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Is pregnancy anxiety a relatively distinctive syndrome?

Anja C. Huizink, Pascale G. Robles de Medina, Edu J.H. Mulder, Gerard H.A. Visser & Jan K. Buitelaar

Under reference process

4.1 Abstract

Background: Assessment of general anxiety during pregnancy may underestimate anxiety specifically related to pregnancy. Therefore, a questionnaire on pregnancy anxieties was used to test their structure, internal consistency, stability and change in the course of pregnancy. In addition, associations with general anxiety and depression measures were examined, and possible clinical correlates of pregnancy anxieties were investigated.

Methods: Nulliparous pregnant women (N=230) filled out a 34-item questionnaire on pregnancy-related anxiety and several other questionnaires covering general personality factors, such as general anxiety (STAI), locus of control (IPC), appraisal of pregnancy and neuroticism (ABV-N). These questionnaires were filled out at 15-17 weeks, 27-28 weeks and 37-38 weeks of gestation.

Results: A three-factor model of pregnancy anxiety was found by means of confirmatory factor analysis, reflecting 'fear of giving birth', 'fear of bearing a physically or mentally handicapped child' and 'concern about one's appearance'. The factor structure is stable throughout pregnancy. Mean scores change over time, with highest levels of fear during early pregnancy, slightly lower levels in late pregnancy and lowest scores during mid pregnancy. Personality factors can explain only a small part of the variance of these fears. High risk groups, such as women suffering from mental problems or women with a previous miscarriage, have more fear of bearing a physically or mentally handicapped child and are less concerned about their personal appearance than are low risk pregnant women.

Conclusion: Pregnancy anxiety should be regarded as a relatively distinctive syndrome. Its measurement can make a unique contribution to the evaluation of anxiety during pregnancy.

4.2 Introduction

Pregnancy is an event that changes many perspectives of a woman's life. It has been regarded as a time of psychological and biological crisis and of emotional upheaval, and as a life event for first-time mothers which initiates a new social role (Thorpe et al., 1992). A more optimistic standpoint views pregnancy as a period that brings marvellous feelings of well-being and psychological strength, while others view it simply as a relatively normal and largely positive developmental experience (Brown, 1979). Although the individual experience may vary between these extremes, pregnancy has potentially important short- and long-term implications for women's health, well-being and social roles (Striegel?Moore et al., 1996). Since a pregnant woman is the environment for the developing fetus, psychological alterations or even mental disorders may affect the fetus. Given the fact that about 90% of all women become pregnant at least once in their life, it seems highly relevant to investigate psychological changes during pregnancy.

However, over the years research interest has focused on the marked changes in women' s emotional reactions following delivery rather than on their psychological state during pregnancy. This is understandable in so far as epidemiological studies suggest that puerperium is a period of increased vulnerability to severe psychiatric disorders like psychoses, whereas the prevalence of such disorders during pregnancy may even be slightly less than among age-matched females in the general population (Pugh et al., 1963; Kendell et al., 1976, 1987). When less severe manifestations of psychopathology are considered, however, a different picture emerges. The prevalence rates of depression in pregnancy, measured by means of interviews and recognized diagnostic criteria, are similar to those found after delivery and range from 3.5 % to 16 % (Green and Murray, 1994). Studies using self-report symptom scales show even higher depression scores in pregnancy than postnatally (Green and Murray, 1994). In a more recent study among a population sample of pregnant women, levels of dysphoria assessed by means of a composite score of the anxiety and depression subscales of the Symptoms Checklist (SCL-90R) were rather stable throughout pregnancy and were comparable to baseline data on the emotional state of the same women before pregnancy (Striegel?Moore et al., 1996). Moodiness, on the other hand, was experienced more often in pregnant women than in non-pregnant controls, but only in the first trimester of pregnancy.

All these studies have centred around the issue of whether the presence and course of common symptoms of depression and anxiety are influenced by pregnancy or childbirth. The interpretation of the results, however, is limited by the use of general scales of depression and of anxiety, such as the General Health Questionnaire-30 (GHQ-30; Goldberg, 1972), the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970) and the Manifest Anxiety Scale (MAS; Taylor, 1953). These scales have not been designed to assess anxieties and worries related specifically to pregnancy. Various descriptive and exploratory studies suggest that pregnant women may experience specific and intense fears, such as fear of incompetence and concerns about pain and loss of control during delivery, fear for their own life and the life of their baby, and worries about changes in their personal life due to pregnancy and childbirth (Dunkel?Schetter, 1998; Sjögren, 1997).

Few studies have systematically assessed the specific fears and worries related to pregnancy and examined the structure of pregnancy anxiety. In the early seventies, the Pregnancy Anxiety Scale (PAS) was created by Burstein et al. (1974). A later confirmatory factor

analysis performed on the original items of the PAS collected retrospectively after childbirth in a sample of 266 women suggested a three-dimensional model of pregnancy anxiety: 'anxiety about being pregnant', 'anxiety about childbirth', and 'anxiety about hospitalization' (Levin, 1991). Standley et al. (1979) obtained data concerning the presence of one general anxiety and five specific pregnancy anxieties (physical anxiety, anxiety about the integrity of the fetus, childbirth anxiety, child care anxiety and infant feeding anxiety) during the last month of pregnancy in 73 near-term nulliparous pregnant women. Exploratory factor analysis showed that the specific pregnancy anxieties could be clustered in two dimensions: 'anxiety about pregnancy and childbirth' and 'anxiety about future parenting'.

A Dutch questionnaire about pregnancy anxiety was developed by Van den Bergh (1990). This Pregnancy Related Anxiety Questionnaire (PRAQ) consisted of 58 items, with 33 items from the PAS and the remaining items based on other questionnaires (Blau et al., 1984; Kumar & Robson, 1984; Pleshette et al., 1956; Schaefer & Manheimer, 1960) and based on their clinical relevance. Exploratory factor analysis performed on data from the PRAQ completed by 231 women in the third trimester of pregnancy revealed five factors: fear of childbirth, fear of bearing a physically or mentally handicapped child, fear of changes in the relationship with the partner, fear of changes in the mother's personal life, and fear of changes in the mother's mood and problems in the mother-child relationship. A revised version (PRAQ-R) of this questionnaire was used in the present study.

Until now, only general anxiety indices have been used to predict birth outcome and the postnatal development of children (Allen et al. 1998; Pagel et al. 1990; Dorn et al. 1993; Beck et al. 1980; McCool et al. 1994; McCool & Susman, 1994; Istvan, 1986) and the aspects of anxiety specifically related to pregnancy have been ignored. Research into the effects of prenatal maternal psychological influences on birth outcome and on the postnatal development of children requires as a first step a full assessment of both general anxiety, depression and specific fears and worries during pregnancy. The present prospective study was therefore designed to achieve the following aims:

1. To investigate the structure of specific fears and worries related to pregnancy ('pregnancy anxieties') in the course of pregnancy.
2. To examine changes in the level of pregnancy anxiety throughout pregnancy.
3. To differentiate pregnancy anxiety from symptoms of general anxiety and depression and to study the personality predictors of pregnancy anxiety.
4. To examine clinical correlates of pregnancy anxiety.

4.3 Methods

4.3.1 Participants

All the participants in this study were deliberately included in a larger prospective longitudinal project which also investigated the influence of prenatal psychosocial factors on fetal behaviour and on the postnatal development of children. Subjects were recruited from a consecutive series of referrals to the Outpatient Clinic of the Department of Obstetrics of the University Medical Centre Utrecht (UMCU), which is a first-line referral center for low-risk

pregnancies with responsibilities for mid-wives as well, between January 1996 and July 1998. The UMCU is located outside the city of Utrecht and attracts a mixed rural and urban population of patients. From a total of approximately 650 invited women, 230 agreed to participate. The main reason for refusing to participate was the time-consuming aspect of the study. The study was approved by the ethical committee of the UMCU; participation was on a voluntary basis but written informed consent was required. Only nulliparous women with a singleton pregnancy were included. Characteristics of participants did not differ from those of non-participants, except in the case of women with full-time jobs, who were less likely to participate. The descriptives of the participants are summarized in Table 4.1. As shown, the sample of participants consisted largely of middle class women, although both lower social and higher social classes were represented. The majority of women (92.4%) lived together with their partner, either in wedlock or unmarried. Furthermore, at the time of their inclusion in the study, the majority of women had a paid job, 54.2 % working less than 38 hours a week and 45.8 % working full-time.

Participants were asked to fill out questionnaires three times during pregnancy; at 15-17 weeks (early pregnancy), 27-28 weeks (mid pregnancy), and 37-38 weeks of gestation (late pregnancy). Of the 230 women who completed the questionnaires on the first occasion, 217 completed the questionnaires on the second occasion and 172 on the third occasion. The main reason for the drop in the number of participants towards late pregnancy was delivery before 37 weeks of gestational age or delivery before the last session of data collection, which was planned near term, had taken place; other reasons were lack of interest, lack of time, stillbirth, pregnancy complications that required intensive follow-up, or relocation to another city.

Table 4.1 **Demographic characteristics of participants**

Variable	early pregnancy (N=230)
age (yr), mean (sd)	30.9 (5.1)
range	17 - 45
having a paid job (%)	93.5 %
part-time (less than 38 hr)	54.2 %
full-time	45.8 %
smokers (%)	22.9 %
use of alcohol (%)	19.9 %
socio-economic status	
low	23.4 %
middle	57.6 %
high	19.0 %
married or cohabiting (%)	92.4 %

smokers are women who smoke at least 1 cigarette a day during the relevant part of pregnancy;
use of alcohol is defined as using at least one glass of an alcohol-containing beverage during the relevant part of pregnancy;
socio-economic status is described by a combination of educational and professional levels.

4.3.2 Questionnaire measures

Among the package of questionnaires that were compiled to measure various aspects of the mental status of the pregnant women, some measured pregnancy-related fears and worries, while others assessed common symptoms of anxiety and depression and aspects of personality such as neuroticisms and locus of control, which may be important predictors of pregnancy-related fears.

Pregnancy Related Anxieties Questionnaire-Revised. Specific fears and worries related to pregnancy were measured on each occasion by means of an abbreviated version of the PRAQ developed by Van den Bergh (1989). This shortened 34-item version, the PRAQ-R, was derived from the original version by retaining the items with the highest factor loadings on each of the five subscales: 'fear of giving birth' (8 items), 'fear of bearing a physically or mentally handicapped child' (5 items), 'fear of changes and disillusion in partner relationship' (6 items), 'fear of changes' (8 items) and 'concern about one's mental well-being and the mother-child relationship' (4 items). The PRAQ-R can be obtained from the corresponding author on request.

State-Trait Anxiety Inventory (STAI). The STAI (Spielberger et al., 1970) comprises two self-report scales for measuring two distinct anxiety concepts, state-anxiety and trait-anxiety. Both scales contain 20 statements that ask the respondent to describe how she feels at a particular moment in time (state-anxiety) or how she generally feels (trait-anxiety). State anxiety is conceptualized as a transitory emotional state, whereas trait-anxiety refers to relatively stable individual differences in proneness to anxiety. Cronbach's alpha in this study was .88 for state anxiety and .83 for trait anxiety. The STAI was filled out on each occasion.

Edinburgh Postnatal Depression Scale (EPDS). The EPDS (Cox et al., 1987) is a 10-item questionnaire that can be used to measure prenatal and postnatal depression and has been validated for use in pregnancy (Green and Murray, 1994). The EPDS was completed twice during pregnancy (mid and late pregnancy) and Cronbach's alphas in this study were .86 and .87, respectively.

Neuroticism was determined with a subscale of the Amsterdam Biographical Questionnaire (Wilde, 1963). This questionnaire was filled out only during early pregnancy because it is believed to reflect a stable personality trait. Cronbach's alpha of the items on the subscale Neuroticism was .83.

Locus of control was measured by means of the items with the highest factor loadings on the subscales of the Internal locus of control, Powerful Others and Chance-Scale (IPC; Brosschot et al. 1994), with two items reflecting the Powerful Others scale, two items representing the Internal locus of control scale and two items for the Chance scale. Both the Powerful Others scale and the Chance scale reflect external locus of control. Powerful Others means that an individual believes that other powerful persons are in control of her life, whereas the Chance scale reflects the idea that the world is unordered and unpredictable, and is thus controlled by chance. Internal locus of control is found in individuals who believe they have their own life under control. Since locus of control is believed to reflect a stable personality trait, this questionnaire was completed only in early pregnancy.

Appraisal of pregnancy was measured by two single-item instruments. The perceived threat of the situation, or primary appraisal, was measured by the question 'Can you indicate on a ten-point scale the degree to which your pregnancy relates to the most upsetting (=1)

and most pleasant event (=10) in your life?'. Secondary appraisal, or the perceived options to control the situation, was assessed with the question 'To what extent do you think you are able to influence the course of your pregnancy?'. Participants could answer on a 5-point scale ranging from 'considerably' to 'not at all'. These two items were answered on each occasion.

4.3.3 High-risk groups

To examine the clinical correlates of pregnancy anxiety, we formed two mutually exclusive high-risk groups. First of all, women without a history of mental health problems (N=163, numbers refer to early pregnancy) were differentiated from women with previous mental problems that required treatment in the past and from women who were suffering from mental problems for which they received therapy during their pregnancy (total N=66). Secondly, we explored whether women with a previous miscarriage (N= 45) could be differentiated from women without such an obstetric history with regard to their pregnancy anxiety.

4.3.4 Statistical analysis

The factor structure of the PRAQ-R was examined by means of exploratory and confirmatory factor analysis (CFA), using SPSS version 6.1 for Windows and LISREL 8.30, respectively. CFA was performed by means of structural equation modelling and postulates relations between the observed measures and the underlying factors a priori. The goodness of fit between the hypothesized structure and the sample data was subsequently tested. This provided information about the reliability and validity of the model while taking measurement errors into account. Goodness of fit measures used were Chi Square (χ^2) and Chi-square divided by degrees of freedom. The latter is sensitive to sample size, and is therefore regarded as a measure of fit instead of a test statistic. When chi-square is divided by its degrees of freedom the result should be less than 3 if it is to indicate a reasonable fit to the data. Other fit criteria include: Comparative Fit Index (CFI ; >.9 indicates a good fit), Non-Normed Fit Index (NNFI; >.9 indicates a good fit), Root Mean Square Error of Approximation (RMSEA), which should be at least less than .08 and Root Mean Square Residual (RMR), which should be less than .05.

The next step was to examine the stability of pregnancy anxiety in the course of pregnancy by means of LISREL tests for stability of factor loadings and with Pearson intercorrelation coefficients. The change in the level of pregnancy anxiety over the trimesters was examined with MANOVA with repeated measures.

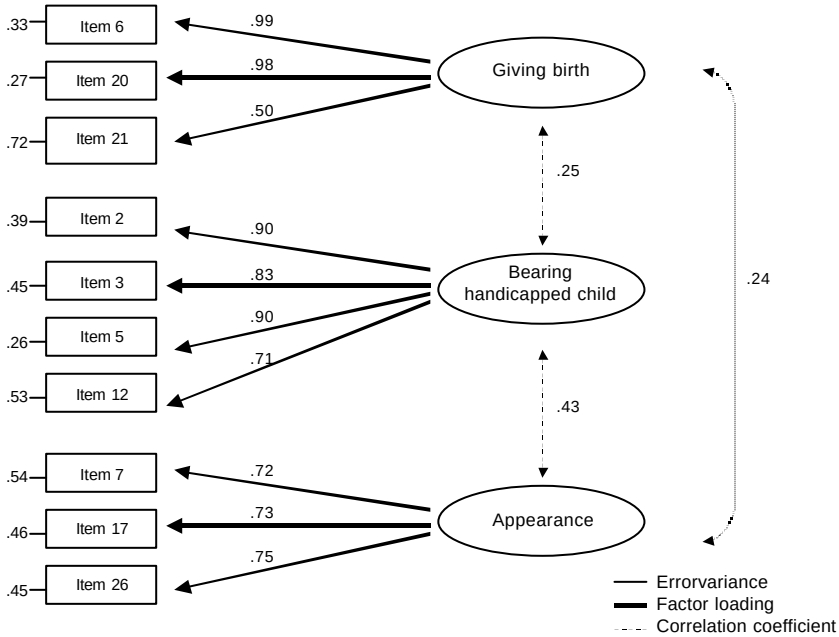
The associations of pregnancy anxiety with common symptoms of anxiety and depression and with personality factors were examined with linear regression models. MANOVA was used to compare the mean level of pregnancy anxiety of the high risk groups and the level of fear of the low risk group.

4.4 Results

4.4.1 The factor structure of pregnancy anxiety

Exploratory factor analysis of the PRAQ-R data collected three times during pregnancy revealed five factors in each part of pregnancy, similar to those found by Van den Bergh (1990), with eigenvalues larger than 1. Since two of these factors (fear of changes in the relationship with the partner and fear of changes in one's own mood and problems in the mother-child relationship) accounted only for 5.6 % and 4.9 % of the total explained variance, respectively, a CFA was performed with only three factors despite the fact that the theoretical concept of the questionnaire included five factors. As a check, CFA was first run testing a model with five factors. The results showed a bad fit, with very high error variances (>.85) of the items of the last two factors, even if they were allowed to load on the three other factors. Then, the three-factor model was fitted to the data of early pregnancy. Several items were removed due to high error variances. The remaining model included three items for the factor *Fear of giving birth*, four items for the factor *Fear of bearing a physically or mentally handicapped child*, and three items representing the factor *Concern about one's appearance*. These items are shown in appendix I. The model showed a good fit to the data (χ^2= 32.48, df = 29, p = .30, RMSEA = .03, RMR= .05, CFI= .99, NNFI=.99) and is shown in Figure 4.1.

Figure 4.1 Best fitting model of the factor structure of the pregnancy-related anxiety questionnaire in early pregnancy.



Likewise, the PRAQ-R data obtained during mid and late pregnancy were tested with CFA, as an attempt to build a three-factor model. With data obtained during mid- pregnancy, a model was fitted similar to the one fitted with data from early pregnancy (χ^2= 44.63, df = 32,

p = .07, RMSEA = .05, RMR= .05, CFI= .98, NNFI=.98). With data derived during late pregnancy, again a three factor model of pregnancy anxiety was fitted (χ^2= 40.41, df = 32, p = .15, RMSEA = .04, RMR= .04, CFI= .99, NNFI=.98).

The internal consistency of the three-factor scores during each trimester of pregnancy, as reflected in Cronbach's alpha, proved to be quite sufficient. The consistency of *Fear of giving birth* varied between .79 and .83, that of F*ear of bearing a physically or mentally handicapped child* between .87 and .88, and that of *Concern about one's appearance* between .76 and .83.

4.4.2 Stability of the factor structure

To test for the stability of the factor structure of pregnancy anxieties in the course of gestation, we set the factor loadings of items equal in early, mid, and late pregnancy. In addition, measurement error of an item measured early in pregnancy was allowed to be correlated to the measurement error of the same item measured during mid and late pregnancy and so forth. Fit indices showed a good fit for the factors *Fear of giving birth* (χ^2 = 24.78, df=20, p=.21, RMSEA=.04, RMR = .05, CFI= .99, NNFI=.99) and for *Concern about one's appearance* (χ^2=23.12, df=20, p=.28, RMSEA=.03, RMR=.04, CFI=.99, NNFI=.99) and an adequate fit for Fear of bearing a physically or mentally handicapped child (χ^2= 66.88, df=44, p=.02, RMSEA= .06, RMR=.06, CFI= .97, NNFI=.96).

Another procedure to determine the stability of the factor structure is to calculate intercorrelation coefficients of the three factors from early, to mid, to late pregnancy. Pearson correlation coefficients between factor scores of *Fear of giving birth* derived at early, mid and late pregnancy were all significant and ranged between .69 and .78 (p< .0005). Likewise, the scores on the factor *Fear of bearing a physically or mentally handicapped child* were significantly intercorrelated between early, mid and late pregnancy (r= .62 - .73, p < .0005) as well as the scores on the factor *Concern about one's appearance* (r = .55- .75, p < .0005).

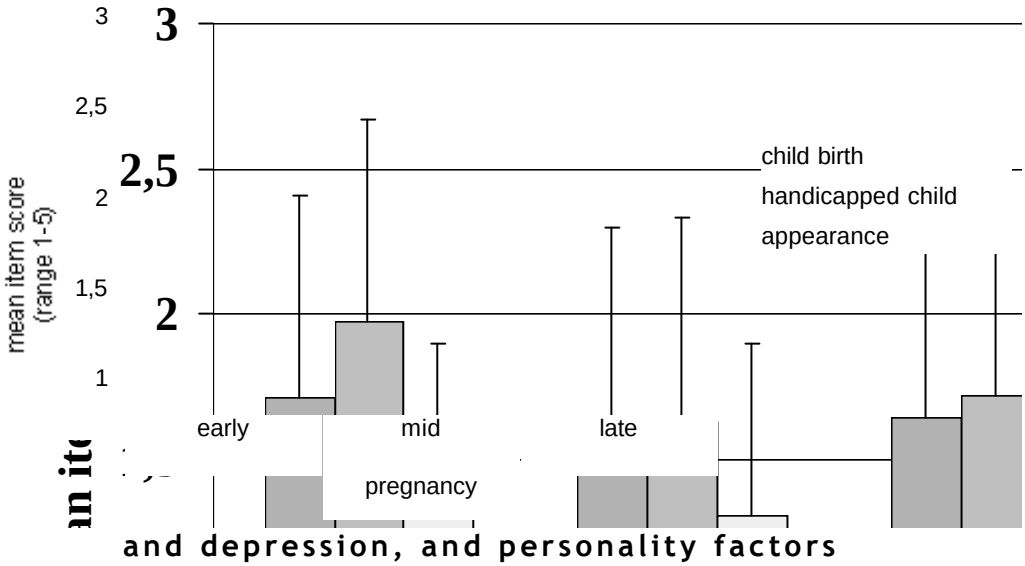
4.4.3 Change in the level of pregnancy anxiety in the course of pregnancy

MANOVA with repeated measures and polynomial contrasts was performed with two within- subjects factors: time and anxiety. These results are presented graphically in Figure 4.2. Significant main effects were found for the factor time (F= 4.71, df=2, p<.01), reflecting the changes in anxiety scores from early to late pregnancy, and for the factor anxiety (F=24.49, df=2, p< .0005), reflecting that within a certain time period mean item scores on the three different anxieties differed significantly. In addition, a significant interaction effect was found (F=2.65, df=4, p<.05). Thus, depending on the time period in pregnancy, differences could be found in the ranking of the anxiety scores.

Follow-up tests showed that *Fear of giving birth* and *Fear of bearing a physically or mentally handicapped child* had highest scores in early pregnancy, decreased in mid pregnancy and were elevated again in late pregnancy. In contrast, *Concern about one's appearance* remained rather stable throughout the course of pregnancy. In early pregnancy, *Fear of bear-*

ing a physically or mentally handicapped child was highest, followed by *Fear of giving birth*. *The Concern about one's appearance* scores were rather low, compared to the other two fears. In mid-pregnancy, both *Fear of bearing a physically or mentally handicapped child* and *Fear of giving birth* no longer differed significantly from each other on the mean item score. Both had significantly higher mean item scores than *Concern about one's appearance*. In late pregnancy the pattern was identical to the one found in mid-pregnancy.
Figure 4.2 Changes in level of pregnancy-related anxiety in the course of gestation.

4.4.4 Pregnancy anxiety, common symptoms of anxiety



and depression, and personality factors

To examine whether symptoms of general anxiety and depression and personality factors were associated with pregnancy anxiety, we performed a series of multiple stepwise regression analyses with the three factors of pregnancy anxiety as dependent variables. Predictors were trait and state anxiety, prenatal depression, neuroticism, locus of control indices, and primary and secondary appraisal of the pregnancy. Possible covariates such as maternal age and socio-economic status (SES) were first tested for their linear relationship with the dependent variables, by means of correlation and regression analyses. When found to be a significant covariate, this variable was entered in the regression analysis as a first block. The second block consisted of the predictor variables. Although SES was found to be correlated significantly with the dependent variables, in none of the regression analyses its contribution was significant. The results of the regression analyses are shown in Table 4.2.

Concerning early pregnancy, trait anxiety explained 17.9 % of *Fear of giving birth*. Neuroticism explained 20.4 % of *Fear of bearing a physically or mentally handicapped child*. In addition, secondary appraisal of the pregnancy explained another 7.5 % of this fear. External

locus of control explained 18.7% of the third factor, *Concern about one's appearance*, and primary appraisal of the pregnancy and state anxiety explained 6.8% and 6.1 % of the variance of this factor.

In mid-pregnancy, neuroticism explained 20 % of the variance of the *Fear of giving birth* and external locus of control (powerful others) an additional 4.8 %. Trait anxiety explained a significant part (37.2 %) of the variance in *Fear of bearing a physically or mentally handicapped child*. External locus of control contributed to another 6 % of the total variance and state anxiety contributed 6.9 %. *Concern about one's appearance* was explained partly by prenatal depression (18 %), with an additional contribution of 6.2 % by an external locus of control (powerful others).

In late pregnancy, prenatal depression explained a significant part of the F*ear of giving birth* (13.6 %) rather than trait anxiety or neuroticism. *Fear of bearing a physically or mentally handicapped child* was explained by trait anxiety (21.7 %). Trait anxiety explained 18.2% of the variance of *Concern about one's appearance*.

Table 4.2
Results of multiple regression analyses

Dependent variable	Predictors	R^2	F	Beta	Significance
Fear of child birth	*Early pregnancy*				
	X_1 = Trait anxiety	.18	8.36	.42	.0001
	Mid pregnancy				
	X_1 = Neuroticism	.20	19.71	.39	< .0001
	X_2 = Powerful others	.25	12.83	-.23	.0288
	Late pregnancy				
	X_1 = EPDS	.14	11.65	.37	.001
Fear of handicapped child	*Early pregnancy*				
	X_1 = Neuroticism	.20	9.85	.43	<.0001
	X_2 = Secundary appraisal	.28	9.79	.28	.0063
	Mid pregnancy				
	X_1 = Trait anxiety	.37	46.81	.24	<.0001
	X_2 = Powerful others	.43	29.63	-.33	.0004
	X_3 = State anxiety	.50	25.72	.37	.0017
	Late pregnancy				
	X_2 = Trait anxiety	.22	20.73	.47	<.0001
Concern about own appearance	*Early pregnancy*				
	X_1 = Powerful others	.19	17.88	-.41	<.0001
	X_2 = Primary appraisal	.25	13.12	-.25	.0104
	X_3 = State anxiety	.32	11.67	.25	.0110
	Mid pregnancy				
	X_1 = EPDS	.18	17.38	.32	.0044
	X_2 = Powerful others	.24	12.44	-.27	.0137
	Late pregnancy				
	X_1 = Trait anxiety	.18	16.66	.43	.0001

4.4.5 High-risk groups and pregnancy anxiety

To explore the clinical correlates of pregnancy anxiety, we performed MANOVA to compare pregnancy anxiety scores of high-risk and low risk samples as defined earlier.

Early pregnancy. The results showed that women with mental problems tended to have increased fear of bearing a physically or mentally handicapped child when compared to low risk women (10.1 versus 8.9; F=3.23, df=1, p=.074). Women with a previous miscarriage worried less about their appearance during early pregnancy than did women without a previous miscarriage (3.2 versus 4.0; F= 4.69, df=1, p=.032).

Mid-pregnancy. Analyses of the two risk groups showed that women with mental problems have increased fear of bearing a physically or mentally handicapped child when compared to the low risk group (7.4 versus 5.9; F=7.3, df=1, p=.008). Likewise, women with a previous miscarriage had an elevated level of anxiety of bearing a physically or mentally handicapped child when compared to low risk women (5.9 versus 7.4; F= 5.29, df=1, p =.025).

Late pregnancy. The results showed that women with mental problems had increased fear of bearing a physically or mentally handicapped child when compared to women without mental problems (7.4 versus 6.4; F=3.80, df=1, p=.050). With regard to pregnancy-related fears, women with a previous miscarriage no longer differed from women without such an obstetric history.

4.5 Discussion

The first aim of the study was to examine the structure of pregnancy anxiety. Using structural equation modelling, we were able to specify a measurement model of pregnancy anxiety. Starting with the PRAQ-R questionnaire which consisted of 34 items, only ten items were found to offer a good indication of pregnancy-related fears and worries. A three-factor model emerged in early, mid and late pregnancy. The stability of the three-factor model was tested and found to be good from early to late pregnancy. The low to moderate size correlations (.24 - .46) between factors indicated that they are not derived from a single underlying latent variable. In fact, three aspects of pregnancy related anxiety could be distinguished; 'Fear of giving birth', 'Fear of bearing a physically or mentally handicapped child', and 'Concern about one's appearance'. These findings need to be replicated in another and perhaps larger sample. They could form the basis of the development of a rather short questionnaire that would provide sufficient information about a pregnant woman's amount of pregnancy-related fears and could be used in obstetric practice or in research.

In contrast to prior studies which described the structure of pregnancy anxiety, this study used a prospective design and thus information was gathered during pregnancy, which avoided recall bias. This could explain the differences between our results and those of Levin (1991). In addition, the population in the study of Levin (1991) was rather different from ours; Anglo and Black and Hispanic women were possibly from a lower socio-economic status than our population. Moreover, Levin (1991) did not report on the parity of the women.

The second aim was to examine changes that occurred in the level of pregnancy anxiety in the course of gestation. We found that the amount of fear of giving birth decreased from early to mid pregnancy but thereafter remained stable. Fear of bearing a physically or men-

tally handicapped child was highest during early pregnancy, lowest during mid-pregnancy and increased from mid to late pregnancy. Concern about one's appearance was rather stable throughout pregnancy. Thus, the highest levels of pregnancy related anxieties were found in early and late pregnancy. During these periods there is also the highest risk for adverse effects on birth outcome and the development and behaviour of the child (Barker, 1995; Korelman & Schneibel, 1983; Otake & Schull (1984); Ravelli et al. 1998; Schneider et al. (1999); Sherman et al., 1985).

With regard to the third aim of this study, it was found that pregnancy anxiety can be differentiated from general anxiety and other personality characteristics. However, various personality factors were found to have effects on the amount of pregnancy anxieties reported. First of all, trait anxiety was significantly positively related to all pregnancy-related anxieties. The feeling of being in control of the course of pregnancy appeared to have an influence on the amount of pregnancy anxiety. Women who experienced the course of pregnancy as uncontrollable had increased fear of bearing a physically or mentally handicapped child, but they did not have increased fear of giving birth, nor did they have more worries about their appearance. Related to the appraisal of the pregnancy are factors that represent the locus of control a woman experiences. When she put her locus of control in powerful others (external locus of control), she showed less concern about her appearance during early pregnancy and displayed a surprisingly lower level of all pregnancy-related fears in mid-pregnancy. Perhaps, putting her trust in the medical staff or in other significant persons in her surroundings reduced her worries. This suggestion was also proposed by Sjögren (1997), who documented lack of trust in the obstetric staff as an important reason for anxiety about childbirth in a sample of extremely anxious pregnant women. Likewise, in the present study, primary appraisal of pregnancy was negatively related to the amount of concern about one's appearance during pregnancy. Furthermore, personality factors such as neuroticism and prenatal depression were found to be associated with increased fears at some time periods during pregnancy. All these factors together, however, only explained about 20-25 % of pregnancy anxieties during early and late pregnancy. Thus, the largest part of pregnancy anxiety was not explained by these factors and it is therefore concluded that pregnancy anxiety and general anxiety are different entities.

Mid-pregnancy appeared to differ in some respects from early and late pregnancy. During mid-pregnancy, 50 % of the fear of bearing a physically or mentally handicapped child could be explained by various personality factors. Neuroticism explained about 20 % of the fear of giving birth, whereas trait anxiety did not predict this fear at all. In other words, during mid-pregnancy pregnancy-related anxieties and personality factors were more related. The decreased levels of pregnancy anxieties during mid pregnancy could reflect the impression that during this period, women tend to worry less about their pregnancy and are more or less used to the changed situation in their lives. Therefore, it could well be that pregnancy-related anxieties can be less well differentiated from other personality factors during this period, due to the relative absence of the former. In this respect, it is interesting to notice that at the end of pregnancy, when the woman is more aware of the approaching delivery and of the period of life thereafter, only trait anxiety and prenatal depression explained a small part of the variance of pregnancy related anxieties (13.6 % - 21.7 %). Thus, when levels of pregnancy-related anxieties are increased, it is clear that they should be differentiated from more general anxieties and other personality factors.

The fourth aim of this study was to explore the clinical correlates of pregnancy anxiety. In our sample of normal nulliparous pregnant women, some women suffered from mental health problems for which they either had received psychological or psychiatric treatment in the past or were currently having therapy. These women had increased levels of fear of bearing a physically or mentally handicapped child from early pregnancy onwards. Further research is needed to clarify the relation between pregnancy-related anxieties and general anxiety in this group. Also, another risk group, women with a previous miscarriage, were found to worry less about bodily changes during early pregnancy than low risk women. Perhaps, the event of a miscarriage has led them to focus solely on the well-being of the child, instead of on their own physical well-being. During mid pregnancy, women with a previous miscarriage had increased levels of fear of bearing a physically or mentally handicapped child, when compared to low risk women, whereas the level of this fear was comparable to that of low risk women in late pregnancy.

In conclusion, our results show that pregnancy anxiety is a relatively distinctive syndrome that is different from general indices of anxiety and depression, at least during early and late pregnancy. Furthermore, pregnancy anxiety is not a single construct, but can be differentiated in several aspects. In a normal population of pregnant women levels of pregnancy-related anxieties change from early to late pregnancy. Authors of studies using anxiety during pregnancy as predictors of birth outcome or postnatal development should be aware of the specific fears related to pregnancy. Clinical significance and possibly harmful effects of pregnancy-related anxieties on birth outcome and postnatal development should be carefully examined in prospectively designed studies. In addition, when studying the development of psychopathology in women during or after pregnancy, one needs to take these normative changes in pregnancy related anxieties into account. Our results suggest that pregnancy itself should not be regarded simply as a common life event; it includes specific fears that might be increased in women with mental problems. An elevated amount of pregnancy-related anxieties could be a precursor of general anxiety syndromes or other psychopathology. More research is therefore warranted with regard to pregnancy-related anxieties in women who risk developing psychopathology during or after pregnancy.

4.6 References

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