2 = .53$  for step 2;  $\Delta R^2 = .02$  for step 3.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

The longitudinal contributions of depressive and (state or trait) anxiety symptoms at 22 weeks also were explored in the prediction of change in parenting self-efficacy from 22 to 32 weeks of pregnancy. Similar results were found as those for the prediction from 12 to 32 weeks: Age (only in Step 1) and parenting self-efficacy at 22 weeks (Step 2 in regression) were significantly associated with parenting self-efficacy at 32 weeks, for age:  $\beta = -.10$ ,  $t(528) = -2.22$ ,  $p < .05$ ; for parenting self-efficacy:  $\beta = .78$ ,  $t(528) = 28.74$ ,  $p < .001$ . Both state and trait anxiety symptoms contributed uniquely to predicting changes in parenting self-efficacy from 22 to 32 weeks, for state anxiety:  $\beta = -.14$ ,  $t(528) = -3.74$ ,  $p < .001$ ; for trait anxiety:  $\beta = -.17$ ,  $t(528) = -4.46$ ,  $p < .001$ , explaining 1 and 1.4%, respectively, of the variance (adjusted for age of mother, parenting self-efficacy at 22 weeks, and depressive symptoms).

## DISCUSSION

The aim of this study was to examine parenting self-efficacy over the course of pregnancy in relation to self-reported symptoms of depression and anxiety in a sample of first-time-expecting women. Parenting self-efficacy showed a slight, but significant, increase from the first to the last trimester of pregnancy. In addition, depressive symptoms and state anxiety symptoms decreased from the first to the second trimester, but increased from the second to the third trimester. A substantial minority of the women in the current study reported elevated levels of anxiety and/or depressive symptoms at some point in pregnancy, which is comparable to prevalence levels found in other studies (Grant et al., 2008; Heron et al., 2004; Lee et al., 2007; Teixeira et al., 2009). Concurrent symptoms

of depression and anxiety were negatively associated with parenting self-efficacy in all trimesters; however, depressive symptoms proved not to be a significant predictor of parenting self-efficacy when anxiety scores were taken into account. Analyses of longitudinal data yielded comparable results: Anxiety and depressive symptoms in the first trimester predicted a reduction of the observed increase in parenting self-efficacy in the last trimester, but depressive symptoms in early pregnancy were not predictive when anxiety symptoms were included in the regression model.

In the current study, the increase of parenting self-efficacy over the course of pregnancy was quite small, but indicated that on average, women experienced more confidence in their parenting abilities as their pregnancy progressed. The small increase was possibly due to the fact that the mean score for parenting self-efficacy in the first trimester was high for the women in our sample. This leaves little opportunity, on average, for a substantial increase. However, our results showed that women with more anxiety symptoms have lower scores on parenting self-efficacy at 12 weeks of pregnancy, and their parenting self-efficacy seems to increase less from the first to the second and third trimesters, which indicates a deviation from the normative pattern, as compared to the group as a whole.

In addition, the *U*-shaped pattern for depressive and state anxiety symptoms found in the current study also has been reported previously (Lee et al., 2007; Setse et al., 2009), although for depressive symptomatology, the results were less consistent (Haas et al., 2005; Teixeira et al., 2009). The decrease in depressive symptoms from the first to the second trimester might be related to the stabilization of the hormonal changes in early pregnancy and a decrease in some of the most frequently occurring physical symptoms (e.g., nausea, fatigue) in that period (Furneaux, Langley-Evans, & Langley-Evans, 2001). The subsequent increase from the second to the third trimester could be related to the increase of physical discomfort by being pregnant, for example, due to insomnia, fatigue, and heartburn (Kamysheva, Wertheim, Skouteris, Paxton, & Milgrom, 2009; Setse et al., 2009; Striegel-Moore, Goldman, Garvin, & Rodin, 1996). The pattern of state anxiety symptoms across pregnancy may have comparable links with the development of physical symptoms during pregnancy (Koken et al., 2008), although this has not yet been confirmed in a longitudinal design. Another possibility is that the trajectory of anxiety symptoms resulted from the reassuring effect of fetal movements and the ultrasound at 20 weeks in the second trimester as well as increasing concerns about the baby or impending childbirth in the third trimester (Green, Kafetsios, Statham, & Snowdon, 2003). However, further research is needed to clarify the interrelations between somatic and psychological phenomena in pregnancy.

The negative associations between antenatal symptom levels and parenting self-efficacy established in the present study are consistent with results from postpartum

studies on maternal depression and anxiety (Barnett & Parker, 1985; Haslam et al., 2006; O'Neil et al., 2009; Teti & Gelfand, 1991). Furthermore, the finding that antenatal anxiety symptoms appear to be a stronger predictor of parenting self-efficacy than are depressive symptoms is in line with observations by Porter and Hsu (2003). A more prominent role of anxiety in the development of parenting self-efficacy during pregnancy might be related to the specific features of this condition. Pregnant women have to adapt to substantial physiological, psychological, and social changes, a process which can give rise to uncertainty, emotional arousal, and anxieties about future responsibilities rather than to feelings of sadness, worthlessness, or hopelessness (Delmore-Ko et al., 2000). There is evidence that cognitive processes in anxiety and depression show similarities, but also that each condition is associated with more specific cognitions (MacLeod, Tata, Kentish, & Jacobsen, 1997; Mineka, Watson, & Clark, 1998; Stober, 2000). Cognitive processes in depression are predominantly associated with memory bias for negative experiences (e.g., previous failures or losses) and a lack of positive expectations about the future in general (hopelessness) (Mineka et al., 1998). In contrast, cognitions associated with anxiety appear to be more future-oriented and are characterized by attentional bias for anxiety-provoking information and a high level of negative expectations in the context of a highly valued outcome (e.g., becoming a parent) (Stober, 2000). From this perspective, it is reasonable to assume that in the transition to parenthood, the influence of distress and anxiety on cognitions in general and parenting self-efficacy in particular is more prominent, unless there is substantial comorbid depression. The effect of comorbidity was not explored in this study and remains an important issue for further research, given the substantial comorbidity between depression and anxiety that has been found in perinatal research (Matthey, Barnett, Howie, & Kavanagh, 2003; Ross, Gilbert Evans, Sellers, & Romach, 2003).

Finally, there is debate on the direction of influence regarding the links between mood symptoms and parenting self-efficacy (for a review, see Jones & Prinz, 2005). Some studies have found evidence for the influence of parenting self-efficacy on mood symptoms, showing that low parenting efficacy predicted maternal depression and dysphoria (Cutrona & Troutman, 1986; Williams et al., 1987). In other studies, maternal depression has been shown to undermine parenting efficacy in a variety of ways (for a review, see Dix & Meunier, 2009), which gives support to results from longitudinal studies that have found that postpartum parenting self-efficacy was predicted by antepartum depressive and anxiety symptoms (Porter & Hsu, 2003; Zayas et al., 2005). The results of the current study add to the existing literature that antenatal anxiety symptoms in first-time-expecting mothers predict lower parenting self-efficacy over

the course of pregnancy, but a bidirectional relationship between parenting efficacy and depressive or anxiety symptoms is still possible.

### Strengths and Limitations

Although the current study has methodological strengths such as the considerable size of the sample and the prospective design, there are some limitations. First, the observed longitudinal associations between symptom levels and parenting self-efficacy in our sample are small and need to be interpreted with caution. A replication study is needed, preferably in at risk samples, before clinical implications can be inferred. Second, the majority of the participating women were from Dutch or from other Western backgrounds and were well-educated, which limits the generalizability of the results (O'Neil et al., 2009; Zayas et al., 2005). Third, it was not possible to calculate the response rate due to the method of recruitment, which leaves open the possibility that participants differ from the general population. Furthermore, other relevant factors that might influence the associations between antenatal depressive or anxiety symptoms and parenting self-efficacy (e.g., social support, marital satisfaction, obstetric status, psychiatric history) were not taken into account (Lancaster et al., 2010; Lee et al., 2007; Milgrom et al., 2008; Rubertsson, Waldenstrom, Wickberg, Radestad, & Hildingsson, 2005; Zayas et al., 2005).

### Conclusions

Most studies in the field of perinatal mental health and parenting have focused on depression while the role of anxiety has long been overlooked. The current study provides evidence for the unique association between antenatal anxiety symptoms and parenting self-efficacy in first-time-expecting women and underscores the importance of studying both depressive and anxiety symptoms in the transition to motherhood. Higher levels of anxiety symptoms during pregnancy announce wavering confidence in the ability to cope with the challenges of impending parenthood, which may explain the link between prenatal anxiety and postpartum adjustment problems and depression (Grant et al., 2008; Heron et al., 2004; Milgrom et al., 2008).

The current study highlights the need for further research of the relationships between perinatal symptomatology and the development of parenting competence in the transition to parenthood. Furthermore, the results emphasize the need to focus on anxiety symptoms as well as depressive symptoms in antenatal care and to evaluate the expectations that women have about parenthood. Women who encounter adjustment problems during pregnancy could benefit not only from interventions designed to decrease their levels of anxiety and depression during pregnancy but also from strategies to improve parenting self-efficacy.

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## ENDNOTES

- 1 Fisher's exact test (two-sided) is used since expected frequencies are  $<5$  in two cells.
- 2 Degrees of freedom from the Greenhouse-Geisser correction were used because Mauchly's test indicated the violation of the assumption of sphericity.

