Positive experiences of early motherhood: predictive variables from a longitudinal study

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Abstract

Studies of women's postnatal experiences have tended to emphasise the negative, yet for many women experiences are positive. This paper attempts to redress the balance using data from a large prospective study of childbearing women in south-east England. 1285 women completed questionnaires approximately 6 weeks after delivery. For most, motherhood was a positive experience: for example, two-thirds gave the maximum score of 5 for enjoying looking after the baby and 79% for being proud of being a mother while 72% had no disappointments about motherhood. Preliminary analysis indicated that answers to these questions were related to many of the concurrent measures that might be expected, such as support from partner, EPDS score and tiredness. These were also related to each other. Principal components analysis was therefore used to create a new 'positive experiences of motherhood' variable, POSMO and this was then subjected to multiple regression analysis. This showed that 25% of the variance could be accounted for by antenatal variables, particularly by expectations of motherhood assessed at 35 weeks. A further 24% of the variance was accounted for by concurrent variables, of which anxiety was the most important. Perceptions of the baby, tiredness and dysphoria (EPDS score) also made independently significant contributions.

Introduction
Studies of women's postnatal experiences have tended to emphasise the negative, yet for many women experiences are positive. Postnatal depression may be prevalent, but the majority of mothers are not depressed, and within the 'not depressed' there will be a wide range of experience. However, the normal range of experience, and, in particular, positive experiences of early motherhood, have received scant attention. This may give a rather misleading view of the world. For example, as has been argued elsewhere (Green, 1996), studies of postnatal depression that recruit women only after delivery serve to reinforce the idea that the depression is indeed postnatal in origin, when prospective studies show that in many cases it is pre-existing. The emphasis on the abnormal has also meant that few studies of postnatal women have been large enough or detailed enough to examine the range of variation.

In this paper we will present data based on secondary analysis of a longitudinal study of a large sample of normal childbearing women. Such data, firstly, allows us to describe the range of women's experiences and answer questions such as "What proportion of women actively enjoy looking after their babies?" Secondly, the longitudinal nature of the study allows us to examine a wide range of possible determinants of these experiences, both concurrent, such as support from partner or tiredness, and antecedent, such as expectations or personality. Thirdly, because the sample is so large we are able to apply multivariate statistical techniques in an attempt to disentangle the factors which relate to women's experiences.

Methods
The Cambridge Prenatal Screening Study

The data to be presented is drawn from the Cambridge Prenatal Screening Study. The purpose of the study was to chart the knowledge, attitudes, anxieties and experiences of pregnant women from before their first hospital appointment through to the post-natal period, with a particular focus on screening for fetal abnormality during routine antenatal care. The emphasis throughout was on normal experience, aiming to understand women’s feelings at any given point within the context of the other aspects of their lives. Given this approach, data were collected not only on obstetric and demographic variables but also on a very wide range of other variables such as worries, relationships, attitudes, feelings and personality measures. Data were collected via postal questionnaires, designed specifically for the study, on four occasions: at or before 16 weeks (time 1), at 22 weeks (time 2), at 35 weeks (time 3) and at 6 weeks after the expected date of delivery (time 4). Other aspects of the study have been reported elsewhere (Statham et al, 1992, Green et al, 1992, Green et al, 1993 a, b, Statham & Green, 1994, Green & Murray, 1994, Green, 1996). This paper will focus on the postnatal data (time 4).

Recruitment of sample

Pregnant women were recruited to the study between January and March 1990 in nine District hospitals, all within 60 miles of Cambridge (UK). All women booking for antenatal care during the recruitment period were eligible. Women were recruited via a letter and questionnaire forwarded to them with notification of their first hospital appointment. Data in this paper are restricted to women who completed all four questionnaires, excluding those whose babies had died (N=8) or had a serious
health problem or abnormality (N=26), leaving a total sample of 1285 women.

Measures (with variable names)

Postnatal (time 4)

Experiences of Motherhood

Women's experiences were measured using questions from Kumar et al's (1984) "Maternal Adjustment and Maternal Attitudes" (MAMA) scale. Two considerations led to this choice. Firstly, a lack of other scales which tap positive as well as negative feelings. Secondly, the scale is designed to be administered antenatally, to measure attitudes and expectations, as well as postnatally, to gauge experiences. Six items were used:

D1. Has life been more difficult since your baby was born?
D2. Are you enjoying looking after your baby?
D3. Do you feel proud of being a mother?
D4. Do you think that you are a good mother?
D5. Do you feel disappointed by motherhood?
D6. Have you had enough time to yourself since your baby was born?

Some of these were slightly rephrased from the originals, because it was felt that women would not identify with the language used, for example, item 2 was originally 'Have you enjoyed caring for your baby's needs?'. The response format was also modified from four graded labels eg 'Never', 'Rarely' etc. to a 0-5 rating scale labelled only at the extremes as 'Not at all' and 'Very much'. (For item 6 the top of
the scale was labelled 'As much as I need'). This was done firstly for consistency with the rest of the questionnaire, and secondly because of the difficulties associated with the labelling of intermediate points.

*Measures of mood*

Two widely used measures of (negative) mood were included in order to assess the degree of overlap with the 'experiences' questions: the Edinburgh Postnatal Depression Scale (Cox, Holden and Sagovsky, 1987) (EPDS4) and the Spielberger State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch and Lushene, 1970). The STAI has two components: a Trait scale, which measures anxiety as a personality characteristic ('how you usually feel') and State anxiety, which measures current anxiety ('how you feel at this moment'). The State scale was used at time 4 (STAI4) and the Trait scale (STAI(T)) at Time 1 (see below). Scores can range from 20 to 80 on each scale.

*Concurrent circumstances*

It was hypothesised that women's reports of their own physical health, their tiredness and the emotional support that they received from their partner would be significant correlates of their experiences of motherhood. The questions used were:

(HLTH) 'How has your health been since your baby was born?' Response options: No problems; Minor problems; Major problems.

(TIRED) 'How tired have you been feeling?' answered on a 0 - 5 rating scale from 'not at all' to 'exhausted'.

(SUPP) 'Do you feel that you are getting the emotional support you would like from
your husband/partner?’ answered on a 0 - 5 scale from 'not at all' to 'completely'.
They were also asked about breastfeeding, (BRFEE) scoring 2 if they were still
breastfeeding, 1 if they had started but given up and 0 if they had never started.

The Baby
It was also hypothesised that perceptions of the baby would similarly be correlated
with the experience of motherhood. These were assessed in two ways:
(PNEG) A checklist of 16 adjectives from which women were asked to select all the
words that described their baby. To control for the different numbers of words
chosen, the score given was the number of negative adjectives chosen as a
proportion of all the words chosen. This variable has been described in an earlier
paper (Green et al, 1991).
(EASY) ‘Do you think your baby is easy to look after, compared with other babies?’
Response options were: 1. easier than other babies; 2. same as other babies; 3.
more difficult than other babies. 'Don't know' was also a response option but was
omitted from analyses.
(CONF) Women were also asked to rate 'How confident do you feel at the moment
that your baby will not be found to have any long-term problems' (from 0 not at all
confident to 5 very confident).

Antenatal
Time 3: Expectations of motherhood
Four of the 'Experience of Motherhood' items (1,2,4,6) for which the MAMA scale
includes antenatal versions phrased as expectations were asked at 35 weeks.
C1. Do you feel that life will be more difficult once the baby is born?
C2. Do you think that you will enjoy looking after your baby?
C4. Do you worry that you might not be a good mother?
C6. Do worry about not having enough time to yourself once your baby is born?

These were answered on a 0 to 5 scale from 'not at all' to 'very much'.

*Time 1 (pre-booking)*

*Attitude to pregnancy*

An earlier study (Green, 1991) had shown the initial reaction to the pregnancy to be a significant predictor of postnatal emotional well-being. Women were therefore asked:

(PREG1) ‘How did you feel about finding out that you were pregnant?’ Response options were Overjoyed (1)/Pleased (2) /Mixed feelings (3) /Not very happy (4) /Very unhappy (5) /No particular feelings (6).

Also assessed at time 1 were demographic variables and trait anxiety.

*Demographic variables:* (PARITY) women were coded as 1 if they had had a previous delivery at 28 weeks+, otherwise as zero.

(EDN) Level of education was coded as 1 ( # age 16 ), 2 (education beyond age 16 but not higher education) or 3 (higher education).

(AGE) Age in years was treated as a continuous variable.

*Trait Anxiety:* (STAI(T)) The trait scale of the STAI (see above).
All statistical analyses were carried out on SPSS 6.1. Parametric tests (eg Pearson’s product moment correlation) were used when their assumptions were met, otherwise non-parametric tests were used (eg Spearman’s rank correlation).

Sample characteristics
Table 1 shows the characteristics of the 1285 women who completed all four questionnaires and had a healthy living baby. Demographic characteristics show that the sample is broadly representative of the population from which it was drawn. Mean age was 27.1 years (sd 4.9). There is a slight excess of women with higher education: 13% vs 9% for this age group nationally, (Central Statistical Office, 1991), but that is likely to be typical for the region where the study took place. The sample also has an under-representation of non-Caucasian women. This is partly because they were less likely to join the study and also because they were more likely to drop out. We have attempted to redress this with a separate study (Green & France-Dawson, 1993). Table 1 also shows the sample characteristics of the original 1825 women who joined the study. Comparison of the two sets of figures shows that young, less well educated women without a job and without a resident partner were the most likely to drop out. However, the effect on the overall sample characteristics is not large.

Results
Experiences of motherhood
Figure 1 shows the distribution of responses to the six 'Experience of motherhood' questions. As the figure shows, certain items are very severely skewed. For
example, 66% of the sample scored the maximum for 'enjoying looking after the baby', and 79% for feeling proud of being a mother while 72% scored zero for feeling disappointed by motherhood. The other three items were more evenly distributed, although only 5% answered less than 3 to 'Do you think that you are a good mother?'. Table 2 shows the inter-correlations between the six questions, all of which are significant (p<0.001). The highest correlation (0.51) is between enjoying motherhood and being proud of being a mother; the lowest (-0.20) between being proud and finding life difficult.

**Mood**

The mean EPDS score at time 4 was 7.4 (sd 4.6). Thirteen per cent scored above 12, which is the recommended cut-off when the EPDS is being used to screen for clinical depression. EPDS scores for this sample have been described in detail elsewhere (Green & Murray 1994, Green 1996). The mean STAI state score was 35.5 (sd 9.6), which is in the low-normal range.

**Breastfeeding**

Forty-eight percent of the sample (N=609) were still breastfeeding at the time of completing the postnatal questionnaire, 26% (N=338) had started but given up and the remaining 26% (N=333) had never started.

**Mother's health**

Fifty-three per cent of the sample (N=680) said that they had had no health problems since the birth; 44% (N=567) had had 'minor' problems and 3% (N=34) had had 'major' problems. Reported tiredness covered the full range from 1.4% (N=18)
scoring 0 to 11% (N=141) scoring 5. The majority (67%, N=858) scored 3 or 4.

*Emotional support from partner*

This question was assessed on a 0 to 5 rating scale. Twenty-one per cent (N=261) rated support at 2 or less, and less than one third (30%, N=371) scored the maximum of 5, although a similar number (31%, N=381) scored 4.

*Perceptions of the baby*

Most women used a mixture of positive and negative words to describe their babies, but 37% (N=467) used no negative words at all and, at the other extreme, 7 women used only negative words. The proportion of negative adjectives therefore ranged from 0 to 1, but the distribution was heavily skewed; the median was 0.15, ie approximately one negative word to 6 positive. Only 6% of the sample (N=74) used more negative words than positive ones (ie a proportion of negative words >0.5).

Thirty-four percent of the sample (N=438) rated their baby as easier to look after than other babies, 8% (N=99) as more difficult, 45% (N=571) as the same and 13% (N=163) said that they did not know. Three women said they could not answer the question because 'all babies are different'.

*Antenatal expectations of motherhood*

Figure 2 shows the responses given at 35 weeks to the four 'expectations of motherhood' questions. Comparison with Figure 1 shows that there is a broad parallel between the proportions expecting and experiencing 'enjoyment' and 'life being more difficult'. The other two questions, following the original MAMA wording,
are phrased as 'Do you worry ...[that you may not be a good mother/ about having enough time to yourself...]', thus introducing another element in addition to the expectation (ie worrying about it). For this reason we would not expect such a direct parallel in the distribution of scores. The distribution of answers to these two questions was fairly similar. In both cases approximately half the sample scored only 0 or 1, ie not a significant worry. At the other extreme, 'Being a good mother', was only a major worry (4 or 5) for 14% and 'Having enough time to yourself', for 13%. Thus, the overall expectation of motherhood is a fairly positive one. The inter-correlations between these four items is shown in Table 3. As with the experiences, most correlations are in the range 0.2 to 0.5, confirming that they are related but are still tapping slightly different issues.

Principal components analysis of experiences of motherhood (POSMO)

Preliminary analysis (not shown) indicated that virtually all the variables described were significantly related, to varying degrees, with all the experience of motherhood questions. Since many are also related to each other (see below), principal components analysis was carried out in order to derive a composite 'experience of motherhood' score. The 'proud' and 'disappointed' questions were dropped from this analysis, firstly because they had not been included as antenatal expectations and secondly because most people scored at the extremes and their inclusion was not found to contribute greatly to the factor.

The principal components analysis resulted in one component with eigenvalue greater than 1 (eigen.=2.04 ), accounting for 51% of the variance. The Kaiser test of
sampling adequacy was satisfactory (0.70) as was the Bartlett test of sphericity (p<.0000). Factor loadings ranged between 0.67 and 0.73 (D1= -0.73, D2=0.71, D4=0.67, D6=0.69). The direction of the item loadings reflects positive experiences of motherhood, ie the higher the score the more positive the experience.

In order to take into account the relative influence of each item, a weighted variable was derived (POSMO) using the regression method. This creates a new variable with a mean of 0 and standard deviation of 1. In contrast, a construction of a common variable with equal weights (just adding them up) would conceal some of the explainable variance. The correlations of the new composite measure of motherhood experience with the other measures can be seen in table 4.

**Principal components analysis of expectations of motherhood (EXMO)**

A similar procedure was used to construct a variable based on the expectations of motherhood questions. Answers to the four expectations questions were entered into a principal components analysis, that gave one component with eigenvalue greater than 1 (eigen.=2.2) accounting for 55.1% of the item variance. Item factor loadings ranged between 0.66 and 0.82. (C1=0.79, C2= -0.66, C4=0.67, C6=0.82). The direction of the item loadings shows that the underlying factor reflects negative expectations of motherhood which in turn reflects the predominantly negative wording of the original questions. Thus the higher the score the more negative the expectations. Finally, weighted component scores were constructed as above, giving a new variable (EXMO). Correlations between EXMO and other variables, including POSMO, are shown in Table 4.
Correlations with POSMO

Table 4 shows the correlations between POSMO and the other variables. The highest correlations are with the postnatal measures of mood: STAI4 (-0.55) and EPDS4 (-0.46). The next most highly correlated items are expectations (ie EXMO) (-0.41), TIRED (-0.38) and PNEG (-0.40). Support from partner, trait anxiety, confidence in the bay's long-term health and judging the baby to be easy to look after all have correlations in between 0.2 and 0.3. Maternal health problems, breastfeeding, initial reaction to pregnancy, level of education and age all have low, albeit significant, correlations with POSMO. The only variable considered which was not significantly correlated at the p<0.01 level, was parity; there was apparently no difference between multiparous and primiparous women in their POSMO scores. This was also confirmed in a one-way ANOVA (F_{1,1283}=2.16, p=.14).

Correlations between independent variables

Many of the independent variables were inter-correlated. In particular the mood measures, EPDS4 and STAI4 were highly correlated with each other (0.73), and with trait anxiety (STAI(T)) (0.43 and 0.48 respectively). They were also both quite highly correlated with TIRED (0.37 in both cases) and partner support (SUPP)(0.36 and -0.43), and these variables were, in turn, related to each other. The proportion of negative adjectives used to describe the baby, (PNEG), had higher correlations with the mood variables than did the other baby-related questions. How easy the baby was to look after (EASY), for example, had low correlations with most other variables except PNEG (0.45), although its correlation with POSMO was -0.27. AGE was
related to STAI(T), breastfeeding (BRFEE), education (EDN) and PARITY. PARITY and EDN both showed near zero correlations in nearly all other cases. The notable exception was the relationship between breastfeeding and education (0.28). There was also a significant relationship between PARITY and PNEG. Expectations of motherhood (EXMO) were weakly correlated with most other variables, although there was no correlation between EXMO and EASY. The highest correlation for EXMO was with POSMO (-0.41), and there were also moderate correlations with STAI4 (0.31), EPDS4 (0.23) and initial reactions to pregnancy (PREG1) (0.22).

**POSMO and other variables**

The relationship between POSMO and a large number of other variables was considered. The following were not significantly correlated with POSMO: Being in paid employment at time 1; marital status; social class; baby's age at time of completing the postnatal questionnaire; baby's sex; admittance to SCBU; Caesarean section; instrumental delivery, induction; acceleration; episiotomy; stitches; drip; enema; shave; artificial rupture of the membranes; woman's rating of how well she coped with pain in labour; the extent to which she felt that she lost control of her behaviour during labour or was in control of contractions. Variables which showed a very modest significant correlation were: use of pethidine in labour (-0.09), feeling 'in control' (0.09), 'calm' (0.08) or 'excited' (0.08) during labour (these three were part of an adjective checklist), not being able to get comfortable during labour (-0.06), not feeling in control of what staff were doing during labour (-0.06) and overall satisfaction with the birth (scored out of 10) (0.15).
Multiple regression

The univariate analyses discussed above, show that many variables are significantly related to positive experiences of motherhood scores, but are also related to each other. In order to assess which variables uniquely predicted positive experiences of motherhood, a linear model was constructed. Variables were entered into a stepwise/hierarchical multiple regression in two sets: a first set that pertained to antenatal predictors of motherhood experiences: EXMO, EDN, PREG1, PARITY, STAI(T), AGE and a second group of concurrent measures: PNEG, TIRED, EASY, CONF, EPDS4, BRFEE, HLTH and SUPP. STAI4 was excluded from the analysis as it was found to have a low tolerance score (.35) when EPDS4 was also in the equation (i.e there was too great an overlap between these two variables). The decision to enter antecedent variables first was made in order to determine how much of the variance was predictable antenatally. This order also gave far better indices of the final model fit ($F_{10,1135}=102.56$) than when concurrent variables were entered first ($F_{13,1135}=80.66$) or when no order was specified ($F_{11,1135}=92.80$). <how is the last sentence? is it not clear?> Not clear to me why the df's are different. otherwise OK

Within the antecedent/concurrent categories stepwise regression determined the order of entering variables into the model, which means that both entry and removal criteria were considered for inclusion in the model, until the best-fitting model was found. However, both Forward and Backward procedures were also tested and yielded the same solution, adding to the reliability of the final model. The model histogram of standardised residuals was perfectly normally distributed.
To secure against type 1 errors, the model was tested with a randomly selected sub-sample of half the cases, and then applied to the other half. In both cases the final model was replicated.

The multiple regression analysis on the total sample is presented in Table 5. Both antecedent and concurrent variables can be seen to account for a significant amount of the variance of POSMO (49% in total). The two most important explanatory variables are EPDS4($\beta=-0.30$) and EXMO ($\beta=-0.33$), i.e. concurrent mood and expectations of motherhood at 35 weeks. EXMO was entered first and accounted for 23% of the variance. Three other antecedent variables made small independent contributions to the model: STAI(T), EDN and PARITY. PREG1 and AGE did not make any additional contribution. Note that the direction of the relationship with trait anxiety is positive, although the correlation obtained in the univariate analysis was negative.

Concurrent measures accounted for a further 24% of the variance. EPDS4 was the most important variable, but PNEG, EASY, TIRED, CONF and SUPP all made independently significant contributions. BRFEE, and HLTH did not, and were thus not retained in the model.

**Discussion**

This paper has presented data from nearly 1300 mothers reporting on their experiences of motherhood at approximately 6 weeks after delivery. As anticipated,
this has shown that for most women motherhood is a positive experience: for example, two-thirds gave the maximum score for enjoying looking after the baby and 79% for being proud of being a mother while 72% had no disappointments about motherhood. Preliminary analysis had shown that these questions were related to many of the concurrent measures that might be expected, such as support from partner, EPDS score and tiredness. They were also related to each other. We therefore used principal components analysis to create a new 'positive experiences of motherhood' variable, POSMO, which was based on four of the original questions, weighted according to their contribution to the component, and then subjected this to multiple regression analysis.

The multiple regression analysis indicated that both antecedent and concurrent variables accounted for a significant amount of the variance of POSMO. The two most important explanatory variables were EXMO (β=-0.33) and EPDS4(β=-0.30), ie expectations of motherhood at 35 weeks and concurrent mood. The finding that negative expectations are related to negative experiences is consistent with some of our own earlier work showing that 'low' expectations of labour and delivery were associated with poorer outcomes (Green et al, 1990a,b). The data do not support the stereotypical notion that women with high expectations are setting themselves up for failure and disappointment, although we hope to carry out further analysis on the small number of women who were disappointed by motherhood, and/or had expectations that differed in a major way from their reported experiences. We do not, of course, know whether expectations lead directly to experiences or whether both expectations and experiences are a reflection of some other variables, such as
mood, personality or other predispositions. The strength of our data set is such that we could pursue this question further using path analysis, which we hope to do in a subsequent paper. It is notable that expectations were not related to parity, nor to judging the baby to be easier or more difficult to look after than other babies, both of which might have been predicted.

A surprising finding was that trait anxiety was positively related to POSMO in the regression model, even though the uncorrected correlation had been in the opposite direction. In other words, in the regression model, higher POSMO scores are predicted by higher trait anxiety scores. One explanation for this apparently paradoxical finding is that trait anxiety scores reflect (at least) two factors which operate in different directions. One is associated with worries and negative self-image and is therefore a major component of the EXMO variable. Once the influence of the EXMO has been accounted for in the regression model, that allows the influence of the other factor, which perhaps has more to do with arousal and not being apathetic, to come into play. This explanation is entirely hypothetical, but is one that we would hope to be able to test.

The other antecedent variables that were retained in the regression model were initial reactions to pregnancy, and education. That level of education should stay in the model as an independent predictor was surprising, as was the absence of PARITY from the model. As a check, the model was rerun independently for multips and primips. However, the only difference to emerge was that EDN dropped out of the multiple regression equation for primips.
Of the concurrent measures, five further variables were found to make small independent contributions after EPDS4. Three of these were to do with the baby: the proportion of negative adjectives used to describe the baby; the judgement that the baby was easier or more difficult to look after than other babies and confidence in the baby's long-term health. The latter is perhaps more a measure of the mother's confidence in her mothering, but we were surprised that the other two variables both contributed independently to the model.

Of the variables to do with the mother's postnatal circumstances, tiredness was the major contributor; mother's health and breastfeeding went out of the model after tiredness had been accounted for. Tiredness proved to be an interesting variable in its own right. Unlike many of the 0 to 5 ratings, most responses to the tiredness question were in the mid range, the mean being 3.2; only 12% of the sample claimed not to be at all tired, while 11% were exhausted. Surprisingly, tiredness did not relate to Caesarean delivery or to breastfeeding, and was not as strongly correlated with either mother's health problems since the birth or emotional support from partner as might have been expected. It was, however, strongly related to the mood variables (EPDS and state anxiety) and also, interestingly, to the proportion of negative adjectives (PNEG) chosen to describe the baby but much less to EASY, the judgement that the baby was easier/more difficult to look after than other babies. Since PNEG is also highly related to EPDS4 and STAI4, while EASY is not, this might suggest that the report of tiredness and negative perceptions of the baby are both just reflections of low mood. However, the multiple regression showed that all of
these variables were in fact making independent contributions to POSMO.

Our own earlier work had shown that women's subjective experiences of labour and delivery, particularly those relating to perceived control, were important predictors of unhappiness after childbirth (Green, 1990). The same questions had been asked in the present study but were not found to be related to POSMO. We will be investigating this finding further, but, given the similarity of the independent variables, the most likely explanation is that our measure of positive experiences of motherhood really is measuring something different from the negatively loaded measure used in the earlier study. In other words, it suggests that POSMO is more than just an inversion of measures of negative mood, such as EPDS. The fact that the correlation between POSMO and EPDS4 was no higher than -0.46 would also support this interpretation.

A notable feature of these data is the lack of differences between those who had had a previous child and those who had not.

*Caution is needed with some of the other variables which have very unbalanced distributions, such as PNEG, (where 37% of the sample scored the minimum score), and BRFEE which assumes an ordinal scale that may not always apply. Correlational methods are clearly not the most sensitive approach for such variables, and a number of the negative relationships reported in this paper should be treated with some caution. Nevertheless, we feel confident that our regression model has considerable statistical power. The multiple regression was based on a total of 1158
cases. Tabachnick & Fidell (1989) suggest that for a standard or hierarchical multiple regression one should have at least 20 times more cases than predictor variables; in this analysis, we had almost 100 times more. We therefore feel confident that its findings are reliable.

This paper has presented exploratory statistical analyses by which we hope to advance our understanding of what contributes to a positive experience of motherhood. Many of its findings will need further investigation, not least because correlational measures of categorical data can disguise non-linear relationships. However, the data are sufficiently robust that we feel confident that they do indeed reflect the experiences of most mothers.

**Acknowledgements**

We gratefully acknowledge the support of the Health Promotion Research Trust in funding both the original study and in awarding a subsequent grant for secondary analysis. The Cambridge Prenatal Screening Study was carried out jointly by Josephine Green, Helen Statham and Claire Snowdon.

**References**


Green, J.M. (1990) Who is unhappy after childbirth?: Antenatal and intrapartum correlates from a prospective study. *Journal of Reproductive & Infant Psychology,* 8,


Table 1. Sample characteristics (N=1285) compared to characteristics of total sample

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<td>Married or living as married</td>
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<td>Paid employment @ time 1</td>
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<td>overjoyed/pleased re discovering pregnancy (time 1)</td>
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<td>Mean trait anxiety score (sd)</td>
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Table 2. Correlations between 6 questions assessing experiences of motherhood (see Methods section for full questions). All significant at p<0.001. N=1285.

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<td>-0.29</td>
<td>+0.40</td>
<td>+0.41</td>
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<tr>
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<td>-0.46</td>
<td>-0.34</td>
<td>-0.31</td>
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<td>Time</td>
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<td>+0.29</td>
<td>+0.22</td>
<td>+0.26</td>
<td>-0.22</td>
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Table 3. Correlations between 4 questions assessing expectations of motherhood (see Methods section for full questions). All significant at p<0.001. N=1285.

<table>
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<tr>
<th></th>
<th>Difficult</th>
<th>Enjoy</th>
<th>Good</th>
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<td></td>
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<tr>
<td>Good</td>
<td>+0.38</td>
<td>-0.26</td>
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<tr>
<td>Time</td>
<td>-0.56</td>
<td>-0.40</td>
<td>+0.38</td>
</tr>
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</table>
Table 4. Correlations between POSMO, EXMO and other postnatal and antenatal variables (N=1285) (See Methods section for definition of variables).

<table>
<thead>
<tr>
<th></th>
<th>POSMO</th>
<th>EXMO</th>
<th>STAI (T)</th>
<th>STAI4</th>
<th>EPDS4</th>
<th>HLTH</th>
<th>TIRED</th>
<th>SUPP</th>
<th>PNEG</th>
<th>EASY</th>
<th>CONF</th>
<th>BRFREE</th>
<th>PREG1</th>
<th>EDN</th>
<th>PARITY</th>
</tr>
</thead>
<tbody>
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<td>EXMO</td>
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<td>+0.26</td>
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<td>+0.17</td>
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<td>+0.37</td>
<td>+0.26</td>
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<tr>
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<td>+0.27</td>
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<td></td>
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<tr>
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<td>+0.02</td>
<td>+0.19</td>
<td>+0.14</td>
<td>+0.04</td>
<td>+0.22</td>
<td>-0.04</td>
<td>+0.45</td>
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<tr>
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<td>-0.17</td>
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</tr>
<tr>
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<td>+0.15</td>
<td>-0.10</td>
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<td>-0.09</td>
<td>0</td>
<td>+0.01</td>
<td>+0.06</td>
<td>+0.03</td>
<td>+0.02</td>
<td>+0.05</td>
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<tr>
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<td>+0.21</td>
<td>+0.20</td>
<td>+0.10</td>
<td>+0.06</td>
<td>+0.09</td>
<td>-0.19</td>
<td>+0.07</td>
<td>-0.03</td>
<td>-0.04</td>
<td>+0.02</td>
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</tr>
<tr>
<td>EDN</td>
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<td>+0.15</td>
<td>-0.08</td>
<td>-0.01</td>
<td>-0.01</td>
<td>+0.07</td>
<td>+0.01</td>
<td>+0.04</td>
<td>+0.03</td>
<td>+0.03</td>
<td>-0.05</td>
<td>+0.28</td>
<td>+0.01</td>
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</tr>
<tr>
<td>PARITY</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.06</td>
<td>+0.02</td>
<td>-0.04</td>
<td>-0.07</td>
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<td>-0.07</td>
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<tr>
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<td>-0.21</td>
<td>-0.03</td>
<td>-0.07</td>
<td>+0.01</td>
<td>+0.11</td>
<td>+0.04</td>
<td>-0.02</td>
<td>+0.03</td>
<td>+0.01</td>
<td>+0.23</td>
<td>+0.02</td>
<td>+0.26</td>
<td>+0.33</td>
</tr>
</tbody>
</table>
All correlations > 0.07 are significant at p<0.01. Shaded boxes denote correlations >0.20. For BRFEE, EDN and PARITY Spearman rank correlations are reported.
Table 5: Stepwise regression of antenatal and concurrent variables on POSMO with antenatal variables entering first

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Mult.R.</th>
<th>Adj.R²</th>
<th>R² change</th>
<th>F change</th>
<th>Beta</th>
</tr>
</thead>
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<td>1</td>
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<td>0.23</td>
<td>0.23</td>
<td>353.24</td>
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<td>0.24</td>
<td>0.01</td>
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<td>-0.10</td>
</tr>
<tr>
<td>4</td>
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<td>0.25</td>
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<tr>
<td>6</td>
<td>PNEG</td>
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<td>0.016</td>
<td>35.06</td>
<td>-0.11</td>
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<tr>
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<td>0.010</td>
<td>68.02</td>
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<tr>
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<td>CONF</td>
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<td>0.010</td>
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<td>+0.09</td>
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<tr>
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<td>0.004</td>
<td>26.40</td>
<td>+0.06</td>
</tr>
</tbody>
</table>

Variables out of the equation: PREG1, AGE, BRFEE, HLTH