PERSONALITY AND PSYCHOLOGICAL SYMPTOMS BEFORE AND AFTER CHILDBIRTH

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ABSTRACT

Postnatal depression is contemporarily considered to be typical of depressions that occur at other times, but a comparison of symptoms in post-partum and non-maternal samples lent strong support for Pitt's (1968) view that postnatal depression is "atypical". Diminished self-esteem is a feature of depression generally, but this may be particularly true for women who are depressed post-partum. The Edinburgh Postnatal Depression Scale (Cox, Holden and Sagovsky, 1987) is a serviceable index of post-partum symptoms, but new symptom components (Self-esteem and Tension) would serve as useful additional indices. Tension may represent a hormonal component of post-partum symptoms, but there was little support for a hormonal explanation of postnatal depression generally. Analysis of symptoms during the first post-partum week confirmed the existence of a maternity Blues syndrome. The psychometric properties of the Emotion Control Questionnaires (Roger and Nesshoever, 1987; Roger and Najarian, 1989) were confirmed in two maternal samples, during which maternity-specific individual differences emerged. New emotion control questionnaires for maternal samples (ECQ-A, ECQ-P) were incorporated in true prospective analyses along with stress and social support measures. There was only modest support for a diathesis-stress model of susceptibility. The role of social support in moderating the effects of stress in maternal samples can be overestimated. There were strong main effects for emotion control subscales, especially Rehearsal and Maternal Anxiety. The results had important implications for primary health care, and suggestions for how these might be developed into mechanisms for targeting of resources and the amelioration of post-partum symptoms were formulated.

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PREFACE

This world is a comedy to those that think, a tragedy to those that feel. *(Horace Walpole, 1776)*

Nothing on earth [is] so easy as to forget, if a person chooses to set about it. *(R.B. Sheridan, 1775)*

I am lucky having a nice house, loving husband and family and also my own car so, if I feel down, the thought of people without these usually helps to make me feel better. *(Subject number 253)*

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Data were processed in SPSS-X or SPSS for Windows (v5.1 or v6.0).

CHAPTER 1. INTRODUCTION

1.1 Post-partum psychiatric disorders - historical perspective

The earliest reports of mental illness associated with childbearing are attributed to Hippocrates who, *circa* 460 BC, suggested that suppressed lochial discharge could be carried towards the head and result in "agitation, delirium and attacks of mania". In a similar vein, Trotula of Salerno, an 11th century gynaecologist, explained tearfulness in childbearing women as follows: "if the womb is too moist the brain is filled with water, and the moisture running over the eyes compels them to involuntarily shed tears". In nineteenth century Paris, Esquirol described the "mental alienation of those recently confined, and of nursing women" (Steiner, 1990, p89).

Louis Victor Marcé (1858) gave detailed accounts of mental illness during pregnancy and the puerperium. Today, the Marcé Society is an international organisation for "the understanding, prevention and treatment of mental illness related to childbearing". Marcé Society literature ubiquitously states that one of the society's primary aims is to strive "for improvement in the classification and recording of such disorders".

In this latter connection, specific reference to post-partum disorders was expunged from the first Diagnostic and Statistical Manual (American Psychiatric Association, 1951) in 1952 when, following contemporaneous difficulties in establishing a nosology based on aetiology, a system of nomenclature based on patterns of symptoms, or syndromes, became a next best favoured alternative. The current Diagnostic and Statistical Manual (DSM-III-R, American Psychiatric Association, 1980) does not allow for diagnoses of specific post-partum disorders (Hamilton, 1989). At least two recent reviewers (Hamilton, 1989; Steiner, 1990), however, advocated separate classification of post-partum psychiatric disorders in DSM-IV.

1.2 Categories of post-partum psychiatric disorders

Post-partum psychiatric disorders fall into three categories: the maternity Blues, postnatal depression and post-partum psychoses (e.g., O'Hara, 1987).

1.3 The maternity Blues

The maternity Blues develops in the first few days following delivery and is characterised by emotional lability of a transitory nature. Colloquially the Blues is considered synonymous with tearfulness, and it is not clear whether a clinical description should include depressed mood (Kennerley and Gath, 1989). Frequency reports of the Blues range between 15% and 80%. Much of this variability is accounted for by discordant diagnostic criteria.

Yalom, Lunde, Moos and Hamburg (1968) monitored the duration of crying episodes in a group of 39 women during the first 10 post-partum days. Two thirds of the sample had at least one episode of crying lasting over five minutes. Of these, nearly half had a bout of crying lasting over an hour. The frequency of crying episodes in the same sample at eight months post-partum was substantially diminished. Yalom *et al* reported that women who cried typically said they did so out of "vulnerability, or hypersensitivity to possible rejection" (p19), and all claimed that such behaviour was uncharacteristic of themselves.

Daily ratings of a variety of measures, including the 40-item Mood Adjective Checklist (MACL - Zuckerman and Lubin, 1965) and further self-report and observer ratings, were subjected to a principal components analysis for each day. The first factor was consistently represented by anxiety, depression, deactivation and aggression subscales of the MACL, and this factor was used to calculate an average "depression" score over the 10 days for each subject.

Kennerley and Gath (1989), however, argued that rating scales designed to measure depression were inappropriate in the context of the immediate post-partum period "because it is not established that depressive symptoms are the main feature of the blues" (p356).

Kennerley and Gath initially devised a 49-item questionnaire which comprised adjectives of mood elicited from a sample of 100 women during the first 10 post-partum days. This was completed by a second group following which items were eliminated if they were: deemed redundant (highly correlated with other items), highly skewed (endorsed by less than 15% of respondents), not sufficiently specific or overtly related to physical state. A further four items were discarded because they failed to demonstrate a peak in frequency in the first few post-partum days in a third sample.

The final 28-item scale (Kennerley Blues Questionnaire) was subjected to two cluster analyses, the first using data from the third sample (N=50) and the second using data from a fourth sample (N=87). Seven clusters emerged in both analyses. Four items consistently loaded on a "primary blues" cluster: tearful, overemotional, changeable in mood and low spirited. Similarly, four items consistently loaded on a "depression" cluster: brooding on things, irritable, depressed and self-pitying. A three-item "reservation" cluster also maintained a consistent structure. Thirteen items, however, demonstrated discrepant migration behaviour in the two analyses. The two sets of seven clusters were, nevertheless, deemed "unusually close".

Cluster scores (derived from the first cluster analysis, i.e., on the third sample) for 79 subjects of the fourth sample were available from an ante-partum assessment. Only two cluster scores changed significantly by the puerperium, primary blues and "hypersensitivity". These trans-parturition observations suggested that the primary blues factor might indeed represent a phenomenon specific to the first post-partum days, suggested that depression is not a specific feature of the Blues and were consistent with Yalom *et al*'s subjects' reports that they felt hypersensitive.

Iles, Gath and Kennerley (1989) compared Kennerley blues questionnaire scores (percentage-of-items-endorsed) during the first 10 post-partum days with scores of a non-childbearing sample in the 10 days following elective gynaecological surgery. The post-operative group had higher overall scores and, whereas symptoms in the puerperal sample peaked on day five, symptom scores in the post-operative group peaked on day two, declining steadily over the remaining eight days. Iles *et al* concluded that "maternity blues is a distinct puerperal condition, and not just a non-specific 'end reaction' to stressful experience" (p366).

In conclusion, the Blues is recognised as a syndrome, characterised primarily by tearfulness and hypersensitivity although not necessarily depression, specific to the first few post-partum days. Frequency estimates vary, but suggest that a majority of women experience the Blues. Symptom clusters have not been reliably established, notwithstanding the emergence of the Kennerley Blues questionnaire. Further data relating to components of symptoms in the first post-partum week are reported in Chapter 4. Relationships between biographic measures and symptoms in the first post-partum week are presented in Chapter 8. The extent to which symptoms in the first post-partum week can be predicted is discussed in Chapter 10.

1.4 Postnatal depression

Postnatal depression is surrounded by controversies which do not apply as readily to the Blues syndrome; the most fundamental of these is whether it exists at all. One view of postnatal depression is that it is clinically indistinguishable from depressions that do not follow childbirth (the point following childbirth at which a new episode of depression is no longer regarded as "postnatal" is not well established). Although there is consensus that postnatal depression affects around 10-15% of new mothers (Pitt, 1968; Cox, Connor and Kendell, 1982; Kumar and Robson, 1984; Watson, Elliott, Rugg and Brough, 1984; O'Hara, 1987; O'Hara, Zekoski, Philipps and Wright, 1990), the prevalence of postnatal depression may not be significantly higher than that of depression in women generally (Cooper, Campbell, Day, Kennerley

and Bond, 1988). The comparability of prevalence rates during pregnancy and following delivery (O'Hara *et al*, 1990) supports the notion of "continuity of depression", especially when a substantial proportion of women depressed post-partum were also depressed during pregnancy (e.g., Watson *et al*, 1984). If postnatal depression is typical of other depressions, there are likely to be common aetiological factors. Proponents of this view are sceptical about the possible contribution of endocrine variations associated with parturition, and see the maternity context as a convenient natural laboratory for longitudinal studies of depression developing in response to stress in vulnerable women (i.e., invoking a "diathesis-stress" model of depression).

It is not clear when the term "postnatal depression" was coined, although Pitt's (1968) study, now regarded as classical, applied the description "atypical" to postnatal depression, meaning somehow different from classical or endogenous depression. Atypical depression was characterised by the prominence of neurotic symptoms that overshadowed other underlying symptoms, or by certain features that are the converse of those found in classical depression (West and Dally, 1959; Sargent, 1961; Pollitt, 1965). According to Pitt, atypical depression "is a milder variant of physiological depression most often seen in younger women or immature personalities" (p1331).

Symptoms of atypical depression in the puerperium, according to Pitt, included tearfulness, despondency and anorexia. Feelings of inadequacy, inability to cope and irritability were accompanied by associated self-reproach and guilt. Hopelessness and suicidal ideation were, however, infrequent. An inappropriate degree of anxiety over the baby's health and feeding concerns were accompanied by somatic hypochondriasis. Fatigue and exhaustion were accompanied by impaired concentration and memory. Mood worsened towards the end of the day with distress greatest in the evenings and sleep disturbance greatest on retiring (unlike the early morning waking with accompanying depressed mood that occurs in classical depression). The individual's usual level of interest, including sexual interest, was diminished. In addition, "... many felt quite changed from their usual selves, and most had never been depressed like this before" (p1327).

Cox (1986) profiled postnatal symptomatology in similar phraseology. The mood of depressed mothers was low, "down in the dumps" or dispirited; sad, anxious or tearful. Some reported "Jekyll-and-Hyde-like" variations. Sleep disturbance was not attributable to a noisy baby or partner (Cox reported both getting off to sleep and early morning waking). Some mothers went back to bed during the day as a way of coping with fatigue. Self-esteem appeared to have dwindled as mothers doubted their ability to cope, whether with the baby or with household chores. They perceived themselves as having fallen short of their own expectations of themselves as mothers, and such perceptions were likely to exacerbate feelings of incompetence and guilt. Some were particularly afraid of criticism from others. Cox also noted a diminution of sexual interest which was not attributable to episiotomy or fears about effective contraception. Somatic symptoms included headache and palpitations.

Although Pitt regarded puerperal depression as somehow different from classical depression, he did not ascribe its distinguishing characteristics to hormonal upheavals associated with parturition. In this respect, his position can be contrasted with that of Dalton (e.g., 1989) who is unequivocal in attributing puerperal symptomatology to biochemical aetiology. For Dalton, irritability, not necessarily present in typical depression, is the hallmark of postnatal depression. Conversely, whereas disturbances of sleep and appetite characterise typical depression "... women with postnatal depression have a yearning for sleep and never get enough ... the appetite is increased and the woman is always thirsty" (p25). Dalton claims that her regime of progesterone therapy has been successful in warding off postnatal depression (e.g., Dalton, 1985), but there is no clear evidence implicating endocrine factors as aetiological agents of postnatal depression. The most swingeing hormonal changes associated with pregnancy and parturition are necessary (and thus universal) physiological processes, yet very few prevalence estimates of postnatal depression exceed 20%. The hormonal contribution to postnatal depression is discussed later in this chapter (please see *1.12 Hormones and postnatal depression*).

Dalton's account is consistent with Pitt's in that she claims that the early morning despondency of typical depression is not a feature of postnatal depression. Rather, women with postnatal depression start the day at their best, but by evening depression and inability to cope have set in. Dalton also identifies exhaustion, both physical and mental, as a particular component of postnatal depression. Dalton's view of postnatal symptoms relating to disturbances of sleep and appetite is, however, at variance with those of Pitt and Cox. Campbell and Cohn (1991) screened 1,027 married, Caucasian primiparae for depression at 6 weeks post-partum over the telephone using a shortened version of the Schedule for Affective Disorders and Schizophrenia (SADS - Endicott and Spitzer, 1978). Ninety-six subjects met Research Diagnostic Criteria (RDC - Spitzer, Endicott and Robins, 1975) for depression (36 for major depression, 30 for probable major depression and 30 for minor depression). As expected, the proportion of depressed women reporting each of eight SADS symptoms was significantly higher than the corresponding proportion of non-depressed women. The differences were, however, less marked for the three somatic symptoms (sleep disturbance, loss of appetite and fatigue). The results can be interpreted in two ways: they are consistent with Pitt and Cox's accounts as disturbances of sleep and appetite are prevalent in non-depressed as well as depressed post-partum women, alternatively, they support Dalton's view as the diminished discrepancy between depressed and non-depressed women on disturbances of sleep and appetite is accounted for by the low frequency of these symptoms among depressed women. Accordingly, the extent to which disturbances of sleep and appetite feature in postnatal depression is not clear.

Cooper, Campbell, Day, Kennerley and Bond (1988) used the Present State Examination (PSE - Wing, Cooper and Sartorius, 1974) to compare new onset cases of psychiatric disorder in the first postnatal year with cases who neither were pregnant nor had given birth in the last 12 months. The PSE is a structured interview yielding an Index of Definition (ID) between 1 and 8, and "caseness" was determined by an ID of 5 or over. The proportion of cases in each group corresponding with each of 16 PSE syndromes was compared. At three and 12 months post-partum, no significant differences emerged between the maternal and non-maternal groups. At six months post-partum, however, a greater proportion of the maternal cases had simple depression (SD) and loss of

interest and concentration (IC), whereas a smaller proportion had generalised and situational anxiety (GA and SA respectively). Cooper *et al* concluded there was "no evidence to support the view that non-psychotic psychiatric disorder occurring after childbirth has any distinctive clinical features" (p805), notwithstanding the differences at six months post-partum. As diagnostic criteria go, the PSE is a relatively stringent example, and may not be sufficiently sensitive to reveal group differences in symptom severity.

In a series of studies between 1984 and 1991, O'Hara and his colleagues used the SADS and the Beck Depression Inventory (BDI - Beck, Ward, Mendelson, Mock and Erbaugh, 1961) to make comparisons of symptoms in post-partum and non-childbearing women. The 21-item Beck Depression Inventory can be partitioned into somatic (Items 1-14) and cognitive-affective (Items 15-21) categories. O'Hara, Neunaber and Zekoski (1984) had 99 women complete the BDI during the second trimester of pregnancy, and again at nine weeks post-partum. The SADS was administered on the same occasions to permit diagnoses according to RDC. The BDI and SADS scores were divided into somatic and cognitive-affective components, with the SADS scores adjusted (downgraded) if the symptom germane could be accounted for by a non-depression factor. The BDI and unadjusted SADS scores showed an overall reduction from pregnancy to the postnatal interview, but this was accounted for by reductions in somatic, rather than cognitive-affective symptoms. The adjusted symptom scores for each category remained stable over the assessment period.

A similar pattern of BDI scores was reported by O'Hara *et al* (1990). Pregnant women were asked to nominate acquaintances resembling themselves in age and socio-economic, marital and work status in order to obtain a group of matched non-childbearing control subjects. The BDI was completed during the second and third trimesters of pregnancy, and at three, six and nine weeks post-partum. Repeated measures analyses, with paired t tests (alpha levels adjusted for number of tests per variable) applied to group differences at each testing occasion revealed that, for overall BDI scores, there were main effects for both group and time, and also a significant interaction. The childbearing group, moreover, reported significantly higher BDI scores throughout pregnancy and at three weeks post-partum. By six weeks post-partum, however, the

group difference was no longer significant. For BDI somatic symptoms, there were also main effects for both group and time, and again a significant interaction. The paired t tests revealed that the childbearing group reported significantly higher BDI somatic scores on all occasions other than the last. For BDI cognitive-affective symptoms, there was a main effect for time, but neither the group main effect nor the interaction was significant.

O'Hara *et al*'s results can be taken to suggest that group differences in symptom scores are actually accounted for by physiological discomfort which is routinely experienced by childbearing women; additionally, there are no differences between childbearing and non-childbearing women on indices of non-somatic symptoms. In O'Hara *et al*'s (1990) study, however, group differences were observed on two different non-somatic symptom measures. The Depression subscale of the SCL-90-R (Derogatis, 1983) has 13 items, only two of which represent somatic symptoms. For this measure, there were significant main effects for group and time, and the interaction was also significant. The paired t tests revealed that the childbearing group had significantly higher depression scores on both testing occasions during pregnancy and also at three weeks post-partum. The second non-somatic symptom measure was a cluster of four cognitive-affective symptoms (loss of interest, guilt, impaired concentration and suicidal ideation) derived from the SADS. Here, only the first (second trimester of pregnancy) and last (nine weeks post-partum) testing occasions applied. This measure showed a main effect for group, but neither the time main effect nor the interaction were significant. The paired t tests revealed that the childbearing group had significantly higher levels of cognitive-affective symptoms on both testing occasions (although this was true only for the nine weeks post-partum occasion when the SADS items were downgraded if, during the interview, it was established that the symptom could be attributed to some factor other than mood disturbance).

Notwithstanding group differences on these latter cognitive-affective symptom measures, there were no significant group differences in rates of depression, according to RDC, on either of the first and last testing occasions. There were, moreover, no within group differences in rates of depression across the two testing occasions.

Recent studies that have reported on whether the symptom profile of postnatal depressions differs from that of other depressions have generally reported negatively, although such studies have used measures that have been too global (e.g., "somatic" versus "cognitive-affective") or excessively stringent (e.g., RDC and the PSE). The view that postnatal depression is "atypical", nevertheless, is out of date according to Kumar (1982):

> In many ways the label [atypical] is an unfortunate one because the [postnatal] depressions are very typical of the sorts of common affective disturbances that are mainly dealt with by general practitioners". (p103)

Similarly, according to O'Hara *et al* (1990):

> Although post-partum depressions were once described as "atypical" depressions because their symptom picture differed from that of classical depressive illness with its endogenous features ... they are now generally regarded as nonpsychotic depressions that can be adequately characterised by standard diagnostic criteria ... Finding that the puerperium is not a high-risk time for nonpsychotic depression would force many researchers, clinicians and advocates to reconsider their views on "what is so special" about post-partum depression. (pp3-4)

Although standard diagnostic criteria (e.g., RDC; DSM-III-R) may constitute satisfactory working tools for diagnosis in clinical settings, "they are insensitive to a wide range of psychological distress" (O'Hara *et al*, 1990, p4) and, like the PSE (cf. Cooper *et al*, *supra*), may not be sufficiently sensitive to reveal differences in symptoms among post-partum women. The range in prevalence rates for postnatal depression must partly be accounted for by variability in diagnostic criteria. This is not worrying, however, for the range is small, from 10% to 15% (*supra*). Whether these rates are comparable to prevalence rates in non-childbearing women is only one consideration in "what is so special" about postnatal depression. Elliott (1990) argued that respective prevalence rates are not a significant consideration at all as they say nothing about the clinical importance of postnatal depression. Firstly, a stable prevalence rate in one sample might

indicate a persistently depressed sub-population, whereas in another sample it might disguise many individuals changing their depressive status regularly. Secondly, postnatal depression may have greater clinical significance because of the mother's perceived failure to function effectively and the possible impact of the mother's symptoms on the development of the infant.

The question whether postnatal depression is typical has also been addressed by further studies which have reported on the proportion of women depressed post-partum who were also depressed during pregnancy. Watson *et al* (1984) assessed the psychiatric status of 128 women during pregnancy and the first postnatal year using the standardised psychiatric interview (SPI - Goldberg, Cooper, Eastwood, Kedward and Shepherd, 1970). Five cases of depression were detected at around 16 weeks pregnancy, and a further seven identified at some later antenatal stage. At six weeks post-partum, 15 women were depressed, five of whom had been depressed before childbirth. Cox *et al* (1982) reported that, in a sample of 100 women, three out of 11 women with high SPI scores (10 or over) at around four months post-partum recorded correspondingly high SPI scores during either early or late pregnancy. For the whole group, the overall reduction in mean SPI score from late pregnancy (5.0) to around four months post-partum (3.9) was accounted for by abatements in anxiety, irritability and sleep disturbance rather than attenuation of depression. Again using the SPI but reporting rather discrepant findings, Kumar and Robson (1984) observed 15 cases of depression at 12 weeks post-partum, but only one of these had been depressed in pregnancy. Twelve new cases of depression were seen in the first trimester of pregnancy most of whom, however, were no longer cases by the second and third antenatal trimesters. The second and third trimesters each saw in three new cases, although five of these had experienced bereavement during pregnancy. Only four of the women who had been cases of depression at any antenatal stage were cases at 12 weeks post-partum.

Kumar and Robson's sample were all primiparae and either married or had common law partners. Three quarters of the sample came from the middle or upper social classes and with only eight women retrospectively assessed as cases of neurotic disorder in the trimester prior to

conception, the sample was also relatively healthy, psychiatrically speaking. Watson *et al* argued that the prevalence of post-partum disorder should have been greater in their own sample as, according to Brown and Harris (1978), working class women are particularly susceptible to depression. The prevalence rate was, nevertheless, greater in Kumar and Robson's sample (14% versus 12%). Watson *et al* proposed that "middle class primiparae are more likely to develop depression in response to the specific stress of birth, which would increase the prevalence in a sample such as Kumar and Robson's" (p460). Of the 15 subjects in Watson *et al*'s study who were depressed post-partum, nine had psychiatric histories, and four of these were depressed during pregnancy. Watson *et al* suggested:

> This continuity between "postnatal" and "other" depressions is apparent in the significant association of postnatal depression with previous psychiatric history ... and psychiatric disorder in early pregnancy ... there is little to distinguish groups of women with affective disorder in the puerperium from groups experiencing it at other times". (p461)

Inconsistent results were also obtained by Hayworth, Little, Bonham Carter, Raptopoulos, Priest and Sandler (1980) and Bridge, Little, Hayworth, Dewhurst and Priest (1985). In the earlier study, three out of seven women with severe depression (scores exceeding 47 on the Self-Rating Depression Scale or SRDS - Zung, 1965) at six weeks post-partum were also depressed at 36 weeks pregnancy (according to a depression scale derived from the Delusions-Symptoms-States Inventory of Bedford, Foulds and Sheffield, 1976). In the later study, SRDS scores were obtained from 109 women ante-partum and at six weeks post-partum. On the latter occasion, nine women were severely depressed (SRDS > 47), only one of whom had been severely depressed during the third antenatal trimester (although six attained SRDS scores corresponding with at mild depression (SRDS > 39). Of 10 women severely depressed during the third trimester of pregnancy, only one was still severely depressed at six weeks post-partum (although a further five were mildly depressed).

Although Dalton (1971) observed an upwards trend of symptoms from late pregnancy to 10 days post-partum, Elliott, Rugg, Watson and Brough (1983

- their sample comprised the same subjects as those of Watson *et al*, 1984) reported a trend in the reverse direction. A battery of tests including the Crown-Crisp Experiential Index (CCEI - Crown and Crisp, 1979), the MACL and a further range of self-report items was completed at 36 weeks pregnancy and three weeks post-partum. The proportions of women reporting increases versus decreases on the various measures were compared. An overall improvement in physical health from late pregnancy to the puerperium was apparent, with a higher proportion of women having decreases than increases in CCEI Somatic score and self-report ratings of being unwell. A significantly greater proportion of women showed decreases on all five MACL factors (depression, tension, vigour, fatigue and anger) than showed increases. The additional self-report data revealed that, on the whole, women were less depressed, fed up, irritable, bored and lonely than before the birth.

Playfair and Gowers (1981) had 64 general practitioners check the presence of 13 symptoms in 618 women attending during the second trimester of pregnancy and at three months post-partum. Irritability, tearfulness, tiredness / inability to cope and tension / overanxiousness were prominent on both occasions. Sleeplessness was particularly characteristic of antenatal symptomatology, whereas the prevalence of guilt increased significantly from the antenatal assessment to the postnatal one. Unfortunately, the antenatal symptom status of women who became depressed post-partum was described only for 17 subjects whose illnesses were of sufficient severity to require psychiatric intervention, and five of these were psychotic.

In O'Hara *et al*'s (1984) study, a personal or family history of diagnosed depression featured in hierarchical regression analyses predicting postnatal diagnostic status, but not in regressions for predicting postnatal symptoms. In a later study (O'Hara, Schlechte, Lewis and Varner, 1991), a personal history of diagnosed depression was associated with both diagnostic and symptomatological status. A diagnosis of depression during pregnancy predicting a postnatal diagnosis, but not postnatal symptoms. Again, the relationship between psychiatric history and postnatal depression were considered to support the notion of continuity:

> ... the significant association between depression before and during pregnancy and post-partum depression suggests the possibility of chronic depression in some women or a continuity of depression between pregnancy and the puerperium. (p69)

The degree of overlap between antenatal and postnatal caseness in the two studies was, however, modest. In the 1984 study, nine diagnoses of minor or major depression (RDC) were made during pregnancy, and twelve during the first nine weeks post-partum. Only two of the post-partum cases had been depressed ante-partum. In the 1991 study, only five out of 19 postnatal cases had been antenatal cases.

In conclusion, the question whether symptoms in postnatal women vary in kind or severity compared with those in non-maternal women has not yet been resolved. To the extent that such differences exist, it may be too early to conclude that postnatal depression is typical of other depressions. Further data relating to the nature of postnatal depression are reported in Chapter 3. Data pertaining to the relationships between postnatal depression and biographic variables are presented in Chapter 8. Further data pertaining to the continuity of postnatal depression are presented in Chapters 7, 8 and 11. The extent to which postnatal depression can be predicted is discussed in Chapter 10.

1.5 Assessment of postnatal depression

In a clinical context, the psychiatrist makes a diagnosis of postnatal depression made on the basis of standard diagnostic criteria such as Research Diagnostic Criteria, DSM-III-R, the Standardised Psychiatric Interview or the Present State Examination. All of these criteria involve establishing whether the severity of symptoms attains some threshold beyond which a patient is deemed a "case". The end result, i.e., "caseness", is an all-or-nothing category. In contrast, depression scales such as the Beck Depression Inventory allow for the assessment of depression along a continuum of severity. A criterion score may be selected for the purposes of categorising subjects, but the scales are ostensibly dimensional.

O'Hara *et al* (1984) argued:

> The use of diagnostic criteria, in addition to measures of depression severity, is necessary to characterize accurately the prevalence of depression during pregnancy and the puerperium. A number of studies have provided prevalence estimates of post-partum depression based on the percentage of women above a cutoff score on a depression severity measure ... this strategy is unacceptable because, even when normal physiological changes are accounted for, the concordance between measures of depression severity and diagnosed depression is moderate at best. (p158)

Self-report measures of depression and diagnostic categories are, indeed, frequently discordant. Depue and Monroe (1978) reported mean BDI scores as high as nine, the recommended cut-off for mild depression, in college students. In the context of maternity, O'Hara *et al* (1984) diagnosed 12 cases of postnatal depression according to the SADS and RDC. The mean concurrent BDI score of these 12 cases was, however, only 6.58. Conversely, Gotlib, Whiffen, Mount, Milne and Cordy (1989) observed that a quarter of a sample of 295 women scored over nine on the BDI at four-to-five weeks post-partum, yet only 20 were identified as cases of depression according to the SADS and RDC. A substantial proportion of women with low BDI scores, moreover, were found to satisfy RDC criteria for depression.

O'Hara *et al*'s (1984) argument, however, relies unduly on the validity of diagnostic systems themselves. Costello (1992) has advanced arguments in favour of "research on symptoms versus research on syndromes". First, the concurrent validity of (level of concordance between) the various diagnostic criteria is low, and this undermines their construct validity. If construct validity is in question, comparisons within and between diagnostic categories are also suspect. Second, when working towards establishing the presence of a syndrome, the measurement of individual symptoms is usually based on a non-systematic response to a short question and is consequently inadequate. Third, there is a risk of misclassification when biological or psychological mechanisms are postulated for symptoms. For example, if a particular mechanism is thought responsible for thought disorder, the researcher may hypothesise

that the mechanism is present in schizophrenics, but not in non-schizophrenics. Not all schizophrenics have thought disorder, however, and thought disorder may be present among members of other diagnostic categories. Fourth, it is difficult to explore whether there are normal counterparts of syndromes such as schizophrenia, but it is feasible to do so with symptoms (e.g., suspicion as the normal counterpart of paranoia). Fifth, it is easier to evaluate animal models of symptoms than animal models of syndromes. Sixth, in the context of genetic research, symptoms are likely to be better phenotypes than syndromes. If a genetic component is established for a diagnostic category, this does not reveal which specific symptoms are genetically determined.

The position thus becomes circular; invoking cut-off scores on a depression scale to define a depressed sample is arguably invalid if that "diagnostic" strategy does not correspond with standard diagnostic systems (O'Hara *et al*, 1984), yet there is poor concordance among the latter (Costello, 1992). O'Hara *et al* (1990) recognised that, although standard diagnostic criteria may constitute satisfactory working tools for diagnosis in clinical settings, "they are insensitive to a wide range of psychological distress" (p4).

Wing (1988), moreover, said:

> My own position is that humans and other animals cannot help themselves categorizing and that this has stood them in good stead. Scientists, however, must be able to move from the categorical to the dimensional mode as it suits their purposes. (p325)

From the researcher's (as distinct from the clinician's) perspective, then, there are good reasons for avoiding reliance on standard diagnostic criteria and employing dimensional approaches to the measurement of symptoms. In addition, it could be argued that cut-off scores on depression scales are no less valid than standard diagnostic criteria for identifying depressed groups.

Which scales might be appropriate for measuring symptoms in post-partum women? Huffman, Lamour, Bryan and Pederson (1990) have shown that the BDI is unsuitable for use with maternal women who may endorse symptoms of depression (e.g., disturbances of sleep, appetite and body weight) which are normal physiological concomitants of childbearing. Huffman *et al* proposed a refinement of the somatic category of BDI symptoms (items 1-14) in which only items 1-9 were deemed somatic, and items 10-14 were named "residual". Moderate internal consistency (alpha) coefficients for the three new clusters and low inter-cluster correlations were obtained. Fifty married middle class women without a psychiatric history completed the BDI at around 30 weeks pregnancy and at 12 weeks post-partum. Forty non-pregnant nulliparae of similar characteristics also completed the BDI on two occasions separated by a 20 week interval. Analyses of variance were carried out with time-of-test as a within subjects factor and group as a between subjects factor. For total BDI scores, both of the main effects and the interaction were significant. *Post hoc* tests showed that the childbearing subjects had higher BDI scores during pregnancy, and these significantly declined across the retest interval so that there was not a significant group difference at 12 weeks post-partum. Residual scores followed the same pattern as total BDI scores. For somatic scores, both of the main effects and the interaction were once again significant but, although scores declined significantly across the retest interval in childbearing subjects, this group had significantly higher scores on both occasions. For the cognitive-affective category, neither of the main effects nor the interaction were significant. Huffman *et al* argued that total BDI scores overrepresent depressive symptomatology in childbearing women and that "the cognitive-affective cluster is the more sensitive indicator of clinically valid depressive symptoms" (p95).

The Edinburgh Postnatal Depression Scale (EPDS - Cox, Holden and Sagovsky, 1987) was developed for the purpose of screening for postnatal depression in the community by professionals such as health visitors. Although there is some doubt regarding the suitability of its items, the EPDS has strong psychometric properties, and demonstrates better concordance with diagnostic status than the BDI.

Derivation of the EPDS began with scrutiny of the State of Anxiety and Depression scale (SAD - Bedford and Foulds, 1978) and the Hospital Anxiety and Depression Scale (HAD - Zigmond and Snaith, 1983) for appropriate items. Those lacking face validity were rejected before a pool of 21 items, including some of the authors' own construction, was submitted to the verdicts of health visitors and mothers. "Thirteen items were eventually selected as being those most likely to detect postnatal depression; seven of these items constructed by ourselves and the other six were adapted from the [IDA] and the HAD" (Cox *et al*, 1987, p783). The 13-item scale, was reduced to 10 items following a factor analysis in which three items were deemed to comprise a "non-depression" factor. The three items were: "I have enjoyed being a mother", "People upset me so that I felt like slamming doors and banging about" and "I have felt I might lose control and hit someone". In view of Dalton's characterisation of postnatal depression as a disorder whose hallmark is irritability (e.g., Dalton, 1989), omission of the latter two items is potentially regrettable. Indeed, Dalton says, "Unfortunately the EPD questionnaire does not focus on [irritability], it is designed for typical depression" (Dalton, personal communication, 3rd March 1994).

The EPDS lacks specific items that refer to fatigue and disturbances of appetite, although these omissions were deliberate as they were deemed normal for the postnatal period and "would not discriminate depressed from non depressed women on a self-report scale" (Murray and Cox, 1990, p100). The final EPDS comprised 10 items in respect of each of which the respondent is asked to underline one of four answers corresponding with how they have felt in the past seven days. Each answer carries a score from zero to three, so that a maximum depression score of 30 is possible.

Notwithstanding its succinctness, the EPDS has impressive psychometric credentials. These include its concordance with diagnostic status, its validity as a state measure and its internal reliability. In the initial validation procedure (Cox *et al*, 1987), 84 women, most of whom considered by their health visitors to be potentially depressed, were interviewed in their own homes at, on average, three months post-partum using the SPI. A threshold EPDS score of 12.5 identified all 21 women that met RDC for definite major depressive illness, and two of three

women that met RDC for probable major depressive illness. Over an 11 week follow-up period, women who were no longer depressed (according to RDC) had significantly lower EPDS scores, whereas those who were still depressed did not. No retest reliability coefficient was reported, although this is understandable as the EPDS was shown to be sensitive to changes in depression over time. The EPDS was found to have satisfactory internal reliability (coefficient alpha of 0.88).

Further validation of the EPDS, especially with regard to its correspondence with diagnostic status, was provided by Murray and Carothers (1990). From a sample of 646 postal submissions of the EPDS completed at six weeks post-partum, 197 respondents were later interviewed using the SPI. Additional information regarding appetite and weight loss was acquired in order to be able to meet RDC for minor and major depression. At a range of EPDS thresholds from 6.5 to 16.5, three EPDS attributes were reported: specificity (the proportion of RDC non-depressed women correctly identified as non-depressed by the EPDS), sensitivity (the proportion of RDC depressed women correctly identified by the EPDS) and positive predictive value (the proportion of women identified as depressed by the EPDS and who were truly depressed according to RDC). The results are presented in Table 1.1 which is reproduced from Murray and Carothers (1990).

THRESHOLD	SPECIFICITY	SENSITIVITY			POSITIVE PREDICTIVE VALUE		
		Minor	Major	Both	Minor	Major	Both
6.5	54.7	96.2	99.5	98.0	9.8	11.9	21.7
7.5	65.1	93.2	99.0	96.3	11.6	14.4	26.1
8.5	74.6	88.4	97.8	93.5	13.9	18.0	31.9
9.5	82.3	81.6	95.8	89.3	16.5	22.7	39.2
10.5	88.3	73.2	92.6	83.6	19.3	28.5	47.7
11.5	92.5	63.5	88.0	76.7	21.7	35.1	56.8
12.5	95.7	52.0	81.1	67.7	23.6	43.0	66.7
13.5	97.5	41.5	73.1	58.5	24.6	50.5	75.1
14.5	98.7	30.7	62.7	47.9	24.4	58.3	82.7
15.5	99.3	22.6	53.0	39.0	23.5	64.3	87.8
16.5	99.7	14.5	40.6	28.6	21.6	70.8	92.4

TABLE 1.1 RANGE OF EPDS THRESHOLDS AND THE CORRESPONDING VALUES OF SPECIFICITY, SENSITIVITY AND POSITIVE PREDICTIVE VALUE (ALL VALUES EXPRESSED AS PERCENTAGES). ESTIMATES OF SENSITIVITY AND POSITIVE PREDICTIVE VALUE ARE GIVEN FOR RDC MINOR DEPRESSION, RDC MAJOR DEPRESSION AND BOTH COMBINED.

The EPDS is not intended as a substitute for clinical assessment by a primary care worker (Cox *et al*, 1987); however, Table 1.1 shows that EPDS scores are a serviceable indicator of diagnostic status, as well as a general indicator of severity of depression. Clearly, as EPDS thresholds increase, the proportion of RDC non-depressed women correctly identified as non-depressed by the EPDS increases, and the proportion of RDC depressed women correctly identified as depressed by the EPDS decreases. Sensitivity and positive predictive value both indicate how well (or badly) the EPDS indicates diagnostic status. There is a trade-off between the two; positive predictive value increases at the expense of sensitivity. Cox *et al* (1987) suggested that "women who scored above a threshold of 12/13 were most likely to be suffering from a depressive illness of varying severity" (p785), however, the sample was modest in size and the selection of the EPDS threshold was not systematic.

The EPDS is versatile; as it contains no specific reference to the puerperium, it can be administered at any time, including during pregnancy. Murray and Cox (1990) interviewed 100 women who completed the EPDS between 28 and 34 weeks pregnancy using the SPI, again with additional items included so as to permit diagnoses for minor and major depression according to RDC. Over a range of thresholds from 11.5 to 14.5, sensitivity to RDC major depression was 100%, with a false-positive rate of only 4% at the upper threshold. Positive predictive values were 33% and 60% at thresholds 12.5 and 14.5 respectively. The EPDS was less sensitive to RDC major and minor depression combined, with a rate of 64% at the 12.5 threshold generating 14 false-positives. At the 14.5 threshold, the false-positive rate was reduced to 8% at the expense of sensitivity which reduced to 57%. Positive predictive values were 50% and 80% at thresholds 12.5 and 14.5 respectively. Thus, sharp gains in positive predictive value were obtained with increases in EPDS threshold from 12.5 to 14.5, with modest loss of sensitivity. According to Murray and Cox:

> In our study all 6 RDC major depressions were detected at the higher cut-off of 14/15 and if screening for major depressive disorder this is the recommended cut-off. Screening for all (major and minor) depression the 12/13 cut-off is recommended even though the sensitivity is only 64%". (p104)

In conclusion, there are sound reasons for conducting research at the level of symptoms rather than syndromes. The BDI has serious shortcomings when scores are interpreted in pregnant or puerperal women. The EPDS was developed specifically for maternal women and has sound psychometric properties. It samples a narrow range of behaviour, however, and may fail to represent important features of postnatal depression. Total scores on miscellaneous depression scales, or scores on clusters within them, may gloss over "atypical" postnatal symptoms. For example, according to Dalton, irritability is the hallmark of postnatal depression, yet irritability is but one member of Huffman *et al*'s "residual" group of BDI items. Similarly, the cognitive-affective cluster of BDI scores, on which no differences between maternal and non-maternal subjects were reported by Huffman *et al*, may contain individual items which would discriminate between the two groups. Overall, psychometric approaches to the question whether postnatal depression is atypical have been too rough and ready.

1.6 Post-partum psychoses

The severity of puerperal psychotic illnesses, and their infrequency relative to the Blues and postnatal depression, make them a discriminable category of post-partum psychiatric disorders. Their severity usually results in the hospitalisation of the mother with her baby. The United Kingdom has an international reputation for the provision of "mother and baby units" set up for this purpose.

Although no definitions are universally accepted, puerperal psychoses begin in the first few weeks following delivery. Estimates of the incidence of psychoses in the first 90 days following childbirth range from 1.1 per 1,000 to 4 per 1,000 deliveries (O'Hara, 1987).

As with postnatal depression, there is controversy over whether puerperal psychoses are distinguishable from psychoses occurring at other times. Brockington, Cernik, Schofield, Downing, Francis and Keelan (1981) compared symptoms in 58 women with a puerperal psychosis with

symptoms in 52 women with a non-puerperal psychosis. The puerperal women showed greater euphoria, activity, incompetence and confusion, whereas the non-puerperal women exhibited greater odd affect, paranoia, delusions, social withdrawal and paranoia (i.e., less florid symptoms more typical of schizophrenia).

Hamilton (1989) identified three separable post-partum psychoses: "puerperal psychosis" (a mercurial syndrome characterised by dramatic lability and changeability of mood, with potential for suicide and infanticide), "major post-partum depression" (a less mercurial syndrome which develops after the twentieth day post-partum but which, nevertheless, is accompanied by a serious risk of suicide and the potential for long-term deterioration) and "post-partum psychotic depression" (a combination of puerperal psychosis and major post-partum depression in which psychotic features of the depression eventually become less apparent, but episodes of hallucinations and delusions continue to recur).

According to Kendell (1985), however:

> Although many earlier writers regarded [puerperal psychoses] as an independent group of psychoses with their own distinct symptomatology, aetiology and prognosis, they are now generally regarded as schizophrenic or affective psychoses, and young women with a history of manic depressive disorder are at particularly high risk of becoming psychotic in the puerperium. However puerperal psychoses are conceptualised it is clear that childbirth, or something associated with it, is a potent aetiological influence, for the incidence of psychotic illness rises suddenly to ten or twenty times its previous level in the first three months after delivery. (p4)

Thus there is controversy over whether puerperal psychoses are typical of psychoses occurring at other times. Although there is a similar backdrop with respect to postnatal depression, puerperal psychoses are at least 100 times less frequent than depression following childbirth.

Whalley, Roberts, Wentzel and Wright (1982) showed that the risks of both puerperal and non-puerperal affective disorders were the same in first degree relatives of matched groups of women with puerperal and non-puerperal affective psychoses. Accordingly, a genetic contribution to both puerperal and non-puerperal affective disorders is possible. A psychiatric history has also been implicated in puerperal psychosis; the risk of puerperal psychosis is increased to around 1 in 5 in women with a previous episode of affective illness (Bratfos and Haug, 1966; Reich and Winokur, 1970), and to around 1 in 7 in women with a previous episode of puerperal psychosis (Protheroe, 1969).

Kendell (1985) concluded:

> ... all that can be said with certainty about the aetiology of puerperal psychoses is that constitutional predisposition plays a major role, and that this predisposition has much in common with, and perhaps is identical to, the genetically transmitted predisposition to affective psychoses. (p6)

Because puerperal psychoses are so infrequent, studies that aim to identify their nature using a psychometric approach must rely on sample sizes that are prohibitively difficult to garner. In addition, the psychosocial contribution to their aetiology is equally difficult to establish, partly because of their infrequency but also because of the likely biogenetic component. Accordingly, the investigation of puerperal psychoses will not be attempted in the present studies.

1.7 Normal pregnancy, labour and puerperium

The average duration of human gestation is 280 days (i.e., 40 weeks, or nine calendar months plus a week) counting from the first day of the last menstrual period. This convention is preferred to the trickier alternative of establishing the actual date of conception, from which the average gestation period is 265 days (i.e., 38 weeks).

Pregnancy is accompanied by several physiological changes in the mother. In particular, endocrine changes are associated with the placenta and the thyroid, pituitary and adrenal glands (Sweet, 1988).

The placenta is a pregnancy-specific endocrine gland which has the additional function of nourishing and maintaining the foetus via the umbilical cord. Secretion of chorionic gonadotrophin by the placenta stimulates growth of the corpus luteum which, in turn, secretes oestrogen and progesterone for the first three months of pregnancy. Following this, the placenta secretes oestrogens (chiefly oestrone, oestradiol and oestriol in conjunction with the foetus) and progesterone. During pregnancy, oestrogens suppress ovulation and promote the growth of uterine muscle and lining. Progesterone is responsible for the relaxation of plain muscle, thus preventing premature onset of labour. The ureters and bowel also comprise plain muscle, however, and this can predispose pregnant women to urinary infections and constipation. Relaxation of venous plain muscle can result in varicose veins, particularly in the legs, rectum and vulva. Relaxation of the cardiac sphincter can cause or exacerbate heartburn. Levels of both oestrogen and progesterone fall massively and rapidly following labour during which the placenta is expelled.

The thyroid gland is situated in the neck immediately below the larynx, and comprises two lateral lobes connected by a band of tissue, the thyroid isthmus. The thyroid normally secretes tri-iodothyronine and thyroxine which are essential for normal physical growth. In pregnancy, an increase in plasma binding proteins causes a reduction in free thyroxine. Through negative feedback, thyroid stimulating hormone (TSH) is secreted by the anterior pituitary gland, and enlargement of the thyroid gland ensues. The release of TSH is dependent on thyroid releasing hormone (TRH) from the hypothalamus, and TRH can be influenced by emotional factors. The pituitary gland, situated at the base of the brain and connected to the hypothalamus, also enlarges in pregnancy. There is an increase in adrenocorticotrophic hormone (ACTH) from the anterior pituitary which is accompanied by an increase in the size and activity of the adrenal glands. The adrenal cortex secretes three categories of steroids: mineralocorticoids (which regulate sodium and fluid equilibrium), glucocorticoids (which regulate the metabolism of

carbohydrates, proteins and fats) including cortisol (or hydrocortisone) and the sex steroids (androgens, oestrogen and progesterone).

There is also a series of cardiovascular changes which accompany pregnancy. By late pregnancy, blood volume has increased by 30-40%. There is, however, a proportionately higher increase in plasma than in blood cells. This "physiological" anaemia is normal, although true anaemia is common in pregnancy. Haemodilution also results in a decline in the density of plasma protein, and the associated fall in osmotic pressure can predispose pregnant women to oedema (excessive fluid in body tissues). Carpal tunnel syndrome, in which the median nerve is compressed at the wrist, is associated with oedema, and causes numbness or tingling in the hands and fingers.

Additional strain is placed on the heart because of the increased blood volume, and also because of weight gain. Cardiac output increases by up to 30%, and there is an associated increase in blood pressure. This is, however, offset by the reduced viscosity of the blood and vasodilation caused by the effects of progesterone on plain muscle. Blood pressure in mid-pregnancy tends to decrease because of these latter factors, but increases again across parturition.

Musculoskeletal changes also accompany pregnancy. Placental hormones tend to soften the ligaments and joints and, whilst this may facilitate the passage of the foetus through the pelvic cavity, it can contribute to backache. In addition, a pregnant woman may adopt an over-erect posture to compensate for the increasing weight of the foetus, and this may also contribute to backache.

Normal labour begins spontaneously between the 38th and 42nd week of pregnancy, and concludes with the birth of a live healthy infant and expulsion of the placenta and membranes, all without complications. Labour is conventionally divided into three stages. The first stage begins with the onset of regular uterine contractions and ends with full dilatation of the cervix. The second stage ends with delivery of the baby, and the third with expulsion of the placenta and membranes.

All of the circumstances which trigger labour are not fully understood; however, a combination of maternal and foetal hormones are thought to be responsible. Towards the end of pregnancy, cortisol in foetal circulation rises. This (or possibly androgen which is also secreted by the foetal adrenal glands) stimulates an increase in oestrogen production by the placenta. The resulting increase in the oestrogen-progesterone ratio possibly diminishes the relaxing effect of progesterone on uterine smooth muscle. It may also lead to the release of prostaglandins, naturally occurring fatty acids found in all tissues, which promote the contraction of uterine smooth muscle.

The first stage of labour normally lasts 12-14 hours in primigravidae and 6-10 hours in multigravidae. The second stage lasts around an hour in primigravidae and half an hour in multigravidae. The probability of intervention with forceps or vacuum extractor (Ventouse) increases the more these averages are superseded. For all deliveries, the third stage should be achieved within half an hour, although this can be substantially reduced with intervention. The placenta usually separates from the uterus within a few minutes of the baby's birth. Uterine contractions force the placenta down to the lower segment of the uterus and thence to the vagina. Blood loss is controlled by contraction of uterine muscle fibres which interlace with blood vessels, and by blood clotting at the placental site. Oxytocic drugs, which stimulate contraction of the uterus, are frequently administered. The risks of post-partum haemorrhage, retained placenta and infection remain, however, in the event that any of these processes are ineffective.

Lacerations of the pelvic floor during labour are common and conventionally divided into three categories. A first degree laceration involves the skin of the fourchette only. A second degree laceration involves the fourchette and perineum. Episiotomy, a surgical incision through the perineum made shortly before delivery in order to enlarge the vaginal orifice, is included within this category. The rate of episiotomy is currently between 50% and 90% of all deliveries. Episiotomies were thought to result in less discomfort and heal more quickly than spontaneous perineal tears, but these suppositions are becoming less widely accepted. A third degree tear involves the fourchette, perineum and anal sphincter.

During labour, the normal range of foetal heart rate is 120-160 beats per minute. In the event of hypoxia, tachycardia usually ensues, followed by bradycardia if hypoxia is prolonged. Foetal distress is indicated by bradycardia at the end of, or just after, a contraction (bradycardia during a contraction is likely to be caused by compression of the foetus's head or the umbilical cord). Foetal distress is also indicated by meconium-stained liquor.

Sweet (1988) discussed perineal lacerations, episiotomy and signs of foetal distress in the context of normal labour. Complications of pregnancy, labour and the puerperium are discussed later in this chapter (please see *1.9 Complications of pregnancy, 1.10 Complications of labour and 1.11 Complications of the puerperium*).

1.8 Analgesia in labour

Several techniques are employed for the relief of pain in labour. Antenatal classes invariably encourage the practice of relaxation in preparation for and during childbirth. In addition, four analgesics are frequently used in labour: transcutaneous electrical nerve stimulation (T.E.N.S.), Entonox ("gas and air"), pethidine and epidurally-administered anaesthetic, usually bupivacaine.

T.E.N.S. is a non-invasive analgesic technique in which pulses of electrical current are passed through the skin via a series of electrodes positioned parallel to and either side of the spine. The technique is based on the gate control theory of pain (Melzack and Wall, 1965) which postulates a neural mechanism located along the spinal cord governing the amount of neural information transmitted to the brain. Activity in large afferent nerve fibres tends to inhibit such information (i.e., close the gate) and it is stimulation of these that is achieved using T.E.N.S..

The Entonox apparatus comprises a cylinder containing 50% nitrous oxide (the active component) and 50% oxygen, a "demand" valve and a face-mask or mouthpiece. Entonox is inhaled at the user's discretion, reaches maximum effect after some 40 seconds and wears off very quickly. It is thus used most effectively by beginning inhalation as soon as the onset of a contraction is anticipated. Entonox mitigates rather than eradicates discomfort.

Pethidine is a powerful synthetic narcotic which also has sedative and antispasmodic properties. Because it can traverse the placenta and suppress foetal respiration, it is best avoided shortly before delivery. Pethidine may be given intramuscularly or intravenously; in the latter case, self-administration is possible and less pethidine may be required for the same analgesic effect.

The epidural space surrounds the dura mater of the spinal cord. Local anaesthetic (e.g., bupivacaine) is introduced either as a single dose or via a catheter in which case continuous administration is possible. Epidural anaesthesia usually gives complete relief from pain, although only partial relief occurs in 12-17% of cases. Approximately 3% of epidurals are ineffective, in which case the epidural may have been introduced too late in labour.

A variety of alternative or supplementary analgesic measures include acupuncture, hypnosis, reflexology, paracervical and pudendal nerve blocks (e.g., local administration of lignocaine), tranquillisers (which tend to potentiate other analgesics and are also anti-emetic), Meptid (containing the narcotic Meptazinol which causes less respiratory depression than pethidine but has side-effects of nausea and vomiting) and diamorphine (a morphine derivative similar to heroin).

Many women manage labour without the use of any analgesics at all, especially when labour is not prolonged. In some cases a single analgesic is used, but it is common for several analgesics to be used in combination.

1.9 Complications of pregnancy

Complications of pregnancy include vomiting, bleeding, hypertensive diseases, anaemia, diabetes and epilepsy (Sweet, 1988).

Mild vomiting is common in the first trimester of pregnancy, and is known colloquially as "morning sickness". Some women, however, experience nausea without vomiting and some experience nausea or sickness later in the day. Nausea and sickness may continue beyond the first trimester of pregnancy. Severe vomiting may be accompanied by dehydration and ketosis. Hyperemesis gravidarum is a serious condition in which there is continuous vomiting, ketonuria and proteinuria. Left untreated, pyrexia, jaundice, polyneuritis and encephalopathy may ensue. Hyperemesis gravidarum is usually, however, prevented or treated effectively following detection of ketonuria.

Bleeding from the genital tract before the 28th week of pregnancy may be the consequence of abortion, the most common cause of which is a defective conceptus. Other reasons for bleeding include ectopic gestation (in which the ovum implants in some place other than the uterine cavity) and hydatidiform mole (in which placental tissue develops abnormally because of degeneration of the chorionic villi). Bleeding may also occur because of cervical erosion, cervical polyp and carcinoma of the cervix.

Antenatal haemorrhage is defined as bleeding from the genital tract after the 28th week of pregnancy (from which point the foetus is deemed viable). It is usually caused by separation of the placenta which is either abnormally situated (placenta praevia) or normally situated (abruptio placentae). Placenta praevia is more common in multigravidae than in primigravidae. There are four types of antenatal haemorrhage, each determined by the degree to which the placenta encroaches upon the lower segment of the uterus and, ultimately, obscures the internal os.

Pregnancy-induced hypertension occurs in approximately 10% of pregnancies, and falls into three categories: gestational hypertension (without proteinuria - more common in multigravidae and increasing with age), pre-eclampsia (with proteinuria - occurs mainly in primigravidae) and eclampsia (a serious condition proceeding from untreated pre-eclampsia and characterised by epileptiform fits).

Pre-eclampsia may be superimposed on chronic hypertension (existing prior to and persisting after pregnancy). Oedema is usually present in pre-eclampsia, although it is not considered abnormal unless accompanied by proteinuria. Proteinuria is a late sign of pre-eclampsia and is always serious as it signals that the kidneys are sufficiently damaged to allow escape of plasma proteins into the urine. Pre-eclampsia is accompanied by arteriolar vasoconstriction and disseminated intra-vascular coagulation. These can lead to abruptrio placentae and, in severe pre-eclampsia and eclampsia, cerebral haemorrhage and cardiac, renal and hepatic failure. The precise causes of pre-eclampsia are not understood, and its only known cure is the conclusion of pregnancy by Caesarean section.

Anaemia is a deficiency in the quantity or quality of red blood cells which diminishes the oxygen-carrying capacity of the blood. Anaemia is common in pregnancy and is exacerbated by haemodilution and increased demands on the mother's reserves of iron. Anaemia depletes the woman's ability to fight infection and can lead to digestive problems, thromboembolic disorders and intrauterine hypoxia. Anaemia is usually responsive to iron supplements which can be administered orally, intramuscularly or intravenously.

Diabetes mellitus is a hereditary disorder in which insufficient insulin, which is used for the consumption and storage of glucose, is produced by the pancreas. Failure to "burn up" or store glucose results in raised blood glucose, some of which is excreted in urine. Because body tissues are unable to use glucose, fat is used instead with the result that ketones collect in the blood and appear with glucose in the urine. Ketosis may exacerbate extant nausea or vomiting. Glucose tolerance is tested diagnostically by administering glucose orally and

monitoring blood glucose following a two hour interval. When impaired glucose tolerance is only revealed in pregnancy, the condition is known as gestational diabetes. Known diabetics require increasing amounts of insulin as pregnancy advances. Hyperglycaemia disposes to infections of the urinary tract and vagina (Candida albicans thrives in a glucose environment). Pre-eclampsia is more common in pregnant women with diabetes.

Doses of sedatives or anti-convulsants for epilepsy often need to be adjusted following pregnancy as the frequency of fits may increase or decrease. Women taking anti-convulsants may suffer from a folic acid deficiency; folic acid is given prophylactically against megaloblastic anaemia. Although anticonvulsant drugs are associated with congenital abnormalities, particularly of the lip, palate and heart, repeated fits are likely to result in intrauterine hypoxia.

Data pertaining to the relationships between complications of pregnancy and biographic variables are presented in Chapter 8.

1.10 Complications of labour

Complications of labour include preterm labour, induction of labour, multiple labour, prolonged and precipitate labours, occipito-posterior positions of the foetal head, malpresentations of the foetus, cephalopelvic disproportion, presentation and prolapse of the umbilical cord, the use of operative procedures to assist delivery, prolonged third stage of labour and post-partum haemorrhage (Sweet, 1988).

Labour is preterm when it occurs before completion of the thirty-seventh week of pregnancy. The term "premature", which was previously applied to babies weighing less than 2500g regardless of duration of pregnancy, is no longer used and the term "low birth weight" is now applied to newborns weighing less than 2500g. Thus a baby may be preterm, of low birth weight or both. The underdeveloped foetus is particularly at risk

because of lack of subcutaneous fat and surfactants which allow the passage of oxygen into the lungs.

The cause of preterm labour is frequently not known, although cervical incompetence, foetal and uterine abnormalities, multiple pregnancy and pregnancy-induced hypertension are sometimes implicated. In addition, teenage and older mothers deliver more preterm infants.

Early induction of pregnancy may be effected for a number of reasons including antenatal haemorrhage, diabetes mellitus, essential hypertension, renal disease, placental insufficiency and premature rupture of the membranes. Hypertensive disorders of pregnancy have an unfavourable influence on placental functioning, and induction may facilitate delivery of breech presentations and large babies.

The most common reason for induction, however, is prolonged pregnancy, meaning one that extends beyond 42 weeks. A decline in placental efficiency and a fall in the volume of amniotic fluid are pertinent concerns, both of which are associated with increased perinatal morbidity and mortality. Induction is achieved surgically (by amniotomy or artificial rupture of the membranes) or medically (using oxytocic drugs which cause the uterus to contract).

In Caucasians, the incidence of twins is around 1 in 80 births; in Negroes it is around 1 in 50 and in Asians around 1 in 150. Triplets and other higher order multiple births are much rarer, although their incidences are rising because of increasing use of fertility treatment. Twins are dizygotic or monozygotic. In the former case, two separate ova are fertilised and each embryo has its own placenta. In the latter case, a fertilised ovum starts to develop, but after a few days the blastocyst divides into identical halves from each of which a separate foetus develops. Monozygotic twins usually share the placenta. Occasionally one twin apparently develops at the expense of the other which may die.

The first stage of labour was once considered prolonged after 24 hours, although with active management of labour (amniotomy and administration of oxytocic drugs) few are now expected to exceed 12 hours. Prolonged labour can lead to maternal distress and exhaustion, and also carries the risk of intrauterine hypoxia and perinatal death. Failure to accelerate labour is likely to conclude with an operative delivery. Prolonged labours are less common in multiparae as the first labour alters the birth canal facilitating subsequent deliveries. Prolonged labour in a multiparae is likely to be attributable to obstruction.

The second stage of labour is deemed prolonged if it exceeds one hour in primigravidae or half an hour in multigravidae. Causes of delay include inefficient uterine action or inadequate maternal effort which may be attributed to loss of the "bearing down" reflex in the case of epidural anaesthesia. Malpresentations of the foetus may also retard delivery.

Labour occasionally progresses extremely rapidly (precipitate labour), particularly in multiparae. Excessively strong and rapid uterine contractions may cause foetal hypoxia and intracranial injury. Lacerations may, moreover, be inflicted on the mother who is also at risk of post-partum haemorrhage.

In around one in 10 labours, there is a bregmatic presentation in which the anterior fontanelle of the foetal head covers the internal os. This is associated with an occipitoposterior position of the foetal head with respect to the mother's pelvis, and may be right (ROP) or left (LOP) depending on which posterior pelvic quadrant accommodates the foetus's occiput. In delivery, wide diameters of the head are presented and there is an increased risk of intracranial injury and perineal lacerations of the mother. Most occipitoposterior presentations, however, conclude without serious consequences.

A malpresentation of the foetus is defined as one in which some part other than the vertex is presented, i.e., the presentation is breech (buttocks) or of the face, brow or shoulder.

Breech presentation occurs in 3% of deliveries, of which around a quarter are preterm (a foetus is often in the breech position during pregnancy, but usually turns spontaneously to present its vertex by delivery). Some breech presentations are attributable to twin delivery or uterine and foetal abnormality, but many are unexplained. Breech presentations are more perilous for the foetus than for the mother, with anoxia a particular hazard. There is also risk of intracranial haemorrhage and damage to internal organs.

Face presentation occurs in around one in 500 deliveries. When face presentation occurs before the onset of labour (primary), the foetus is often malformed. When it occurs during labour (secondary), there is often no clear cause. Face presentations confer varying degrees of difficulty, and operative procedures are appropriate in some cases.

Brow presentation occurs in around one in 2,000 deliveries. The presenting diameter of the foetal head is large, and obstructed labour the likely consequence. A Caesarean delivery is usually conducted.

Shoulder presentation is commonly the result of laxity of uterine and abdominal muscles which allows the foetus to lie transversely instead of longitudinally. Shoulder presentation is associated with high parity, placenta praevia and multiple pregnancy. Uncorrected, a transverse lie will result in obstructed labour. A transverse lie can be corrected by external manipulation in order for a normal labour to proceed.

Cephalopelvic disproportion occurs when the foetal head is large relative to the size of the obstetric conjugate at the brim of the mother's pelvis. A Caesarean section is necessary unless the disproportion is slight in which case the mother may be admitted to hospital for trial of labour. In trial of labour, healthy women who have had an uncomplicated pregnancy are continuously monitored in order to maintain effective contractions of the uterus which, it is hoped, will flex and mould the foetal head sufficiently for vaginal delivery. In the event of failure of the foetal head to engage, or foetal distress, a Caesarean section is performed.

A loop of the umbilical cord may emerge with the membranes still intact in which case it is said to be presented; it becomes prolapsed when the membranes rupture. Prolapse of the cord is particularly likely to occur when there is malpresentation of the foetus, although it is also associated with multiparity and twin births.

Operative procedures used to assist delivery include forceps, Ventouse extraction and Caesarean section.

Forceps or Ventouse extraction are used to aid delivery when there is delay in the second stage of labour (often caused by poor uterine contractions or an obstructed labour). Forceps or Ventouse may also be used in the case of foetal or maternal distress, when it is desirable to avoid excessive muscular exertion in the mother (e.g., in the case of pre-eclampsia, hypertension or heart disease) or when it is necessary to protect the foetal head. Pudendal, epidural or general anaesthesia is used and an episiotomy is usually performed.

In Caesarean section, the foetus is delivered through an incision made in the abdominal and uterine walls. A transverse incision of the lower uterine segment with epidural anaesthesia is now preferred to longitudinal incision of the upper uterine segment with general anaesthetic. Caesarean sections are on the increase, occurring in approximately 11% of all deliveries. Caesarean section is carried out whenever the safety of the mother or the foetus is in jeopardy. Caesarean section frequently follows hindrance to the normal progression of labour, although it is sometimes planned in advance of labour (elective). Emergency Caesarean is particularly hazardous to the mother, as she is at greater risk of haemorrhage, infection and pulmonary embolism. Women who have delivered by Caesarean section frequently express dissatisfaction with the birth, sense failure at not having given birth normally and are disappointed at not having been able to bond with their baby immediately.

The third stage of labour, during which the placenta and membranes are delivered, is usually accomplished within 30 minutes. A retained

placenta, however; will be accompanied by bleeding from the placental site unless the placenta is completely adherent to the uterine wall. Retained placenta is usually caused by an atonic uterus (uterine inertia) although it can also be attributable to an abnormal uterus, placenta accreta or a full bladder during the third stage of labour. The risk of haemorrhage and infection is minimised by ensuring that no fragments of the placenta remain in the uterus.

Post-partum haemorrhage (PPH) is defined as excessive bleeding from the genital tract occurring at any time from the birth of the child to the end of the puerperium. If it occurs in the first 24 hours it is known as primary and, if later, as secondary or puerperal haemorrhage. The source of blood loss is usually either the placental site or, less frequently, a laceration of some part of the genital tract. Primary PPH from the placental site is caused by failure of the uterus to contract and retract quickly, and is potentially dangerous as blood loss can be rapid. PPH from the placental site occurs more often in women who have previously had a PPH or retained placenta, in multiparae, in multiple pregnancy, in women who have had antenatal haemorrhage and women who have had prolonged labours. It can also occur as a complication of an otherwise normal labour.

Data pertaining to the relationships between complications of labour and biographic variables are presented in Chapter 8. The extent to which complications of labour can be predicted is discussed in Chapter 9.

1.11 Complications of the puerperium

Two principal complications of the puerperium are infection and thrombosis. The unhealed placental site, together with lacerations in the genital tract and perineum, comprise areas of vulnerability to infection from bacteria which ordinarily exist in the vagina but do not normally have access to body tissues. Infection may also arise from bacteria such as beta-haemolytic streptococci originating in other sources. Infection of the genital tract (puerperal sepsis) was once a

major cause of maternal mortality whereas, nowadays, it is infection of the urinary tract that presents a major peril to the mother's health. Urinary tract infection is common in the puerperium because of the tendency of antenatal pyelonephritis to recur and also because of the mother's insensitivity to bladder distension which leads to retention of stagnant urine. Breast infections are usually caused by staphylococcus aureus which is readily transmitted from the sucking infant's nose to the breast via a cracked nipple. Untreated mastitis may lead to an abscess. A general susceptibility to infection following labour leaves many women with influenza, bronchitis and gastro-enteritis.

The tendency of pregnant women to develop varicose veins, and the increased tendency of the blood to coagulate in the puerperium, disposes post-partum women to thrombophlebitis in which a blood clot becomes securely anchored to the lining of a superficial vein. Less commonly, a clot forms in a deep vein of the leg or pelvis (phlebothrombosis) when there is a greater risk of detached fragments causing a potentially fatal pulmonary embolism. Phlebothrombosis is more likely to occur in older women, overweight women and multiparae.

Data pertaining to the relationships between complications of the puerperium and biographic variables are presented in Chapter 8. The extent to which complications of the puerperium can be predicted is discussed in Chapter 9.

1.12 Hormones and postnatal depression

Hormones are the secretions of endocrine (ductless) glands. They are transported in the blood, and have specific effects on target organs and tissues. Growth, maturation, metabolic processes and reproduction are dependent on the endocrine system. The mechanisms by which hormones interact with cells are not fully understood. The production of hormones is governed by need, i.e., their production is increased or inhibited when homeostatic systems are in disequilibrium.

During the normal menstrual cycle, gonadotrophin releasing hormone (GnRH) is released from the hypothalamus. As a consequence, follicle stimulating hormone (FSH) and luteinizing hormone (LH) are released from the anterior pituitary gland. FSH acts on the ovary to promote development of a follicle containing an egg cell, and also stimulates the secretion of oestrogen by the ovary. The action of oestrogen on the uterus is to rebuild its inner lining (which disintegrates and is shed at menstruation if conception does not occur). LH causes the follicle to rupture and release the egg cell, and is also responsible for the formation of the corpus luteum in the ruptured follicle. The corpus luteum releases progesterone which thickens the lining of the uterus in readiness for the reception of a fertilised egg. This rise in progesterone has the effect of suppressing further release of LH. If conception does not occur, the levels of FSH, LH, oestrogen and progesterone all decline towards menstruation.

In the event of conception, however, levels of LH, oestrogen and progesterone continue to rise throughout pregnancy (the placenta takes over the production of oestrogen and progesterone from the corpus luteum at around three months pregnancy). An additional hormone, prolactin (which prepares the breasts for lactation), also rises steadily throughout pregnancy. The output of corticosteroids from the mother's adrenal glands increases by around 100%. Very shortly after delivery, hormone levels diminish sharply, especially those of oestrogen and progesterone which fall to minute levels. Progesterone disappears in the puerperium while oestrogen levels remain low. Prolactin levels are maintained as long as the mother continues to breast-feed. Menstruation returns once prolactin levels fall at the cessation of breast-feeding.

Dalton's argument (e.g., 1989) is that hormonal upheavals are causally related to postnatal depression. The premenstrual interval, like the puerperium, is accompanied by a rapid decline in progesterone level. Although the existence of a premenstrual syndrome is a controversial matter, the premenstrual interval is widely considered to be accompanied by adverse mood changes. Indeed, Dalton argues that postnatal depression and premenstrual syndrome are extremely similar having in common "exhaustion, depression, irritability, headaches and occasional psychosis" (Dalton, 1989, p123). A positive relationship between

dysmenorrhea and postnatal depression was reported by Jacobson, Kaij and Nilsson (1965), Pitt (1968) and Playfair and Gowers (1981), although Nilsson and Almgren (1970) found no such relationship.

Dalton (1971) observed that women depressed at 10 days post-partum had been relatively free from symptoms during late pregnancy, rather, they had been somewhat elated. She surmised that these women had been especially well endowed with progesterone during pregnancy, and that the post-partum decline of progesterone in these women would consequently have been the sharpest. Corroboration was provided by Nott, Franklin, Armitage and Gelder (1976) who took hormonal assays from 27 subjects on 19 occasions across parturition. The only clear relationship between hormones and mood was a positive association between fall in progesterone across delivery and depression in the first 10 days after childbirth. Dalton claims to have treated women prophylactically with progesterone successfully (Dalton, 1985); the recurrence rate of postnatal depression in 94 women who were administered progesterone on a daily basis following delivery was only 10%, whereas it was 68% in a sample of 221 non-treated women.

Dalton's views are not, however, widely accepted. All women experience sharp falls in progesterone following delivery, yet only around 1 in 7 women suffer from postnatal depression (please see *1.4 Postnatal depression*). The onset of postnatal depression, moreover, happens at any time up to six months post-partum (Dalton, 1989, p85), by which time progesterone and oestrogen levels have been restored. Endocrinology and its relationship with mood is complex and far from fully understood. As Kendell (1985) commented on miscellaneous studies on this topic:

> It is difficult to make sense of these various findings and there is, of course, no reason why the hormonal and haemodynamic changes associated with parturition need be any different in women who do and do not develop psychiatric symptoms. They might be different, but they might equally well be identical, with the women who develop psychiatric symptoms simply possessing a vulnerability that others lack. (p9)

1.13 Sociocultural considerations

Stern and Kruckman (1983), Harkness (1987) and Cox (1989) have commented on the absence of rituals associated with childbirth in the developed world. Stern and Kruckman hypothesised a relationship between a lack of social structure in the post-partum period and post-partum depression. Although Cox agreed that this hypothesis may be relevant, he argued that it is not if it excludes psychological and medical considerations.

According to Stern and Kruckman, there are six common elements in the social structuring of the post-partum period: (i) the post-partum period is chronologically distinct, culturally recognised and the mother's usual responsibilities are suspended, (ii) the mother is regarded as vulnerable and is protected, (iii) the mother is socially secluded, (iv) the mother is obliged to rest, (v) the mother is assisted in tasks, mainly by other women and (vi) the new social status of the mother is recognised by rituals including donation of gifts.

The exact nature of the rituals may not be crucial. Rather, their mere existence carves out an identity for the new mother, and provides a scaffold for her emotional integrity. Rituals vary from culture to culture, and the following are given only by way of examples. In Guatemala, the mother is confined for eight days during which time she is considered dangerously weak ("muy delicada") and the midwife burns a candle for the protection of the mother and baby. A seclusion period of eight days is also instituted by the Philippine Eastern Subanum; during "tandeg" the mother is confined, forced to rest and subjected to a regime of special diet, heat treatment and elaborate medication. There is a period of ritual seclusion among Jamaican women which is observed strictly for the first nine days and less so for a further 40 days, during which the new mother is tended by her own mother, there are dietary taboos and special garments are worn. A chronologically defined confinement period is also observed in many other places including the Yucatan, the Punjab, Nigeria, Spain, the Caribbean and Latin America (Stern and Kruckman, 1983).

Stern and Kruckman proposed:

> that a relationship exists between the strategies typically employed cross-culturally in the post-partum period, which serve to mobilize social support to the new mother, and post-partum mental health. Our hypothesis is that the negative outcomes of depression and baby blues ... result from the relative *lack* of: (1) social structuring of post-partum events; (2) social recognition of a role transition for the new mother; and (3) instrumental assistance to the new mother. (p1036)

Both Stern and Kruckman and Harkness (1987) claimed that, according to the Kipsigis of Kenya, post-partum depression does not exist in their community. Similar claims were made for the Chinese, the Ibibio of Nigeria and the Nepalese. Establishing whether there are actually lower ethnic rates of depression post-partum is difficult for several reasons. First, prevalence rates are utterly confounded with the criteria used for diagnosis. The degree of seriousness of disorder at which medical help is sought is broadly similar in the U.S.A. and Western Europe, but standard diagnostic criteria such as DSM-III-R are not applied, nor are as readily applicable, in many of the ethnic groups germane. Secondly, the enthusiasm with which anthropologists pursue cultural differences may obscure ethnic similarities. Finally, it is possible that the views expressed by the spokesmen of some ethnic communities do not always represent those of their childbearing women.

Cox (1989), notwithstanding long personal experience of psychiatric work in Africa, was not willing to adopt a view of postnatal depression as a culture-bound phenomenon. With regard to Stern and Kruckman's hypothesis, Cox said:

> This hypothesis about the lack of postnatal ritual being an important cause of postnatal depression that has been put forward by anthropologists are in this author's opinion highly relevant; if tested and upheld they would re-energise the commitment of health professionals to assist in the restructuring and the co-ordination of the weeks that follow childbirth. They also gain greater credence because research into biological factors that may

cause postnatal depression has led as yet to no major breakthrough. Nevertheless when these sociocultural explanations of postnatal depression are over-stated to the exclusion of intrapsychic and biological considerations then they lack credibility. It is naive, as well as inaccurate, to conclude that postnatal depression is not found in a non-Western society which has more complete postnatal rituals. (pp78-79)

In a comparison study of Ugandan and Scottish women, Cox (1986) found that 10% of 178 Ugandan women were found to have a depressive illness in the puerperium, compared with 13% of 89 Scottish women. There were, however, differences in the symptoms reported by the two groups. The Scottish women were more concerned with living up to their own expectations of being a good mother, whereas the Ugandan women were much less likely to report that they felt personally responsible for their babies, and less likely to report guilt or self-blame. Thus, whilst it cannot be said with confidence that postnatal depression is a culture-bound phenomenon specific to the developed world, its symptoms may vary in emphasis from one culture to another.

1.14 Stress and aetiology

Stress is a fuzzy word. It is as frequently used to refer to external or environmental demands as it is to their emotional and physiological consequences. In the context of maternity, the demands on a woman may comprise: background stress, i.e., the variety of stress that is measured by life event scales, childbirth itself and obstetric difficulties associated with pregnancy and labour. A woman may also refer to mental distress or anxiety as stress.

Life event scales have frequently been employed to provide an index of recent upheaval, but this approach is beset with both theoretical and methodological difficulties. Is there a causal relationship between life events and health? If so, are there other variables that moderate this relationship? Who is vulnerable?

Germinal efforts to assess environmental stress sprang from a clinical context in which a degree of life change was thought to precede the onset of various illnesses (Hawkins, Davies and Holmes, 1957; Rahe, Meyer, Smith, Kjaer and Holmes, 1964). The Schedule of Recent Experience (SRE) emerged from this early work; it comprised a list of 43 events (e.g., bereavement or change in living conditions), each of which was checked by a respondent if it had happened in their lives in the recent past. A simple count of events yielded an index of recent life change.

Holmes and Rahe (1967) sought to engender greater precision in the SRE by affording to each event a weighting corresponding with the degree of adjustment associated with it. A panel of raters was invited to assign values to each SRE event (with reference to marriage which was assigned the arbitrary value of 500) according to "the intensity and length of time necessary to accommodate a life event, regardless of the desirability of the event" (p213). A high level of agreement was reported for the adjustment ratings, notwithstanding that the raters were not required to have experienced the event, and the 43 events appeared in rank order of "life change units", or LCUs, in the Social Readjustment Rating Scale (SRRS). A similar approach in which "life change weights" (LCWs) were computed according to objective ratings of the distress or emotional upset associated with events was adopted by Paykel, Prusoff and Uhlenhuth (1971). Their LCWs for events actually experienced were summed for a "total life change score".

A common feature of these early attempts was the *a priori* objective determination of the degree of adjustment or distress associated with individual events, with the consequent failure to have taken account of individual differences in the *a posteriori* appraisal of the desirability and stressfulness of events.

Hurst, Jenkins and Rose (1978) demonstrated that subjective ratings of experienced events corresponded less well with mere counts of events than did objective ratings. They assembled a 103-item composite scale (Review of Life Experience or ROLE) which included 39 SRE events, 52 events from Paykel *et al*'s scale and a further 12 events chosen by the authors. Adjustment and distress ratings were furnished by 416 air

traffic controllers, only for events actually experienced in the past two years. The SRRS yielded little, if any, advantage over the SRE; the correlation between SRE LCUs and a simple count of SRE events was 0.93, seemingly rendering the objective weighting of events redundant. This was confirmed by the similarly substantial correlation (r=0.94) between LCWs and a simple count of events from the Paykel *et al* scale. Correlations between counts of events and the adjustment (SRE items) and distress (Paykel *et al* items) ratings, however, were only r=0.70 and r=0.73 respectively. Thus, whereas some 85% of the variance in objective weightings was accounted for by simple counts of events, only half of the variance in the subjectively rated impact of events actually experienced was similarly accounted for.

Vinokur and Selzer (1975) divided SRE items into those that represented positive and negative life change respectively. Only negative change correlated significantly with a variety of measures that included depression, anxiety, tension, aggression and suicidal proclivity. Vinokur and Selzer argued that it was negative change, and not change *per se*, that mattered as far as outcomes were concerned. As with early attempts to gauge impact, however, the desirability of a life event was determined on an *a priori* basis by the authors.

Subjective ratings of stressfulness and desirability were included in the Life Experiences Survey (LES - Sarason, Johnson and Siegel, 1978). The LES comprises 47 items rated for impact on a seven point scale ranging from extremely negative to extremely positive; the mid-point on the scale was "no impact". The respondent was allowed to list a maximum of three additional events, making the scale sensitive to idiosyncrasies. The subject also indicated whether an event happened in the past six months, or in the period seven months to one year ago. A "positive change score" resulted from the summation of impact ratings for events graded positive, and a "negative change score" was similarly obtained by aggregating impact ratings for negative events. Both measures, in turn, could be added together for a "total change score". Negative change scores were significantly associated with Beck Depression Inventory scores in 64 students of mixed sex, and with BDI scores in a separate sample of 69 female students. Negative change scores were also strongly associated with state anxiety as indexed by

the State-Trait Anxiety Inventory (STAI - Spielberger, Gorsuch and Lushene, 1970) in a sample of 97 students. Eighteen students receiving treatment for psychological problems at a university counselling centre, moreover, had higher negative change scores than a matched comparison group. Sarason *et al* concluded, "It seems possible that life stress is most accurately conceptualized in terms of negative life changes rather than in terms of positive or total change" (p940).

Sarason *et al* also remarked, however:

> A major consideration in the assessment of life stress concerns the nature of the relationships obtained between life change scores and stress-related dependent variables. One might question, for example, whether relationships such as those reported in this article and found elsewhere in the literature reflect the effects of life stress on individuals or simply reflect the effects of specific variables on the reporting of life change. Regarding life stress research in general, one might also question whether persons experiencing high levels of life stress are actually more susceptible to the development of physical and / or psychological problems or whether persons who already manifest such difficulties are more prone to experience life change. Thus the directionality of the relationships obtained in life stress studies is often unclear. This makes it difficult to draw firm cause-effect conclusions ... definitive answers regarding cause-effect relationships must ultimately come from longitudinal studies that are more complex than those typically found in the life stress literature. (p940)

Monroe (1982), moreover, emphasised the importance of taking into account the existing symptom status of subjects, i.e., symptoms should not be attributed to the effects of life events if those symptoms were present before those events occurred. Monroe found that, for individuals relatively free from symptoms initially, life events (measured using the Psychiatric Epidemiology Research Interview (PERI - Dohrenwend, Krasnoff, Askenasy and Dohrenwend, 1978) in the first six months of 1978 were significantly associated with scores on the General Health Questionnaire (GHQ - Goldberg, 1972) in excess of six months later.

Monroe's data suggested that the latency of the effects of life events can be rather protracted. Antoni (1985) also reported a substantial latency, in this case among 73 male military students. Events, negatively rated on the LES, that happened in the first six months of the past year were significantly associated with illness records in the most recent six months. Events in the latter half of the year were not, however, related to recent illness. Because this study disregarded recent illness if the same symptoms had occurred earlier in the past year, however, the contribution of recent events to recent illness could have been underrepresented.

Protracted latencies, however, appear inconsistent with rapid forgetting of life events. Jenkins, Hurst and Rose (1979) administered the ROLE to 382 subjects with reference to the past six months. Nine months later, the same subjects completed the ROLE for the same interval (i.e., the period 15 to nine months ago). A mean of 118.2 LCUs were reported initially, but only 64.0 LCUs were reported on the second occasion. LCWs declined in a similar fashion, from 32.6 to 19.5. These changes correspond with a rate of forgetting of around 5% per month.

Data reported by Andrews (1981) suggested rather shorter latencies between events and symptoms. A 45-item life events scale (with items consensually weighted for distress) was completed with reference to the past 12 months. After four months, the scale was completed with reference to the past four months, and this was repeated after a further four months. On each occasion, subjects also completed the GHQ. The correlation between symptoms on the last occasion and life events in the past four months was 0.34. The correlation between symptoms and events four to eight months ago was 0.17. Events eight to 20 months ago were virtually unrelated to current symptoms (r=0.06).

An almost contiguous relationship between events and illness was reported by Stone, Reed and Neale (1987). Married couples kept a daily record of events and symptoms in the life of the husband. Compared with days which did not precede an episode of infectious illness, there was an increase in undesirable events four and five days before an episode, and a decrease in desirable events three and four days before an

episode. Stone *et al* inculpated the secretory immune system (particularly suppression of secretory IgA) to account for such short latencies prior to infection.

Maternal subjects are invariably recruited after conception, thus any assessment of life events occurring before pregnancy tends to be excessively retrospective. Positive relationships between recent life events (usually meaning since conception) and post-partum depressive symptoms were reported by Playfair and Gowers (1981), O'Hara, Rehm and Campbell (1982), Cutrona (1983) and O'Hara *et al* (1984). In addition, Paykel, Emms, Fletcher and Rassaby (1980), O'Hara, Rehm and Campbell (1983) and O'Hara (1986) reported a positive relationship between recent life events and the probability of a diagnosis of post-partum depression. Pitt (1968), Kumar and Robson (1984) and Hopkins, Campbell and Marcus (1987), however, reported no relationship between recent life events and post-partum depression.

One of the most thorough confirmatory studies was that of Paykel *et al*, (1980). At six weeks post-partum, 120 women were interviewed in order to obtain information regarding, *inter alia*, recent life events and recent depressive symptoms. Life events were measured with an expanded version of the Interview for Recent Life Events (Paykel, Myers, Dienelt, Klerman, Lindenthal and Pepper, 1969) in which the occurrence and timing of events was established in a semi-structured interview. The period covered was that since becoming pregnant, i.e., the past ten-and-a-half months. Events were rated for "objective negative impact" on a five-point scale (in which the respondent's subjective report of impact was specifically ignored) and "independence" (in which the likelihood of an event being specifically attributable to pregnancy, delivery or having a child was assessed). A further classification of events into those that were "clearly socially undesirable" and those that were "desirable" was also made. Depressive symptoms were measured with the Raskin Three Area Depression Scale (Raskin, Schulterbrandt, Reatig and McKeon, 1970). A criterion score of seven or over was invoked to define a depressed group of 24 subjects. Also, "since it was difficult to evaluate the meaning of scores of 5 or 6, indicating minor depression, a prior decision was made to omit from the analyses the 16 patients scoring in this range" (p341).

A simple count of events revealed a highly significant group difference (mean number of events 3.46 and 2.00 for depressed and non-depressed groups respectively). A chronologically sensitive analysis showed that the depressed group reported a greater number of events in all three trimesters of pregnancy as well as in the post-partum period. The depressed group reported a greater number of events rated as moderate, marked or severe objective negative impact than the non-depressed group, but the group difference in number of events rated as mild or no objective negative impact was not significant. The depressed group reported a significantly greater number of undesirable events, but the difference in number of desirable events was not significant. Similarly, the depressed group reported a significantly greater number of independent events, but the difference in number of dependent events was not significant. These findings suggested that only particular types of events, namely undesirable events not directly connected with pregnancy (but occurring at any time ante-partum) and which had a negative impact, were associated with post-partum symptoms.

Paykel *et al*'s study was sophisticated in its assortment of events into negative impact, desirability and independence categories; however, each of the relevant judgements were made by the experimenters, not by the respondents. Although its coverage of the previous ten-and-a-half months was comprehensive, the single post-partum assessment occasion would have yielded less accurate recall of events than regular assessment occasions throughout pregnancy. Finally, the exclusion of subjects with intermediate depression scores would have had the effect of artificially inflating any differences between depressed and non-depressed groups.

Childbirth may be a uniquely important stressor with respect to postnatal depression. According to Reading (1983):

> Women are exposed to an increasing array of technology, in the form of ultrasonography, amniocentesis, fetoscopy and fetal monitoring, both during the pregnancy and at labor. Although birth has become safer and more controlled from a medical standpoint, advocates of natural childbirth have claimed that this has imposed a heavy social and psychological burden on the mother ... Pregnancy necessitates regular attendance at prenatal clinics.

> These may be characterized by delays and a lack of continuity of staff contact ... Research shows extensive contact with the medical profession ... and repeated vaginal examinations can be stressful ... The adverse psychological effects of continuous fetal monitoring in labor has been documented ... (p191)

Thus even uncomplicated pregnancy and delivery brings its own challenges. The specific effects of childbirth as a stressor, however, have not been clearly identified, and women depressed postpartum may comprise a heterogeneous group, with some subjects' depressions related directly to childbirth and other subjects' depressions unrelated. Bearing in mind Watson *et al*'s (1984) explanation for the greater prevalence rate of depression in Kumar and Robson's (1984) study, professional women may become depressed in response to the loss or interruption of a valued career, alternatively, a low commitment to pregnancy and birth. Non-professional women, however, may become depressed because of chronic difficulties that are essentially unrelated to childbirth. Elliott (1990) was reluctant to accept excessively general conclusions about the nature of childbirth as a life event:

> It seems to me that all the data to date confirm that which most parents know intuitively - that births change lives, that these changes are not necessarily predictable and that the changes are as variable as the preexisting lives or indeed as variable as babies! (p154)

Reports on the relationship between obstetric complications and postnatal depression have been inconsistent. Positive relationships were reported by O'Hara *et al* (1984) and Tod (1964). Negative ones, however, were reported by Paykel *et al* (1980), Pitt (1968) and O'Hara *et al* (1991). Both of the studies led by O'Hara were of a similar design. BDI scores at nine weeks post-partum were regressed on several sets of predictor variables. First, sociodemographic variables were entered into the regression equation. Next, measures of depression history, including depression during pregnancy, were entered (this step yielded the largest F ratio in both studies). The ensuing block of life stress measures included Varner's (1982) Peripartum Stress Scale (PSS) in the 1984 study and O'Hara, Varner and Johnson's (1986) Peripartum Events Scale (PES) in

the 1991 study. The PSS and the PES are both indices of obstetric stress; scores were derived by a simple count of specified events associated with pregnancy and labour. Each block of life stress measures was significant in the regression equations, but only the PSS was significant as a single stress variable. Neither PSS nor PES scores were significant in regression equations when BDI scores were substituted by diagnostic status. Accordingly, it would appear unlikely that obstetric difficulties make a substantial contribution to the aetiology of postnatal depression.

Both life events and anxiety during pregnancy have been implicated in complications of pregnancy and labour, and also in the health status of the neonate. Unambiguous conclusions have frequently been thwarted, however, by nebulous dependent variables (often a dichotomous measure of whether any of miscellaneous complications has been experienced) and by the emergence of as many non-corroborative as positive findings.

Anxiety is conceptualised as either a trait or a state measure depending on whether anxiety is elicited reliably in multifarious situations (trait), or is specific to a particular situation (state). The three anxiety scales that have most commonly been used with maternal samples are the Manifest Anxiety Scale (MAS - Taylor, 1953), the IPAT Anxiety Scale Questionnaire (Cattell and Scheier, 1963) and the State-Trait Anxiety Inventory (STAI - Spielberger *et al*, 1970).

The MAS comprises 50 items from the Minnesota Multiphasic Personality Inventory (MMPI - Hathaway and McKinley, 1951) judged by a panel of five clinicians to be "indicative of manifest anxiety". Notwithstanding the designation of the scale, trait behaviour is frequently implicated with substantial use of adverbs such as "frequently", "usually", "sometimes" and "often" (e.g., "I am often sick to my stomach"). MAS retest correlations, moreover, exceeded 0.8 over more than five months. Lubin, Gardener and Roth (1975) found that IPAT scores did not vary significantly as a function of pregnancy trimester in a group of 93 middle class women, but Anxiety Adjective Check List (AACL - Zuckerman and Lubin, 1975), scores revealed abatements of anxiety in the second trimester which had dissipated by the third. Thus the IPAT, like the

MAS, is best regarded as a measure of trait, not state, anxiety. The STAI, conversely, clearly distinguishes between enduring and transitory patterns of anxiety behaviour. It has two scales, one of which assesses anxiety in the subject at the time of responding and one of which assesses how anxious the respondent generally feels.

Anxiety during pregnancy has been linked with postnatal depression, although the relevant studies have used unsystematic or questionable strategies for measuring anxiety and depression. Tod (1964) reported that 20 cases of puerperal depression were preceded by pathological anxiety during pregnancy, but this was based on subjective observations in a clinical setting. Meares, Grimwade and Wood (1976) used visual analogue scales to assess post-partum symptoms, and deemed women depressed if sufficiently severe symptoms persisted over a month. Women were also deemed depressed if they received treatment for depression. Of the 49 subjects, five satisfied each criterion, but only two women satisfied both. The visual analogue scales referred to the first six months following delivery, but were completed at any stage up to 18 months after the birth; the study was thus excessively retrospective. Notwithstanding the methodological shortcomings, the depressed women had significantly higher MAS scores during pregnancy.

Several studies have reported positive relationships between stress (life events, anxiety, or a combination of both) during pregnancy and complications of pregnancy (McDonald, Gynther and Christakos, 1963; McDonald and Parham, 1964; Nuckolls, Cassel and Kaplan, 1972; Gorsuch and Key, 1974; Norbeck and Tilden, 1983). All of these studies, however, used a "dustbin" dichotomised outcome measure which classified women according to whether their pregnancy was free of complications, or was associated with any of many stipulated difficulties (some of which frequently pertained to labour as well as pregnancy). In addition, the studies were not true prospective ones, in which outcome variables are recorded on an occasion subsequent to that on which stress measures were obtained. Where outcome measures pertain to pregnancy, true prospective studies rely on the recruitment of subjects prior to conception; this practical difficulty is exceedingly difficult to overcome.

Studies that have explored the relationship between stress and complications of labour have also adopted the practice of partitioning subjects according to whether they experienced any of several complications, thus creating a dichotomous dependent variable.

Davids and DeVault (1962) divided 50 puerperal women into two groups (both N=25) according to whether they had experienced any of a variety of delivery complications (not including prolonged or precipitate labour) or whether they had delivered infants with congenital abnormalities. The group with complications had significantly higher MAS scores in the third trimester of pregnancy. McDonald and Christakos (1963) observed higher MAS scores during the seventh month of pregnancy in a group of women who experienced complications compared with a group free of difficulties. Burstein, Kinch and Stern (1974), however, administered the MAS to 61 women between 28 and 36 weeks gestation, but found no significant difference in scores between the 24 women who were later to have complicated labours and the remaining 37 women. Burstein *et al*'s subjects were a relatively older group of mothers, and this may help to explain the discordant finding. A further anomalous finding was obtained by Jones (1978), who reported a non-significant relationship between MAS scores and complications of labour, and also a significant, but inverse, relationship between SRE life events and complications. Once again, subjects' characteristics may be relevant; Jones' study was conducted on a sample of teenage mothers in a hospital setting.

Crandon (1979a) divided 146 subjects into two groups; those scoring six or less and those scoring seven or over on the IPAT in the third trimester of pregnancy. The rates of pre-eclampsia, forceps delivery, precipitate labour and primary post-partum haemorrhage were significantly greater in the high anxiety group. In addition, all cases of prolonged labour, manual removal of placenta and clinical foetal distress (tachycardia, bradycardia or meconium stained liquor) occurred in the highly anxious group. McDonald *et al* (1963) also observed higher IPAT scores (during the seventh month of pregnancy) in a group of women with any of several complications of labour.

Amongst a sample of 53 women, Edwards and Jones (1970) reported that those who experienced a normal delivery had low STAI state anxiety scores up until two weeks before delivery when anxiety levels increased. Women experiencing complicated deliveries, however, were anxious until shortly before delivery when anxiety levels diminished. Norbeck and Tilden (1983) found neither STAI state scores nor LES life events to be significantly associated with complications of labour. Beck, Siegel, Davidson, Kormeier, Breitenstein and Hall (1980) found that STAI state anxiety, measured during the third trimester of pregnancy and on entry to the delivery room, did not predict an index of overall complications. Thus state anxiety, as measured by the STAI, is not reliably associated with complications of labour.

Three studies reported a positive relationship between anxiety and duration of labour. In stepwise regression, Beck *et al* (1980) found that STAI state anxiety, measured on entry to the delivery room, was a significant predictor of labour duration having first entered into the regression equation extent of cervical dilation as the strongest predictor. Crandon (1979a) found that all eight cases of prolonged labour in his study had IPAT scores of seven or over, and Lederman, Lederman, Work and McCann (1978) reported significant associations between the duration of the second stage of labour and STAI anxiety (both trait, and state at the onset of the second stage).

Newton and Hunt (1984) partitioned women into two groups according to whether they had delivered babies of low birthweight. This dichotomised measure was significantly related to four indices derived from Cochrane and Robertson's (1973) Life Events Inventory (LEI): major life events, objective major life events, self-rated major life events and weighted overall life events. Low birthweight babies are often preterm, and Newton and Hunt also reported that mothers who delivered preterm infants had significantly higher scores on the LEI, particularly with reference to the last trimester of pregnancy. Newton, Webster, Binu, Maskrey and Phillips (1979) found that length of gestation was inversely related to number of LEI life events during pregnancy. Norbeck and Tilden (1983) reported the same effect with LES life events. Berkowitz and Kasl (1983) used a modified version of Holmes and Rahe's SRRS to assess life events in each trimester of pregnancy in 299 mothers of full-term and 166

mothers of preterm infants. No significant group differences emerged when each trimester was looked at separately. When scores for the first and second trimesters were combined, however, the preterm mothers not only had more life events, but there was a significant trend in which the risk of preterm delivery increased the greater the number of life events experienced.

A significant relationship has been reported between antenatal anxiety and infant Apgar scores. Crandon (1979b) designated 34 out of 146 women in their third trimester of pregnancy highly anxious if they scored seven or over on the IPAT. The mean five-minute Apgar score of infants delivered by the highly anxious women was significantly lower than that of babies delivered to the remaining women. In addition, all five-minute Apgar scores below eight were in the highly anxious group. Crandon suggested that hypoxia associated with delayed onset of respiration could account for later neurological abnormality. Maternal anxiety, may, accordingly, be relevant to the infant's developmental progress.

Presently, little is known about the possible relationship between psychological events and uterine function. Elevated activity in the hypothalamic-pituitary-adrenal axis has been associated with longer labours: Burns (1976) reported a positive relationship between plasma cortisol and duration of the first stage of labour, and Lederman *et al* (1978) found that elevated plasma levels of adrenalin were associated with both STAI state and trait anxiety, and also a longer second stage of labour. With reference to foetal well-being, Ascher (1978) suggested that maternal anxiety promotes hypertension, which in turn constrains blood flow through the uterus, and may lead to foetal hypoxia.

In summary, there are methodological problems with the use of life event scales, but both life event scores and anxiety measures have been widely implicated in postnatal depression and obstetric complications, although not all of the findings have been mutually consistent. Very few studies, moreover, have been designed prospectively and explored the interactive relationships between stress and other potential moderators such as social support and personality. Data pertaining to such relationships are presented in Chapters 5, 9, 10 and 11.

1.15 Social support as a protective asset

Cobb (1976) defined social support as "information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations" (p300). According to Cobb:

> ... it is my current opinion that social support facilitates coping with crisis and adaptation to change. Therefore, one should not expect dramatic main effects from social support. There are of course some main effects simply because life is full of changes and crises ... it is in moderating the effects of the major transitions in life and of the unexpected crises that the effects should be found. (p302)

The moderating effect of social support is represented in Figure 1.1. The data are real, derived from a study of 170 women who gave birth at a military hospital (actual values are recalculated by Cobb, 1976, from the data of Nuckolls *et al*, 1972). Life change and social support categories represent median splits. The graph is a stereotypical buffering effect - the benefits of social support accrue when life change is high, but they are not apparent when life change is low.

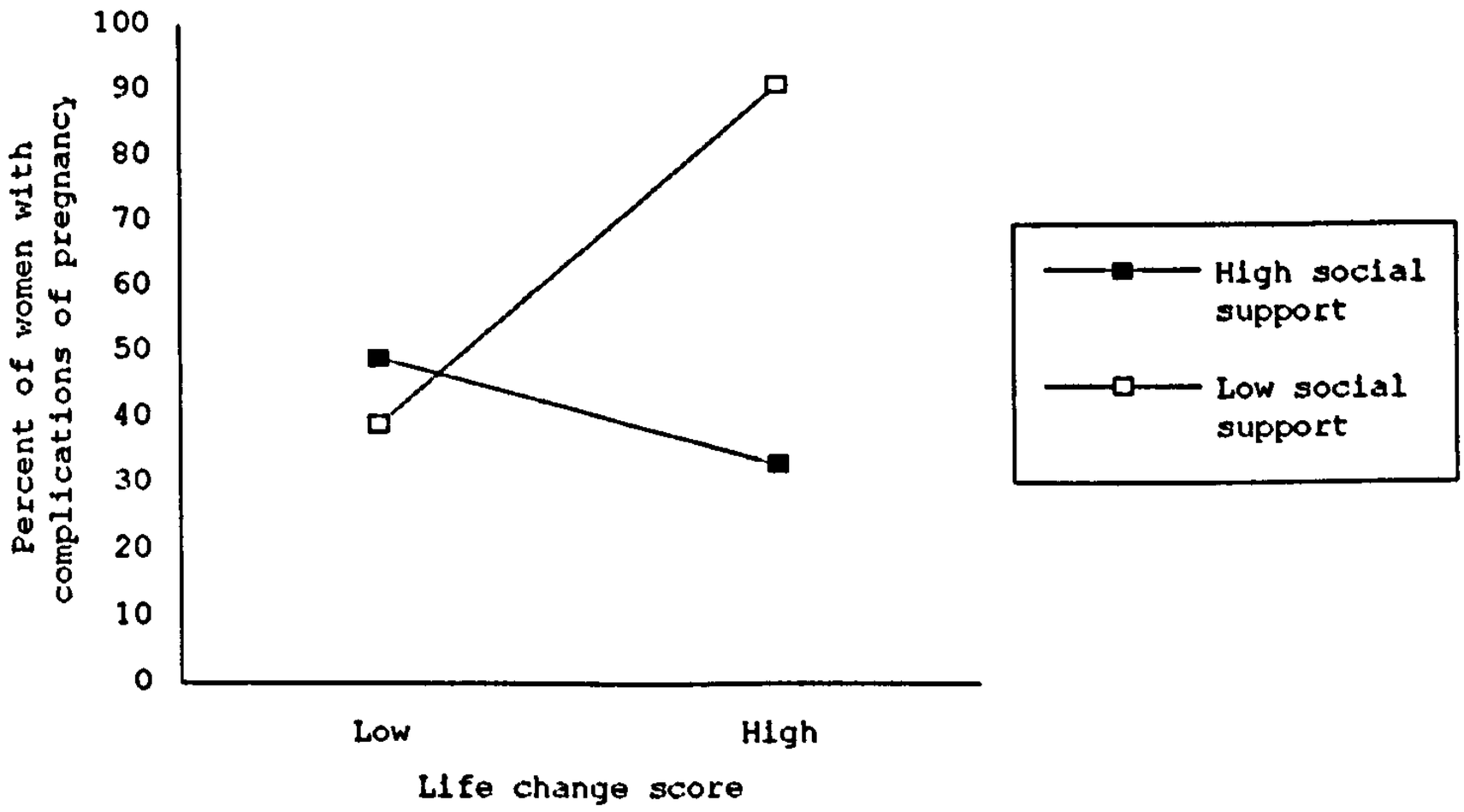


FIGURE 1.1 PERCENT OF WOMEN WITH COMPLICATIONS OF PREGNANCY BY LIFE CHANGE SCORE AND SOCIAL SUPPORT (DATA COURTESY OF NUCKOLL *et al*, 1972 AND COBB, 1976).

According to Sarason, Levine, Basham and Sarason (1983), "Social support is usually defined as the existence or availability of people on whom we can rely, people who let us know that they care about, value, and love us" (p127). Their Social Support Questionnaire (SSQ) makes a clear distinction between quantity and quality of support. The SSQ comprises 27 items, each of which describes a set of circumstances. The respondent lists the number of persons (N - up to a maximum of nine) who can be counted upon for help or support in that situation, and also rates satisfaction (S - on a scale from zero to six) with support received in that situation. N and S scores were internally reliable (alpha coefficients of 0.97 and 0.94 respectively), and the correlation between them was modest (r=0.34). Sarason *et al* concluded that N and S were independent "basic elements" of social support.

Sarason, Sarason, Potter and Antoni (1985) illustrated how SSQ-N and SSQ-S governed the relationship between negative life events and self-reported symptoms. Male military students completed the LES and the SSQ, along with a self-report health questionnaire. Three illness variables were computed: isolated illnesses (which occurred no more than twice in the past year), chronic illnesses (which occurred more than twice in the past year) and total illnesses. The subjects were partitioned according to a median split of SSQ-N scores following which correlations were computed between weighted negative life events (LES-NW) and the illness indices. In both SSQ-N groups, there were significant correlations between LES-NW and isolated illnesses, and LES-NW and total illnesses (a significant correlation between LES-NW and chronic illnesses was present in the sub-median SSQ-N group only). Subjects were also partitioned according to a median split of satisfaction with social support (SSQ-S). There were significant correlations between LES-NW and the three illness indices in the sub-median SSQ-S group only. These results suggested that the relationship between negative life events and illness was governed more by quality (SSQ-S) of support than by quantity (SSQ-N).

As in the context of life events, the importance of prospective studies in the evaluation of the role of social support has been emphasised. Cohen and Wills (1985) argued that:

Concurrent correlations between support and well-being are amenable to three alternative causal interpretations. They may reflect social support causing changes in symptomatology, symptomatology causing changes in support level, or a third factor (e.g., social class or personality) causing changes in both support and symptomatology. When two-wave (Time 1 and Time 2) longitudinal data are available, the most desirable model is an analysis using Time 2 symptomatology as the criterion with Time 1 life events and social support as the predictors and Time 1 symptomatology included as a control variable. By focusing on changes in symptomatology that occur as a function of Time 1 stress and support, this analytic model helps rule out the possibility that results are attributable to preexisting symptomatology causing subsequent life events and loss of support. The use of multiple regression analysis (or analysis of covariance) also makes it possible to control for third variables (e.g., age, sex, social class) that may be correlated with the predictors and symptomatology and hence affect interpretation of the results. (p318-319)

Monroe, Bromet, Connell and Steiner (1986) similarly discriminated between longitudinal and prospective studies and argued in favour of the statistical control of initial symptoms. According to Monroe *et al*, longitudinal studies merely comprise two or more testing occasions whereas true prospective studies are defined by temporal separation between assessments of predictor and criterion variables. Only prospective studies can contend the possibility that psychological distress may influence the availability or reporting of support. Unless initial symptoms are statistically controlled, there is an implicit assumption of "acute onset", in which symptoms are attributed to stress or lack of support without taking into account the possibility that elevated levels of symptoms already existed.

Monroe *et al* assessed 709 married women for recent life events, social support (predominantly their satisfaction with the marriage), marital conflict and depression (using the depression subscale of the Hopkins Symptom Checklist-90, Derogatis, 1977). Depression scores were recorded again after 12 months. Upsetting events and marital support were both

significantly associated with depression scores on the follow-up occasion. The addition of an events x support cross-product interaction term to the regression equation was not, however, significant. When initial symptoms were entered into the regression equation first, however, the main effects of events and support were no longer significant, and the only significant interaction term was one that included a subcategory of very upsetting events. Thus, the main effects of events and support were not independent of initial symptoms, and there were none of the anticipated buffering effects.

Monroe *et al*'s subjects were, however, recruited from newspaper birth announcements approximately two years prior to the initial assessment. They were, presumably, all mothers of children of around three years of age. This arguably placed them all in a higher than average ongoing stress category. If all subjects in a study are subject to high stress, then buffering effects cannot manifest themselves as there is no low stress condition in which the benefits of social support do not accrue. Second, the latency between the two testing occasions was rather protracted. Perhaps prospective studies in which there are shorter intervals between assessments of predictor and criterion variables are more suitable for uncovering the buffering effects of social support.

Paykel *et al* (1980) partitioned mothers at six weeks post-partum into non-depressed and depressed subjects according to their scores on the Raskin Three Area Depression Scale (four or less and seven or greater respectively), and also into groups according to whether they had experienced an undesirable life event since the beginning of pregnancy. Buffering effects for three aspects of the marital relationship were uncovered. That is, the proportion of depressed women reporting low social support was higher than the proportion of non-depressed women reporting low social support, but only amongst those women reporting an undesirable life event since the beginning of pregnancy. This study suggested that buffering effects can be uncovered in a maternal sample, but its design was not true prospective.

Further data pertaining to the main and buffering effects of social support in maternal subjects are presented in Chapters 5, 9, 10 and 11.

1.16 Individual differences as diathesis

Diathesis, or vulnerability, is implicated in mainstream psychological theories of depression. For example, Beck (1967) proposed that depressed persons commit characteristic errors in logic (arbitrary inference, selective abstraction, overgeneralisation, magnification and minimisation) which fuel negative schemata. Lewinsohn's (1974) model of depression posited that depression was the consequence of a suppressed rate of positive reinforcement, which in turn was a function of personal characteristics and the individual's repertoire of reinforceable behaviour (as well as other environmental factors). Abramson, Seligman and Teasdale (1978) suggested that depressives have an attributional style through which negative outcomes are attributed to personal, global and stable faults of one's own character.

Other investigations of the nature of susceptibility to depression have invoked stable individual differences. Few reliable findings have emerged, however, possibly because the relevant dimensions have been insufficiently specific. A distinction can be drawn between personality (a relatively stable disposition to behave in a particular way) and attitude. The latter has been defined by Fishbein and Ajzen (1975) as a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object. Both personality and attitude implicate consistency of behaviour, although the dimensional approach to the measurement of personality is founded on normally distributed tendencies which can be measured reliably across testing occasions. Physiological and emotional turbulence which may accompany the maternity experience, however, may have the effect of diminishing the stability of personality and attitudes across parturition.

Rating scales that have been developed for maternal women more often purport to measure attitudes or adjustment to motherhood than personality, and most exhibit psychometric shortcomings. A review of these scales is followed by an account of the use of personality scales in the context of maternity. Trait anxiety in the context of maternity has already been discussed (please see *1.14 Stress and aetiology*).

The Maternal Attitude toward Pregnancy Instrument (MAPI - Blau, Welkowitz and Cohen, 1964) comprises 48 items, answered on a four-point scale of agreement. The items were written during a pilot study of mothers of premature infants. The MAPI was derived following factor analysis (centroid extraction and quartimax rotation) of the responses of a new sample of 337 post-partum women. The first two factors represented comfort with, and enhanced attitudes toward pregnancy. A third factor reflected endorsement of a "natural" delivery and breast feeding, but had only four items. The fourth factor had 11 items, but lacked face validity. The third and fourth factors, moreover, had internal (coefficient alpha) reliability coefficients of 0.55 or less. The pilot study yielded an alpha reliability coefficient of 0.8 for the entire MAPI, suggesting that it is more appropriately regarded as a unitary scale. The substantial majority of the MAPI's 48 items reflect attitudes towards pregnancy and labour, yet its construction and validation was carried out using post-partum, not pregnant women.

Chalmers (1983) reported that, of 459 women who completed the MAPI at 26 weeks pregnancy, the 318 with scores exceeding 123 (thus expressing favourable attitudes) experienced more obstetric difficulties than those with lower scores. Chalmers suggested that this counter-intuitive finding might be attributable to the possibility that lower MAPI scores represent a realistic attitude to pregnancy, reflecting comprehension and assimilation of both favourable and unfavourable aspects.

There have, however, been findings in the expected direction. Molfese, Bricker, Manion, Yaple and Beadnell (1987) had 96 women in their eighth month of pregnancy complete the MAPI as one component of a package of questionnaires. Significant correlations were observed between the first MAPI factor and two indices of intrapartum complications, type of analgesia in labour, infant's birth weight and an index of post-partum status, but not with six other perinatal measures. The second MAPI factor correlated with birth weight, but not with ten other measures. The third factor correlated only with type of analgesia. The fourth factor correlated with type of analgesia and one index of intrapartum complications. It is not clear whether attitudes this late in pregnancy might have been influenced by the mother's knowledge of her own and her foetus's health status.

Grimm and Venet (1966) developed the Health Insurance Plan (HIP) Pregnancy Questionnaire using a sample of 124 married women in the first 16 weeks of pregnancy. Seventeen "subject-matter areas" intended to cover emotional adjustment and attitudes were investigated using 215 items answered on a four-point Likert-type scale of agreement. One-hundred-and-thirty-seven items were dropped following interviews conducted to establish correspondence between assessment ratings and questionnaire responses. The remaining 78 items, along with six symptom scores, were inter-correlated and subjected to centroid extraction. Varimax (Kaiser, 1958) rotation of seven factors yielded neuroticism, attitudes towards labour and delivery, desire for pregnancy, worry about the baby, satisfaction with the husband and life in general, dependent attitudes and somatic symptoms. The HIP Questionnaire was re-administered at 36 weeks pregnancy to 92 of the original sample. Factor score retest correlations all exceeded 0.67. A new factor analysis showed that by late pregnancy, however, the neuroticism and somatic symptoms factors had merged. Scores were unrelated to obstetric indices, and no index of post-partum affective status was used to determine the HIP's capacity for predicting postnatal depression.

The Maternal Adjustment and Maternal Attitudes (MAMA) questionnaire (Kumar, Robson and Smith, 1984) comprised 60 items organised in five subscales; body image, somatic symptoms, marital relationship, attitudes to sex and attitudes to pregnancy / baby. Although no factorial validity was established, internal (split-half) and retest (over one week) reliability coefficients were satisfactory. The short retest interval was deemed appropriate because the questionnaire was designed to measure change. Concurrent validity for all subscales except body image was established using interview data. The psychometric weakness of the MAMA questionnaire lies in the method used to define the subscales. Although care was taken to reflect the topics discussed by a group of 99 antenatal women in their third trimester, the subscale categories were "pin-pointed" from an examination of an initial sample of 91 items, only 45 of which survived through to the final version. Thus, the relationships between items were evaluated only by means of subscale split-half reliability correlations, and no comment was made about the inter-relationships of the subscales themselves.

Ruble, Brooks-Gunn, Fleming, Fitzmaurice, Stangor and Deutsch (1990) submitted to factor analysis 73 items of their Childbearing Attitudes Questionnaire (CAQ). Respondents were 667 women who were either planning to conceive within two years, pregnant, or one and three months post-partum. The wording of individual items was re-phrased, where necessary, to maintain compatibility with status. Principal components analysis showed that 20 factors with Eigenvalues exceeding 1 explained 58% of the total variance. Subsequently, 20 factors were extracted following principal axis factoring and oblique rotation. An internal (coefficient alpha) reliability criterion of 0.5 was set for each resulting scale, for at least two of the three childbearing phases (pre-pregnant, pregnant and post-partum). This modest requirement was met by fourteen scales, although fifteen were retained. Eight of these possessed three or fewer items each, which rendered somewhat narrow the range of behaviour sampled by each factor. The nearer the number of factors chosen to represent a set of items approaches the number of items in the set, the smaller the rationale for data reduction. When comparisons between maternity transition phases are anticipated, moreover, it may be more valuable to conduct separate analyses for each phase, rather than seek a common solution which may not be justified in the circumstances.

The Eysenck Personality Inventory (EPI - Eysenck and Eysenck, 1964) and the Eysenck Personality Questionnaire (EPQ - Eysenck and Eysenck, 1975) were derived following serial non-orthogonal factor analyses of questionnaire items that represented a broad range of behaviour. The EPI measured the "higher order" personality components of Extraversion (E) and Neuroticism (N), along with a Lie scale (L) which was included to detect false or improbable answers. The EPQ comprised three scales in addition to a Lie scale: Extraversion, Neuroticism and Psychoticism (P). Whilst psychometric equivalence across the two scales was claimed by the Eysencks for E and N, Rocklin and Revelle (1981) showed that EPI E measured two components, Sociability and Impulsivity, whereas EPQ E measured Sociability alone. Similarly, Roger and Nesshoever (1987) and Roger and Morris (1991) reported that, whereas EPI N measures two components, Social Sensitivity and Hypochondriasis, the latter component does not feature in EPQ N. Roger and Morris also showed that EPQ P is a heterogeneous scale which includes items reflecting physical anhedonia, callousness, paranoia, intolerance, selfishness and impulsiveness.

The Maudsley Personality Inventory (MPI - Eysenck, 1959) was a forerunner of the EPI, and also measured E and N. Pitt (1968) reported greater MPI-N and lower MPI-E scores in women diagnosed with puerperal depression than their non-depressed counterparts. Coppen and Metcalfe (1965), however, showed that MPI scores may be sensitive to changes in depression status. Consequently, MPI scores of women depressed post-partum may not be reliable indices of pre-morbid personality. Chapple and Furneaux (1964), moreover, reported variations in MPI-E scores as a function of stage of pregnancy and puerperium, and variations in MPI-N scores as a function of both gestational stage and E (whereas extraverts became more stable towards delivery, introverts became less stable).

Attempts to predict postnatal depression from antenatal N scores have yielded widely discrepant results. Meares *et al* (1976) observed higher EPI-N scores at non-specific stages of pregnancy in women depressed post-partum, and Watson *et al* (1984) reported a highly significant association between EPQ-N before the 24th week of pregnancy and caseness, using the SPI and RDC, at six weeks post-partum. Kumar and Robson's (1984) study, however, produced contrary findings. Primiparae were assessed for depression at 12 weeks pregnancy and 12 weeks post-partum using the SPI and RDC. Subjects also completed the EPQ at 12 weeks pregnancy. High N and P scores were associated with concurrent depression, but antenatal EPQ scores were not significantly associated with postnatal caseness. As discussed previously (please see *1.4 Postnatal depression*), the subjects in Watson *et al*'s and Kumar and Robson's studies were not equivalent in profile, but this consideration alone is unlikely to explain the discrepant results.

The Hostility and Direction of Hostility Questionnaire (HDHQ - Caine, Foulds and Hope, 1967) was developed with a prison population in mind and reports of its internal structure support a distinction between intropunitive and extrapunitive hostility. Philip (1969) favoured summing self criticism (SC) and guilt (G) for an intropunitive factor, and Needs (1985), based on data from long-term inmates, confirmed three extrapunitive factors: acting out hostility (AH), delusional hostility (DH) and criticism of others (CO).

Bridge *et al* (1985) administered the HDHQ to a sample of 109 women during the first and third trimesters of pregnancy, and at six weeks and twelve months post-partum. Zung's (1965) SRDS was administered on those occasions and, in addition, at six and nine months post-partum. Nine women were found to be seriously depressed (SRDS score > 47) by six weeks post-partum, a further six by six months post-partum, a further one by nine months post-partum and two further women were seriously depressed after a year. First trimester HDHQ scores were strongly associated with SRDS scores at six weeks, six months and nine months post-partum, and less substantially with SRDS scores at 12 months. Although first trimester SRDS scores predicted postnatal SRDS scores more strongly than they did HDHQ scores at six, nine and twelve months post-partum, first trimester HDHQ scores were the most powerful predictor of depression at six weeks post-partum. Unfortunately, however, the results did not reveal the predictive utility of third trimester HDHQ scores. Bridge *et al* did not, moreover, establish whether components of the HDHQ as identified by Philip (1970) and Needs (1985) might have refined the predictive value of antenatal hostility. In an earlier study (Hayworth *et al*, 1980), however, Direction of Hostility (Dir H) scores at 36 weeks pregnancy were computed according to the formula given by Caine *et al* (1967): Dir H = (2SC+G) - (AH+CO+DH). When Dir H scores were divided at the mean, a significant correlation was observed between extrapunitive scores (i.e., those above the mean) and SRDS scores at six weeks post-partum.

Rotter's Externality-Internality (E-I) locus of control scale (Rotter, 1966) purported to measure a unitary, normally distributed expectancy about whether control over reinforcement was determined by one's own behaviour (Internality) or by the behaviour of others or chance (Externality). Later studies reported more specific dimensions of locus of control although some of these were psychometrically dubious, chiefly because of factors that comprised too few items or were excessively homogeneous. Of the less questionable, Levenson's (1973) scale had three factors: Internal, Powerful Others and Chance, and Paulhus's (1983) Spheres Of Control (SOC) questionnaire comprised three concentric components: personal efficacy, interpersonal and socio-political. Notwithstanding developments, maternity studies have generally relied on Rotter's original scale, and have yielded inconsistent results.

Dimitrovsky, Perez-Hirshberg and Itskowitz (1987) obtained scores on Rotter's E-I scale during the last trimester of pregnancy, and SRDS scores between four and eight weeks post-partum from 54 primiparae. A criterion for externality of nine or over on Rotter's E-I scale was invoked, but the difference in SRDS score between externals and internals was not significant. Hayworth *et al* (1980, *supra*), however, reported that the mean SRDS score at six weeks post-partum of women scoring 11 or over on Rotter's scale at 36 weeks pregnancy was substantially greater than women scoring 10 or below. When HDHQ scores at 36 weeks pregnancy were divided into extrapunitive and intropunitive (according to a mean split of Dir H scores), the association between locus of control and depression scores was significant for the intropunitive group only. Hayworth *et al*'s findings suggest two vulnerable groups: extrapunitive/hostile, and intropunitive/external.

Molfese *et al* (1987) observed significant correlations between scores on Rotter's E-I scale in the eighth month of pregnancy and duration of the first stage of labour. Locus of control was also significantly associated with one- and five-minute Apgar scores.

The Interpersonal Sensitivity Measure (IPSM - Boyce and Parker, 1989) was not developed specifically for use with maternal women, but Boyce, Parker, Barnett, Cooney and Smith (1991) demonstrated that it could be used prospectively during the second trimester of pregnancy to identify women at increased risk of depression by six months post-partum. An original pool of 73 items were answered on a four-point Likert-type scale of agreement by 265 patients waiting to see a general practitioner. Following serial principal components analyses with oblique rotation, 36 items remained on five factors: interpersonal awareness, need for approval, separation anxiety, timidity and fragile inner-self. With a terminal oblique solution, there is a substantial risk of correlated factors, and with the exception of the correlation between need for approval and fragile inner-self ($r=0.08$), all other subscale intercorrelations ranged between 0.26 and 0.47. A total IPSM score retest correlation of 0.7 was reported over six weeks in a student population, but IPSM scores showed some sensitivity to depressive status in a clinical group. All 36 IPSM items were worded in the same direction which makes the entire measure susceptible to response set.

Second trimester overall IPSM scores correlated substantially with concurrent EPI-N, but second trimester EPI-N scores failed to compete with overall IPSM scores in predicting BDI or EPDS scores at six months post-partum. The IPSM's capacity to predict EPDS sores was stronger than its capacity to predict BDI scores, but only overall IPSM rather than subscale scores were significantly related to post-partum depression scores. Although the BDI was administered during the second trimester of pregnancy (when a significant correlation with the IPSM was observed), the EPDS was not, and no post-partum IPSM scores were reported. It was not, therefore, possible to evaluate the progression and interrelationships of IPSM and EPDS scores over the childbearing cycle.

O'Hara *et al* (1991) evaluated a vulnerability model of depression in maternal women and in a matched comparison group. Matching of maternal and non-maternal subjects was achieved by asking maternal women to nominate acquaintances that resembled themselves sociodemographically. Unfortunately, the only individual differences vulnerability measure used was the Self-Control Questionnaire (SCQ - O'Hara *et al*, 1982; Rehm, Kornblith, O'Hara, Lamparski, Romano and Volkin, 1981). The SCQ comprises 41 items answered on a seven-point Likert scale of agreement. The SCQ had previously been significantly associated with both ante-partum and post-partum depression (O'Hara *et al*, 1984; O'Hara *et al*, 1982). The SCQ was completed prior to or during the second trimester of pregnancy and scores were entered into regression equations predicting post-partum depression after sociodemographic and depression history variables had already been entered. Separate regressions were computed for depressive symptomatology (i.e., BDI scores at nine weeks post-partum) and diagnostic status (i.e., caseness following the nine-weeks-post-partum assessment according to the SADS and RDC).

The entry of SCQ scores was significant only for the childbearing subjects with reference to depressive symptomatology (i.e., it was not a significant entry for non-childbearing subjects whether in respect of symptomatology or diagnostic status, and it was not a significant entry for childbearing subjects in respect of diagnostic status). After life stress variables had been entered, the SCQ x stress interaction term was also a significant addition to the regression equation predicting symptomatology for the childbearing group, but no such interaction

featured in the regression equation predicting symptomatology for the non-childbearing group. Regressions of diagnostic status on the same sets of predictor variables did not feature any significant SCQ x stress interactions. These observations are inconsistent with the notion that interactions of stress and vulnerability measures are less likely to be observed in a childbearing sample because of uniformly elevated stress (please see *1.15 Social support as a protective asset*).

A recent advance in the context of individual differences and the moderation of the stress-illness relationship has been the development of the Emotion Control Questionnaires (ECQ - Roger and Nesshoever, 1987; ECQ2 - Roger and Najarian, 1989). Emotional control was defined as "the tendency to inhibit the expression of emotional responses" (Roger and Nesshoever, 1987, p527). Emotion control can be contrasted with the Eysencks' Neuroticism; whereas Neuroticism represents a biogenetically based tendency to experience emotion, emotion control refers to the particular ways in which individuals deal with or process that emotion.

The repression or "bottling up" of emotion has long been thought to have a deleterious effect on health. Experiments in which arousal (indexed by, e.g., galvanic skin response) was measured in "sensitisers" and "repressors" following exposure to stressful stimuli (typically a film depicting an industrial accident) revealed greater arousal in repressors, notwithstanding their characteristic denial of subjectively experienced anxiety (Lazarus and Alfert, 1964). The link between chronically elevated levels of activity in the hypothalamic-pituitary-adrenal axis and their effects on both the immune and cardiovascular systems has been detailed by Asterita (1985) and Krantz and Manuck (1984). Impaired immune functioning arises from cortisol, a glucocorticoid secreted from the adrenal cortex which, in large and sustained concentrations, diminishes the number and effectiveness of white blood cells. Sustained levels of adrenalin, secreted from the adrenal medulla, promote injury to the endothelial lining of arteries and the development of artheromatous plaques. Its effects may be mechanical (exacerbated by hypertension) and through the mobilisation of levels of free fatty acids beyond metabolic requirements.

A scale which purported to measure Repression-Sensitisation (the R-S Scale) was introduced by Byrne (1961). In its original form it comprised 186 items reproduced from six scales of Hathaway and McKinley's (1951) MMPI, although it was subsequently reduced to 127 items (Byrne, Barry and Nelson, 1963). Several studies, however, expressed doubt that the scale actually measured repression-sensitisation, or that it measured a unitary construct at all. Abbott (1972) reported that the R-S scale is confounded with social desirability and Budd and Clopton (1985) argued that the scale is actually an index of psychopathology. Carlson (1979) extracted five factors from the R-S scale, but none of these was internally coherent. Roger and Schapals (1995) extracted four factors, only one of which appeared to measure emotional expression, and this comprised only 12 items. The shortcomings of the R-S scale provided the impetus to development of the Emotion Control Questionnaires.

The second of these (ECQ2) comprised 56 items equally distributed across four subscales derived following principal axis factoring and Varimax orthogonal rotation (Kaiser, 1958). Rehearsal (R), is a rumination scale measuring a tendency to dwell on emotionally significant events or situations. Emotional Inhibition (EI), measures a tendency to express or inhibit emotion, and is the closest conceptual cousin of repression-sensitisation. Aggression Control (AC), measures a tendency to withhold or discharge hostile feelings and Benign Control (BC), is essentially a measure of impulsiveness. The factors were reported to be statistically independent of one another, with the exception of a modest correlation between AC and BC. Satisfactory internal and retest reliability coefficients were reported for all of the factors, and concurrent validation with a range of existing rating scales was also established. Rehearsal correlated significantly with both EPI-N and EPQ-N, although in the former case the relationship was accounted for primarily by EPI-N's Social Sensitivity component. Similarly, Emotional Inhibition correlated significantly with both EPI-E and EPQ-E, although in the former case the relationship was accounted for primarily by EPI-E's Sociability component. Aggression Control correlated in expected ways with HDHQ scores, particularly Acting out Hostility (AH). Benign Control correlated significantly with EPI-E, although the relationship was accounted for primarily by EPI-E's Impulsivity component. Benign Control correlated significantly with EPQ-P (but not with EPQ-E) and with the I5 index of Impulsivity (Eysenck and Eysenck, 1978).

Field studies have confirmed the candidature of emotion control, particularly Rehearsal, as an index of vulnerability. Roger and Jamieson (1988) measured the time taken for heart rate to return to resting levels following exposure to a laboratory stressor. Partial correlations were computed between mean heart rate in the first post-stressor minute and the four emotion control subscales, having statistically controlled pre-stressor resting (baseline) and peri-stressor (reactivity) levels. The partial correlation with Rehearsal was significant, and when the calculations were repeated having substituted EPI-E and EPI-N for the ECQ subscales, no significant relationships were observed. The results lent support to the argument that Rehearsal tends to prolong autonomic arousal, and is a more refined index of susceptibility than Neuroticism.

Roger (1988) measured urinary free cortisol in student nurses who had recently sat an important written examination and compared the observed levels with baseline levels two weeks later. A cortisol index was derived by expressing the difference in cortisol levels over the two occasions as a proportion of the baseline. Once again, Rehearsal correlated significantly with the cortisol index whereas neither EPI-E nor EPI-N did so. The results also support the notion that Rehearsal underlies excessive autonomic arousal.

It is well established that the average duration of labour is greater in women giving birth for the first time (e.g., Sweet, 1988) and that, in turn, first-time mothers are more likely to avail themselves of analgesia in labour. Nieland and Roger (1993a) devised a scale of analgesia in labour in which potent analgesics (such as epidurally-administered bupivacaine) were ascribed high values and less potent ones (such as Entonox) were ascribed lower values. The scale was internally consistent in that scores for analgesics used in combination were the sum of the values ascribed to the relevant analgesics used in isolation. Regression equations predicting analgesia score were computed in which age, parity and duration of labour were first statistically controlled. Scores on the ECQ2 subscales, along with EPI N's Hypochondriasis, were then entered individually in order to evaluate their independent contribution to the predictive power of the regression equation (Hypochondriasis was included because, in the original validation studies, it did not correlate significantly with any of the emotion

control subscales and may have comprised a useful additional measure of personality). The additions of Rehearsal and Hypochondriasis only were significant, although the inclusion of the latter was less unexpected since Hypochondriasis represents excessive anxiety over health.

Roger, Jarvis and Najarian (1993) reported a factor analysis of coping strategies in which four styles emerged. Two of these were characterised as adaptive (Detached and Rational) and the remaining two non-adaptive (Emotional and Avoidance). Detached and Rational were negatively associated with Rehearsal, whereas Emotional and Avoidance were positively associated with Rehearsal. Since poor coping styles are plausibly related to psychopathology, it is reasonable to suppose that emotion control might be implicated in postnatal depression. Hypercortisolaemia, moreover, has been implicated in depression (Checkley, 1992), and Roger's (1988) field study which uncovered raised cortisol levels in high Rehearsers provides a further reason for investigation of emotion control and depression in combination. As discussed previously (please see *1.14 Stress and aetiology*), maternal hypertension may be hazardous for the foetus because of its effects on the placenta, and maternal autonomic arousal may prolong labour. Emotion control may, accordingly, also be a fruitful backdrop for the study of psychosocial factors in the context of obstetrics.

At least two recent reviews of post-partum psychiatric disorders have concluded that this area of study lacks, and would benefit from, more specific instrumentation (Nixon, 1985; Steiner, 1990). The emotion control questionnaires were developed using student samples, and replication of their factorial structure using maternal subjects would be valuable as the development sample would then reflect the target population. The development of new emotion control questionnaires for maternal subjects is reported in Chapter 2. Data pertaining to these new questionnaires appear ubiquitously in the following Chapters.

CHAPTER 2. EMOTION CONTROL QUESTIONNAIRES FOR MATERNAL SAMPLES

2.1 Introduction

In Chapter 1 (please see *1.16 Individual differences as diathesis*), a distinction was drawn between personality and attitudes. Personality was defined as a relatively stable disposition to behave in a particular way, whereas attitude is a learned predisposition to behave in a consistently favourable or unfavourable manner with respect to a given object. It was concluded that most of the rating scales designed for maternal samples have been attitude scales rather than personality questionnaires, and no psychometrically sound individual differences questionnaire has been developed specifically for maternal samples. Such a questionnaire should be developed using responses from subjects who represent the target population (i.e., maternal subjects), and should measure some element(s) of behaviour that are theoretically relevant to the prediction of postnatal depression and obstetric complications. Emotion control was selected as a backdrop against which these criteria might be satisfied.

The definitions of both personality and attitude implied consistency of behaviour. Indeed, the notion of personality is meaningless without the requirement of reliability. Reliability refers to the consistency with which a personality scale measures what it purports to measure, and is usually established by correlating test scores on one occasion with the same subjects' scores on the same test on a second subsequent occasion. Correlations in excess of 0.8 are desirable (e.g., Epstein, 1980). Personality questionnaires must also satisfy the requirement of validity which refers to the confidence with which the questionnaire can be said to measure what it purports to measure. The validity of a scale can be tested internally by intercorrelating its constituent items (using factor analyses and internal reliability measures such as Coefficient Alpha), and externally by correlating the entire scale with concurrent and predictive criteria.

The present chapter reports an attempt to replicate the structure of the emotion control questionnaires on a maternal sample, and investigate whether maternity-specific components of emotion control could be identified. Any new scales that emerged during factor analytic procedures were intended for incorporation in a longitudinal study designed to uncover the extent to which psychosocial measures, including emotion control variables, could be used to predict postnatal depression and obstetric complications in true prospective analyses.

2.2 Method

2.2.1 Pilot and construction of exploratory individual differences questionnaires

A pilot questionnaire was prepared in order to procure raw material for an exploratory individual differences questionnaire. The rationale for the pilot was the derivation of items that would be relevant to maternal subjects. A condensed version of the pilot questionnaire comprises Appendix 1 (the original version had four pages, so allowing plenty of room for free responses).

Questionnaires were left at general practices in York with instructions to practice staff: subjects should be either pregnant or have a child less than one year old, be asked whether they would like to take part, be reassured that participation was anonymous and complete the questionnaire alone so that answers would not be influenced by others.

The pilot was completed by 32 women. Fourteen respondents were pregnant (mean number of weeks pregnant 28.50, SD 5.93; mean age in years 28.71, SD 4.45; mean number of pregnancies including current 1.79, SD 0.98). The remaining respondents had given birth in the past year (mean age of baby in weeks 21.28, SD 17.7; mean age of respondent in years 27.83, SD 4.57; mean number of pregnancies 2.11, SD 1.28).

Thirty-two categories of response were identified, of which five were generated by one respondent only. Of the remainder, the most frequent categories were (number of subjects mentioning category): "health of baby" (23), "presence of partner in labour" (23), "interfering friends or relations" (21), "coping with the baby" (20), "pain in labour" (18), "adequate help from partner" (17), "expected to be a paragon of motherhood" (16), "need for information" (14), "control of analgesia in labour" (14), "wanting to be in control" (14) and "support and cooperation of health professionals" (14). The next most frequent category was "fear of miscarriage" (9).

The response categories obtained in the pilot study were converted into items for an exploratory individual differences questionnaire, with due weight afforded to high response category frequencies. It was impossible to phrase certain categories in terms that were equally applicable to pregnant and post-partum women (e.g., "I frequently imagine how painful childbirth might be" versus "Even though my baby's birth is in the past, I often find myself thinking about the pain I suffered in labour"). Accordingly, two questionnaires were devised (versions for antenatal and postnatal subjects respectively), both of which had 130 items, but only 110 of which were common. Each of the questionnaires included 39 items from an unpublished expanded version of the ECQ2, together with further items designed to bolster themes or constructs otherwise underrepresented.

The possibility of contamination by response set was contended by counterbalancing agreement and disagreement on items similar in content. Each item required a response from 1 (strongly agree) to 4 (strongly disagree). This arrangement was chosen for its enhanced sensitivity over a Yes / No response format and, because it comprised an even number of responses, the subject was effectively forced to agree or disagree, so obviating any tendency to offer a neutral answer consistently.

The antenatal and postnatal versions of the 130-item questionnaires comprise Appendices 2 and 3 respectively.

2.2.2 Subjects

Initially, pregnant subjects were recruited at general practices in North, South and West Yorkshire. The antenatal exploratory individual differences questionnaire, together with a biographic questionnaire, were attached to a covering letter and inserted into an unsealed S.A.E. addressed to the University of York. The questionnaires were distributed by practice staff. The biographic questionnaire and the covering letter comprise Appendices 4 and 5 respectively.

Subjects were also recruited through a popular national parenting magazine ("Mother and Baby") which agreed to carry an appeal for volunteers to help with research into postnatal depression. The advertisement asked pregnant women and women with infants less than one year of age to respond. Pregnant respondents were sent by post the same materials given to subjects recruited at general practices.

Respondents with infants were sent the postnatal version of the exploratory individual differences questionnaire to which an amended version of the Edinburgh Postnatal Depression Scale (EPDS) was attached. (The EPDS instructions were changed to be compatible with the style of instructions on other questionnaires, and Item 10 was reworded to disambiguate reference to deliberate rather than accidental self-harm - Green, Snowden and Statham, 1991). The amended EPDS comprises Appendix 6. Post-partum subjects were also sent a biographic questionnaire and a covering letter (Appendices 7 and 8 respectively).

The postnatal version of the exploratory questionnaire was completed on a second occasion following an interval of 12 weeks, when a 70-item self-report symptom checklist was also included. The symptom checklist was purpose-designed for the present studies and is described in Chapter 3 (please see *3.2.2 Materials*). The derivation of Self-esteem and Tension components from the checklist items is also described in Chapter 3 (please see 3.3 Results). The symptom checklist comprises Appendix 9.

A small number of respondents returned questionnaires with missing answers, and these were omitted from the present analyses. A total of 709 fully completed questionnaires were received (405 antenatal and 304 postnatal). Biographic details of these 709 subjects, distributed by status (antenatal versus postnatal) and source (of recruitment), are shown in Table 2.1.

	ANTENATAL			POSTNATAL			ALL
	G Prc N=227	Mag A N=178	Sub t N=405	G Prc N=013	Mag A N=291	Sub t N=304	Total N=709
MEAN AGE IN YEARS (SD)	26.86 (5.3)	26.56 (4.8)	26.64 (5.0)	29.39 (5.0)	27.86 (5.0)	27.92 (5.0)	27.19 (5.0)
MEAN AGE LEFT FULL-TIME EDUCATION (SD)	17.15 (2.2)	18.11 (2.9)	17.57 (2.6)	18.15 (2.6)	18.00 (2.8)	18.01 (2.8)	17.76 (2.7)
PERCENT GAINFULLY ENGAGED WHEN LAST BECAME PREGNANT*	71.56	71.35	71.46	84.62	80.41	80.59	75.39
PERCENT RETURNED OR PLANNING TO RETURN TO WORK	39.56	44.94	41.94	69.23	55.86	56.44	48.16
PERCENT SMOKERS	20.26	16.29	18.52	7.69	15.81	15.46	17.21
PERCENT LIVING WITH A HUSBAND OR OTHER PARTNER	92.51	88.20	90.62	100.00	92.10	92.43	91.40
PERCENT THIS PREGNANCY* PLANNED	73.45	67.98	71.04	76.92	71.97	72.19	71.53
PERCENT WITH BABY <1 YR WHEN LAST BECAME PREGNANT*	4.85	11.24	7.65	0.00	6.87	6.58	7.19
PERCENT MORNING SICKNESS IN THIS PREGNANCY*	63.00	73.03	67.41	53.85	67.24	66.67	67.09
MEAN WEEKS PREGNANT (SD)	26.43 (9.7)	24.11 (9.6)	25.41 (9.7)	- -	- -	- -	- -
OR MEAN AGE OF BABY IN WEEKS (SD)	- -	- -	- -	7.00 (9.5)	24.59 (13.1)	23.95 (13.4)	- -
PERCENT PRIMIGRAVIDAE	37.45	37.08	37.28	-	-	-	-
PERCENT NULLIPARAE	47.14	55.62	50.86	-	-	-	-
PERCENT PRIMIPARAE	38.33	29.78	34.57	76.92	66.21	66.67	48.31
MEAN NUMBER OF PREGNANCIES (SD)	2.1 (1.1)	2.1 (1.3)	2.1 (1.2)	2.1 (1.8)	1.8 (1.1)	1.8 (1.2)	2.0 (1.2)
MEAN PARITY (SD)	0.7 (0.8)	0.6 (0.8)	0.7 (0.8)	1.4 (0.8)	1.5 (0.7)	1.5 (0.7)	1.0 (0.9)

Abbreviations: G Prc = General Practices
Mag A = Magazine Appeal
Sub t = Sub-total

* If postnatal, referent is last full-term pregnancy

TABLE 2.1 SUBJECTS' BIOGRAPHIC DETAILS DISTRIBUTED BY STATUS AND SOURCE.

2.2.3 Construction of final questionnaires

All 709 responses to the 110 common items were screened for extreme response frequencies. Ten items, to which over 90% of subjects either agreed (response 1 or 2) or disagreed (response 3 or 4), were omitted, and the remaining 100 items were subjected to principal axis factoring. The resulting factor scree plot is shown in Figure 2.1.

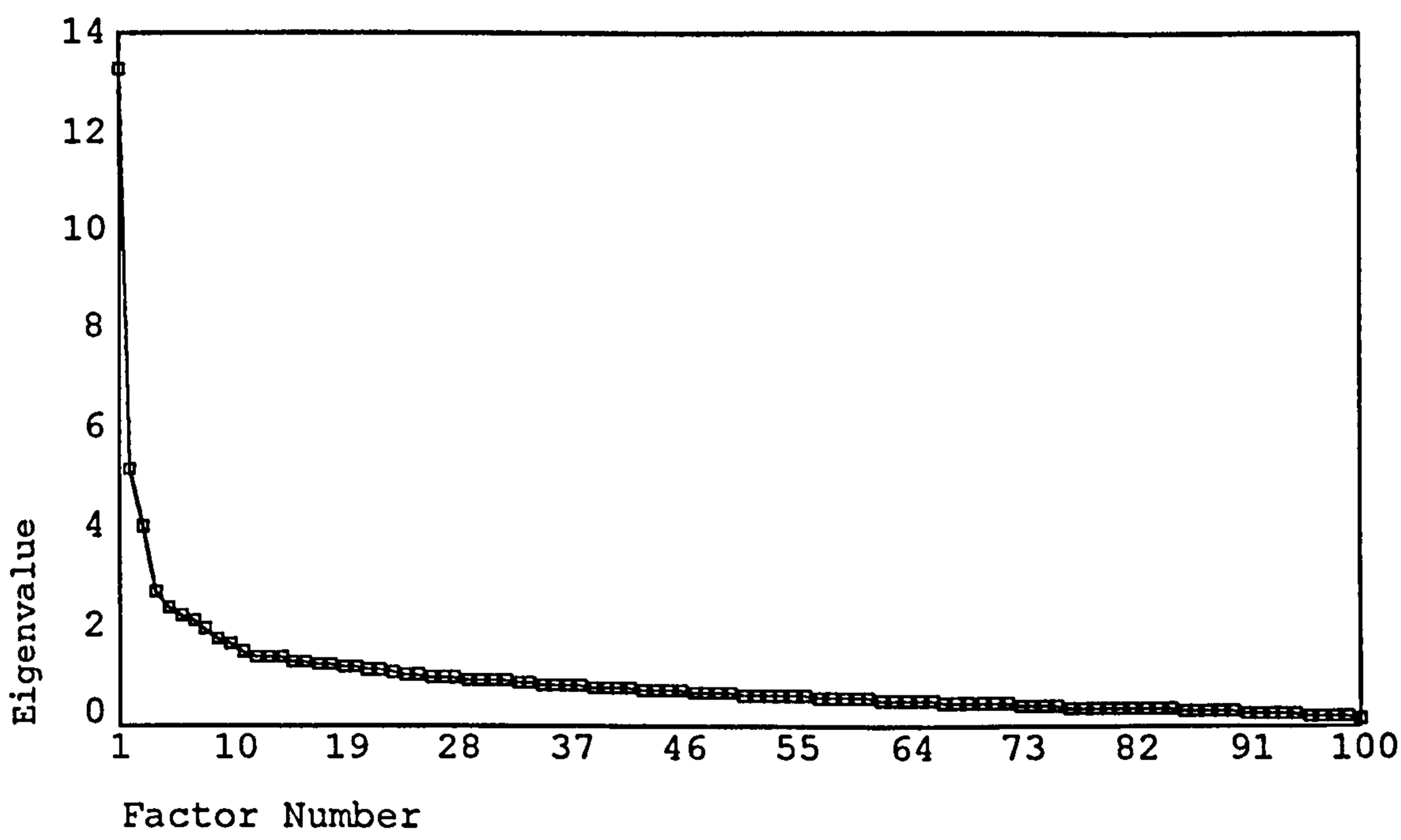


FIGURE 2.1 FACTOR SCREE PLOT FOR 100 COMMON ITEMS.

Kaiser's criterion (or "Eigenvalue 1" in which factors with Eigenvalues exceeding 1 appear in the final solution) suggested 28 factors but, as already mentioned in Chapter 1 (please see *1.16 Individual differences as diathesis*), the rationale for data reduction diminishes as the number of factors in the solution approaches the original number of variables. An alternative to Kaiser's criterion is Cattell's (1978) "scree" test (named after the geological term for rocky debris on mountain slopes). The point on the scree plot at which the slope levels off represents the point at which successive factors no longer explain substantial increments of variance in the factor matrix. A conservative version of the scree test is to select the point at which the first scallop of the

scree plot levels off. This technique tends to yield a relatively small number of factors, each of which is represented by a relatively large number of items. None of these strategies, however, should override inspection of the item content of emerging components in order to check that factors represent coherent aspects of behaviour.

Three and four factor solutions were obtained following Varimax (Kaiser, 1958) orthogonal rotation of the factor matrix (orthogonal factors are desirable because they represent discriminable components of behaviour). The three factor solution closely resembled Rehearsal, Emotional Inhibition and Aggression Control components of the ECQ. The four factor solution included an autonomy factor in which the highest loading items were: "I make my greatest efforts when things are most difficult for me", "I don't let it bother me if friends or relations criticise my behaviour" and "I don't need sympathy or understanding from others". The solution, however, contained many items that loaded substantially on more than one factor (including the second and third highest loading items on the autonomy factor).

Separate analyses were subsequently performed on the antenatal and postnatal data (in both analyses, all 130 items were included). Partitioning the subjects in this way reduced the subject number-to-item number ratio from 7:1 to 4:1 and 3:1 respectively. According to Child (1990), large ratios reduce the effects of sampling errors, and various criteria for an adequate ratio (anywhere between one and 10) have been stipulated. Guadagnoli and Velicer (1988), however, argued that sample size-to-number of variables ratio rules "lack both empirical support and a theoretical rationale" (p265). Having systematically varied the parameters of a hypothetical data set (sample size, number of variables, number of factors and magnitude of factor loadings), the stability of sample factor patterns relative to the population pattern was governed more by absolute sample sizes than by ratios. The sample size required to produce a stable pattern depended on the number of items per factor and the magnitude of factor loadings. Even where these were both modest (and much more so than in the present analyses), a sample size of 300 was sufficient. Both antenatal and postnatal sample sizes (N=405 and N=304 respectively) satisfied this requirement.

Response frequencies analyses using the same (90%) criterion as previously resulted in the omission of 11 antenatal items and 10 postnatal items. Remaining items were subjected to principal axis factoring. The resulting scree plots are shown in Figures 2.2 and 2.3.

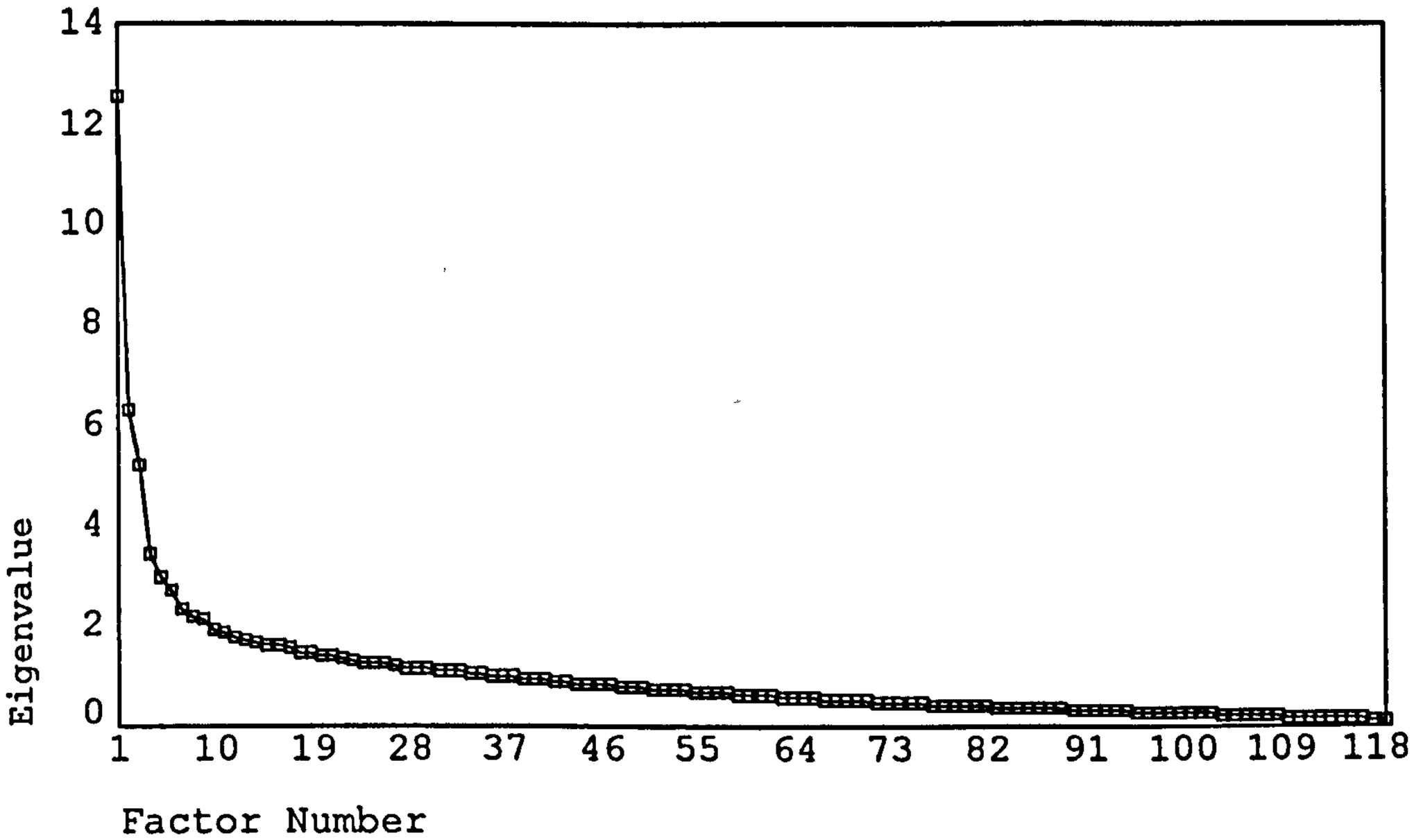


FIGURE 2.2 FACTOR SCREE PLOT FOR 119 ITEMS - ANTENATAL DATA.

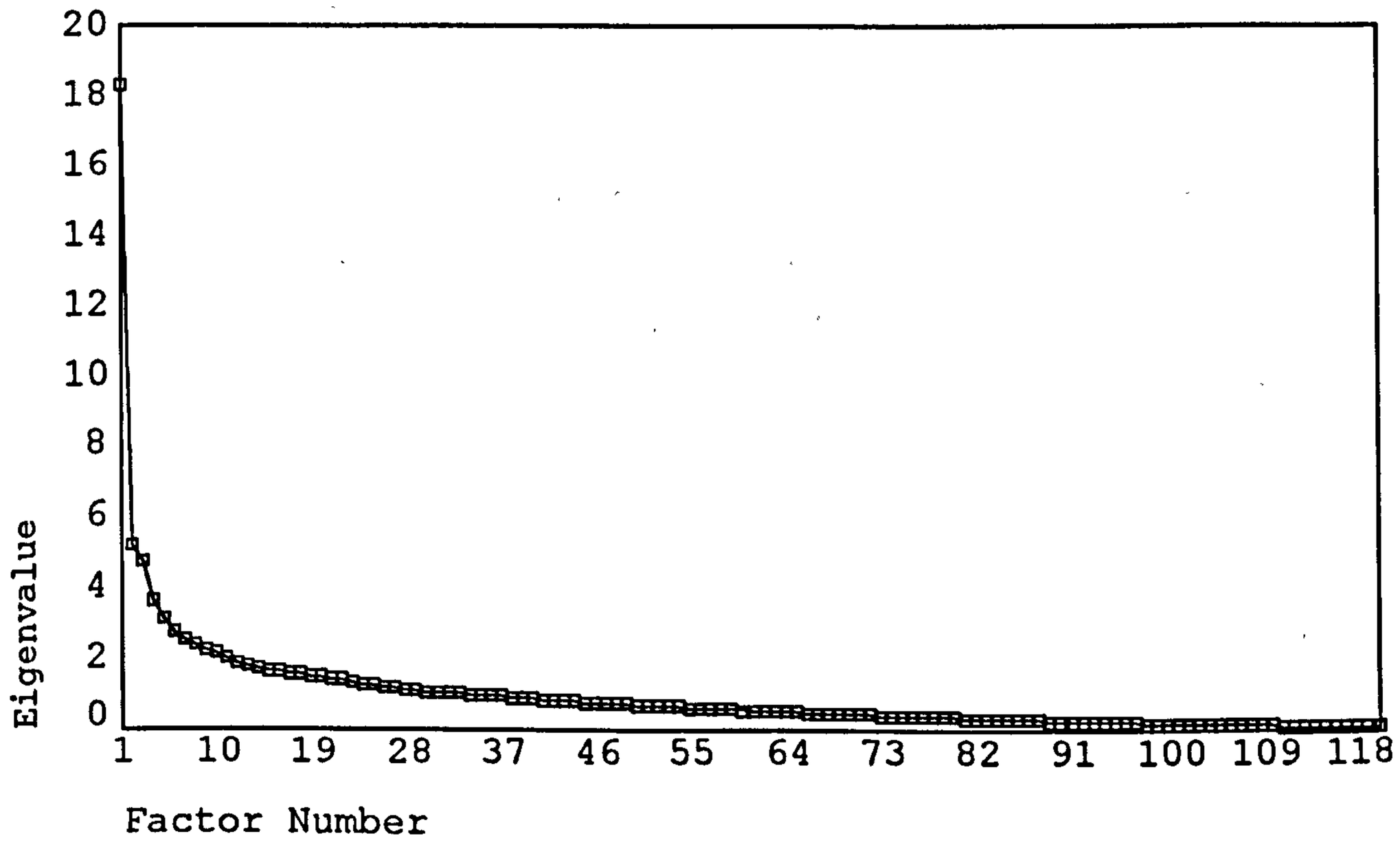


FIGURE 2.3 FACTOR SCREE PLOT FOR 120 ITEMS - POSTNATAL DATA.

Solutions containing between three and eight factors (following Varimax rotation) were considered for both sets of data. For the antenatal data, only the six factor solution yielded a coherent set of factors. A loading criterion of +/- 0.3 was applied and non-loading items, and items loading above this criterion on more than one factor were discarded. The final solution contained 54 items. Four factors closely resembled the four ECQ subscales, and were assigned equivalent names with the suffix "-A" to denote antenatal.

The first new factor was named Maternal Autonomy. It comprised nine items (in descending order of loadings): "Motherhood comes naturally to me", "Becoming pregnant is the best thing that ever happened to me", "I don't mind how long labour takes, I know it will be over eventually", "I never doubt that I will love my baby", "Looking after a newborn baby is mostly a matter of instinct, so I don't try to plan everything in advance", "I have already worked out a routine that I will follow with my new baby", "For some women there are more fulfilling things than motherhood" (negative loading) and "If someone tells me I'm doing something wrong, I ignore it and get on with things my own way".

The second new factor was named Maternal Anxiety. It comprised eight items (in descending order of loadings): "I worry about the health of my baby", "I sometimes wonder whether I am doing all the right things for my baby", "Even though my baby isn't born yet, I am already wondering how I will cope", "It is important to me that I sometimes receive praise or reassurance about being a mother", "I often think about the impact that having a baby might have on my own health", "I frequently imagine how painful childbirth might be", "I never worry about money" (negative loading) and "I am seldom preoccupied with thoughts about events which may happen in the future" (negative loading).

The six-factor solution was checked with an oblique rotation which did not yield a significantly different solution to the factor structure derived following orthogonal rotation, shown in Table 2.2. The new six subscale questionnaire was named ECQ-A, where "-A" denotes antenatal. The ECQ-A, together with its scoring key, comprise Appendix 10.

Item No.	ECQ-A FACTORS					
	REHEARSAL	EMOTIONAL INHIBITION	AGGRESSION CONTROL	MATERNAL AUTONOMY	MATERNAL ANXIETY	BENIGN CONTROL
54	0.77	0.06	0.03	0.00	0.11	-0.06
48	0.75	-0.00	0.03	0.03	0.18	-0.03
40	0.69	-0.03	-0.10	-0.02	0.25	-0.02
04	0.67	0.10	-0.04	-0.02	0.10	-0.07
31	0.65	0.02	0.06	0.13	0.10	-0.16
11	0.62	0.09	0.09	0.06	0.04	-0.04
22	0.52	0.10	-0.04	0.00	0.15	-0.11
08	-0.44	-0.08	0.16	0.13	-0.26	0.01
44	-0.42	-0.02	-0.11	0.11	-0.05	0.15
33	-0.34	-0.15	0.08	0.10	-0.19	0.11
14	0.08	-0.68	0.02	0.11	0.01	-0.04
42	0.02	0.65	0.01	-0.01	-0.05	0.03
53	0.04	0.62	-0.08	-0.04	0.14	0.11
38	-0.02	0.62	-0.02	0.12	0.06	0.04
03	0.21	0.54	-0.11	-0.15	0.15	-0.20
07	-0.14	-0.48	0.26	0.13	-0.06	0.13
02	0.15	0.44	-0.01	0.07	-0.08	0.00
32	0.17	-0.39	0.12	0.17	0.07	-0.08
15	0.22	0.35	-0.12	-0.05	0.05	-0.04
50	0.07	0.32	-0.06	0.05	-0.04	0.01
19	0.06	0.16	-0.62	-0.01	0.02	-0.08
27	0.04	0.27	-0.56	0.02	-0.05	-0.01
37	0.15	-0.04	0.54	0.09	-0.15	0.11
30	0.14	0.18	-0.54	-0.08	-0.08	-0.09
46	0.02	-0.05	0.53	0.10	-0.03	-0.19
05	0.05	0.14	-0.52	0.19	0.08	-0.08
09	0.06	0.09	0.51	0.14	-0.03	-0.12
16	0.04	0.09	0.43	0.19	-0.01	-0.08
20	-0.00	0.26	-0.37	0.20	0.01	0.05
23	0.02	-0.01	0.35	0.20	0.09	-0.21
13	-0.00	-0.08	0.06	0.57	-0.13	0.04
51	-0.10	-0.02	-0.11	0.57	-0.03	-0.01
24	-0.12	-0.16	-0.02	0.50	-0.12	0.02
01	-0.07	-0.01	0.08	0.50	0.05	0.09
21	-0.05	-0.09	0.14	0.40	-0.11	0.14
41	0.04	-0.02	-0.00	0.39	-0.15	0.00
34	0.09	0.00	0.10	0.34	0.04	0.17
25	-0.10	-0.18	-0.07	-0.33	0.07	-0.01
18	0.01	0.10	0.19	0.30	-0.07	-0.07
12	0.13	0.04	0.03	0.00	0.52	-0.07
29	0.10	0.06	0.03	-0.06	0.48	-0.05
47	0.14	0.01	-0.12	-0.20	0.47	-0.05
28	0.08	-0.08	-0.06	0.11	0.44	-0.02
10	0.05	-0.04	0.08	-0.17	0.42	-0.01
45	0.20	0.07	-0.03	-0.08	0.39	-0.05
36	-0.20	-0.03	0.05	0.08	-0.35	0.09
06	-0.24	0.07	0.02	0.15	-0.34	-0.06
49	0.06	0.01	0.01	0.17	0.08	0.54
35	0.23	0.04	0.06	0.19	0.07	-0.50
26	0.23	0.02	0.12	0.08	0.17	-0.46
17	-0.08	0.05	-0.11	0.09	-0.16	0.45
39	-0.19	-0.00	-0.04	0.05	-0.13	0.43
43	-0.02	0.21	0.23	0.10	-0.09	0.38
52	-0.06	-0.01	0.01	0.17	0.12	0.31

TABLE 2.2 ITEM LOADINGS FOR THE SIX ROTATED FACTORS OF THE ECQ-A.

Correlations among the six ECQ-A subscales (unweighted factor scores) are shown in Table 2.3 along with descriptive statistics and internal reliability coefficients.

	ECQ-A FACTORS					
	REHEARSAL	EMOTIONAL INHIBITION	AGGRESSION CONTROL	MATERNAL AUTONOMY	MATERNAL ANXIETY	BENIGN CONTROL
R	-	0.19‡	0.02	-0.09	0.40‡	-0.29‡
EI		-	0.26‡	-0.12*	0.08	-0.01
AC			-	-0.15†	0.05	0.07
M AUT				-	-0.23‡	0.12*
M ANX					-	-0.19‡
Mean score (SD)	24.70 (4.7)	23.50 (4.0)	24.31 (4.1)	23.16 (3.5)	22.60 (3.0)	16.83 (2.6)
Min. score	13	13	11	14	16	9
Max. score	37	36	35	33	32	26
Coeff. Alpha	0.86	0.78	0.77	0.69	0.68	0.65

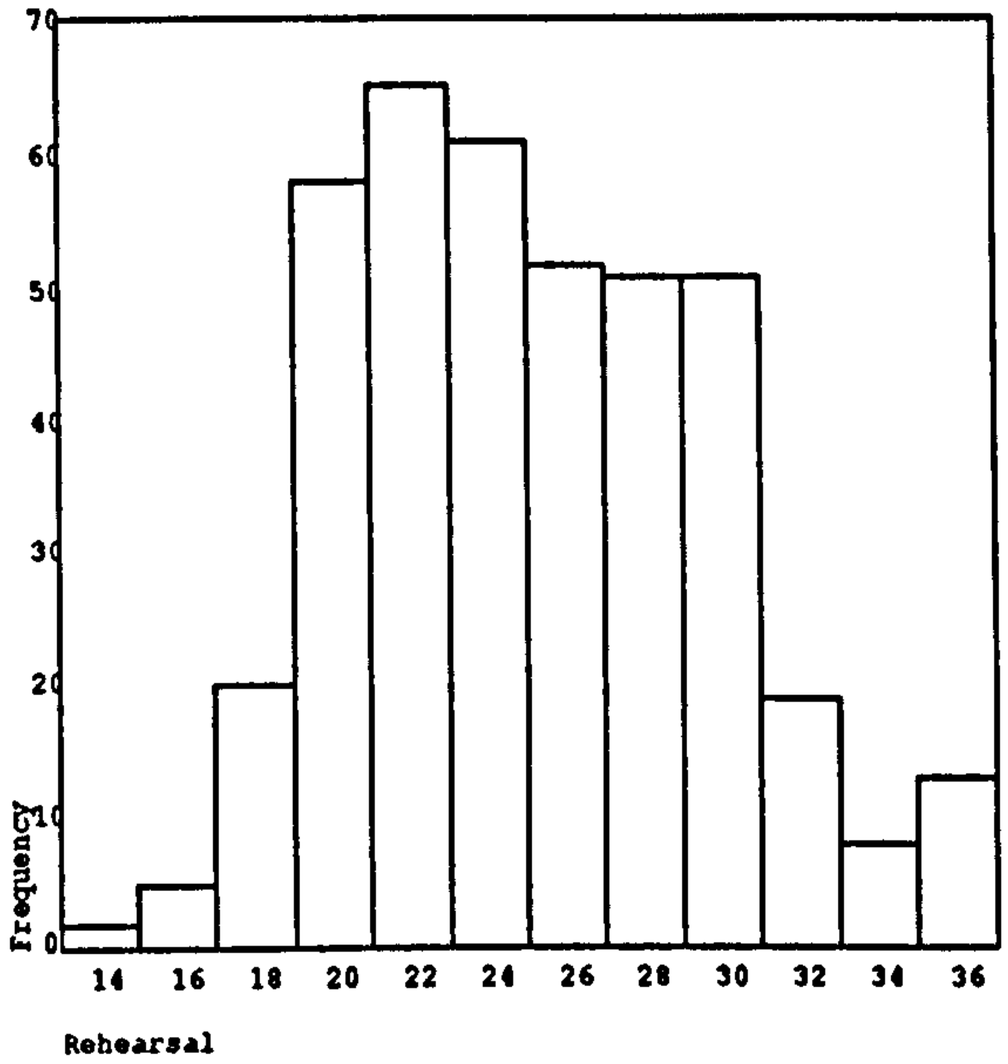
* $p<0.05$
† $p<0.01$
‡ $p<0.001$

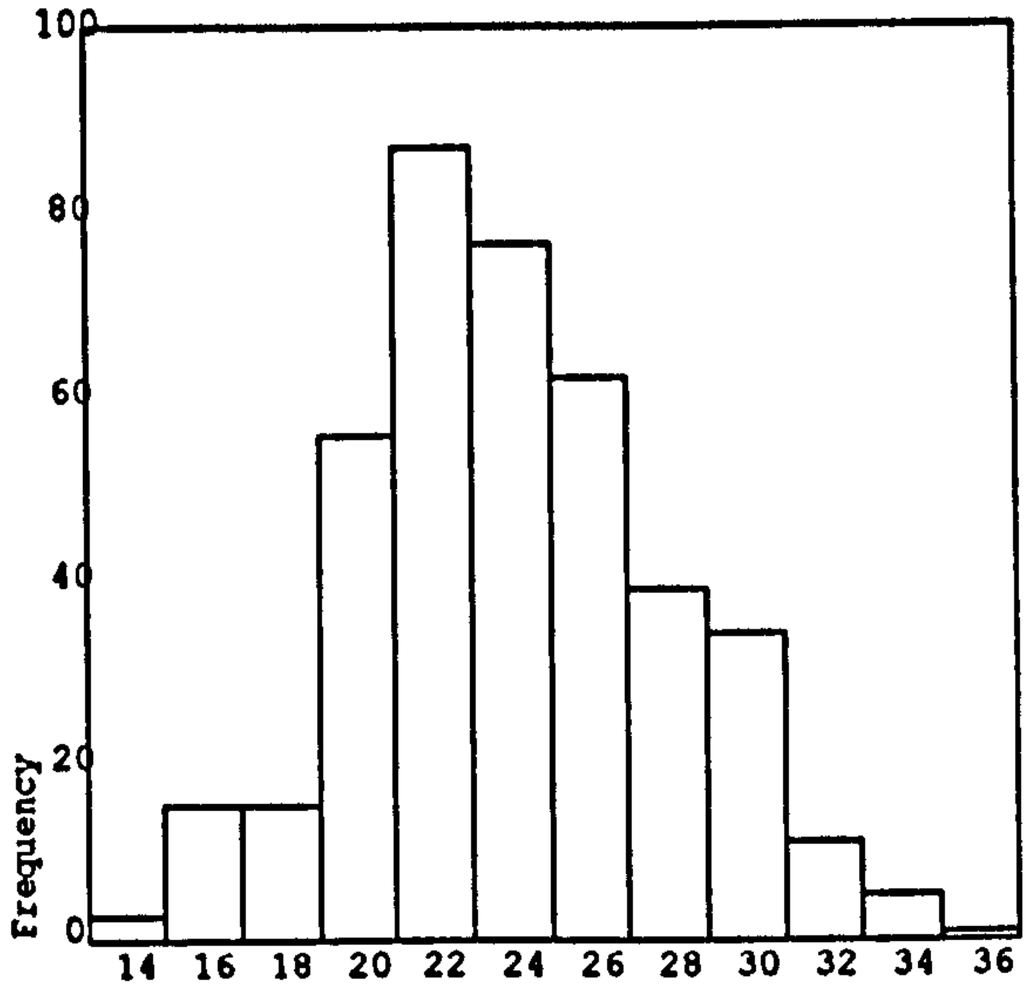
TABLE 2.3 CORRELATIONS AMONG FACTORS, DESCRIPTIVE STATISTICS AND INTERNAL RELIABILITY COEFFICIENTS FOR THE ECQ-A.

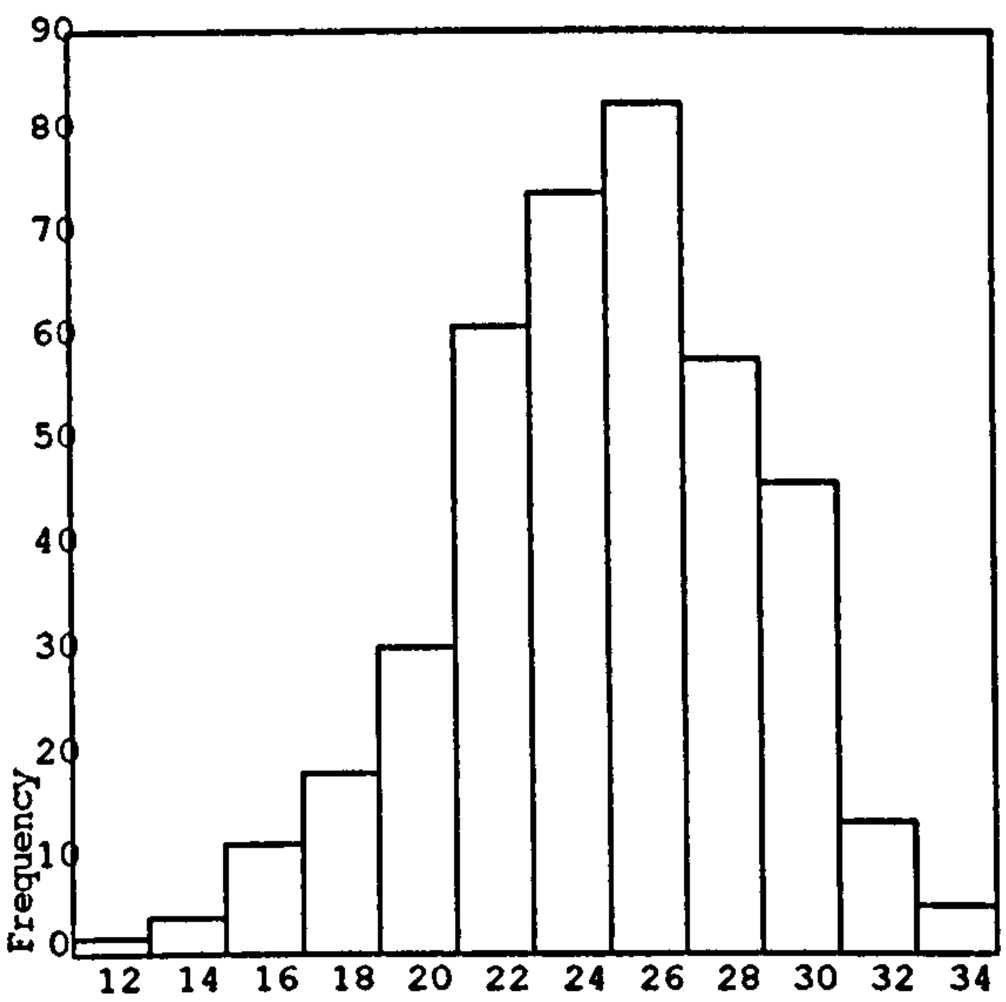
Roger and Nesshoever (1987) and Roger and Najarian (1989) reported that the four ECQ subscales were mutually orthogonal with the exception of a modest correlation between Aggression Control and Benign Control. In the present study, stronger relationships between the ECQ-A subscales emerged. Rehearsal was positively associated with Emotional Inhibition and Maternal Anxiety, but negatively associated with Benign Control. Emotional Inhibition was positively associated with Aggression Control and to a lesser extent negatively with Maternal Autonomy. Maternal Autonomy was negatively associated with Maternal Anxiety and Aggression Control. Benign Control was associated positively with Maternal Autonomy and negatively with Maternal Anxiety. The strongest relationship was

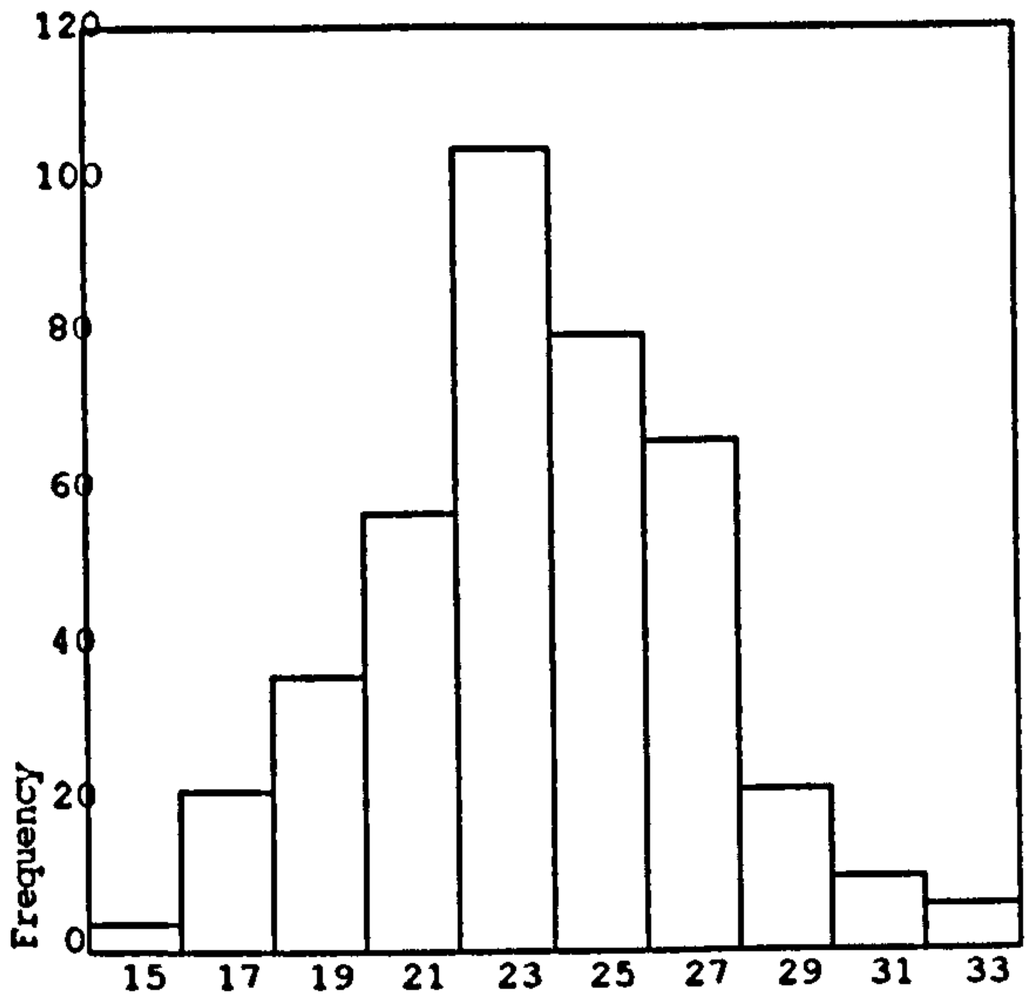
between Rehearsal and Maternal Anxiety, although the shared variance was only 16%. The remaining correlations, including that between Benign Control and Aggression Control, were not significant.

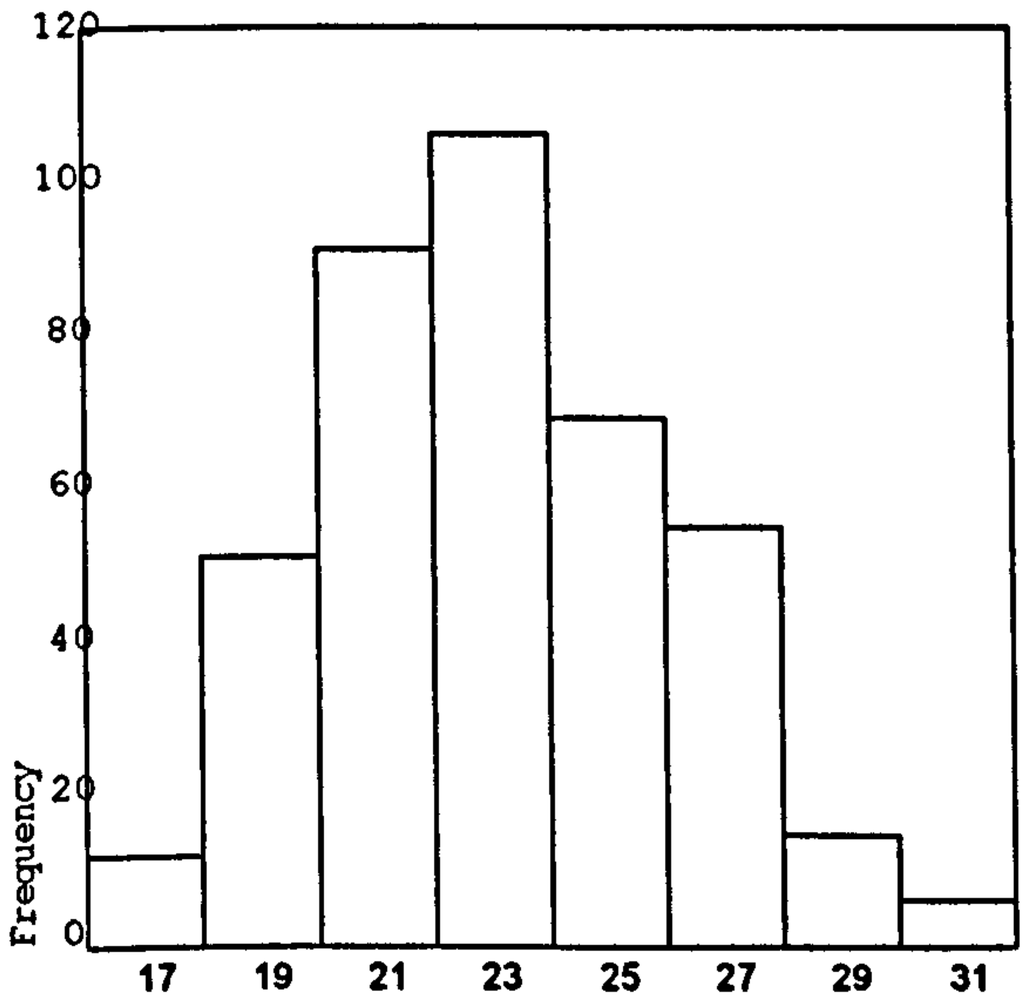
Figure 2.4 shows frequency distributions for scores on the six ECQ-A subscales. There were 405 cases in each distribution. All distributions were approximately normal. There were no serious floor or ceiling effects, although there was an unexpected number of high Rehearsal scores.











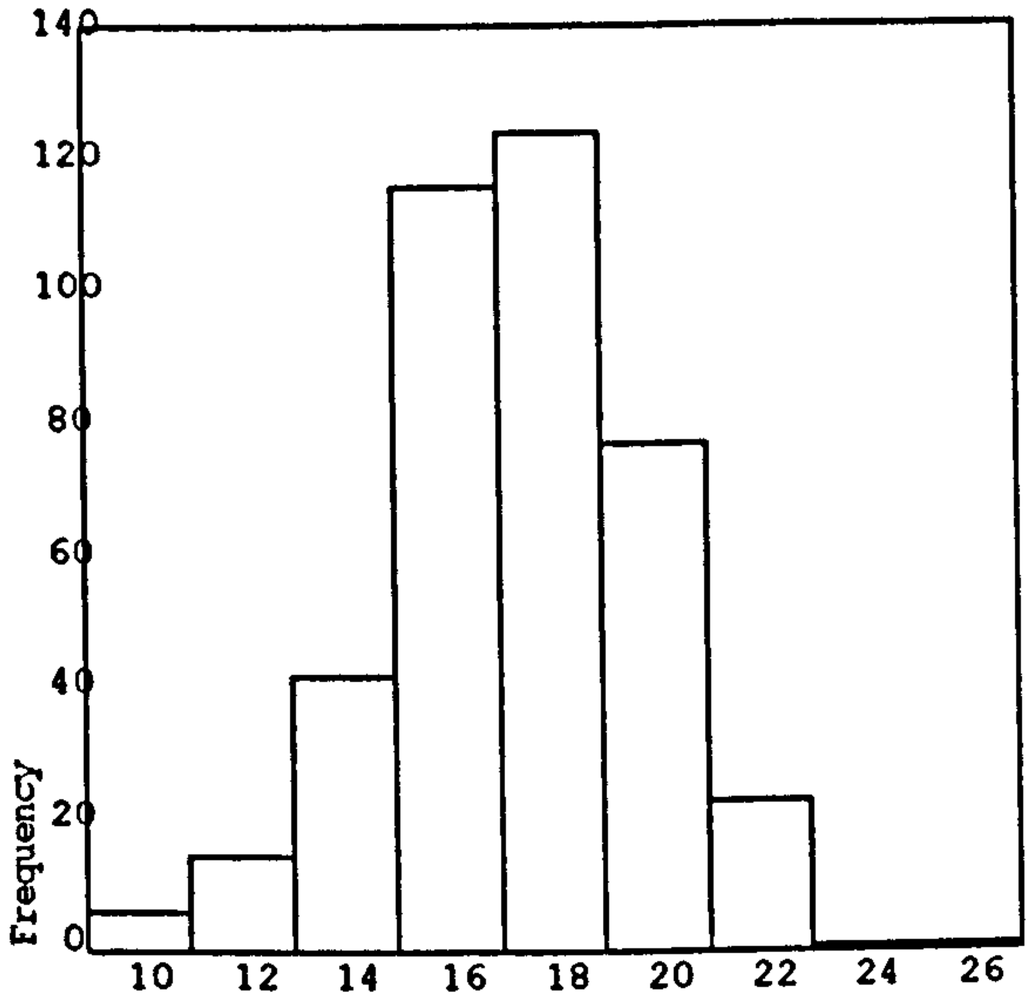


FIGURE 2.4 FREQUENCY DISTRIBUTIONS FOR THE SIX ECQ-A SUBSCALES.

With respect to the postnatal data, only the four factor solution yielded a coherent set of factors. A loading criterion of +/- 0.3 was applied and non-loading items, and items loading above this criterion on more than one factor were discarded. The final solution contained 44 items. Three factors closely resembled Rehearsal, Emotional Inhibition and Aggression Control ECQ subscales, and were assigned equivalent names with the suffix "-P" to denote postnatal.

The new factor was named Maternal Discomfort. It comprised eleven items (in descending order of loadings): "I sometimes feel that I endure rather than enjoy motherhood", "I often wish I had never become pregnant", "A mother's duties are often tiresome and boring", "Becoming a mother is the best thing that ever happened to me" (negative loading), "I resent the loss of freedom to enjoy my own interests that comes with having a baby", "Motherhood comes naturally to me" (negative loading), "I frequently wish I had more time to myself", "I am never sure I understand all my baby's needs", "Motherhood is a lonely occupation - people don't understand how isolated a mother can be", "Sometimes I wonder whether I chose the right method of feeding my baby" and "I have had no trouble deciding whether to breast or bottle feed" (negative loading).

The four-factor solution was checked with an oblique rotation which did not yield a significantly different solution to the factor structure derived following orthogonal rotation, shown in Table 2.4. The new four subscale questionnaire was named ECQ-P, where "-P" denotes postnatal. The ECQ-P, together with its scoring key, comprise Appendix 11.

Item No.	ECQ-P FACTORS			
	REHEARSAL	MATERNAL DISCOMFORT	AGGRESSION CONTROL	EMOTIONAL INHIBITION
11	0.83	0.12	0.02	0.05
34	0.81	0.10	-0.02	0.13
26	0.76	0.17	-0.06	0.06
04	0.75	0.14	-0.04	0.11
39	0.67	0.18	-0.04	0.07
17	0.67	0.28	-0.04	0.15
22	0.63	0.08	0.10	0.03
30	-0.61	-0.14	0.16	0.09
08	-0.61	-0.15	0.02	-0.05
38	-0.49	-0.26	0.09	0.04
12	-0.38	0.03	-0.12	-0.02
35	0.34	0.16	-0.00	0.14
05	-0.33	-0.12	0.18	-0.01
43	0.33	0.20	-0.01	0.02
25	-0.31	-0.20	0.18	-0.02
41	-0.30	-0.29	0.05	0.12
18	0.21	0.77	-0.06	-0.03
32	0.16	0.67	-0.04	0.09
09	0.10	0.63	0.01	0.05
40	-0.03	-0.63	0.05	0.14
15	0.11	0.62	-0.02	-0.04
24	-0.06	-0.60	0.09	0.07
03	0.21	0.57	0.12	0.04
27	0.11	0.42	-0.04	0.06
21	0.24	0.38	-0.07	0.07
36	0.19	0.37	-0.04	0.09
07	-0.12	-0.36	-0.08	0.01
14	0.11	0.01	0.63	0.13
23	0.01	-0.10	0.58	0.05
37	0.13	0.04	-0.58	0.01
28	-0.02	0.09	-0.53	0.02
06	-0.05	0.07	0.51	-0.03
02	0.09	0.12	-0.51	0.06
20	0.19	0.02	0.45	0.18
42	0.17	0.01	-0.44	0.22
13	0.13	0.14	-0.42	0.17
31	0.22	-0.09	-0.39	0.06
10	0.12	0.11	0.38	0.06
29	0.08	-0.02	0.10	0.77
16	0.13	0.13	-0.02	0.69
44	-0.08	0.03	0.00	-0.67
01	0.08	0.02	-0.16	0.66
33	0.11	-0.01	0.12	0.53
19	0.22	0.05	0.14	-0.39

TABLE 2.4 ITEM LOADINGS FOR THE FOUR ROTATED FACTORS OF THE ECQ-P.

Correlations among the four subscales of ECQ-P (unweighted factor scores) are shown in Table 2.5 along with descriptive statistics and internal reliability coefficients.

	ECQ-P FACTORS			
	REHEARSAL	MATERNAL DISCOMFORT	AGGRESSION CONTROL	EMOTIONAL INHIBITION
R	-	0.44‡	0.10	0.13*
M DIS		-	0.07	0.04
AC			-	0.04
EI				-
Mean score (SD)	43.28 (7.6)	25.10 (5.8)	27.03 (4.6)	14.59 (3.1)
Min. score	21	14	11	6
Max. score	61	41	40	23
Coeff. Alpha	0.89	0.83	0.78	0.79

* p<0.05
† p<0.01
‡ p<0.001

TABLE 2.5 CORRELATIONS AMONGST FACTORS, DESCRIPTIVE STATISTICS AND INTERNAL RELIABILITY COEFFICIENTS FOR THE ECQ-P.

As in the antenatal sample, Rehearsal was positively associated with Emotional Inhibition, although the correlation was smaller in the postnatal sample. Rehearsal was also positively associated with Maternal Discomfort although the shared variance was less than 20%. The remaining correlations were not significant, including that between Emotional Inhibition and Aggression Control (the corresponding correlation was positive and significant in the antenatal sample).

Figure 2.5 shows frequency distributions for scores on each new ECQ-P subscale. There were 304 cases in each approximately normal distribution. There were no serious floor or ceiling effects, although there were unexpected numbers of high Rehearsal and Emotional Inhibition scores, and a greater than expected number of low Maternal Discomfort scores.

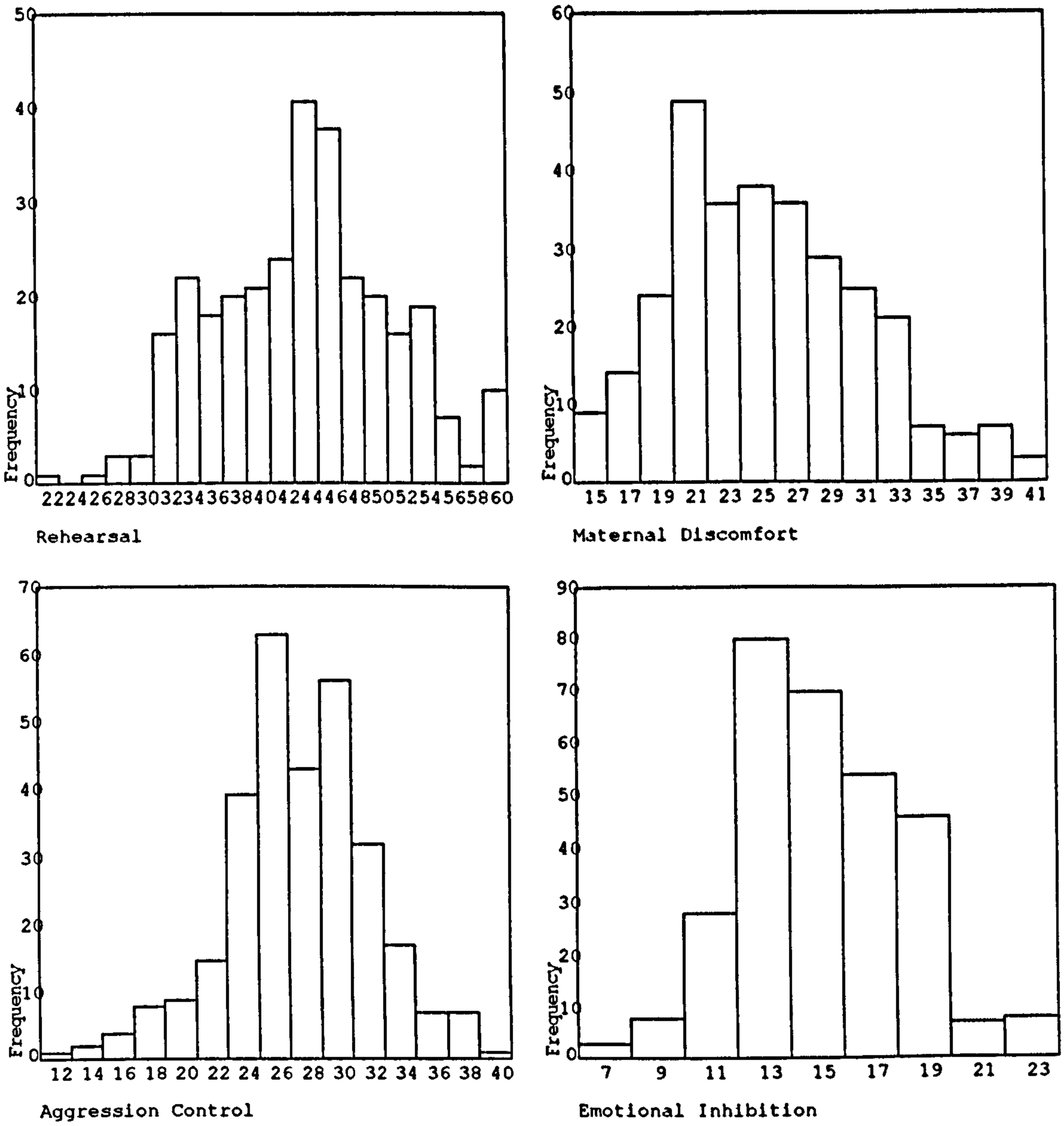


FIGURE 2.5 FREQUENCY DISTRIBUTIONS FOR THE FOUR ECQ-P SUBSCALES.

2.2.4 Retest Reliability

Two-hundred-and-four of the postnatal sample completed the 130-item questionnaire following the 12 weeks follow-up interval, with no missing data from the 70-item symptom checklist and the EPDS. ECQ-P factor scores were calculated using the relevant items, and retest reliability coefficients were all satisfactory: Rehearsal, 0.84; Aggression Control, 0.84; Emotional Inhibition, 0.70; Maternal Discomfort, 0.83.

Table 2.6 shows retest correlations for ECQ-A and ECQ-P subscales across stages of the longitudinal study described in Chapter 6 (please see *6.2.2 Design and Procedure*). Other data emerging from the longitudinal study, in which the ECQ-A and ECQ-P were incorporated, are reported in Chapters 7 to 11.

	ECQ-A		ECQ-P	
	12-24 WKS ANTENATAL	24-36 WKS ANTENATAL	08-20 WKS POSTNATAL	20-32 WKS POSTNATAL
REHEARSAL-A	0.11 (4)	0.68 (29)	-	-
EMOTIONAL INHIBITION-A	0.93 (4)	0.76 (29)	-	-
AGGRESSION CONTROL-A	0.06 (4)	0.74 (29)	-	-
BENIGN CONTROL-A	0.91 (4)	0.84 (29)	-	-
MATERNAL AUTONOMY-A	0.93 (4)	0.65 (28)	-	-
MATERNAL ANXIETY-A	0.17 (4)	0.76 (29)	-	-
REHEARSAL-P	-	-	0.87 (91)	0.86 (124)
EMOTIONAL INHIBITION-P	-	-	0.83 (93)	0.81 (124)
AGGRESSION CONTROL-P	-	-	0.85 (92)	0.81 (122)
MATERNAL DISCOMFORT-P	-	-	0.78 (91)	0.84 (124)

TABLE 2.6 RETEST CORRELATIONS (DF) FOR ECQ-A AND ECQ-P SUBSCALES ACROSS STAGES OF THE LONGITUDINAL STUDY.

Retest correlations for the ECQ-P were clearly satisfactory in both samples. Subjects were allowed to join the longitudinal study at any antenatal stage, thus subject numbers were fewer for earlier antenatal stages. In addition, there was some delay in incorporating the ECQ-A and ECQ-P into the longitudinal study because of the time taken for them to be developed. For these reasons, only a few subjects were recruited in time to yield retest data for the ECQ-A from 12 to 24 weeks pregnancy, and these were insufficient to generate satisfactory retest coefficients across this interval. Retest correlations for the ECQ-A between 24 and 36 weeks pregnancy were acceptable, although the sample was considerably smaller than those that yielded retest data for the ECQ-P.

2.2.5 Validity

Roger and Nesshoever (1987) and Roger and Najarian (1989) reported extensive concurrent validity for Rehearsal, Emotional Inhibition, Aggression Control and Benign Control (please see *1.16 Individual differences as diathesis*). Additional concurrent validity for the six ECQ-A subscales was derived from correlations with five symptom measures, including the EPDS, at 36 weeks pregnancy; these correlations are shown in Table 2.7. Please see Chapter 3 (3.3 Results) for the derivation of Self-esteem and Tension components from the 70-item symptom checklist (Appendix 9) and Chapter 7 (7.3 Results) for the derivation of Cognitive-affective and Somatic components. NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	SELF-ESTEEM	TENSION	COGNITIVE-AFFECTIVE	SOMATIC	EPDS
REHEARSAL-A	0.61‡	0.49‡	0.60‡	0.41‡	0.60‡
EMOTIONAL INHIBITION-A	0.25*	0.20	0.23	0.18	0.34†
AGGRESSION CONTROL-A	-0.12	-0.21	-0.12	-0.18	-0.11
BENIGN CONTROL-A	-0.29*	-0.31†	-0.34†	-0.29*	-0.34†
MATERNAL AUTONOMY-A	-0.27*	-0.19	-0.25*	-0.17	-0.27*
MATERNAL ANXIETY-A	0.58‡	0.52‡	0.60‡	0.48‡	0.57‡

* p<0.05
† p<0.01
‡ p<0.001

TABLE 2.7 CONCURRENT CORRELATIONS BETWEEN ECQ-A SUBSCALES AND FIVE SYMPTOM MEASURES AT 36 WEEKS PREGNANCY (ALL CORRELATIONS HAVE 69 DF)

Concurrent validity for the ECQ-P subscales was available from two samples. The first comprised subjects who participated in the construction of the ECQ-P (these subjects were not recruited into the longitudinal study), and the second comprised subjects who participated in the longitudinal study (please see Chapter 6).

The first sample completed symptom questionnaires (i.e., the 70-item symptom checklist and the EPDS) following the 12 week retest interval (please see Chapter 2), and the second completed the same symptom questionnaires at eight, 20 and 32 weeks post-partum (please see Chapter 6). The second sample's symptom scores at eight weeks post-partum were selected from the three post-partum occasions for concurrent correlations with the four ECQ-P subscales as there was maximal participation at this stage. With respect to both samples, the relevant symptom measures were confined to post-partum-specific indices, i.e., Self-esteem, Tension and EPDS scores (please see Chapter 3). Correlations between the ECQ-P subscales and symptom scores for both samples are shown in Table 2.8 (correlations for the retest sample, all 177 DF, appear above those for the longitudinal sample, all 106 DF). NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	SELF-ESTEEM	TENSION	EPDS
REHEARSAL-P	0.55‡ 0.57‡	0.50‡ 0.55‡	0.65‡ 0.60‡
EMOTIONAL INHIBITION-P	0.07 0.21*	0.00 0.10	0.09 0.18
AGGRESSION CONTROL-P	0.08 -0.09	-0.07 -0.07	0.10 -0.08
MATERNAL DISCOMFORT-P	0.39‡ 0.45‡	0.34‡ 0.49‡	0.44‡ 0.53‡

* $p<0.05$
‡ $p<0.001$

TABLE 2.8 CONCURRENT CORRELATIONS BETWEEN ECQ-P SUBSCALES AND THREE SYMPTOM MEASURES FOR TWO SAMPLES OF SUBJECTS (177 DF AND 106 DF RESPECTIVELY).

In addition to the foregoing, concurrent correlations between the four ECQ-P subscales and symptoms during the first post-partum week are shown in Table 4.3. Predictive validity for the ECQ-A and ECQ-P subscales is presented in Chapters 9, 10 and 11.

2.3 DISCUSSION

Following a pilot study, in which items for exploratory individual differences questionnaires were founded on free maternal responses, the structure of the Emotion Control Questionnaires (ECQ - Roger and Nesshoever, 1987; ECQ2 - Roger and Najarian, 1989) was replicated on separate pregnant and post-partum maternal samples (although a Benign Control factor failed to emerge from the postnatal data). Each Emotion Control factor in the present analyses included some items from the ECQs, but also included new items contrived for the exploratory questionnaires. With respect to each Emotion Control factor, there was no doubt about the construct resemblance between the previous and present Emotion Control subscales. In addition, maternity-specific factors emerged: Maternal Anxiety and Maternal Autonomy from the ante-partum sample and Maternal Discomfort from the post-partum sample. The new questionnaires were named ECQ-A and ECQ-P depending on whether they were applicable to ante-partum or post-partum subjects respectively.

Whereas previously, however, the ECQ subscales were orthogonal with the exception of modest correlations between Aggression Control and Benign Control, the intercorrelations between ECQ-A and ECQ-P subscales were in some cases more substantial. With respect to the ECQ-A, the positive correlation between Rehearsal and Maternal Anxiety was unsurprising, but the negative correlation with Benign Control was less readily understandable as Neuroticism (with whose Sensitivity component Rehearsal is significantly associated) and Extraversion (with whose Impulsivity component Benign Control is significantly associated) are orthogonal components of personality (e.g., Eysenck and Eysenck, 1964). Emotional Inhibition also correlates with components of the Extraversion constellation (Roger and Nesshoever, 1987), although its positive correlation with Rehearsal in the present study may attest to a co-operative complex of susceptibilities to elevated hypothalamic-pituitary-adrenal activity. The positive correlation between Emotional Inhibition and Aggression Control can be understood if both constructs are conceived of as emotionally inhibitory. The negative correlation between Maternal Anxiety and Benign Control was consistent with the negative correlation between Rehearsal and Benign Control (as Rehearsal and Maternal Anxiety were positively correlated). To the extent that

Emotional Inhibition and Benign Control both correlate with components of extraversion, these relationships in combination indicate that, amongst pregnant subjects, extraverts are more susceptible to rumination. The negative correlation between Maternal Anxiety and Maternal Autonomy is intuitively acceptable if the former is regarded as non-adaptive and the latter adaptive.

With respect to the ECQ-P, there was only a modestly significant correlation between Rehearsal and Emotional Inhibition, and the correlation between Aggression Control and Emotional Inhibition (and also Rehearsal) was not significant. The positive correlation between Rehearsal and Maternal Discomfort (like that between Rehearsal and ECQ-A Maternal Anxiety) was unsurprising.

All of the ECQ-A and ECQ-P subscale distributions were approximately normal, although there were a greater than expected proportion of high Rehearsal scorers in both pregnant and post-partum samples. This could reflect an unrepresentative proportion of neurotic subjects in the volunteer samples, but could equally reflect the possibility that, in any sample, there will be a discriminable proportion of psychopathological subjects.

Internal reliability coefficients for ECQ-A and ECQ-P subscales were satisfactory, although the weaker coefficient for ECQ-A Benign Control may be attributed to its smaller number of constituent items. The coefficients for Maternal Anxiety and Maternal Autonomy were lower than for the remaining subscales, and this may have to do with their referential specificity (i.e., different subjects will have different profiles of aspects of pregnancy and delivery about which they feel anxiety or over which they perceive or desire control). Retest reliability coefficients were also satisfactory, although these were lower for the ECQ-A than for the ECQ-P. This may be attributed to the much smaller samples that yielded retest data for the ECQ-A, but could also indicate greater fluidity of personality during pregnancy as opposed to during the first post-partum year.

Concurrent validity for the ECQ-A and the ECQ-P was derived from correlations with several symptom indices. With respect to the ECQ-A, Rehearsal and Maternal Anxiety were strongly associated with all symptom measures. Emotional Inhibition was moderately associated with EPDS scores at 36 weeks pregnancy and there were moderate negative correlations between all symptom measures and Benign Control, and between Self-esteem, Cognitive-affective and EPDS scores and Maternal Autonomy. The relationships between symptoms and Rehearsal, Maternal Anxiety and Maternal Autonomy are intuitively acceptable, and the consistent negative association between symptoms and Benign Control is consistent with the interrelationships among the ECQ-A subscales themselves (as discussed previously).

Concurrent correlations between ECQ-P subscales and three post-partum symptom indices were unambiguous; there were strong relationships between all symptom measures and both Rehearsal and Maternal Discomfort, whereas, with the exception of a modest correlation between Emotional Inhibition and Self-esteem in one sample only, Emotional Inhibition and Aggression Control were unrelated to symptoms.

The ECQ-A and ECQ-P are individual differences scales that were developed using samples that resemble the populations for which their use is intended, i.e., ante-partum and post-partum women. In this respect they are unique. They have satisfactory psychometric properties and are theoretically relevant to maternity issues such as postnatal depression and obstetric difficulties. Their prospective use with respect to the outcome of pregnancy and the course of post-partum symptoms is reported in Chapters 9, 10 and 11.

CHAPTER 3. WHAT IS POSTNATAL DEPRESSION?

Author's Declaration: A version of this chapter was presented at the annual conference of the British Psychological Society at Blackpool in April 1993 (Nieland and Roger, 1993b).

3.1 Introduction

In Chapter 1, alternative views about whether postnatal depression is symptomatologically equivalent to depressions occurring at other times were discussed (please see *1.4 Postnatal depression*). Whereas Pitt (1968) suggested that postnatal depression is "atypical", most contemporary workers (e.g., Kumar, 1982; Watson *et al*, 1984; Cooper *et al*, 1988; O'Hara *et al*, 1990) see the maternity context as a convenient natural laboratory in which to study the relationship between stress and depression generally. There are two hazards associated with neglecting the guidance offered by the original work. First, the profile of factors that contribute to post-partum symptoms may be different from that of factors implicated in non-maternal depressions. To the extent that this is so, findings in the context of maternity are not generalisable to other contexts, (and *vice versa*). Second, health professionals supporting women following childbirth may not be applying the most effective strategies if "atypical" aspects of postnatal depression are overlooked. A better understanding of post-partum symptoms might contribute to the development of support programmes that are maximally effective.

Arguments that there is nothing special about postnatal depression fell into three categories: first, prevalence rates of depression post-partum do not significantly differ from those observed at other times (e.g., Cooper *et al*, 1988); second, a substantial proportion of women with postnatal depression have a psychiatric history or were depressed during pregnancy, so that post-partum depression is merely a continuation of an existing disorder (e.g., Watson *et al*, 1984; O'Hara *et al*, 1984; O'Hara *et al*, 1991); third, the symptom profiles of post-partum women are not

distinguishable from those in non-post-partum women (e.g., Watson *et al*, 1984; Cooper *et al*, 1988; O'Hara *et al*, 1990).

Elliott (1990), however, said that prevalence rates say nothing about the clinical importance of postnatal depression. Indeed, it does not follow that respective prevalence rates refer to symptomatologically identical disorders. A similar principle applies to so-called "continuity" of depression - the fact that a woman who is depressed post-partum has a psychiatric history or was depressed during pregnancy does not say anything directly about the symptom profile of her current disorder. In any event, the extent of trans-parturition overlap in caseness has frequently been modest (e.g., Hayworth *et al*, 1980; Kumar and Robson, 1984; Bridge *et al*, 1985).

Studies that failed to find differences in the symptom profiles of post-partum and non-post-partum women used excessively global or stringent instruments (e.g., O'Hara *et al*'s use of "Cognitive-affective" and "Somatic" components of the Beck Depression Inventory and Cooper *et al*'s use of the 16 syndromes of the Present State Examination). The descriptive accounts of postnatal depression given by Pitt (1968), Cox (1986) and Dalton (e.g., 1989) have been based on first-hand experience in clinical settings, but have not had support from sufficiently sensitive empirical studies. The present study was designed to evaluate the respective severity of symptoms in post-partum and non-maternal samples, using a more subtle approach than has been adopted hitherto.

3.2 Method

3.2.1 Subjects

Post-partum subjects were drawn from the longitudinal study described in Chapter 6. Dalton (1989, p85) allows for onset of postnatal depression up to six months post-partum, although the more protracted the interval between childbirth and onset of depression, the less "postnatal" it

becomes. In the longitudinal study, the one-week-post-partum stage was included for investigation of the maternity Blues. The eight-week-post-partum data, otherwise closest to the puerperium, were therefore considered the most appropriate to represent post-partum symptoms. At the time of the present analyses, symptom data at eight weeks post-partum were available from 154 subjects.

Additional subjects (N=181) were recruited who met the following criteria: female, aged between 16 and 45 years, not pregnant and not having a child less than two years of age. These subjects were recruited at general practices and high street retailers (via their personnel offices) in York, at the University of York and at York District Hospital. Nineteen subjects omitted one or more responses on the symptom questionnaires; thus 152 subjects yielded complete data.

In order to equalise the numbers of post-partum and comparison subjects (please see *3.2.3 Design and Procedure*), the two post-partum subjects with the highest subject identification numbers were omitted. Summary biographic information for all 304 subjects is shown in Table 3.1.

	POST-PARTUM		COMPARISON	
MEAN AGE IN YEARS (SD)	27.59	(4.91)	28.11	(8.67)
MEAN PARITY* (SD)	0.57	(0.78)	0.52	(0.91)
OCCUPATIONS** (%)				
Professional	26	(17.1)	22	(14.5)
Non-professional	78	(51.3)	60	(39.5)
Housewife/Mother	33	(21.7)	2	(1.3)
Student nurse	0	(0.0)	25	(16.4)
Other student	7	(4.6)	41	(27.0)
None/Unemployed	8	(5.3)	2	(1.3)
Total	152	(100.0)	152	(100.0)

* If postnatal, parity is number of offspring excluding newborn
** If postnatal, occupation is that when last becoming pregnant

TABLE 3.1 SUBJECTS' BIOGRAPHIC DETAILS.

3.2.2 Materials

Each subject completed a purpose-designed self-report 70-item symptom checklist. Items for the checklist were devised following an examination of several depression scales, with additional items deemed suitable for post-partum respondents included. Five response categories were available: 0 if the symptom had not been experienced in the past seven days, or 1 to 4 depending on how severe or intense that symptom had been in the past seven days. The symptom checklist comprises Appendix 9.

Subjects also completed the Edinburgh Postnatal Depression Scale (EPDS - Appendix 6) and a biographic questionnaire. Post-partum subjects completed the antenatal version (Appendix 4) or the postnatal version (Appendix 7) on joining the longitudinal study (please see Chapter 6). A version with minor modifications was completed by non-maternal subjects.

3.2.3 Design and Procedure

Post-partum and comparison subjects' checklist scores were compared in oneway analyses of variance. The possibility that group differences in symptom severity might be attributable to group differences in age, parity (excluding the index child if postnatal) or overall levels of depression (i.e., EPDS scores) was contested by including age, parity and EPDS scores as covariates. The application of parametric tests was made on the basis of convenience (rather than seeking to acquire undue statistical power) and the widely acknowledged actuality that parametric tests are extremely robust with respect to violations of their assumptions (e.g., Kirk, 1968).

Chapter 1 included a discussion of the merits of "research on symptoms versus research on syndromes" (Costello, 1992). In the research context as opposed to the clinical context, a dimensional approach to "diagnosis" was deemed as valid as any other for identifying depressed groups (please see *1.5 Assessment of postnatal depression*). Following

the recommendations of Murray and Cox (1990), a criterion score of 14/15 on the EPDS was invoked in order to compare symptoms in post-partum and non-maternal women with relatively severe depression (such that a diagnosis according to RDC would have been probable).

Twoway analyses of variance with group (post-partum versus comparison) and depression status (depressed or not depressed according to the EPDS criterion) as independent variables were run in order to investigate whether interactive effects between these factors might attest to the particular profile of post-partum versus non-maternal symptoms in "depressed" subjects.

Subsequently, checklist scores for all 304 subjects were subjected to factor analysis (principal components followed by Varimax orthogonal rotation). The new symptom scales were subjected to the same oneway and twoway statistical analyses as the individual symptom scores.

Finally, for post-partum subjects only, correlations were computed between symptom factors, the EPDS and ECQ-P scores.

3.3 Results

Table 3.2 shows mean symptom scores for each group (post-partum versus non-maternal). The symptoms are arranged in descending order of means for the post-partum group. Table 3.2 also shows the results of the oneway analyses of covariance. Please see Appendix 9 for the unabbreviated version of the symptom checklist items.

No.	SYMPTOM (ABBR.)	POSTNATAL MEAN (SD)	COMPARISON MEAN (SD)	* *	ONEWAY ANALYSES F	p
07	IRRITABLE	2.08 (1.24)	1.63 (1.30)	*	9.49	0.002
26	UNATTRACTIVE	1.80 (1.40)	1.11 (1.21)	*	24.60	<0.001
18	TIRED	1.72 (1.46)	1.28 (1.25)	*	8.50	0.004
02	TEARFUL	1.65 (1.39)	1.41 (1.39)	*	1.76	0.185
15	NO ENERGY	1.59 (1.42)	1.33 (1.13)	*	2.67	0.104
14	FRUSTRATED	1.54 (1.35)	1.29 (1.24)	*	2.14	0.145
01	HEADACHE	1.53 (1.21)	1.26 (1.12)	*	3.23	0.073
42	MOOD WORST LATE	1.51 (1.38)	0.86 (1.24)	*	21.10	<0.001
12	PHYSICALLY TENSE	1.50 (1.24)	1.30 (1.26)	*	1.63	0.203
04	SAD	1.49 (1.37)	1.43 (1.24)	*	<1.00	-
45	ACHES & PAINS	1.48 (1.32)	1.17 (1.14)	*	4.30	0.039
59	MENTALLY TENSE	1.39 (1.33)	1.32 (1.25)	*	<1.00	-
40	INTEREST IN SEX	1.37 (1.41)	0.63 (1.18)	*	26.00	<0.001
64	GET OUT OF BED	1.36 (1.44)	1.35 (1.25)	*	<1.00	-
20	ANXIOUS	1.34 (1.23)	1.19 (1.15)	*	<1.00	-
35	LONELY	1.33 (1.34)	0.75 (1.07)	*	22.84	<0.001
70	PEACEFUL	1.27 (1.11)	0.95 (1.04)	*	7.18	0.008
68	AGITATED	1.26 (1.27)	0.94 (1.18)	*	5.72	0.017
38	CRITICISED SELF	1.20 (1.21)	1.02 (1.05)	*	1.57	0.211
61	GO OUT	1.15 (1.50)	0.52 (0.96)	*	21.11	<0.001
19	CONCENTRATE	1.12 (1.27)	1.05 (1.10)	*	<1.00	-
09	GUILTY	1.11 (1.35)	0.88 (1.13)	*	2.02	0.156
39	CONFIDENT	1.09 (1.05)	1.14 (1.09)	*	<1.00	-
32	EXCITED	1.05 (1.28)	1.11 (1.18)	*	<1.00	-
06	DECISIONS	1.05 (1.24)	0.93 (1.08)	*	<1.00	-
05	ATE TOO MUCH	0.99 (1.27)	1.35 (1.24)	*	7.22	0.008
58	MORE WORK	0.99 (1.31)	0.84 (1.12)	*	<1.00	-
52	DO ANYTHING RIGHT	0.98 (1.28)	0.65 (1.03)	*	<1.00	-
60	CHANGE PAST	0.95 (1.41)	0.93 (1.32)	*	<1.00	-
56	INADEQUATE	0.95 (1.21)	0.82 (1.11)	*	<1.00	-
10	CRIED FREQUENTLY	0.95 (1.32)	0.55 (1.03)	*	9.58	0.002
55	SHOWING AFFECTION	0.94 (1.32)	0.53 (1.01)	*	9.23	0.003
27	BORED	0.91 (1.24)	0.76 (0.95)	*	<1.00	-
03	TALK TO ANYONE	0.89 (1.27)	0.95 (1.16)	*	1.11	0.293
65	DISLIKED SELF	0.84 (1.24)	0.79 (1.10)	*	<1.00	-

16	INFERIOR	0.82 (1.20)	0.78 (1.09)	*	<1.00	-
08	NOT WANT MEALS	0.76 (1.25)	0.59 (1.01)	*	1.11	0.292
41	CONTROL	0.74 (1.17)	0.51 (1.00)	*	3.29	0.071
69	ACTIVE	0.74 (1.00)	0.64 (0.96)	*	<1.00	-
53	EMOTIONALLY NUMB	0.74 (1.13)	0.49 (1.02)	*	3.73	0.054
50	ENERGETIC	0.74 (0.97)	0.73 (0.97)	*	<1.00	-
29	PESSIMISTIC	0.74 (1.09)	0.84 (1.16)	*	2.45	0.119
57	DISLIKED BY OTHERS	0.72 (1.16)	0.76 (1.12)	*	<1.00	-
30	PAST FAILURES	0.72 (1.15)	0.70 (1.09)	*	<1.00	-
54	UNPLEASANT DREAMS	0.71 (1.14)	0.75 (1.14)	*	<1.00	-
23	EARLY AWAKENING	0.67 (1.05)	0.72 (1.19)	*	<1.00	-
66	PANICKY	0.67 (1.09)	0.65 (1.05)	*	<1.00	-
47	OVERSLEPT	0.64 (1.10)	0.76 (1.19)	*	1.34	0.249
21	BEDTIME INSOMNIA	0.64 (1.08)	0.76 (1.07)	*	1.56	0.212
36	INTIMIDATED	0.63 (1.08)	0.80 (1.10)	*	4.59	0.033
49	DAYDREAMED	0.63 (0.98)	0.90 (1.16)	*	7.90	0.005
67	INTRUSIVE MEMORIES	0.61 (1.09)	0.67 (1.12)	*	1.11	0.293
44	VERY IMPORTANT	0.59 (0.97)	0.29 (0.72)	*	10.51	0.001
48	NO APPETITE	0.59 (1.12)	0.36 (0.78)	*	3.56	0.060
34	BLAMED SELF	0.59 (1.01)	0.40 (0.89)	*	2.32	0.129
25	NOT LOOK FORWARD	0.55 (1.10)	0.51 (1.00)	*	<1.00	-
63	WORTHLESS	0.54 (1.03)	0.40 (0.86)	*	1.38	0.241
22	MIDDLE INSOMNIA	0.54 (0.94)	0.75 (1.08)	*	5.00	0.026
51	BOWEL MOVEMENTS	0.47 (0.89)	0.42 (0.87)	*	<1.00	-
43	MOOD WORSE EARLY	0.47 (0.88)	0.57 (0.95)	*	1.82	0.178
17	CARE ABOUT ANYTHING	0.46 (0.98)	0.53 (0.96)	*	1.84	0.176
37	SOCIABLE	0.46 (0.86)	0.55 (0.95)	*	<1.00	-
24	ALCOHOL	0.39 (0.39)	0.55 (1.07)	*	2.90	0.090
31	NOT IMAGINE FUTURE	0.34 (0.78)	0.30 (0.72)	*	<1.00	-
46	DESERVED PUNISHMENT	0.22 (0.69)	0.17 (0.65)	*	<1.00	-
11	FLUSHES	0.22 (0.61)	0.34 (0.85)	*	2.36	0.126
13	SELF-HARM	0.20 (0.68)	0.11 (0.44)	*	1.11	0.293
28	PALPITATIONS	0.18 (0.62)	0.21 (0.55)	*	<1.00	-
33	HEARD SOUNDS	0.13 (0.44)	0.08 (0.45)	*	<1.00	-
62	SAW THINGS	0.06 (0.33)	0.09 (0.51)	*	<1.00	-

TABLE 3.2 MEAN GROUP SYMPTOM SCORES (SDs) AND ONEWAY ANALYSES OF COVARIANCE. FACTOR IS GROUP. COVARIATES ARE AGE, PARITY AND EPDS. F TEST DF ARE (1,299).

Group mean EPDS scores were 8.38 (SD 5.74) for the post-partum group and 7.94 (SD 5.09) for the comparison group. The EPDS criterion of 14.5 resulted in the "diagnosis" of 41 depressed women. Twenty-two of these belonged to the post-partum group and 19 to the comparison group (prevalence rates of 14.5% and 12.5% respectively).

The twoway analyses uncovered significant interactions ($p<0.01$; DF 1,300) for nine symptom variables (symptom checklist number): "Thought about deliberately harming yourself" (13), "Felt bored" (27), "Blamed yourself for everything" (34), "Felt lonely" (35), "Had less interest in sex" (40), "Slept longer than usual" (47), "Had no appetite" (48), "Felt emotionally numb" (53) and "Felt worthless" (63). In respect of these nine symptoms, except numbers 40 and 47, the symptom score was higher in the post-partum depressed category than the comparison depressed category, but there was not a significant group difference among non-depressed women. With respect to symptom number 40, the post-partum group scored higher in the non-depressed category, but not the depressed category. With respect to number 47, the postnatal group scored lower in the depressed category, but not the non-depressed category.

Symptom numbers 33 and 62 were excluded from factor analysis as they referred to auditory and visual hallucinations respectively and did not properly belong in any prospective constellations of non-psychotic symptoms. The scree plot following a principal components analysis is shown in Figure 3.1.

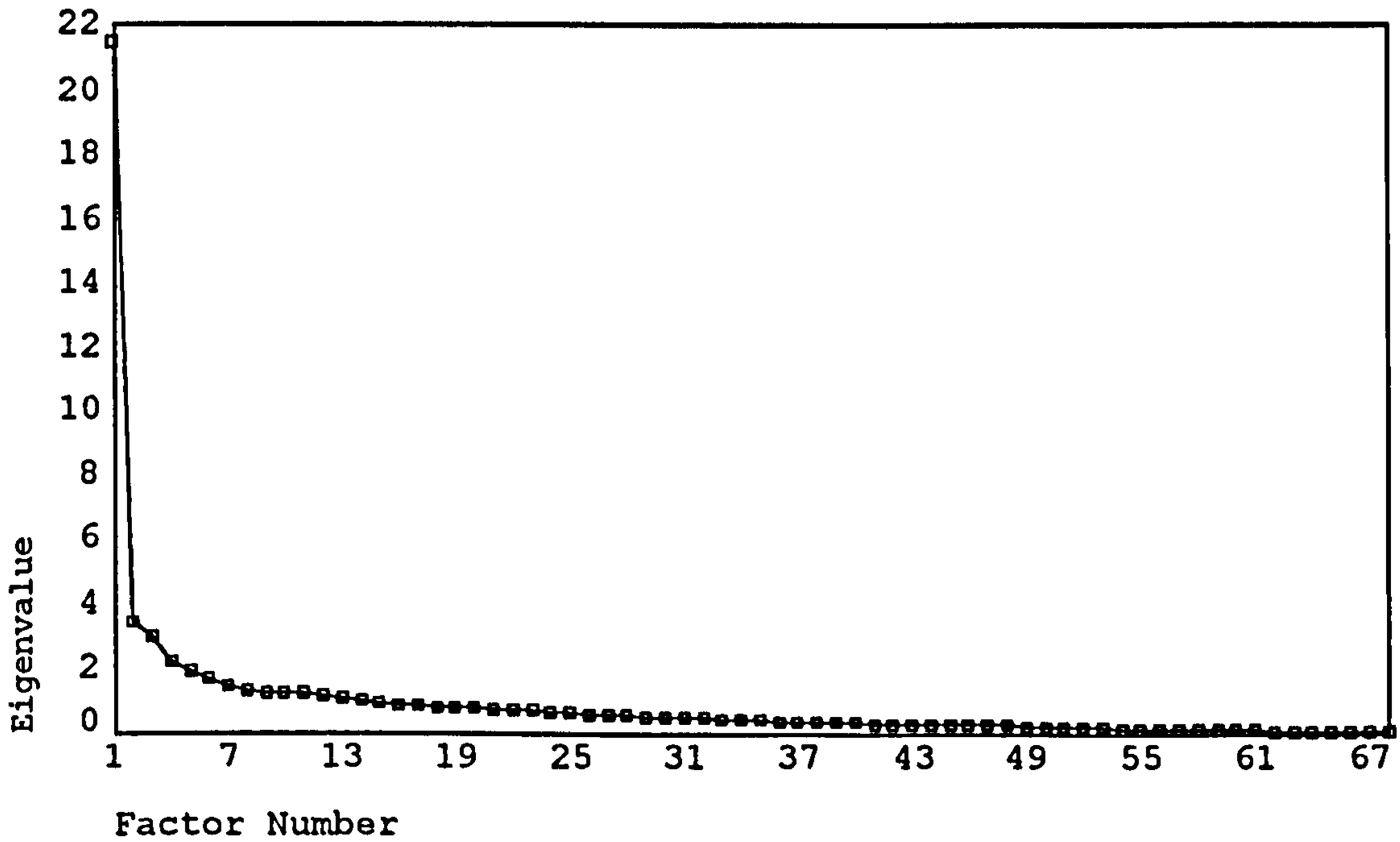


FIGURE 3.1 FACTOR SCREE PLOT FOR 68 SYMPTOMS IN POST-PARTUM AND NON-MATERNAL SAMPLES (TOTAL N=304).

A three factor solution yielded a coherent set of factors. A loading criterion of +/- 0.5 was applied because item loadings were substantial. Non-loading items, and two items loading above this criterion on more than one factor were discarded.

The first factor was named Self-esteem. It comprised 19 items of which the four highest loading were (symptom checklist number): "Felt you deserved punishment" (46), "Disliked yourself" (65), "Felt worthless" (63) and "Blamed yourself for everything" (34). The second factor was named Tension. This factor comprised 15 items of which the four highest loading items were (symptom checklist number): "Felt irritable" (07), "Felt tensed up physically" (12), "Felt tired all the time" (18) and "Felt frustrated" (14). All seven items on the third factor were originally included in the checklist to offset a hypochondriacal response tendency, but eventually loaded together. The highest loading items were (symptom checklist number): "Felt confident" (39), "Felt very energetic" (50), "Was more sociable than usual" (37) and "Felt very excited" (32). This factor was named Ascendancy.

The final solution contained 43 items, and is shown in Table 3.3 (please see Appendix 9 for the unabbreviated 70-item symptom checklist).

No.	SYMPTOM (ABBR.)	SYMPTOM FACTORS		
		SELF-ESTEEM	TENSION	ASCENDANCY
46	DESERVED PUNISHMENT	0.79	-0.04	0.01
65	DISLIKED SELF	0.76	0.28	-0.01
63	WORTHLESS	0.76	0.30	-0.06
34	BLAMED SELF	0.74	0.25	-0.02
30	PAST FAILURES	0.74	0.31	0.07
57	DISLIKED BY OTHERS	0.73	0.24	-0.07
36	INTIMIDATED	0.66	0.29	-0.01
31	NOT IMAGINE FUTURE	0.66	0.16	0.00
56	INADEQUATE	0.63	0.45	0.02
38	CRITICISED SELF	0.62	0.42	-0.01
60	CHANGE PAST	0.62	0.18	0.16
17	CARE ABOUT ANYTHING	0.61	0.35	-0.09
25	NOT LOOK FORWARD	0.61	0.43	-0.13
29	PESSIMISTIC	0.61	0.40	-0.11
53	EMOTIONALLY NUMB	0.60	0.42	0.02
35	LONELY	0.58	0.38	-0.06
13	THOUGHT HARM SELF	0.57	0.16	-0.10
67	INTRUSIVE MEMORIES	0.55	0.25	0.16
16	INFERIOR	0.54	0.44	-0.02
07	IRRITABLE	0.11	0.79	0.03
12	PHYSICALLY TENSE	0.14	0.76	-0.01
18	TIRED	0.18	0.75	-0.03
14	FRUSTRATED	0.20	0.70	0.05
15	NO ENERGY	0.18	0.69	-0.08
19	CONCENTRATE	0.31	0.69	-0.09
68	AGITATED	0.40	0.67	0.06
20	ANXIOUS	0.38	0.67	-0.02
59	MENTALLY TENSE	0.39	0.66	0.03
45	ACHES & PAINS	0.20	0.61	0.12
42	MOOD WORST LATE	0.24	0.59	0.00
64	GET OUT OF BED	0.27	0.56	0.10
06	DECISIONS	0.31	0.55	-0.03
02	TEARFUL	0.33	0.54	-0.09
55	SHOWING AFFECTION	0.35	0.52	0.01
39	CONFIDENT	-0.08	-0.08	0.75
50	ENERGETIC	-0.04	-0.12	0.64
37	SOCIABLE	0.00	-0.02	0.63
32	EXCITED	-0.04	0.13	0.62
69	ACTIVE	0.09	0.08	0.62
44	VERY IMPORTANT	-0.03	0.01	0.56
70	PEACEFUL	0.02	0.00	0.56

TABLE 3.3 ITEM LOADINGS FOR THE THREE ROTATED SYMPTOM FACTORS.

Correlations among the three symptom factors (unweighted factor scores), and correlations between the symptom factors and the EPDS, are shown in Table 3.4, along with descriptive statistics and internal reliability coefficients. NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	SYMPTOM FACTORS		
	SELF-ESTEEM	TENSION	ASCENDANCY
SELF-ESTEEM	-	0.72‡	0.02
TENSION		-	0.00
EPDS	0.82‡	0.76‡	-0.13*
Mean Score (SD)	12.45 (14.25)	19.55 (14.25)	5.66 (4.50)
Minimum Score	0	0	0
Maximum Score	66	58	26
Coefficient Alpha	0.9449	0.9264	0.7470

* $p<0.05$
‡ $p<0.001$

TABLE 3.4 CORRELATIONS AMONG FACTORS, AND BETWEEN FACTORS AND THE EPDS, DESCRIPTIVE STATISTICS AND INTERNAL RELIABILITY COEFFICIENTS FOR THREE SYMPTOM FACTORS.

Correlations between Self-esteem, Tension and the EPDS were all strongly significant, although there was an inverse relationship between Ascendancy and the EPDS. Correlations between Ascendancy and the other two factors were, moreover, marginal. Ascendancy was, accordingly, deemed not to be a symptom measure at all.

Unweighted factor scores were subjected to the same oneway and twoway analyses as the symptom checklist variables. Oneway analyses revealed a significant group difference in Tension scores (DF 1,299; p=0.002). There were, however, no significant group differences in Self-esteem or Ascendancy scores. Group mean scores, and the results of the oneway analyses of covariance, are shown in Table 3.5.

FACTOR	POSTNATAL MEAN	(SD)	COMPARISON MEAN	(SD)	*	ONEWAY ANALYSES F	p
SELF-ESTEEM	13.13	(14.91)	11.77	(13.56)	*	<1.00	-
TENSION	21.54	(13.94)	17.57	(12.58)	*	9.67	0.002
ASCENDANCY	5.93	(4.65)	5.40	(4.35)	*	1.05	0.307

TABLE 3.5 MEAN GROUP FACTOR SCORES (SDs) AND ONEWAY ANALYSES OF COVARIANCE. FACTOR IS GROUP. COVARIATES ARE AGE, PARITY AND EPDS. F TEST DF ARE (1,299)

Mean symptom scores by group and depression status are shown in Table 3.6. The twoway analyses revealed a significant interaction (F=7.84; DF 1,300; p=0.005) for Self-esteem with group and depression main effects also significant (F=6.30; DF 1,300; p=0.013 and F=297.11; DF 1,300; p<0.0001 respectively). The interaction for Tension was not significant, but the group main effect was significant (F=4.04; DF 1,300; p=0.045). Mean Self-esteem and Tension scores by group and depression status are shown in Figures 3.2 and 3.3 respectively. There was neither a significant interaction nor significant main effects for Ascendancy.

		SELF-ESTEEM		TENSION		ASCENDANCY	
		MEAN	SD	MEAN	SD	MEAN	SD
POST-PARTUM	DEPRESSED	42.00	13.59	40.05	12.94	4.73	3.94
	NOT DEPRESSED	8.24	8.01	18.41	11.49	6.13	4.74
COMPARISON	DEPRESSED	33.05	15.79	36.00	8.40	5.32	5.00
	NOT DEPRESSED	8.73	10.09	14.93	10.74	5.41	4.27

TABLE 3.6 MEAN SYMPTOM FACTOR SCORES BY GROUP AND DEPRESSION STATUS.

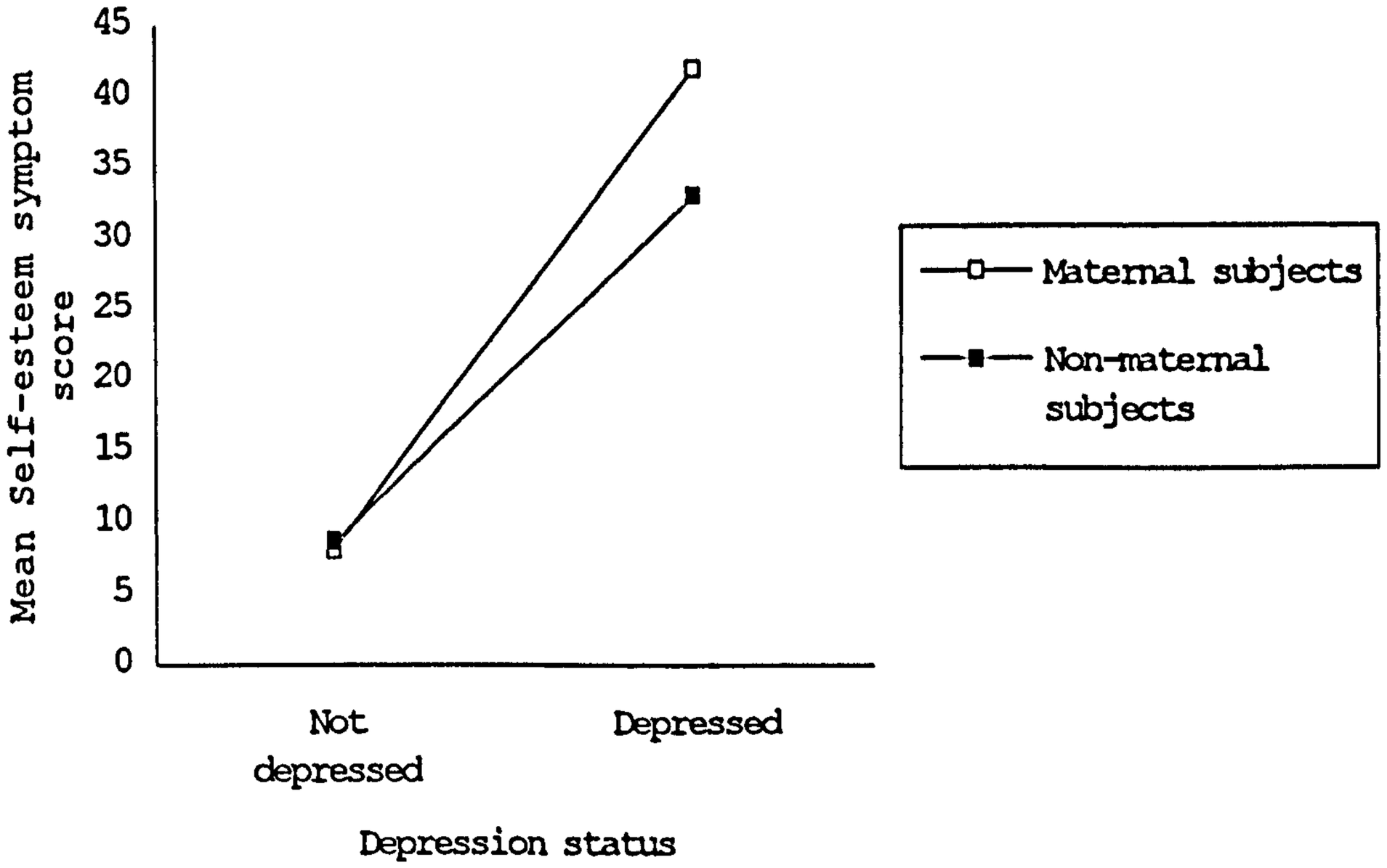


FIGURE 3.2 MEAN SELF-ESTEEM SCORE BY GROUP AND DEPRESSION STATUS.

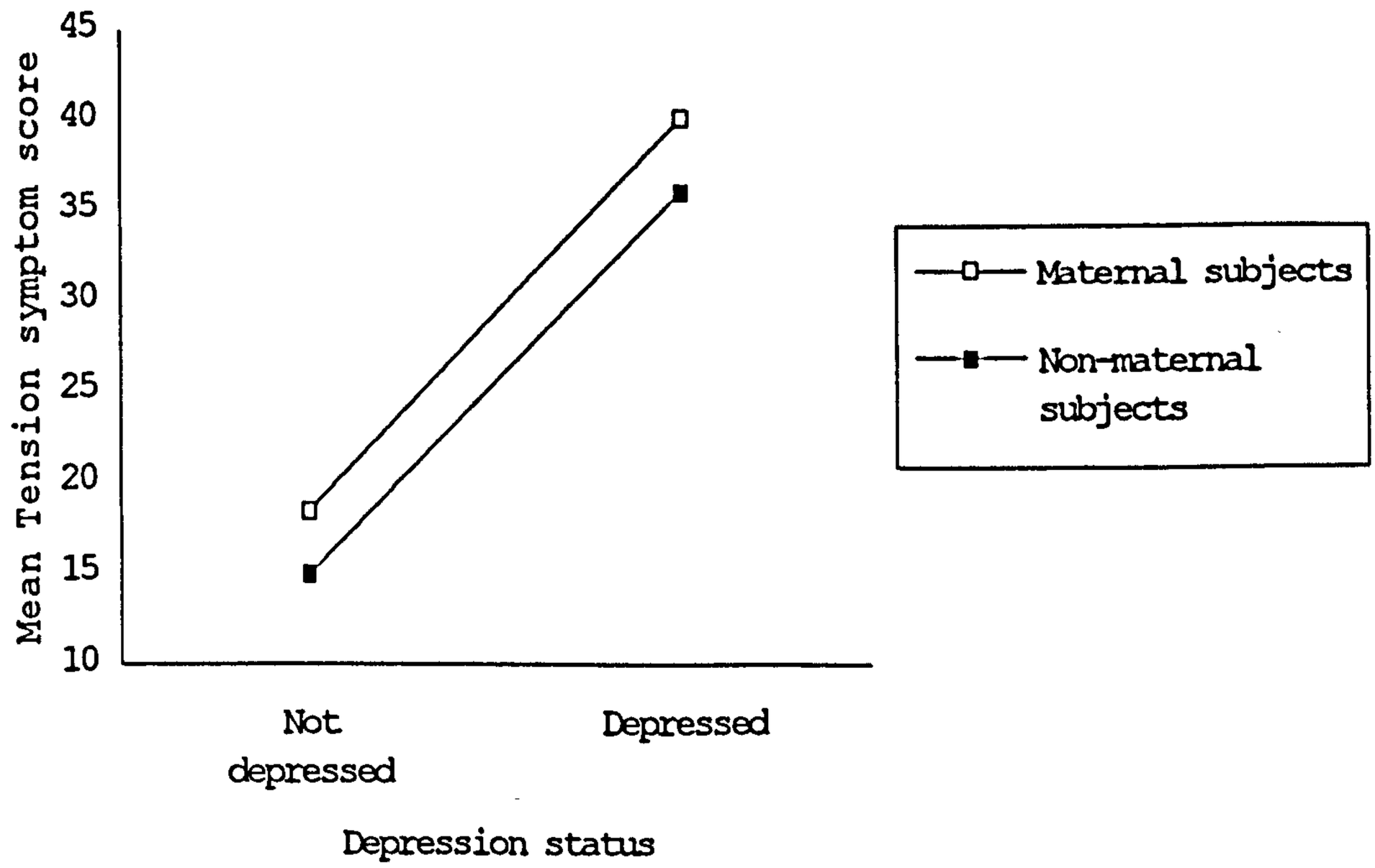


FIGURE 3.3 MEAN TENSION SCORE BY GROUP AND DEPRESSION STATUS.

Correlations between the symptom measures (including the EPDS) and ECQ-P subscales (scores were available for 62 of the post-partum group) are shown in Table 3.7. Rehearsal and Maternal Discomfort correlated significantly with the symptom measures, but Emotional Inhibition and Aggression Control did not. These relationships were consistent with those obtained in a separate sample (please see Table 2.8). NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	SELF-ESTEEM	TENSION	EPDS
REHEARSAL	0.54‡	0.52‡	0.57‡
MATERNAL DISCOMFORT	0.48‡	0.55‡	0.54‡
EMOTIONAL INHIBITION	0.21	0.03	0.18
AGGRESSION CONTROL	-0.00	0.02	0.00

‡ $p<0.001$

TABLE 3.7 CORRELATIONS BETWEEN ECQ-P SUBSCALES AND THREE SYMPTOM MEASURES (ALL CORRELATIONS HAVE 60 DF).

3.4 Discussion

Checklist item 07, "Felt irritable", had the highest mean score in both post-partum and non-maternal groups. Table 3.2 showed, however, that irritability was higher in the post-partum group than the non-maternal group when overall levels of depression (EPDS scores) had been statistically controlled. This lent support to Dalton's view that irritability is prevalent amongst post-partum symptoms. Among the remaining items appearing in Table 3.2 for which F ratios were strongly significant, the majority either directly represented symptoms of atypical depression (e.g., "Felt tired all the time", "Mood worst late in the day", "Had less interest in sex than usual" and "Cried frequently"), or could readily be interpreted as consistent with the accounts presented by Pitt (1968), Cox (1986) and Dalton (1989).

Twoway analyses showed that seven symptoms were more severe in women depressed post-partum than in non-maternal depressed women. Three of these represented diminution of self-regard: "Thought about deliberately harming yourself", "Blamed yourself for everything" and "Felt worthless" (the first of these was inconsistent with Pitt's account, as he reported that suicidal ideation was infrequent in atypical depression - please see *1.4 Postnatal depression*); two represented isolation ("Felt lonely" and "Felt bored"), and the remaining items represented loss of appetite and emotional numbness (the first of these inconsistent with Dalton's account, as she reported that women with postnatal depression are incessantly hungry and thirsty - please see *1.4 Postnatal depression*).

Factoring of the checklist items yielded two new symptom factors, Self-esteem and Tension (NB: as Self-esteem was a symptom scale, there was an inverse relationship between Self-esteem scores and self-esteem). Tension scores were significantly higher in the post-partum group when overall levels of depression had been statistically controlled, but there was not a significant group difference in Self-esteem scores. The EPDS has good psychometric credentials, but it samples a narrow range of behaviour (including aspects that may be pertinent to postnatal depression - please see *1.5 Assessment of postnatal depression*). Self-esteem and Tension would therefore constitute useful adjuncts to the EPDS when measuring post-partum symptoms.

The EPDS criterion of 14/15 identified 22 and 19 "depressed" subjects in the post-partum and non-maternal groups respectively. The corresponding prevalence rates were 14.5% and 12.5%, the former consistent with prevalence rates reported elsewhere (O'Hara, 1987).

The twoway analysis with Tension as the dependent variable revealed only a main effect for group, and this confirmed the results of the oneway analysis. A major problem for a hormonal account of postnatal depression (Dalton, 1989) is that the relevant biochemistry is poorly understood (e.g., Kendell, 1985) - the most swingeing endocrine variations across parturition are universal concomitants of childbirth, yet there is a broad consensus that postnatal depression affects only 10-15% of new mothers (O'Hara, 1987). As both the oneway and twoway analyses revealed

that Tension scores were higher in the post-partum group regardless of depression status (please see Figure 3.3), Tension could represent a hormonal component of post-partum symptoms. The premenstrual phase is widely considered to be accompanied by a hormonally-induced elevation of symptoms and is, like parturition, associated with a decline in levels of oestrogen and progesterone. The evidence for hormonally-induced tension is, however, only indirect, and it is not difficult to imagine alternative sources of tension at seven-to-eight weeks post-partum.

The twoway analysis with Self-esteem as the dependent variable revealed a significant interaction (please see Figure 3.2). The means (please see Table 3.6) clearly indicated that Self-esteem scores among subjects with low EPDS scores (<15) were similar, but that Self-esteem scores among subjects with high EPDS scores (>14) were higher among post-partum subjects. This was consistent with the previous twoway analyses in which symptoms representing diminution of self-regard were more severe among women depressed post-partum than among non-maternal depressed women. The significant positive correlation between ECQ-P Rehearsal and Self-esteem (please see Tables 2.8 and 3.7) is consistent with a report by Rector, Roger and Nussbaum (1993), that new university students with low self-esteem had a propensity for rehearsing past failures.

Self-esteem may, accordingly, be a special issue for women who are depressed post-partum. Indirect support for the notion that self-esteem and postnatal depression are intertwined came from an intervention study by Holden, Sagovsky and Cox (1989) who achieved a greater recovery rate from postnatal depression over a three months interval using Rogerian or non-directive counselling compared with a control group who received no such support. The support provided non-verbal encouragement and a confiding relationship. Strategies aimed at bolstering and augmenting the self-esteem of women who are about to, or who have recently given birth, may therefore be maximally effective in preventing or ameliorating postnatal depression. The present results do not, however, establish whether psychosocial pressures on self-esteem cause postnatal depression, or whether low self-esteem is merely a manifestation. Clearly, such information would have important implications for the prevention and amelioration of post-partum symptoms.

Costello's (1992) treatise on the advantages of research at the level of symptoms rather than syndromes (please see *1.5 Assessment of postnatal depression*) concluded:

> The investigation of symptoms should not become an end in itself. The goal of symptom-orientated research should be to establish the syndromes of psychopathology on a firm research footing ... the pursuit of valid psychiatric syndromes must continue. However, because of the likely complexity of the syndromes and of the symptoms that constitute them, more research time should be spent on the investigation of specific symptoms and their inter-relationships ... our selection of symptoms for study should be determined by our theories concerning the role played by the symptoms in the diathesis, aetiology and pathogenesis of psychiatric syndromes (p307).

The present study of post-partum symptoms has lent support to the notion that postnatal depression may indeed have atypical features; moreover, with few exceptions these are notably consistent with those described by Pitt (1968), Cox (1986) and Dalton (1989). Contemporary workers who fail to take these into account detract from augmenting the body of research upon which successful support strategies may be founded.

CHAPTER 4. SYMPTOMS DURING THE FIRST POST-PARTUM WEEK

4.1 Introduction

The maternity Blues (please see *1.3 The maternity Blues*) is a widely recognised syndrome that occurs in the majority of women during the first few days following childbirth, and is characterised primarily by tearfulness. Kennerley and Gath (1989) argued that depression was not necessarily present, and developed a Blues questionnaire with items that reflected symptoms peaking in the first few post-partum days. With only moderate sample sizes, they deemed two separate cluster analyses of their questionnaire items "unusually close", even though only three out of seven clusters in each case were similar; those three clusters were "primary blues" (including tearfulness), "depression" (including irritability) and "reservation". The entire scale comprised only 28 items, with an average of only four items per cluster. As discussed in Chapter 1 (please see *1.16 Individual differences as diathesis*) and Chapter 2 (please see *2.2.3 Construction of final questionnaires*), factor solutions with an excessive number of components tend to produce subscales that sample too narrowly.

Peaking of symptoms on around days four and five post-partum has been stipulated as a criterion for Blues symptoms (e.g., Kennerley and Gath, 1989) and the most attentive Blues studies have monitored women on a daily basis in the immediate post-partum period (e.g., Yalom *et al*, 1968; Iles *et al*, 1989). Peaking of symptoms has, indeed, been observed, although if criterion symptom measures were designed to measure symptoms that peaked, then it is not surprising that they should have done so.

The detection of peaking symptoms was not the purpose of the present study. It was, however, intended to subject to data reduction a substantial base of symptom scores during the first seven days post-partum in order to discover whether components comparable to those reported by Kennerley and Gath emerged. An ancillary purpose was to develop new dependent measures pertaining to symptoms in the immediate post-partum period that could be investigated prospectively later.

4.2 Method

4.2.1 Subjects

Subjects were drawn from the longitudinal study described in Chapter 6. Symptom data at one week post-partum (with reference to the past seven days, i.e., since childbirth) were used for the present analyses. Symptom checklist scores with no missing data were available from 170 subjects. The biographic details of subjects participating in the longitudinal study at one week post-partum are shown in Table 6.2.

4.2.2 Materials

Subjects completed the 70-item symptom checklist (Appendix 9), the Edinburgh Postnatal Depression Scale (EPDS - Appendix 6) and the ECQ-P (Appendix 11).

4.2.3 Design and Procedure

Symptom scores from the 70-item checklist (with the exceptions of items 33 and 62 - please see 3.3 Results) were submitted to a principal components analysis. Solutions comprising several different numbers of factors obtained following Varimax orthogonal rotation were scrutinised for face validity. The properties of new symptom scales were evaluated, and their concurrent relationships with EPDS and ECQ-P scores reported.

4.3 Results

Figure 4.1 shows the scree plot resulting from a principal components analysis of the 68 symptom scores.

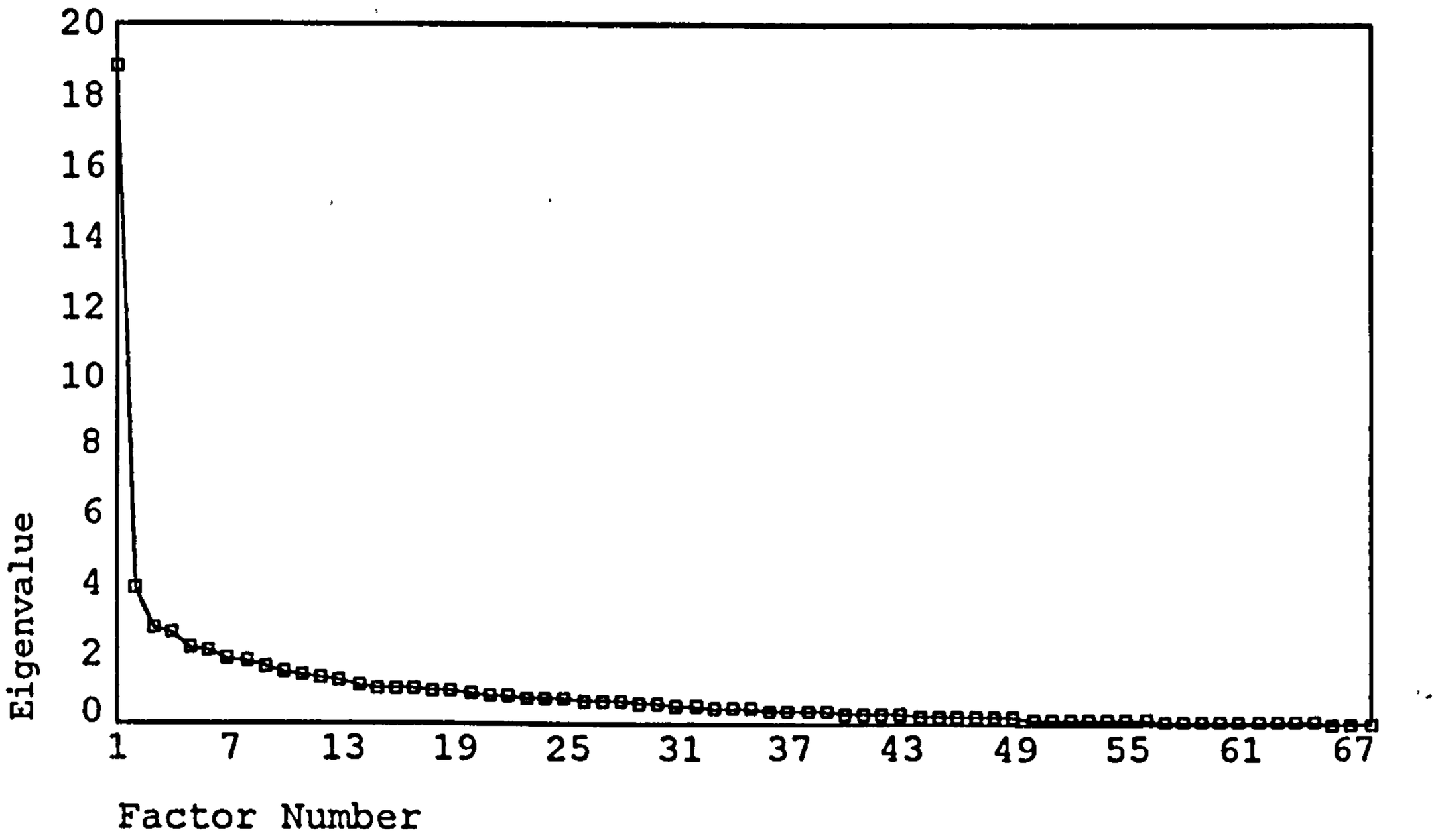


FIGURE 4.1 FACTOR SCREE PLOT: FACTORS ARE 68 SYMPTOM CHECKLIST ITEMS AT ONE WEEK POST-PARTUM.

A solution comprising four factors produced coherent factors. The first resembled Tension (please see Chapter 3), the second reflected a negative past / future orientation and the two remaining factors shared items that loaded on a non-symptom factor (Ascendancy) in a previous analysis (please see Chapter 3). A five factor solution produced similar factors, with a self-denigration factor also emerging. An eight factor solution forfeited none of the foregoing, and included further coherent factors, even though some had few items. Since none of the coherence of the more constrained factor structures was lost, and extra components would facilitate comparison with Kennerley and Gath's clusters, an eight factor solution was eventually favoured. No items loaded on more than one factor. A loading criterion of +/- 0.5 was applied, and non-loading items were discarded.

The first factor comprised the following 15 items in descending order of factor loadings (symptom checklist number): "Felt tearful" (02), "Didn't want to talk to anyone" (03), "Felt tensed up mentally" (59), "Felt irritable" (07), "Cried frequently" (10), "Felt anxious" (20), "Couldn't concentrate on chores or work" (19), "Felt sad" (04), "Felt tensed up physically" (12), "Felt tired all the time" (18), "Had no energy" (15),

"Felt agitated" (68), "Couldn't make decisions" (06), "Felt unable to control anything" (41) and "Felt frustrated" (14). Eleven of these items were common with the 15-item Tension scale developed in Chapter 3; there were, however, important differences between the two factors. "Cried frequently" was present in this first factor, but absent in Tension. "Felt Tearful", moreover, was the highest loading item on this factor but was the second lowest loading item on Tension. "Felt sad" was present in this first factor but absent in Tension. Along with crying, sadness is possibly most associated with the Maternity Blues. This first factor was, accordingly, named "Maternity Blues".

The second factor comprised the following eight items: "Criticised yourself" (38), "Blamed yourself for everything" (34), "Thought you couldn't do anything right" (52), "Felt guilty" (09), "Felt inadequate" (56), "Disliked yourself" (65), "Felt inferior" (16) and "Felt worthless" (63). This factor was named "Inadequacy".

The third factor comprised the following five items: "Felt pessimistic about the future" (29), "Couldn't imagine the future at all" (31), "Felt you deserved punishment" (46), "Felt you had nothing to look forward to" (25) and "Felt that other people disliked you" (57). This factor was named "Pessimism".

The fourth factor comprised the following four items: "Felt very important" (44), "Felt peaceful at times" (70), "Felt very excited" (32) and "Felt confident" (39). This factor was named "Contentment".

The fifth factor comprised the following three items: "Couldn't sleep in the middle of the night" (22), "Couldn't sleep at bedtime" (21) and "Woke up early and couldn't go back to sleep" (23). This factor was named "Sleep disturbance".

The sixth factor comprised the following three items: "Had intrusive memories" (67), Wished you could change the past" (60) and "Dwelt on past failures" (30). This factor was named "Regrets".

The seventh factor comprised the following four items: "Was more active than usual" (69), "Felt very energetic" (50), "Did more work than usual" (58) and "Was more sociable than usual" (37). This factor was named "Activity".

The eighth factor comprised the following two items: "Had no appetite" (48) and "Didn't want to eat meals" (08). This factor was named "Appetite disturbance".

The final solution contained 44 items, and is shown in Table 4.1.

Symptom No.	SYMPTOM FACTORS							
	BLUES	INADEQUACY PESSIMISM		CONTENTMENT	SLEEP	REGRETS	ACTIVITY	APPETITE
02	.72	.25	.26	-.02	-.06	-.01	.00	-.15
03	.71	.05	.01	-.06	.05	.05	-.03	.09
59	.66	.29	.12	-.08	.18	.27	.16	.07
07	.66	.21	.00	-.08	.07	.06	.09	.12
10	.64	.35	.25	-.12	-.05	.00	.09	.02
20	.64	.36	.27	-.02	.20	.14	.05	-.04
19	.63	.04	-.02	.01	.18	.25	.03	.37
04	.62	.31	.36	-.12	-.01	-.01	.10	-.01
12	.61	.31	-.01	.02	.02	.13	.05	.30
18	.59	.26	.04	-.15	.10	.07	-.16	.38
15	.59	.18	-.04	-.04	.19	.01	-.19	.38
68	.58	.34	.13	-.02	.24	.32	.18	.15
06	.58	.10	.13	-.03	.19	.17	.03	.04
41	.57	.34	.10	.07	.24	.37	-.06	.03
14	.56	.23	.12	.08	.29	.16	-.07	.15
38	.30	.81	.06	-.02	.12	.06	.07	.07
34	.26	.75	.23	.07	.04	.08	.04	.06
52	.36	.72	.12	-.00	.08	.28	.01	.12
09	.32	.71	.09	-.12	.08	-.08	.05	.06
56	.43	.68	.14	-.13	.11	.14	.08	-.05
65	.08	.62	.22	-.07	.15	.37	-.01	.24
16	.38	.60	.09	-.09	.04	.03	.12	.09
63	.12	.60	.08	-.11	.05	.35	.05	.19
29	.24	.27	.71	-.19	.02	-.06	-.04	.12
31	.11	.01	.71	-.10	.12	.30	.05	.14
46	-.02	.18	.66	.14	.11	.11	-.12	.06
25	.28	.07	.59	-.20	-.07	.22	-.02	.04
57	.21	.27	.55	.01	.23	.04	.21	.28
44	-.05	-.16	.03	.76	-.06	-.09	.07	-.11
70	-.05	-.07	-.04	.76	.00	.10	.09	.01
32	.08	.11	-.09	.76	.12	-.02	-.02	-.02
39	-.25	-.13	-.11	.74	.08	.04	.12	.08
22	.17	.07	.13	.02	.90	.04	.01	.05
21	.24	.19	-.14	.13	.81	.08	.09	-.04
23	.19	.09	.29	.02	.80	.07	.08	.10
67	.32	.07	-.01	.08	.04	.75	.14	-.02
60	.23	.18	.25	-.03	.06	.70	.02	.16
30	.10	.29	.30	.02	.08	.69	-.02	.05
69	.13	.16	.03	.01	.05	-.13	.82	-.06
50	-.12	.03	.02	.26	.08	.05	.73	-.14
58	.16	.19	-.02	-.19	.07	.17	.69	.07
37	-.05	-.10	-.06	.25	-.04	.08	.65	.20
48	.18	.16	.27	-.03	.00	.09	.05	.78
08	.32	.19	.20	.01	.05	.08	.04	.75

TABLE 4.1 ITEM LOADINGS FOR THE EIGHT ONE-WEEK-POST-PARTUM SYMPTOM FACTORS.

Correlations among the eight symptom factors (unweighted factor scores) are shown in Table 4.2, along with descriptive statistics, internal reliability coefficients and correlations between each factor and concurrent EPDS scores.

	SYMPTOM FACTORS							
	BLUES	INADEQUACY	PESSIMISM	CONTENTMENT	SLEEP	REGRETS	ACTIVITY	APPETITE
BLUES	-	0.72‡	0.52‡	-0.15	0.42‡	0.50‡	0.12	0.50‡
INADEQUACY		-	0.50‡	-0.16*	0.33‡	0.47‡	0.17*	0.41‡
PESSIMISM			-	-0.18*	0.28‡	0.42‡	0.09	0.45‡
CONTENTMENT				-	0.08	-0.03	0.17*	-0.08
SLEEP					-	0.27‡	0.15	0.21†
REGRETS						-	0.14	0.35‡
ACTIVITY							-	0.07
EPDS	0.78‡	0.77‡	0.57‡	-0.32‡	0.32‡	0.49‡	0.04	0.44‡
Mean Score (SD)	19.27 (12.82)	5.08 (6.27)	1.43 (2.48)	6.42 (3.84)	2.45 (3.07)	1.42 (2.56)	2.11 (2.59)	1.95 (2.35)
Min. Score	0	0	0	0	0	0	0	0
Max. Score	59	27	16	16	12	11	14	8
Coeff. Alpha	0.93	0.91	0.76	0.78	0.87	0.80	0.73	0.85

* $p<0.05$
† $p<0.01$
‡ $p<0.001$

TABLE 4.2 CORRELATIONS AMONG FACTORS, AND BETWEEN FACTORS AND THE EPDS, DESCRIPTIVE STATISTICS AND INTERNAL RELIABILITY COEFFICIENTS FOR THE EIGHT SYMPTOM FACTORS AT ONE WEEK POST-PARTUM.

Correlations among the factors were mostly significant although Contentment and Activity were less strongly related to the remainder. Contentment and Activity are notionally antagonistic to symptomatology, but the absence of strong negative correlations with other symptom measures suggested that they may be independent of psychopathology. Correlations between the symptom factors and the EPDS were all significant with the exception of Activity which, like Ascendancy (please see Chapter 3), does not appear to be a symptom factor at all.

Internal reliability coefficients for the symptom factors were all satisfactory, although those for Pessimism, Contentment and Activity were less substantial than the remainder.

Correlations between the eight new symptom factors and the four ECQ-P subscales are shown in Table 4.3 (sixty-five subjects yielded symptom and ECQ-P scores with no missing data at one week post-partum).

	SYMPTOM FACTORS							
	BLUES	INADEQUACY	PESSIMISM	CONTENTMENT	SLEEP	REGRETS	ACTIVITY	APPETITE
REHEARSAL	0.49‡	0.44‡	0.38†	0.00	0.32*	0.45‡	0.05	0.23
MATERNAL DISCOMFORT	0.34†	0.32†	0.33†	-0.25*	0.16	0.35†	0.13	0.19
EMOTIONAL INHIBITION	-0.07	-0.01	-0.02	-0.03	0.03	0.20	0.03	-0.11
AGGRESSION CONTROL	-0.26*	-0.10	0.09	-0.14	-0.01	-0.34†	0.05	-0.15

* $p<0.05$
† $p<0.01$
‡ $p<0.001$

TABLE 4.3 CORRELATIONS BETWEEN INDIVIDUAL DIFFERENCES AND SYMPTOM MEASURES (ALL CORRELATIONS HAVE 63 DF).

As with concurrent relationships between ECQ-P subscales and post-partum symptoms reported previously (please see Tables 2.8 and 3.7), the ECQ-P subscales which had the strongest relationships with concurrent symptoms were Rehearsal and Maternal Discomfort. This was particularly true for Blues, Regrets, Inadequacy and Pessimism. Whereas Aggression Control did not correlate significantly with post-partum symptoms previously, however, there was a significant negative correlation between Aggression Control and the Blues and Regrets factors.

4.4 Discussion

In contrast to Kennerley and Gath's (1989) approach, the present study set no conditions for the inclusion of symptoms in a components analysis relating to the first post-partum week. Both studies, nevertheless, yielded a primary Blues component. Whereas Kennerley and Gath's Blues cluster comprised four items only, the Blues factor in the present analysis comprised 15 items and was reliable internally. Kennerley and Gath obtained a depression component in two separate analyses, but this appeared to have been a composite measure with little homogeneity. In contrast, all of the factors in the present study had strong face validity and internal reliability. Kennerley and Gath also obtained a consistent "reservation" cluster which was not replicated in the present study; two items in that three-item reservation cluster closely resembled items on the 70-item checklist, one of which loaded on the present Blues factor ("Didn't want to talk to anyone") and the other did not load at all ("Felt emotionally numb"). Kennerley and Gath found that scores on a four-item hypersensitivity cluster increased across parturition, but this cluster emerged in only one of their analyses. There was one closely corresponding item in the present study's 70-item checklist ("Felt tensed up mentally"), and this loaded on the Blues factor. Thus the only clear parallel between Kennerley and Gath's and the present study was the emergence of a clear Blues component. These observations are consistent with the notion that there exists a commonly experienced Blues syndrome characterised chiefly by tearfulness (whether its constituent symptoms peak during the immediate post-partum period or otherwise). The Blues factor derived in the present study would constitute a far more comprehensive and reliable measuring instrument of the maternity Blues than Kennerley and Gath's questionnaire.

It was not necessary to establish retest reliability as the maternity Blues is a very short-lived phenomenon. Concurrent validity was established with the EPDS. As previously, the ECQ-P subscales that correlated most strongly with symptoms (particularly Blues, Regrets, Inadequacy and Pessimism) were Rehearsal and Maternal Discomfort. The identification of clusters of symptoms specific to the early puerperium allows for investigation of their precedents in prospective studies. Data pertaining to such relationships are reported in Chapter 10.

CHAPTER 5. PILOT FOR THE LONGITUDINAL STUDY

5.1 Introduction

A diathesis-stress model of illness (please see *1.16 Individual differences as diathesis*) assumes that stress (usually life events) is aetiological with respect to outcome, the strength of the causal relationship governed by moderating variables such as social support and personality. This is revealed statistically in interactions which suggest that the deleterious effects of stress manifest themselves in only a proportion of individuals, depending on their status with respect to the moderating variables germane (please see Figure 1.1 for an illustration of social support as a moderator).

The longitudinal study (described in Chapter 6) was designed to evaluate a diathesis-stress model of vulnerability in maternal subjects, especially using true prospective designs (please see *1.14 Stress and aetiology*, *1.15 Social support as a protective asset* and *1.16 Individual differences as diathesis*). An opportunity arose to evaluate the diathesis-stress model of vulnerability in the context of maternity over a single post-partum follow-up occasion, prior to implementation of a larger project involving several longitudinal stages (each of which was set with reference to each subject's onset of pregnancy and delivery). True prospective data pertaining to the larger study are reported in Chapters 9 (Predicting Obstetric Outcomes), 10 (Predicting Symptom Outcomes) and 11 (The Short Term Progression of Post-partum Symptoms).

The present pilot study also provided an opportunity to ensure that the materials intended for the longitudinal study (i.e., questionnaires designed to measure life events, social support, individual differences and symptoms) could be completed satisfactorily by maternal respondents. Individual differences and symptom questionnaires have already been introduced and comprise Appendices 6 (Edinburgh Postnatal Depression Scale), 9 (70-item symptom checklist), 10 (ECQ-A) and 11 (ECQ-P). The development of purpose-designed life events and social support questionnaires is reported in this chapter.

5.2 Method

5.2.1 Subjects

Subjects recruited for construction of the ECQ-P (please see Chapter 2) were not suitable for recruitment into the longitudinal study (please see Chapter 6) as, because they had already given birth within the past 12 months, perinatal outcomes could not be evaluated prospectively. Of the 204 subjects who provided retest data for the ECQ-P, however, 179 completed life events, social support and symptom questionnaires (please see 5.2.2 *Materials* below) on the follow-up occasion with no missing data. This sample thus yielded sufficient data over a single follow-up occasion in order to test the diathesis-model and check the suitability of questionnaires intended for the subsequent longitudinal study. Biographic details of the 304 subjects recruited for construction of the ECQ-P were shown in Table 2.1. Equivalent data for the 179 subjects in the pilot study are shown in Table 5.1.

MEAN AGE IN YEARS (SD)	28.16	(4.8)
MEAN AGE LEFT FULL-TIME EDUCATION (SD)	18.20	(3.0)
PERCENT GAINFULLY ENGAGED WHEN LAST BECAME PREGNANT*	81.0	
PERCENT RETURNED OR PLANNING TO RETURN TO WORK	55.1	
PERCENT SMOKERS	15.1	
PERCENT LIVING WITH A HUSBAND OR OTHER PARTNER	93.9	
PERCENT THIS PREGNANCY* PLANNED	72.1	
PERCENT WITH BABY <1 YR WHEN LAST BECAME PREGNANT*	5.6	
PERCENT MORNING SICKNESS IN THIS PREGNANCY*	68.2	
MEAN AGE OF BABY IN WEEKS (SD)	26.16	(11.7)
PERCENT PRIMIPARAE	68.2	
MEAN NUMBER OF PREGNANCIES (SD)	1.7	(1.0)
MEAN PARITY (SD)	1.4	(0.7)

* Referent is last full-term pregnancy

TABLE 5.1 BIOGRAPHIC DETAILS OF SUBJECTS IN THE PILOT STUDY.

5.2.2 Materials

Data were obtained from the following questionnaires:

1) Biographic questionnaire (Appendix 7)
2) Postnatal version of the 130-item exploratory individual differences questionnaire (Appendix 3)
3) Edinburgh Postnatal Depression Scale (Appendix 6)
4) 70-item self-report symptom checklist (Appendix 9)
5) Obstetric questionnaire pertaining to the index pregnancy and delivery (Appendix 12)
6) Life events questionnaire (Appendix 13)
7) Social support questionnaire (Appendix 14)

Questionnaires 1) to 3) inclusive were completed on the first occasion; questionnaires 2) to 7) inclusive were completed following the 12 week retest interval.

Criteria for the adequacy of a life events scale (please see Chapter 1 - *1.14 Stress and aetiology*) included the following: listed events should be relevant to the sample, subjects should have the option of including events not listed, the period from which the event was recalled should not be historically remote and subjects should rate both the desirability and stressfulness of events. No existing life events scale was found to satisfy all of these requirements (particularly the first) and, so, a new scale was contrived for present purposes.

A miscellaneous selection of existing life event scales was screened for events appropriate for a maternal sample, and further events deemed suitable were included in a pool which was eventually refined to a list of 40 events. Provision was made for the optional listing of up to four further events. Instructions required subjects to rate the desirability and stressfulness of events which had happened in the past 12 weeks only. The new life events scale comprises Appendix 13.

Criteria for the adequacy of a social support scale (please see Chapter 1 - *1.15 Social support as a protective asset*) included the following: listed sources should be relevant to the sample, subjects should have the option of including sources not listed, the period from which support was recalled should not be historically remote and subjects should rate, in respect of each source, amount of support preferred, amount of support actually received and satisfaction with support received. No existing social support scale was found to satisfy all of these requirements (particularly the first) and, so, a new scale was contrived for present purposes.

A miscellaneous sample of social support scales was screened for sources relevant to a maternal sample, and further sources deemed suitable were included in a pool which was eventually refined to a list of 14 sources. Provision was made for the optional listing of up to two further sources. Instructions included a working definition of support and required subjects to rate, in respect of each source, amount of support preferred, amount of support received and satisfaction with support received with reference to the past 12 weeks only. The social support scale used in the present study comprises Appendix 14.

5.2.3 Design and Procedure

The pilot comprised a single follow-up study in which the relationships between life events and social support over the past 12 weeks (commencing on an occasion within the first post-partum year) and symptoms in the past seven days were evaluated. ECQ-P scores were included as independent variables. Since life events and social support data were procured at the same time as symptom data, the design was not a true prospective one.

The questionnaires were despatched and returned through the post. Each battery was accompanied by a covering letter which thanked the subject for participating, gave an outline of the purpose of the study, and gave instructions on how to complete and return the questionnaires.

Three life events scores were computed: "Stress" was the aggregate of the stressfulness ratings for all life events happening in the past 12 weeks, whatever the desirability rating; "Undesirable" was the aggregate of the stressfulness ratings for all life events happening in the past 12 weeks for events rated as undesirable only, and "Count" was simply the total number of life events happening in the past 12 weeks.

The social support questionnaire yielded three support measures: ideal support, support received and satisfaction with support. A fourth social support variable ("Shortfall") was derived by subtracting support received from ideal support. Increasing positive values on this fourth measure reflected greater shortfalls in support.

Appropriate items on the 130-item exploratory individual differences questionnaire were selected on the retest occasion in order to calculate ECQ-P subscale scores (please see Chapter 2). Appropriate items on the 70-item self-report symptom checklist were selected in order to calculate Self-esteem and Tension scores (please see Chapter 3).

The relationships between independent variables (life events, social support and individual differences) and dependent variables (symptoms) were investigated in regression analyses which included both main effect and interaction terms. With reference to social support studies, Cohen and Wills (1985) said:

> The most common statistical procedure used in social support studies when the criterion variable is continuous (e.g., level of depressive symptomatology) is a twoway analysis of variance, with stress and social support as factors, or equivalently a multiple regression analysis with the cross-product term (Stress x Support) forced into the equation after the main effect terms for stress and support. When appropriate data are available, the regression analysis is preferred because it treats the predictor variables (stress and support) as well as the criterion (symptomatology) as continuous. Regression and analysis of covariance models ... can be used to control for initial symptom level in prospective data analyses. (p317)

Because the present study was not confined to social support, this approach was extrapolated to include individual differences measures and all possible interaction terms.

Separate regression analyses were conducted for each of the three symptom measures (Self-esteem, Tension and EPDS scores). In Chapter 1 (please see *1.14 Stress and aetiology*), the potential hazard of ascribing symptoms to stress when symptoms may have been present before the stress occurred was discussed. One way of contending such a possibility is to statistically control initial symptom levels. EPDS scores (the EPDS was the only symptom scale completed on the first occasion) were accordingly forced into each regression equation first. Life events were then forced as a second step, and all remaining terms subsequently entered into the regression equations stepwise at an inclusion significance criterion of $p<0.05$.

Life events were multiplied by each support and individual differences measure to create cross-product terms that represented interactions of vulnerability with stress. Three further blocks of cross-product interaction terms were subsequently entered stepwise: terms that included each social support measure with each individual differences measure, terms that included support measures only and terms that included individual differences measures only. These blocks were included in order to investigate relationships ancillary to those postulated by the diathesis-stress model.

Finally, within subjects t tests were used to evaluate changes in the magnitude of individual differences and EPDS scores over the 12 week follow-up interval (variations in Self-esteem and Tension scores could not be evaluated as the 70-item symptom checklist was completed on the retest occasion only). This procedure provided an alternative to reliance solely on retest correlations for evaluating the reliability (or changeability) of scores over time.

5.3 Results

First, correlations were computed among the three life event scores in order to evaluate redundancy. The correlation between "Stress" and "Count" was 0.96 (DF 177) which rendered doubtful the utility of conducting separate analyses relating to the two measures. The correlations between "Stress" and "Count" on the one hand and "Undesirable" on the other, however, were 0.68 (DF 166) and 0.63 (DF 166) respectively, each of which represented only 46% and 40% of shared variance. Separate calculations using "Stress" and "Undesirable" were consequently computed, with the "Count" measure deemed redundant (as events weighted for stressfulness were deemed more useful by Sarason *et al*, 1978, please see Chapter 1 - *1.14 Stress and aetiology*).

Descriptive statistics for the variables in the pilot study are shown in Table 5.2.

	Mean	SD	Minimum	Maximum	N
LIFE EVENTS "STRESS"	12.12	8.12	0	43	179
LIFE EVENTS "UNDESIRABLE"	5.14	5.06	0	27	168
SUPPORT (IDEAL)	15.92	6.28	2	37	179
SUPPORT (RECEIVED)	13.15	5.68	0	29	179
SUPPORT (SHORTFALL)	2.78	4.44	-8	18	179
SUPPORT (SATISFACTION)	14.74	7.40	0	38	179
REHEARSAL	42.92	7.18	22	61	179
MATERNAL DISCOMFORT	25.28	5.53	12	40	179
AGGRESSION CONTROL	27.27	4.60	12	39	179
EMOTIONAL INHIBITION	14.54	2.96	8	24	179
SELF-ESTEEM	16.23	15.60	0	76	179
TENSION	23.01	13.37	0	60	179
EPDS	9.50	5.52	0	25	179

TABLE 5.2 DESCRIPTIVE STATISTICS FOR VARIABLES IN THE PILOT STUDY.

Correlations among the variables in the present study are shown in Table 5.3. NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

1 = LIFE EVENTS "STRESS"						8 = MATERNAL DISCOMFORT					
2 = LIFE EVENTS "UNDESIRABLE"						9 = AGGRESSION CONTROL					
3 = SUPPORT (IDEAL)						10 = EMOTIONAL INHIBITION					
4 = SUPPORT (RECEIVED)						11 = SELF-ESTEEM					
5 = SUPPORT (SHORTFALL)						12 = TENSION					
6 = SUPPORT (SATISFACTION)						13 = EPDS					
7 = REHEARSAL											

	2	3	4	5	6	7	8	9	10	11	12	13
1	0.68‡	0.29‡	0.14	0.24†	-0.00	0.24†	0.21†	-0.04	0.04	0.50‡	0.57‡	0.40‡
2	-	0.25‡	0.13	0.19*	-0.06	0.24†	0.14	-0.13	0.03	0.34‡	0.41‡	0.30‡
3		-	0.73‡	0.48‡	0.43‡	0.12	0.08	-0.02	-0.12	0.18*	0.22†	0.19*
4			-	-0.25†	0.66‡	0.01	-0.10	-0.01	-0.12	-0.01	0.05	-0.00
5				-	-0.24†	0.15	0.25†	-0.02	-0.01	0.27‡	0.24†	0.27‡
6					-	-0.03	-0.21†	-0.10	-0.13	-0.12	-0.01	-0.10
7						-	0.42‡	0.12	0.05	0.55‡	0.50‡	0.65‡
8							-	0.14	0.04	0.39‡	0.34‡	0.44‡
9								-	-0.04	0.08	-0.07	0.10
10									-	0.07	0.00	0.09
11										-	0.81‡	0.77‡
12											-	0.71‡

* $p<0.05$
† $p<0.01$
‡ $p<0.001$

TABLE 5.3 CORRELATIONS BETWEEN VARIABLES IN THE PILOT STUDY (ALL CORRELATIONS HAVE 177 DF EXCEPT THOSE INVOLVING LIFE EVENTS "UNDESIRABLE" WHICH HAVE 166 DF).

The regression of Self-esteem score on the predictor variables, including initial symptoms and life events "Stress", resulted in the stepwise addition of Rehearsal and a Life events x Satisfaction with social support interaction. Each addition is shown in Table 5.4, along with its associated F, p and ΔR^2 (increments in variance) values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	43303.61	178					
INITIAL SYMPTOMS[a]	30511.51	177	12792.10	1	74.21	<0.001	0.295
LIFE EVENTS "STRESS"[a]	25057.89	176	5453.62	1	38.31	<0.001	0.126
REHEARSAL[b]	22188.64	175	2869.25	1	22.63	<0.001	0.067
LIFE EVENTS "STRESS" x SUPPORT (SATISFACTION)[b]	21186.03	174	1002.61	1	8.23	0.005	0.023
TOTAL	21186.03	174	22117.58	4	45.41	<0.001	0.511

The regression equation is:

Self-esteem score = - 28.04 + 0.64 (Initial symptoms)[a] + 1.06 ("Stress")[a] + 0.68 (Rehearsal)[b] - 0.03 ("Stress" x Satisfaction with social support)[b]

The regressors explained 51.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.4 REGRESSION OF SELF-ESTEEM SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "STRESS") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

The regression of Tension score on the predictor variables, including initial symptoms and life events "Stress", resulted in the stepwise addition of Rehearsal and Aggression Control. No interaction terms featured in the regression equation. Each addition is shown in Table 5.5, along with its associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	31801.98	178					
INITIAL SYMPTOMS[a]	24283.17	177	7518.81	1	54.81	<0.001	0.236
LIFE EVENTS "STRESS"[a]	18034.39	176	6248.78	1	60.98	<0.001	0.197
REHEARSAL[b]	16455.39	175	1579.00	1	16.79	<0.001	0.049
AGGRESSION CONTROL[b]	15974.64	174	480.75	1	5.24	0.023	0.016
TOTAL	15974.64	174	15827.34	4	43.10	<0.001	0.498

The regression equation is:

Tension score = - 2.92 + 0.48 (Initial symptoms)[a] + 0.71 ("Stress")[a] + 0.52 (Rehearsal)[b] - 0.37 (Aggression Control)[b]

The regressors explained 49.8% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.5 REGRESSION OF TENSION SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "STRESS") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

The regression of EPDS score on the predictor variables, including initial symptoms and life events "Stress", resulted in the stepwise addition of Rehearsal. No interaction terms featured in the regression equation. Each addition is shown in Table 5.6, along with its associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	5416.75	178					
INITIAL SYMPTOMS[a]	2358.42	177	3058.33	1	229.53	<0.001	0.565
LIFE EVENTS "STRESS"[a]	2161.32	176	197.10	1	16.05	<0.001	0.036
REHEARSAL[b]	1864.70	175	296.62	1	27.84	<0.001	0.055
TOTAL	1864.70	175	3552.05	3	111.12	<0.001	0.656

The regression equation is:

EPDS score = - 6.50 + 0.47 (Initial symptoms)[a] + 0.12 ("Stress")[a] + 0.22 (Rehearsal)[b]

The regressors explained 65.6% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.6 REGRESSION OF EPDS SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "STRESS") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

The regression of Self-esteem score on the predictor variables, including initial symptoms and life events "Undesirable", resulted in the stepwise addition of Rehearsal, Maternal Discomfort and a Life events x Satisfaction with social support interaction. Each addition is shown in Table 5.7, along with its associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	41819.98	167					
INITIAL SYMPTOMS[a]	28773.75	166	13046.23	1	75.27	<0.001	0.559
LIFE EVENTS "UNDESIRABLE"[a]	26378.65	165	2395.10	1	14.98	<0.001	0.049
REHEARSAL[b]	23853.40	164	2525.25	1	17.36	<0.001	0.048
MATERNAL DISCOMFORT[b]	23157.76	163	695.64	1	4.90	0.028	0.012
LIFE EVENTS "UNDESIRABLE" x SUPPORT (SATISFACTION)[b]	22448.35	162	709.41	1	5.12	0.025	0.013
TOTAL	22448.35	162	19371.63	5	27.96	<0.001	0.681

The regression equation is:

Self-esteem score = - 30.18 + 0.76 (Initial symptoms)[a] + 1.28 ("Undesirable")[a] + 0.61 (Rehearsal)[b] + 0.35 (Maternal Discomfort)[b] - 0.04 ("Undesirable" x Satisfaction with social support)[b]

The regressors explained 68.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.7 REGRESSION OF SELF-ESTEEM SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "UNDESIRABLE") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

The regression of Tension score on the predictor variables, including initial symptoms and life events "Undesirable", resulted in the stepwise addition of Rehearsal. No interaction terms featured in the regression equation. Each addition is shown in Table 5.8, along with its associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	29416.65	167					
INITIAL SYMPTOMS[a]	22094.95	166	7321.70	1	55.01	<0.001	0.499
LIFE EVENTS "UNDESIRABLE"[a]	19020.17	165	3074.78	1	26.68	<0.001	0.096
REHEARSAL[b]	17764.18	164	1255.99	1	11.60	<0.001	0.034
TOTAL	17764.18	164	11652.46	3	35.86	<0.001	0.629

The regression equation is:

Tension score = - 8.31 + 0.62 (Initial symptoms)[a] + 0.77 ("Undesirable")[a] + 0.49 (Rehearsal)[b]

The regressors explained 62.9% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.8 REGRESSION OF TENSION SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "UNDESIRABLE") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

The regression of EPDS score on the predictor variables, including initial symptoms and life events "Undesirable", resulted in the stepwise addition of Rehearsal and Maternal Discomfort. No interaction terms featured in the regression equation. Each addition is shown in Table 5.9, along with its associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	5059.38	167					
INITIAL SYMPTOMS[a]	2218.87	166	2840.51	1	212.51	<0.001	0.749
LIFE EVENTS "UNDESIRABLE"[a]	2095.58	165	123.29	1	9.71	0.002	0.016
REHEARSAL[b]	1795.66	164	299.92	1	27.39	<0.001	0.038
MATERNAL DISCOMFORT[b]	1734.96	163	60.70	1	5.71	0.018	0.008
TOTAL	1734.96	163	3324.41	4	78.08	<0.001	0.811

The regression equation is:

EPDS score = - 8.62 + 0.45 (Initial symptoms)[a] + 0.13 ("Undesirable")[a] + 0.22 (Rehearsal)[b] + 0.12 (Maternal Discomfort)[b]

The regressors explained 81.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 5.9 REGRESSION OF EPDS SCORE ON PREDICTOR VARIABLES (INCLUDING LIFE EVENTS "UNDESIRABLE") WITH STATISTICAL CONTROL OF INITIAL SYMPTOMS.

Retest correlations for ECQ-P and EPDS scores, mean scores across the 12 week interval (from the first occasion - T1 to the second occasion - T2) and t tests of changes in 179 subjects are shown in Table 5.10.

	Retest r	Mean T1 (SD)	Mean T2 (SD)	t	p
REHEARSAL	0.829	43.55 (7.4)	42.92 (7.2)	1.98	0.050
MATERNAL DISCOMFORT	0.833	25.40 (5.9)	25.28 (5.5)	0.45	0.652
AGGRESSION CONTROL	0.852	27.57 (4.7)	27.27 (4.6)	1.59	0.113
EMOTIONAL INHIBITION	0.677	14.77 (3.2)	14.54 (3.0)	1.24	0.217
EPDS	0.751	10.46 (6.2)	9.50 (5.5)	3.07	0.002

TABLE 5.10 RETEST CORRELATIONS FOR ECQ-P AND EPDS SCORES, MEAN SCORES ACROSS 12 POST-PARTUM WEEKS AND t TESTS OF CHANGES IN 179 SUBJECTS IN THE PILOT STUDY (ALL t TESTS HAVE 178 DF).

5.4 Discussion

The correlations among the life event scores suggested substantial redundancy between simple counts of events and overall stress ratings. The correlation between "Count" and "Stress" was notably similar to the correlations between counts of events and objectively-rated life change scores computed by Hurst *et al*, (1978 - please see Chapter 1 - *1.14 Stress and aetiology*). The shared variance between "Undesirable" and the two other life event scores was, however, only approximately half of that between "Count" and "Stress", seemingly corroborating the distinction drawn by Sarason *et al* (1978) between negative and positive life change (please see Chapter 1 - *1.14 Stress and aetiology*). The correlations between "Stress" and "Undesirable" as alternative indices of stress and the remaining variables in the present study were, however, broadly similar. Indeed, the results of the regression analyses predicting three symptom measures were also substantially equivalent when the two alternative stress measures were used. Thus, notwithstanding their relatively modest shared variance, distinguishing overall stress ratings from those pertaining only to events rated as undesirable in the present context did not seem empirically useful.

Correlations among the support measures, and between the life events and support measures were unsurprising. Ideal support was positively associated with received support (those who prefer high levels of support are likely to try to procure it), shortfall in support (the greater the preferred level of support, the greater the risk of a shortfall) and satisfaction with support (those who prefer support are more likely to value it). Received support was negatively associated with shortfall (a shortfall is less likely when received support is high) and positively associated with satisfaction, whilst shortfall in support was negatively associated with satisfaction. Life events were positively associated with ideal support and shortfall in support. These latter relationships are consistent with a buffering role for social support, i.e., it becomes more valuable with increased levels of stress.

Correlations between ECQ-P subscales corresponded closely with those reported in Chapter 2 (please see Table 2.5), although the correlation between Rehearsal and Emotional Inhibition (like that reported for the ECQ and the ECQ2) was not significant in the present study. These relationships support the discriminability of emotion control subscales. All ECQ-P and EPDS scores declined across 12 weeks, but the only clearly significant change was in EPDS scores (the change in Rehearsal score was only marginally significant). Together with the retest correlations, these data are consistent with the relative stability of ECQ-P scores, especially when compared with the relative instability of symptoms.

Life events were positively associated with Rehearsal and Maternal Discomfort (although the relationship between "Undesirable" and Maternal Discomfort was not significant). This is difficult to interpret if there is an assumption that personality is so stable that it is impervious to exogenous stress. Notwithstanding high ECQ-P retest reliability, it remains possible that exogenous stress tends to promote a tendency to ruminate on emotionally salient situations or incidents, and tends to promote dissatisfaction with the mothering role. Conversely, a heightened tendency to ruminate and increased dissatisfaction with motherhood may enhance the likelihood that events will be reported and rated as stressful. In effect, there may be a continuous interactive relationship between exogenous stress, Rehearsal and Maternal Discomfort. Maternal Discomfort was positively associated with shortfall

in social support and negatively associated with satisfaction with social support. These findings suggest that there may also be an interactive relationship between Maternal Discomfort and social support. The shared variance underlying these postulated interactions did not exceed 7%, however, which is consistent with the ECQ-P subscales having substantial inertia in the face of exogenous influences.

There was an expected high degree of association between the symptom factors. As far as their relationships with the independent variables were concerned, life events, Rehearsal and Maternal Discomfort were most consistently associated with symptoms, with a shortfall in social support, and to a lesser extent ideal support, also implicated. The diathesis-stress model, however, was tested in the regression analyses in which interaction terms as well as main effects were evaluated. In each analysis, initial symptom levels and one of two alternative life event scores ("Stress" and "Undesirable") were forced into the regression equation before the stepwise addition of the remaining predictor variables which included all possible interaction terms.

In each regression equation, Rehearsal was the first stepwise addition. This consistent record suggested Rehearsal is implicated in changes in symptom levels over an interval of 12 post-partum weeks, over and above the influence of life events. Maternal Discomfort featured as a stepwise addition in the equations predicting Self-esteem and EPDS scores, but only when "Undesirable" was selected as the stress index. Aggression Control featured in only one regression equation; that predicting Tension score when "Stress" was the selected life events measure. Emotional Inhibition did not feature in any of the regression equations.

None of these main effects, however, supports the diathesis-stress model of susceptibility to symptoms. The only interactions that featured in the regression equations was the consistent inclusion of a Life events x Satisfaction with social support term in the equations predicting Self-esteem score (whatever the life events measure selected). These results do support the buffering model of social support, suggesting that quality of support (satisfaction) rather than mere quantity (received or shortfall) governs the relationship between stress and self-esteem in

post-partum women. The moderating effects of social support on self-esteem could be attributable to the consensual validation of a person's identity, including their social role, but could also be simply attributable to a person perceiving their ability to cope with stress is enhanced when support of a suitable calibre is available. In Chapter 3, it was argued that self-esteem is especially relevant to postnatal depression, and the present findings emphasise quality of social support as a special issue in this connection. They also support Cohen and Wills' (1985) postulation (please see Chapter 1 - *1.15 Social support as a protective asset*) that interactions, rather than main effects, should be observed for social support.

The absence of other interactions might be explained by the fact that all subjects had given birth in the past year (as at the first testing occasion), arguably placing them universally in a high stress category (independently of their life events scores). Under these circumstances, moderating variables would emerge as main effects (as there is no low stress condition under which stress-moderating variables would not demonstrate their effects). Rehearsal would then qualify as a significant vulnerability factor, especially in the light of the magnitudes of increments in variance it explained in regression of symptoms. To a lesser extent, Maternal Discomfort and Aggression Control also appeared to be important in the prediction of post-partum symptoms.

The conclusions available from this pilot study must be tempered by its design, as it was not a true prospective study in which predictor variables are measured on an occasion prior to outcome variables. As discussed previously (please see Chapter 1 - *1.14 Stress and aetiology*, *1.15 Social support as a protective asset* and *1.16 Individual differences as diathesis*), a true prospective design contends the possibility that current symptom status contaminates the reporting of independent measures. As Cohen and Wills (1985) said:

> When two-wave (Time 1 and Time 2) longitudinal data are available, the most desirable model is an analysis using Time 2 symptomatology as the criterion with Time 1 life events and social support as the predictors and Time 1 symptomatology included as a control variable. By focusing on changes in symptomatology that

> occur as a function of Time 1 stress and support, this analytic model helps rule out the possibility that results are attributable to preexisting symptomatology causing subsequent life events and loss of support. The use of multiple regression analysis ... also makes it possible to control for third variables (e.g., age, sex, social class) that may be correlated with the predictors and symptomatology and hence affect interpretation of the results. (pp318-319)

Although all subjects in the present study had given birth in the past year (as at the first testing occasion), the interval since delivery varied. In the longitudinal study described in Chapter 6, data were retrieved at specific stages of pregnancy and the first eight months post-partum (i.e., each longitudinal stage was referenced to each subject's onset of pregnancy and delivery). This allowed not only for the monitoring of changes in symptoms over the maternity cycle (please see Chapters 7 and 11), but for analyses in which stress, social support and individual differences data at one earlier longitudinal stage were prospectively associated with dependent measures at a later one. The prospective prediction of obstetric outcomes is reported in Chapter 9. Analyses in which biographic variables are taken into account in the regression of symptoms are reported in Chapter 10.

Only 179 of the 304 subjects who participated in the construction of the ECQ-P returned questionnaires with minimal missing data on the retest occasion (i.e., 59%). The greatest attrition by far was attributable to questionnaires not being returned, rather than to missing data from questionnaires that were received. Although some subjects appeared to have had difficulty completing questionnaires correctly, there were no systematic errors with the exception of a small number of subjects who, notwithstanding the instructions, appeared to rate the desirability and stressfulness of all life events regardless of whether they had been experienced. The life event, social support, individual differences and symptoms questionnaires were therefore left unaltered with the exception of the insertion of the phrases "Please remember - cross out the event unless it has happened in the last twelve weeks" and "Please remember - past 7 days only" intermittently throughout the life events scale and the 70-item symptom checklist respectively. The versions that appear in Appendices 13 and 9 are as amended and used in the longitudinal study.

Chapters 7 to 11 report data from the longitudinal study which was designed to investigate the course and prospective prediction of symptoms during the maternity cycle. The following chapter (Chapter 6) describes the methodology and design of this longitudinal study.

CHAPTER 6. LONGITUDINAL STUDY: METHOD

6.1 Introduction

The longitudinal study was implemented for three particular purposes: first, to allow for true prospective prediction of post-partum symptoms and obstetric outcomes; second, to monitor the course of symptoms during pregnancy and across parturition and third, to plot the course of symptoms, including caseness, during the first eight months post-partum.

The desirability of true prospective studies, in which predictor variables are measured on an occasion prior to the measurement of outcomes, has been discussed previously (please see Chapters 1 and 5). The prediction of postnatal depression before it happens, i.e., during pregnancy, and the identification of women who may be susceptible to complications of labour and the puerperium, would be helpful to health professionals who could devise and implement appropriate support and intervention strategies. Targeting resources would confer greater efficiency in the allocation of health service resources, and the prophylaxis of disorder would be of net economic benefit to the extent that any effective support or intervention programmes were less costly than the treatment of ailments they were designed to ameliorate.

As discussed in Chapter 1 (please see *1.4 Postnatal depression*), the "continuity" of symptoms (from before pregnancy to the puerperium) has led some researchers (e.g., Watson *et al*, 1984; O'Hara *et al*, 1991) to doubt whether postnatal depression is a specific disorder. In Chapter 3, however, data were presented that supported Pitt's (1968) "atypical" account of postnatal depression. These data suggested that self-esteem is lower in women who are depressed at eight weeks pregnancy than it is in women who are also depressed but neither pregnant nor in their first two years post-partum. They tended to support the notion that depression that happens post-partum is somehow different from depressions happening at other times, but the data were cross-sectional, and no data pertaining to the course of symptoms throughout the maternity cycle has yet been presented herein.

With the exception of a four-and-a-half year follow-up study (Philipps and O'Hara, 1991), and a further study confined to changes in caseness at three, nine and 15 months post-partum (Nott, 1987), previous longitudinal studies in the context of maternity have not continued to monitor symptoms beyond the puerperium. Consequently, it is not clear how the severity of symptoms varies as the first post-partum year proceeds, and factors associated with amelioration or exacerbation of postnatal depression in the short-term have not been identified. In Chapter 3, an EPDS criterion was invoked to define caseness (please see Chapter 3 for a discussion), and this strategy can be redeployed in the longitudinal study in order to plot the course of post-partum caseness.

The present chapter reports on the overall method of the longitudinal study. The longitudinal data have been analysed in the context of the issues discussed above. The corresponding designs, statistical analyses and results are presented in Chapters 7 (Symptoms during pregnancy and across parturition), 8 (Relationships between biographic and outcome measures), 9 (Predicting obstetric outcomes), 10 (Predicting symptom outcomes) and 11 (The short-term progression of post-partum symptoms).

6.2 Method

6.2.1 Materials

The following questionnaires were used in the longitudinal study:

1) Biographic questionnaire (Appendices 4 and 7)
2) Life events questionnaire (Appendix 13)
3) Social support questionnaire (Appendix 14)
4) ECQ-A (Appendix 10)
5) ECQ-P (Appendix 11)
6) 70-item self-report symptom checklist (Appendix 9)
7) Edinburgh Postnatal Depression Scale (Appendix 6)
8) Obstetric questionnaire pertaining to the index pregnancy and delivery (Appendix 12)

6.2.2 Design and Procedure

A longitudinal design was implemented with regular intervals of data collection throughout pregnancy and the first post-partum year. Subjects were not required to be at the same stage of the maternity cycle simultaneously, but did yield data at equivalent points in time with reference to their own gestational advancement and date of delivery. Antenatal data points were 12, 24 and 36 weeks pregnancy. Postnatal data points were one, eight, 20 and 32 weeks post-partum. Each interval between stages (with the exception of those either side of one week post-partum) was, accordingly, 12 weeks (the interval between 36 weeks pregnancy and eight weeks post-partum will approximate 12 weeks as the average duration of pregnancy is 40 weeks). The one-week-post-partum stage was included to monitor maternity Blues symptoms (please see Chapter 1 - *1.3 The maternity Blues* and Chapter 4 for discussions). A chronological representation of the longitudinal study, showing which questionnaires were completed at each stage, is shown in Table 6.1.

	QUESTIONNAIRES					
STAGE	LIFE EVENTS	SOCIAL SUPPORT	ECQ-A / ECQ-P	SYMPTOM CHECKLIST	EPDS	OTHER
12 WEEKS ANTENATAL	✓	✓	✓	✓	✓	①
24 WEEKS ANTENATAL	✓	✓	✓	✓	✓	①
36 WEEKS ANTENATAL	✓	✓	✓	✓	✓	①
01 WEEKS POSTNATAL	×	×	✓	✓	✓	
08 WEEKS POSTNATAL	✓	✓	✓	✓	✓	②
20 WEEKS POSTNATAL	✓	✓	✓	✓	✓	
32 WEEKS POSTNATAL	✓	✓	✓	✓	✓	

① Biographic questionnaire if one had not already been completed
② Obstetric outcome questionnaire

TABLE 6.1 CHRONOLOGICAL REPRESENTATION OF THE LONGITUDINAL STUDY.

Subjects were allowed to join the study at any point up to eight weeks post-partum, although for practical reasons no subjects joined at one week post-partum. On recruitment, the date at which a subject would reach the next longitudinal stage was determined. Through a diarized system, subjects were posted questionnaires appropriate for that stage approximately seven days beforehand. S.A.E.s were provided for the purpose of returning questionnaires to the University of York. As questionnaires were returned, data were entered into SPSS computer files, and the date at which the subject would reach the next longitudinal stage was diarized so that questionnaires appropriate for that stage would be despatched at the appropriate time.

The exception to this system was the procurement of data at one week post-partum. At 36 weeks pregnancy, each subject was sent two sets of questionnaires, the first to be completed straightaway and the second to be completed one week after childbirth. Subjects who failed to return the one-week-post-partum battery were not followed up. Although this would not mollify attrition, it was deemed excessively intrusive to send reminders to women who had given birth in the very recent past (the opportunity to monitor symptoms in the first post-partum week, moreover, would already have been missed). Thus, only subjects who returned the one-week-post-partum battery continued their participation post-partum.

6.2.3 Subjects

Subjects for the longitudinal study were recruited from several sources. The primary source was pregnant women who responded to an appeal printed in a monthly parenting magazine (please see Chapter 2). Other sources included general practices in Yorkshire, the York branch of the National Childbirth Trust and additional volunteers recruited by word of mouth. Because subjects were first recruited at different longitudinal stages, and because of attrition between stages, the numbers of subjects participating at each stage of the longitudinal study varied. The total number of subjects who took part was 466. The number of subjects participating at each stage, along with their biographic details, are shown in Table 6.2 (any apparent variation from these numbers in analyses reported in other chapters is attributable to missing data).

	ANTENATAL			POSTNATAL			
	12 WEEKS	24 WEEKS	36 WEEKS	01 WEEKS	08 WEEKS	20 WEEKS	32 WEEKS
NUMBER Ss	31	85	164	174	199	170	146
MEAN AGE IN YEARS AT DELIVERY (SD)	29.00 (4.2)	28.76 (4.4)	27.86 (4.5)	27.81 (4.8)	28.00 (4.8)	27.91 (4.7)	27.74 (4.8)
MEAN AGE LEFT FULL-TIME EDUCATION (SD)	18.00 (1.3)	18.79 (3.2)	18.61 (3.2)	18.51 (3.1)	18.54 (3.0)	18.34 (2.8)	18.37 (3.0)
PERCENT GAINFULLY ENGAGED WHEN LAST BECAME PREGNANT*	70.6	65.5	68.4	68.4	68.9	68.6	67.6
PERCENT RETURNED OR PLANNING TO RETURN TO WORK	41.2	44.8	49.6	48.6	50.3	48.2	47.9
PERCENT SMOKERS	23.5	13.8	14.3	13.8	16.4	16.7	17.4
PERCENT LIVING WITH A HUSBAND OR OTHER PARTNER	94.1	93.1	92.5	92.1	92.3	92.9	93.8
PERCENT THIS PREGNANCY* PLANNED	88.2	86.2	75.2	74.3	74.0	72.8	71.7
PERCENT WITH BABY <1 YR WHEN LAST BECAME PREGNANT*	11.8	17.2	12.0	11.2	10.2	8.9	9.7
PERCENT MORNING SICKNESS IN THIS PREGNANCY*	76.5	68.4	69.2	70.5	70.0	72.0	70.7
PERCENT PRIMIGRAVIDAE	35.3	25.9	34.6	-	-	-	-
PERCENT NULLIPARAE	47.1	37.9	49.6	-	-	-	-
PERCENT PRIMIPARAE	35.3	44.8	35.3	51.3	56.1	55.0	55.9
MEAN NUMBER OF PREGNANCIES (SD)	2.2 (1.0)	2.2 (1.0)	2.1 (1.1)	2.1 (1.3)	2.1 (1.3)	2.1 (1.3)	2.1 (1.3)
MEAN PARITY (SD)	0.7 (0.8)	0.8 (0.7)	0.7 (0.8)	1.7 (0.8)	1.6 (0.8)	1.6 (0.8)	1.6 (0.8)

* If postnatal, referent is last full-term pregnancy

TABLE 6.2 NUMBER AND BIOGRAPHIC CHARACTERISTICS OF SUBJECTS PARTICIPATING AT EACH STAGE OF THE LONGITUDINAL STUDY.

CHAPTER 7. SYMPTOMS DURING PREGNANCY AND ACROSS PARTURITION

7.1 Introduction

"Continuity" of depression (please see Chapter 1 - *1.4 Postnatal depression*) was regarded by several researchers (e.g., Watson *et al*, 1984; O'Hara *et al*, 1991) to undermine the distinctiveness of postnatal depression if it is preceded by elevated symptoms either during pregnancy or in the interval prior to conception. Typically, a substantial proportion of cases of postnatal depression were also cases during pregnancy, but there were inconsistent findings elsewhere (Kumar and Robson, 1984; Hayworth *et al*, 1980; Bridge *et al*, 1985). O'Hara's series of studies suggested that BDI and SADS scores typically declined across parturition, and that this was accounted for primarily by diminishing somatic symptoms. Elliott *et al* (1983) reported that more women experienced a downwards trend in symptoms from 36 weeks pregnancy to three weeks post-partum than the reverse, as indexed by the CCEI, the MACL and additional self-report measures. Not all of these, especially the MACL components however, could be regarded as somatic rather than cognitive-affective measures. Trans-parturition variations can thus be evaluated at the level of symptoms or the level of syndromes (caseness). What is the overall trend in severity of symptoms across parturition and, if downwards, is this accounted for solely by attenuation of somatic symptoms? Do overall trends disguise the extent of variation at the level of individual subjects? How many cases of postnatal depression were also cases during pregnancy (and *vice versa*)?

There is also controversy surrounding the course of symptoms during pregnancy itself. Lubin *et al* (1975) monitored state anxiety (on the AACL), depression (on the Depression Adjective Checklist - DACL - Lubin, 1967), somatic symptoms (on an unpublished scale) and trait anxiety (on the IPAT) during the second, fifth and eighth months of pregnancy (chosen to represent the three trimesters) in a sample of 93 middle class women. State anxiety varied as a function of trimester, decreasing by the second and rising again by the third. None of the other measures, however, varied significantly during pregnancy.

Ballinger (1982), however, reported that there were no significant differences in anxiety, hostility and depression scores (all on the MACL) at 10-16 weeks pregnancy, 32 weeks pregnancy and 38 weeks pregnancy. Scores on the Wakefield Depression Inventory (WDI - Snaith, Ahmed, Mehta and Hamilton, 1971), however, increased significantly across all three occasions, although this scale does contain a relatively large number of somatic symptoms likely to be endorsed by women advancing in pregnancy (e.g., "I get tired for no reason").

Elliott *et al* (1983) also reported no significant variations throughout pregnancy on subscales of the MACL, including tension. With the exception of somatic symptoms, matters relating to sexual activity and "worries about labour", there were also no changes on the CCEI factors and miscellaneous self-report and observer ratings. Elliott *et al* drew a distinction between specific worries and general levels of anxiety, supposing that pregnancy is accompanied by variations in the former but not the latter, with worries about impending labour along with somatic and sexual difficulties becoming more prevalent in later pregnancy. The discrepancy between the findings of Lubin *et al* on the one hand and Ballinger and Elliott *et al* on the other could be accounted for by the class bias in Lubin *et al*'s sample and, as Elliott *et al* pointed out, the diversity of individual subjects' variations in symptoms disguised by averaging changes for samples. For example, notwithstanding non-significant changes for Elliott *et al*'s entire sample, 16% showed an increase in MACL tension over pregnancy, while 8% showed a fall.

The present chapter reports on changes in symptoms during pregnancy and across parturition to eight weeks post-partum. A casewise analysis will also be presented to shed light on the degree of overlap or continuity of caseness between late pregnancy and eight weeks post-partum. The results will be discussed in the context of the argument that continuity of depression militates against postnatal depression being "atypical".

7.2 Method

7.2.1 Subjects

Subjects were drawn from the longitudinal study described in Chapter 6. The number and biographic characteristics of subjects participating at each stage of the longitudinal study were shown in Table 6.2.

7.2.2 Materials

Questionnaires pertinent to the present study were the 70-item symptom checklist (Appendix 9) and the EPDS (Appendix 6).

7.2.3 Design and Procedure

A new factor analysis of the 68 non-hallucinatory symptoms from the 70-item checklist was carried out on data from antenatal subjects only, in order to discover whether pregnancy-specific components emerged (previous factoring of symptoms has been confined to non-maternal and post-partum samples - please see Chapters 3 and 4).

Of the three antenatal longitudinal stages, 36 weeks pregnancy was that associated with the largest number of subjects (please see Table 6.2). As wide a spread of antenatal stages was sampled by using as much complete data as was available from 12 weeks pregnancy, followed by as much complete data as was available from 24 weeks pregnancy (not already extracted from 12 weeks pregnancy), followed by as much complete data as was available from 36 weeks pregnancy (not already extracted from the previous two stages). This resulted in the pooling of complete symptom data from 28 subjects at 12 weeks pregnancy, 56 subjects at 24 weeks pregnancy and 80 subjects at 36 weeks pregnancy (total N=164).

EPDS, Self-esteem, Tension and pregnancy symptom factor scores were plotted across five longitudinal stages (12, 24 and 36 weeks pregnancy; one and eight weeks post-partum) in order to elucidate changes in severity with gestational advancement and across parturition. Because subjects were recruited at different stages of the longitudinal study and inter-stage attrition, the repeated measures data were not truly within subjects. Accordingly, oneway analyses of variance were conducted in order to assess the significance of changes in scores across stages.

A criterion score of 14.5 on the EPDS was invoked to define caseness (please see Chapters 1 and 3 for a discussion). An investigation of changes in caseness across parturition was necessarily a within subjects one and, so, this analysis was confined to a sub-sample of 131 subjects for whom EPDS scores were available at both 36 weeks pregnancy and eight weeks post-partum. The same sub-sample was also used to explore the extent of variations in symptom scores within overall trends.

7.3 Results

Figure 7.1 shows the scree plot resulting from a principal components analysis of the 68 ante-partum symptom scores.

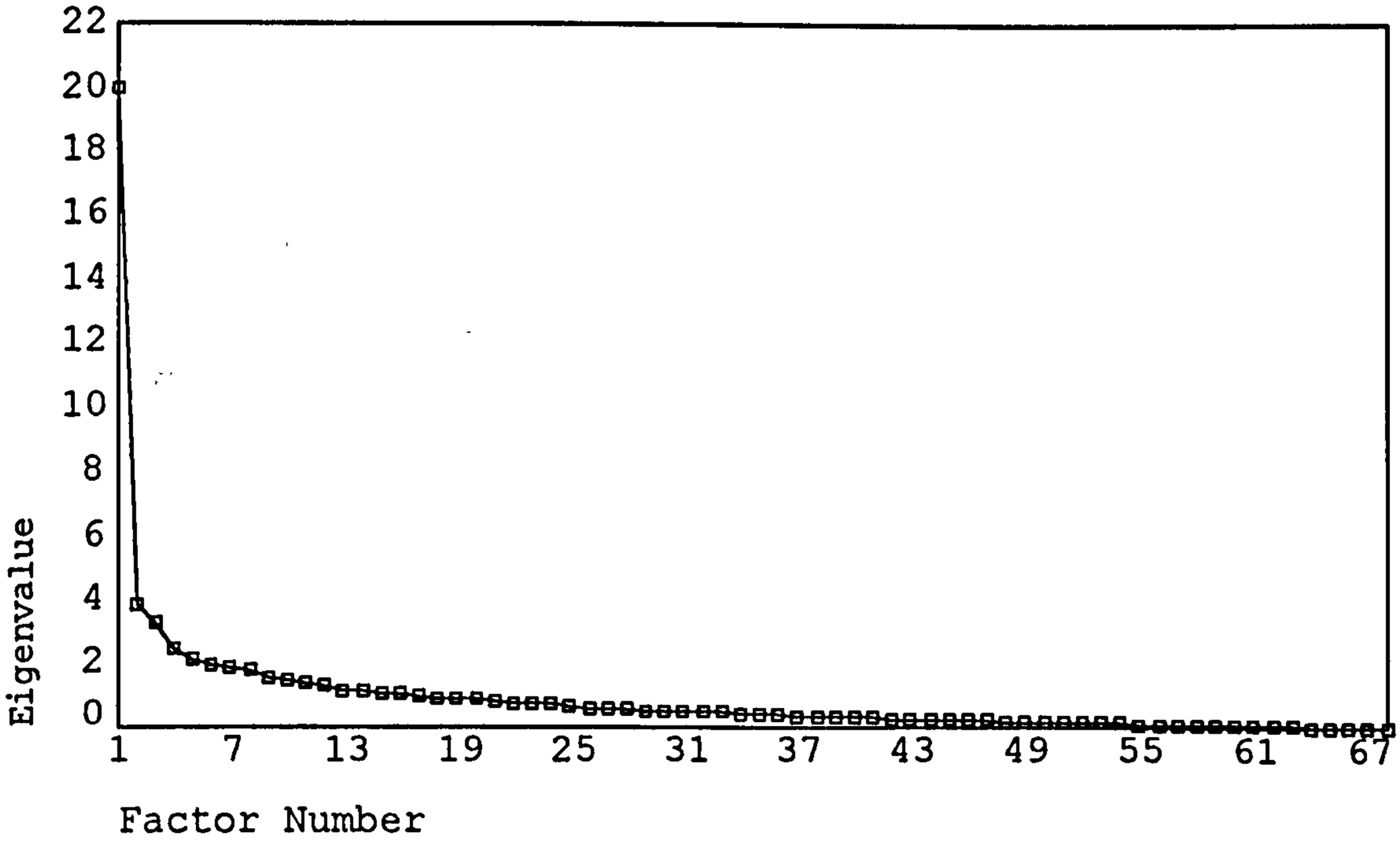


FIGURE 7.1 FACTOR SCREE PLOT FOR 68 ANTE-PARTUM SYMPTOMS

A conservative scree test suggested three factors, although solutions (following Varimax rotation) comprising up to eight factors were scrutinised for face validity. All solutions containing over five factors contained components with too few items, and the four and five factor solutions lacked face validity. The three factor solution yielded coherent factors, the first of which included all 19 Self-esteem items (please see Chapter 3), together with eight of the 15 Tension items. The second factor included seven Tension items, all of which were clearly somatic. A loading criterion of +/- 0.45 was applied, and non-loading items, and three items loading above this criterion on more than one factor were discarded.

The first factor in the final solution was named Cognitive-affective. It comprised 31 items, 18 common with Self-esteem and five with Tension. The second factor was named Somatic. It comprised 14 items, seven common with Tension. The third factor comprised only five items, of which four were common with Ascendancy (please see Chapter 3).

The final solution contained 50 items, and is shown in Table 7.1 (please see the Appendix for the non-abbreviated versions of the symptom items).

No.	SYMPTOM (ABBR.)	SYMPTOM FACTORS		
		COGNITIVE-AFFECTIVE	SOMATIC	FACTOR 3
63	WORTHLESS	0.84	0.09	-0.07
30	PAST FAILURES	0.80	0.06	-0.03
56	INADEQUATE	0.79	0.18	0.08
34	BLAMED SELF	0.78	0.11	-0.02
52	DO ANYTHING RIGHT	0.77	0.17	0.07
65	DISLIKED SELF	0.77	0.17	-0.04
38	CRITICISED SELF	0.74	0.12	0.26
31	NOT IMAGINE FUTURE	0.73	0.11	0.09
29	PESSIMISTIC	0.70	0.23	0.04
25	NOT LOOK FORWARD	0.70	0.18	-0.08
53	EMOTIONALLY NUMB	0.69	0.24	-0.13
57	DISLIKED BY OTHERS	0.68	0.14	0.25
35	LONELY	0.68	0.32	0.04
41	CONTROL	0.63	0.25	0.03
16	INFERIOR	0.62	0.25	0.20
67	INTRUSIVE MEMORIES	0.62	0.10	0.09
09	GUILTY	0.61	0.31	-0.01
60	CHANGE PAST	0.60	0.12	-0.13
66	PANICKY	0.59	0.36	-0.02
04	SAD	0.58	0.32	0.07
59	MENTALLY TENSE	0.57	0.43	0.06
26	UNATTRACTIVE	0.55	0.34	0.17
14	FRUSTRATED	0.54	0.43	0.17
27	BORED	0.54	0.36	0.17
10	CRIED FREQUENTLY	0.54	0.28	-0.11
36	INTIMIDATED	0.53	0.35	0.19
46	DESERVED PUNISHMENT	0.52	0.01	-0.04
02	TEARFUL	0.51	0.24	0.03
13	THOUGHT HARM SELF	0.51	0.06	-0.13
06	DECISIONS	0.47	0.30	0.01
55	SHOWING AFFECTION	0.45	0.26	0.05
18	TIRED ALL THE TIME	0.10	0.75	-0.28
15	NO ENERGY	0.07	0.74	-0.02
19	NOT CONCENTRATE	0.31	0.66	-0.11
22	MIDDLE INSOMNIA	0.15	0.64	0.04
23	EARLY AWAKENING	0.10	0.62	0.06
64	NOT WANT TO GET UP	0.22	0.57	0.07
45	ACHES & PAINS	0.15	0.56	0.24
21	BEDTIME INSOMNIA	0.30	0.55	0.02
07	IRRITABLE	0.39	0.52	0.09
51	BOWEL MOVEMENTS	0.19	0.48	0.24
48	NO APPETITE	0.11	0.48	-0.37
08	NOT WANT MEALS	0.26	0.48	-0.33
43	MOOD WORSE EARLY	0.07	0.47	0.17
12	PHYSICALLY TENSE	0.36	0.46	0.16
69	ACTIVE	0.23	0.20	0.72
70	PEACEFUL	-0.09	0.10	0.64
58	MORE WORK	0.28	0.28	0.63
50	ENERGETIC	0.06	-0.01	0.63
39	CONFIDENT	-0.15	-0.11	0.52

TABLE 7.1 ITEM LOADINGS FOR THE THREE ROTATED PREGNANCY SYMPTOM FACTORS.

Correlations among the three (unweighted) symptom factor scores, and correlations between the symptom factors and the EPDS, are shown in Table 7.2 along with descriptive statistics and internal reliability coefficients.

	SYMPTOM FACTORS		
	COGNITIVE-AFFECTIVE	SOMATIC	FACTOR 3
COGNITIVE-AFFECTIVE	-	0.62‡	0.20*
SOMATIC		-	0.17*
EPDS	0.84‡	0.57‡	-0.11*
Mean Score (SD)	24.25 (22.72)	19.98 (10.80)	4.43 (3.62)
Minimum Score	1	2	0
Maximum Score	101	51	19
Coefficient Alpha	0.9583	0.8714	0.7212

* $p<0.05$
‡ $p<0.001$

TABLE 7.2 CORRELATIONS AMONG THE PREGNANCY SYMPTOM FACTORS, BETWEEN THE PREGNANCY SYMPTOM FACTORS AND THE EPDS, ALONG WITH DESCRIPTIVE STATISTICS AND INTERNAL RELIABILITY COEFFICIENTS.

Table 7.3 shows descriptive statistics for symptom scores by longitudinal stage, together with numbers of subjects who yielded symptom scores at each stage (any variations in subject numbers from those shown in Table 6.2 are attributable to missing data). Mean symptom scores are plotted in Figure 7.2.

		N	Mean	SD	Min.	Max.
COGNITIVE-AFFECTIVE	12 WEEKS (ANTE)	29	17.59	18.20	1	97
	24 WEEKS (ANTE)	84	22.32	22.69	1	101
	36 WEEKS (ANTE)	156	23.57	21.22	1	95
	01 WEEKS (POST)	171	21.75	19.16	0	79
	08 WEEKS (POST)	195	26.65	23.79	0	111
SOMATIC	12 WEEKS (ANTE)	31	21.97	10.36	4	41
	24 WEEKS (ANTE)	84	16.94	9.49	2	40
	36 WEEKS (ANTE)	158	21.54	10.68	2	51
	01 WEEKS (POST)	172	16.51	9.95	1	51
	08 WEEKS (POST)	196	14.55	10.24	0	54
SELF-ESTEEM	12 WEEKS (ANTE)	30	7.03	10.21	0	55
	24 WEEKS (ANTE)	84	9.79	13.39	0	60
	36 WEEKS (ANTE)	157	10.51	12.64	0	53
	01 WEEKS (POST)	172	8.65	10.02	0	44
	08 WEEKS (POST)	195	12.31	14.33	0	66
TENSION	12 WEEKS (ANTE)	30	22.57	9.54	5	48
	24 WEEKS (ANTE)	84	19.71	11.70	0	50
	36 WEEKS (ANTE)	157	21.90	11.78	4	55
	01 WEEKS (POST)	173	20.31	11.84	0	56
	08 WEEKS (POST)	195	21.20	13.87	0	58
EPDS	12 WEEKS (ANTE)	31	9.06	4.87	2	24
	24 WEEKS (ANTE)	84	8.65	5.71	0	25
	36 WEEKS (ANTE)	160	8.86	5.37	0	24
	01 WEEKS (POST)	173	7.98	5.20	0	22
	08 WEEKS (POST)	197	8.32	5.61	0	27

TABLE 7.3 DESCRIPTIVE STATISTICS FOR SYMPTOM SCORES BY LONGITUDINAL STAGE UP TO EIGHT WEEKS POST-PARTUM.

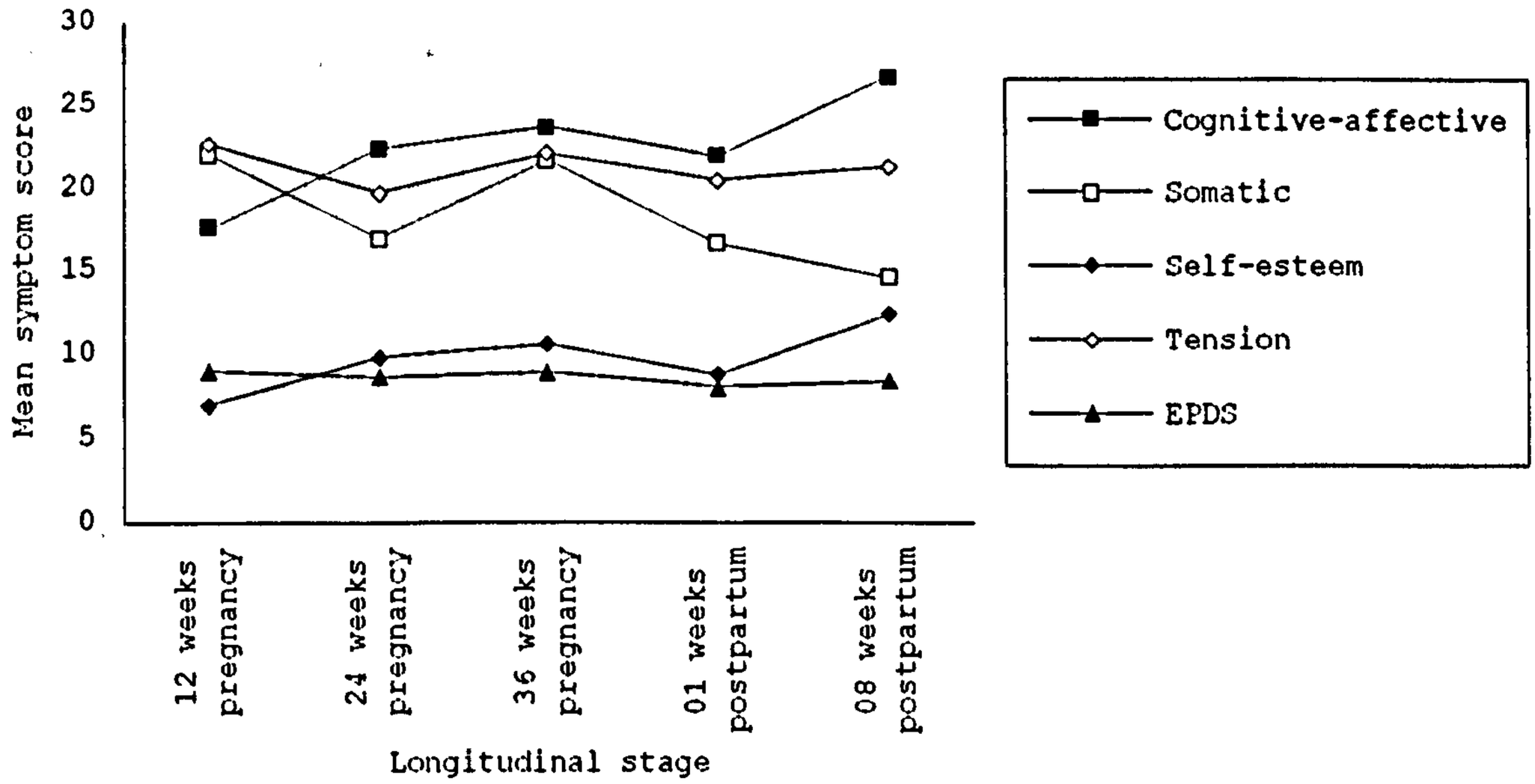


FIGURE 7.2 GRAPH OF MEAN SYMPTOM SCORES BY LONGITUDINAL STAGE UP TO EIGHT WEEKS POST-PARTUM.

Oneway analyses yielded significant F ratios for Somatic (F=12.31; DF 4,636; p<0.001) and Self-esteem (F=2.55; DF 4,633; p=0.038) only. Tukey's HSD tests indicated that the following mean Somatic scores were significantly different: 24 and 36 weeks antenatal; 36 weeks antenatal and one week post-partum; 36 weeks antenatal and eight weeks post-partum; 12 weeks antenatal and one week post-partum; 12 weeks antenatal and eight weeks post-partum. The only Self-esteem scores that were significantly different were those at one and eight weeks post-partum.

Among the 131 subjects for whom EPDS scores were available at both 36 weeks pregnancy and eight weeks post-partum, there were 26 cases (prevalence rate 19.8%) on the former occasion and 16 cases (prevalence rate 12.2%) on the latter. Of the 26 cases at 36 weeks pregnancy, 10 were cases at eight weeks post-partum (probability of non-recovery 0.38) and 16 were not (probability of recovery 0.62). Of the 105 non-cases at 36 weeks pregnancy, six were cases at eight weeks post-partum (probability of becoming a case 0.06) and 99 were not (probability of continuation of non-caseness 0.94). Conversely, of the 16 cases at eight weeks post-partum, 10 were cases at 36 weeks pregnancy (62.5%) and 6 were not (37.5%). Of the 115 non-cases at eight weeks post-partum, 16 were cases at 36 weeks pregnancy (13.9%) and 99 were not (86.1%).

The extent of individual variation within overall changes from 36 weeks pregnancy to eight weeks post-partum are shown in Table 7.4. For each symptom component, the number (N) and proportion (%) of subjects showing an increase, decrease or no change in score are given.

	INCREASE		DECREASE		NO CHANGE	
	N	(%)	N	(%)	N	(%)
SELF-ESTEEM	61	(48.4)	49	(38.9)	16	(12.7)
TENSION	58	(45.7)	66	(52.0)	3	(2.4)
COGNITIVE-AFFECTIVE	64	(51.2)	56	(44.8)	5	(4.0)
SOMATIC	25	(19.5)	97	(75.8)	6	(4.7)
EPDS	55	(42.0)	66	(50.4)	10	(7.6)

TABLE 7.4 VARIATION WITHIN TRANS-PARTURITION SYMPTOM SCORES.

7.4 Discussion

A new factor analysis of the symptom checklist revealed two pregnancy-specific components, "Cognitive-affective" and "Somatic". Although there was some item-sharing between these factors and the two components extracted in Chapter 3, the new factors were distinguishable on both content and factorial grounds, and had satisfactory internal reliability. The correlation between Cognitive-affective and EPDS scores was appreciably more substantial than that between Somatic scores and the EPDS. This suggested that the EPDS is free from contamination by somaticism, making it especially suitable for maternal respondents (although, as discussed in Chapter 3, it samples a narrow range of behaviour, and Self-esteem and Tension would serve as useful adjuncts to the EPDS when measuring post-partum symptoms).

The correlation between the third factor and the EPDS, like that between Ascendancy and the EPDS (please see Chapter 3), was negative and only marginally significant. Ascendancy was not a measure of psychopathology, and because of the extent of item-sharing between Ascendancy and the third factor in the present study, it was unlikely that the latter was an index of symptoms either. The marginal correlation of the third factor with all other symptom measures (please see Table 7.2) confirmed that this was so.

The emergence of a clear somatic symptom factor was fortunate as it facilitated evaluation of whether changes in symptoms during pregnancy and across parturition were attributable to changes in somaticism only. Early and late pregnancy were characterised by elevated symptoms in comparison to mid-pregnancy and the first post-partum weeks, and the oneway analysis confirmed that these differences were significant. The trans-parturition diminution in Somatic scores was consistent with O'Hara *et al*'s argument that trans-parturition reductions in BDI and SADS scores can be attributed to amelioration of somatic symptoms. It was inconsistent with Lubin *et al*'s account, however, which reported no significant variations in somatic symptoms as a function of pregnancy.

The only other significant change was an elevation in Self-esteem scores from one to eight weeks post-partum. This is consistent with the notion that the bolstering effects of the achievement of childbirth on self-esteem wear off rapidly, but Self-esteem scores at one week post-partum were not significantly lower than at any previous stage, and the more plausible interpretation is that there is something about the transition into early motherhood that has a deleterious effect on self-regard. In Chapter 3, it was demonstrated that women who were depressed post-partum had lower self-esteem than women who were depressed but not maternal. This is also consistent with the idea that self-esteem is a particular issue for post-partum women.

The absence of any significant changes in symptoms during pregnancy was generally consistent with Ballinger's (1982) findings, although inconsistent with increases in WDI scores. As discussed previously, the WDI is heavily contaminated by somaticism, and scores would consequently be expected to increase, as they did in Ballinger's study, from mid to late pregnancy. The findings pertaining to the course of symptoms during pregnancy in the present study could, however, be qualified by the relatively smaller numbers of subjects available in the earlier stages of pregnancy. A truly within subjects design, using a sample size similar to that available at 36 weeks pregnancy in the present study, would no doubt endow the these findings with greater credence.

In a sub-sample of 131 subjects, the overall prevalence of cases at 36 weeks pregnancy (19.8%) was greater than that at eight weeks post-partum (12.2%). There was substantial remission, with only 10 of the 26 cases at 36 weeks pregnancy still cases at eight weeks post-partum. Six of the 16 cases at eight weeks post-partum, moreover, were not cases at 36 weeks pregnancy. Previous findings with respect to trans-parturition continuity of caseness have been mixed, and direct comparisons are difficult because of disparate sample profiles and criteria invoked for caseness. The present results do not militate strongly either for or against continuity as, although there was trans-parturition overlap, its extent was not large bearing in mind that the pregnancy-post-partum interval in question was only 12 weeks.

Somatic was the only symptom component showing a significant difference in mean score between 36 weeks pregnancy and eight weeks post-partum, but the extent of variation within overall (significant and non-significant) changes was illuminating. The proportion of subjects showing a decrease in Somatic score from 36 weeks pregnancy to eight weeks post-partum was unsurprisingly far greater than the proportion showing an increase, but this was also true to a lesser extent for Tension and EPDS scores. These observations are consistent with those of Elliott *et al* (1983), and suggested that trans-parturition ameliorations may not be solely somatic ones. Conversely, however, the proportions of subjects showing increases on Self-esteem and Cognitive-affective symptoms were greater than the proportions showing decreases, and these data are once again consistent with the notion that early motherhood is a challenge to self-esteem.

CHAPTER 8. RELATIONSHIPS BETWEEN BIOGRAPHIC AND OUTCOME MEASURES

8.1 Introduction

As with reports on the contribution of stress, social support and individual differences to the incidence of obstetric complications (please see Chapter 1), studies that have reported on the relationships between biographic variables and obstetric difficulties have frequently invoked a dichotomous measure of complications according to whether any of several stipulated difficulties have been experienced. For example, Davids and DeVault (1962) found no differences in age and parity between two groups of puerperal women partitioned according to whether they had experienced any of several delivery complications (excluding prolonged or precipitate labour) or whether they had delivered infants with congenital abnormalities. McDonald and Christakos (1963) also found no differences in age and parity between women who had experienced miscellaneous complications of labour and those who had not.

Sontag and Wallace (1935) reported that smoking during pregnancy affected foetal heart rate, and Ferreira (1965) reported that smoking was implicated in complications of pregnancy. Higher rates of smoking have been reported in working class mothers, and Butler (1969) reported that socio-economic status was also a factor in pregnancy problems. Berkowitz and Kasl (1983) reported that preterm delivery was associated with low age, low socio-economic and single marital status.

Yalom *et al* (1968) and Kennerley and Gath (1989) reported that the maternity Blues was not related to age and previous (non-puerperal) mental ill-health, although Yalom *et al* and Stein (1980) reported that there was possibly an association with previous puerperal depression. Kennerley and Gath and Stein found no relationship between the Blues and social class whilst Kennerley and Gath also reported non-significant relationships with marital and occupational status. Kennerley and Gath found no relationship with obstetric history, but confirmed an association with retrospectively-assessed severity of premenstrual

tension. Yalom *et al* reported positive relationships between immediate post-partum depression and younger age of menarche, a history of menstrual difficulties and shorter duration of menstrual flow. Findings with respect to parity have been more equivocal. Yalom *et al* reported significant relationships between depression in the first 10 days post-partum and low parity, but other studies reported no relationship between the Blues and parity (e.g., Pitt, 1973; Stein, 1980).

Like the Blues, postnatal depression has not been reliably associated with sociodemographic variables. In O'Hara's (1987) review, being unmarried was implicated in only one out of 12 studies, age was implicated in only five out of 17 studies (four of which suggested that younger women were more at risk and one the reverse) and parity was also implicated in five out of 17 studies (three of which suggested that women of higher parity were more at risk and two the reverse). Two studies reported an association between a history of abortion or miscarriage and postnatal depression (Jacobson *et al*, 1965; Playfair and Gowers, 1981) but three studies did not (Paykel *et al*, 1980; Kumar and Robson, 1984; Watson *et al*, 1984).

"Continuity" of depression has been discussed in previous chapters, and there were mixed findings with respect to the degree of overlap between antenatal and postnatal caseness (please see Chapter 1 especially). Gotlib *et al* (1989), following screening with the BDI, identified 20 cases from a sample of 295 that met RDC for major or minor depression at four-to-five weeks post-partum. Ten of these belonged to a group of 30 women who were depressed at either of or both 24 and 36 weeks pregnancy, and were consequently not considered new-onset cases. Gotlib *et al* postulated that "if post-partum and pregnancy depressions are differentially related to sociodemographic variables, it is also possible that they may be associated with different psychological or etiological factors" (p273). Compared with women who were not depressed during pregnancy, antenatal cases were younger, less well educated, had a greater number of children living in their households and were more likely to describe their occupation as housewife. Postnatal cases were more likely than non-cases to describe their occupation as housewife, but were not distinguishable on any other basis.

Elliott's (1990) commentary on childbirth as a life event included a discussion regarding the possibility that there are specific and non-specific postnatal depressions. Hypothetically, the former is more prevalent among middle class women as their maternal depressions are considered to be related to entry into and exit from professional roles. The latter is more prevalent among working class women as their maternal depressions are simply continuations of non-maternal depressions which can be attributed to chronic adversity. Watson *et al* (1984) adopted a similar position explaining discrepancies between their own observations and those of Kumar and Robson (1984) regarding the incidence and continuity of depression (please see Chapter 1). Accordingly, women with professional occupations at conception might be expected to be less likely to have a history of depression, and might also be expected to differ from their non-professional counterparts with respect to their scores on symptom measures throughout pregnancy and the puerperium.

Bivariate statistical relationships between biographic variables and the longitudinal study's outcomes are presented in this chapter. The first set of outcome measures comprised obstetric indices pertaining to pregnancy, labour, the neonate and the puerperium. The second set comprised symptoms, i.e., scores on the EPDS and the various components derived from the 70-item checklist (please see Chapters 3, 4 and 7).

8.2 Method

8.2.1 Subjects

Two groups of subjects provided biographic and obstetric outcome data. The first group comprised subjects who participated in the pilot study (please see Chapter 5). The total number of subjects in this group was 218, although the pilot used only 179 subjects because of missing data. The biographic characteristics of subjects who participated in the pilot study were shown in Table 5.1.

The second group comprised subjects who participated in the longitudinal study. The total number of subjects in this group was 466, although the number who participated at each stage varied because of flexibility of stage of first participation and inter-stage attrition. The biographic characteristics of subjects who participated at each stage of the longitudinal study were shown in Table 6.2. This group of subjects provided both obstetric outcome data and symptom data relating to specific stages of the maternity cycle. The number who yielded obstetric outcome data was confined to a maximum of 199 (this information was procured at eight weeks post-partum).

Three subjects in each group gave birth to twins. The obstetric outcome data pertaining to these subjects were omitted (treated as missing) as their multiple pregnancy and delivery could have been an overriding influence on their obstetric experiences.

8.2.2 Materials

The biographic questionnaires were introduced in Chapter 2, and comprise Appendices 4 and 7. The obstetric outcome questionnaire was introduced in Chapter 6 and comprises Appendix 12. Symptom data were obtained from the 70-item symptom checklist (Appendix 9) and the EPDS (Appendix 6).

8.2.3 Design and Procedure

Subjects in the pilot study completed the postnatal version of the biographic questionnaire concurrently with the first occasion on which they completed the postnatal version of the 130-item exploratory individual differences questionnaire (please see Chapter 2). Subjects in the longitudinal study completed the antenatal version of the biographic questionnaire concurrently with the antenatal version of the 130-item exploratory individual differences questionnaire (please see Chapter 2), or on the occasion of their first participation in the longitudinal study (please see Chapter 6).

Biographic variables included: whether the subject had a history of premenstrual syndrome, whether the subject had a history of treatment for depression, subject's age when leaving full-time education (or subject's current age if still in full-time education), whether the index pregnancy was a first pregnancy, whether the index pregnancy was planned, whether the subject lived with a husband or other partner, whether the subject was a smoker, whether the index delivery was a first delivery and whether the subject's partner (if she had one) was present during childbirth. The subject's age was adjusted to her age at the time of delivery by taking into account number of weeks pregnancy or infant's age in weeks at the time of completing the biographic questionnaires.

The subject's occupation at the beginning of pregnancy was originally intended for coding in a graded system such as that provided by Goldthorpe and Hope (1974), but the information provided by subjects was insufficient to allow for such an exercise to be conducted accurately. It was possible, nevertheless, to identify subjects who were gainfully engaged at the beginning of pregnancy and, further, who had professional occupations (deemed to involve vocational training, e.g., accountant, teacher, doctor, nurse, or have unambiguous status, e.g., company director, bank manager). Coding of subjects' partners' occupations at the beginning of pregnancy was conducted using equivalent criteria. A final occupation-related variable was whether the subject had plans to work or return to work at any interval following childbirth.

For subjects who had ever been pregnant prior to the index pregnancy, number of previous pregnancies comprised a further biographic variable. In addition, subjects were coded according to whether they had a history of any of the following with reference to previous pregnancies: termination, morning sickness, miscarriage, preterm delivery, stillbirth, induction, breech delivery, forceps delivery, planned Caesarean delivery, emergency Caesarean delivery, multiple delivery, birth defects, other obstetric complications, maternity Blues, postnatal depression and other psychiatric problems. For subjects with existing children, two further biographic variables were available: parity (number of children excluding index) and whether the subject had a child less than one year of age at the beginning of the index pregnancy.

The first category of outcome measures comprised those derived from the obstetric outcome questionnaire. Subjects in the pilot study completed the obstetric outcome questionnaire following the 12-week retest interval (please see Chapter 5), and subjects in the longitudinal study completed it at eight weeks post-partum (please see Chapter 6).

Obstetric measures were divided into those pertaining to pregnancy, labour, the neonate and the puerperium. Because of the diversity of complications reported by subjects, and (occasionally) idiosyncratic interpretation of items on the questionnaire, some manipulation of responses was necessary in order to derive coherent outcome variables.

Pregnancy variables included whether the subject experienced morning sickness during pregnancy. The open question regarding complications of pregnancy (please see Appendix 12) elicited 74 different responses (some of which were given by more than one respondent). These were collapsed into 20 categories, which in turn were deemed "minor" or "major" complications based on Sweet's (1988) nomenclature (please see Chapter 1 - *1.9 Complications of pregnancy*). Minor complications included: backache, constipation, cramp, heartburn, headaches or migraine, oedema, miscellaneous infections, paraesthesia and varicosity. A dichotomous variable was created according to whether any of these had been reported. Major complications included anaemia, bleeding, diabetes, hypertension and pre-eclampsia. A dichotomous variable was similarly created. A further dichotomous variable was created according to whether either minor or major complications had been reported.

Labour variables included: whether labour was preterm, whether labour was induced, whether there was a breech presentation, whether forceps were used in labour, whether delivery was by planned Caesarean section, whether delivery was by emergency Caesarean section, which analgesics (if any) were used in labour and the durations of each of the three stages of labour. Ventouse extraction was counted as a forceps delivery. The question referring to augmentation of labour (the acceleration of labour using oxytocic drugs which stimulate contraction of the uterus - please see Appendix 12) was misunderstood by a large proportion of subjects and was not included as an outcome measure.

The obstetric outcome questionnaire (please see Appendix 12) listed the four most common forms of analgesic used in labour. These analgesics are widely regarded as ranging in potency from T.E.N.S. (mildest) to Epidural (strongest) and are frequently administered in combination as well as independently. A scoring key, which represented a working quantitative measure of analgesia in labour, was devised ranging from 0 to 15. The scale was internally consistent in that scores for combinations of analgesics equalled the sum of scores for their components. A modest number of subjects used analgesics not included in the scoring key, and these subjects were not assigned an analgesia score (missing values were assigned). The scoring key is shown in Figure 8.1.

ANALGESIA SCORE	ANALGESICS USED
0	No analgesia
1	T.E.N.S. only
2	Entonox only
3	T.E.N.S. and Entonox only
4	Pethidine only
5	T.E.N.S. and Pethidine
6	Entonox and Pethidine
7	T.E.N.S., Entonox and Pethidine
8	Epidural
9	T.E.N.S. and Epidural
10	Entonox and Epidural
11	T.E.N.S., Entonox and Epidural
12	Pethidine and Epidural
13	T.E.N.S., Pethidine and Epidural
14	Entonox, Pethidine and Epidural
15	T.E.N.S., Entonox, Pethidine and Epidural

FIGURE 8.1 ANALGESIA SCORING KEY.

No analgesia scores were computed for subjects who had a Caesarean section, whether planned or emergency. Similarly, no labour durations were recorded for subjects who had Caesarean sections. Analgesia is used routinely for such operations and normal labour does not occur.

The following criteria for prolonged labour were invoked: first stage exceeding 720 minutes (12 hours), second stage exceeding 90 minutes and third stage exceeding 20 minutes. Total durations exceeding 830 minutes (13 hours and 50 minutes) were deemed prolonged, this being the sum of the criteria for each stage.

Open questions in the obstetric outcome questionnaire (please see Appendix 12) regarding complications of labour and complications of the puerperium elicited 64 and 47 different responses respectively. Complications pertaining to the third stage of labour were reported by subjects in the latter category, thus confounding the two variables. This problem was overcome by coding 10 complications of labour and the puerperium, based on Sweet's (1988) nomenclature, in both variables. Labour complications in the latter variable were recoded to the former, provided no complication of labour had already been reported. It was not necessary to carry out the reverse procedure, as no complications of the puerperium were reported as complications of labour.

Seven of these 10 common categories related to labour and three to the puerperium. The seven labour complications were: failure to progress, cephalo-pelvic disproportion, events involving the umbilical cord, presentation difficulties (including face, brow and occipito-posterior presentations), foetal distress, haemorrhaging and retained placenta. Cephalo-pelvic disproportion was subsequently merged with presentation difficulties as very few cases of the former were reported. The independent breech presentation variable was also merged with presentation difficulties because of its low frequency. Haemorrhaging and retained placenta were merged, as they are frequently concomitant, into a general complications-of-the-third-stage-of-labour variable.

The three complications of the puerperium were: miscellaneous infections, thrombosis and neonatal difficulties. In view of the extremely low frequency of thrombosis, this category was merged with miscellaneous infections into a general complications-of-the-puerperium variable. Other variables pertaining to the neonate were: gender of the neonate, whether a birth defect existed, birthweight and Apgar scores (1 and 5-minute). Birthweights were not recorded for infants born preterm (missing values were assigned) because of the frequent confounding of these variables. A new category of infants small for gestational age (i.e., not preterm and weighing less than 2500g or 85oz) was created.

The second category of outcome measures comprised symptoms. A chronological representation of the longitudinal study, which detailed

the stages at which the EPDS (Appendix 6) and the 70-item symptom checklist (Appendix 12) were completed, was shown in Table 6.1. Factor analyses of checklist items, reported in previous chapters, allowed for the calculation of two pregnancy components ("Cognitive-affective" and "Somatic" - please see Chapter 7), eight immediate-post-partum components ("Maternity Blues", "Inadequacy", "Pessimism", "Contentment", "Sleep disturbance", "Regrets", "Activity" and "Appetite disturbance" - please see Chapter 4) and two general post-partum components ("Self-esteem" and "Tension" - please see Chapter 3).

The relationships between biographic variables on the one hand and the two sets of outcome measures on the other were evaluated using bivariate statistical tests.

8.3 Results

The biographic details of subjects who participated in the pilot and longitudinal studies were presented in Tables 5.1 and 6.2 respectively. Biographic details for the combined set of subjects that yielded obstetric outcome data are now presented (Ns vary because of missing data). Descriptive statistics for non-dichotomous biographic variables are shown in Table 8.1. Category counts for dichotomous biographic variables are shown in Table 8.2.

BIOGRAPHIC VARIABLE	N	Mean	SD	Min.	Max.
AGE OF SUBJECT AT DELIVERY (YEARS)	414	27.79	4.89	16	42.06
AGE SUBJECT LEFT FULL-TIME EDUCATION (YEARS)	413	18.28	2.99	14	38.00
NUMBER OF PREVIOUS PREGNANCIES	415	0.92	1.18	0	8.00

Number of previous pregnancies	*Count (%)*
0	195 (47.0)
1	127 (30.6)
2	54 (13.0)
3	22 (5.3)
4	10 (2.4)
5	5 (1.2)
6	1 (0.2)
7	0 (0.0)
8	1 (0.2)

NUMBER OF EXISTING CHILDREN	415	0.51	0.76	0	4.00

Number of existing children	*Count (%)*
0	259 (62.4)
1	109 (26.3)
2	38 (8.2)
3	8 (1.9)
4	1 (0.2)

TABLE 8.1 DESCRIPTIVE STATISTICS FOR NON-DICHOTOMOUS BIOGRAPHIC VARIABLES.

BIOGRAPHIC VARIABLE	COUNTS TRUE	(%)	FALSE	(%)	TOTAL
All subjects					
HISTORY OF PREMENSTRUAL SYNDROME	166	(43.1)	219	(56.9)	385
HISTORY OF TREATMENT FOR DEPRESSION	75	(19.4)	312	(80.6)	387
HAS A CHILD < 1 YEAR AT CONCEPTION	33	(8.0)	382	(92.0)	415
INDEX PREGNANCY PLANNED	306	(74.1)	107	(25.9)	413
LIVES WITH HUSBAND / PARTNER	385	(92.8)	30	(7.2)	415
GAINFULLY ENGAGED AT CONCEPTION	136	(32.8)	279	(67.2)	415
PROFESSIONAL OCCUPATION AT CONCEPTION	29	(7.0)	386	(93.0)	415
PARTNER GAINFULLY ENGAGED	175	(42.2)	240	(57.8)	415
PARTNER HAS PROFESSIONAL OCCUPATION	34	(8.2)	381	(91.8)	415
SUBJECT A SMOKER DURING PREGNANCY	56	(13.5)	359	(86.5)	415
PARTNER PRESENT AT DELIVERY	158	(93.5)	11	(6.5)	169
SUBJECT HAS POST-PARTUM WORK PLANS	217	(53.1)	192	(46.9)	409
Subjects with one or more previous pregnancies only					
HISTORY OF TERMINATION	49	(22.3)	171	(77.7)	220
HISTORY OF MORNING SICKNESS	136	(62.1)	83	(37.9)	219
HISTORY OF MISCARRIAGE	75	(34.1)	145	(65.9)	220
HISTORY OF PRETERM DELIVERY	17	(7.7)	203	(92.3)	220
HISTORY OF STILLBIRTH	3	(1.4)	217	(98.6)	220
HISTORY OF INDUCED DELIVERY	50	(22.7)	170	(77.3)	220
HISTORY OF BREECH DELIVERY	8	(3.6)	212	(96.4)	220
HISTORY OF FORCEPS DELIVERY	41	(18.6)	179	(81.4)	220
HISTORY OF PLANNED CAESAREAN DELIVERY	2	(0.9)	218	(99.1)	220
HISTORY OF EMERGENCY CAESAREAN DELIVERY	12	(5.5)	208	(94.5)	220
HISTORY OF MULTIPLE BIRTH (TWINS, *etc.*)	3	(1.4)	217	(98.6)	220
HISTORY OF BIRTH DEFECTS	5	(2.3)	215	(97.7)	220
HISTORY OF OTHER OBSTETRIC COMPLICATIONS	40	(18.2)	180	(81.8)	220
HISTORY OF MATERNITY BLUES	104	(47.3)	116	(52.7)	220
HISTORY OF POSTNATAL DEPRESSION	58	(26.4)	162	(73.6)	220
HISTORY OF OTHER PSYCHIATRIC PROBLEMS	16	(7.3)	203	(92.7)	219

TABLE 8.2 CATEGORY COUNTS FOR DICHOTOMOUS BIOGRAPHIC VARIABLES.

Descriptive statistics for non-dichotomous outcome measures (excluding the symptom measures for which descriptive statistics were presented in Tables 4.2 and 7.3) are shown in Table 8.3. Category counts for dichotomous obstetric outcome measures are shown in Table 8.4.

OUTCOME VARIABLE	N	Mean	SD	Min.	Max.
DURATION OF FIRST STAGE OF LABOUR (MINUTES)	268	594.03	513.79	10	3035
DURATION OF SECOND STAGE OF LABOUR (MINUTES)	270	90.09	125.90	2	960
DURATION OF THIRD STAGE OF LABOUR (MINUTES)	243	21.91	39.02	1	420
TOTAL DURATION OF LABOUR (MINUTES)	313	670.02	538.64	19	3120
ANALGESIA SCORE (RANGE 0 - 15)	320	5.03	3.98	0	15
BIRTHWEIGHT OF INFANT (OUNCES)	381	124.45	16.47	65	178
1-MINUTE APGAR SCORE (RANGE 0 - 10)	266	8.29	1.38	2	10
5-MINUTE APGAR SCORE (RANGE 0 - 10)	260	9.43	0.76	4	10

TABLE 8.3 DESCRIPTIVE STATISTICS FOR NON-DICHOTOMOUS OBSTETRIC OUTCOMES.

	COUNTS		
OUTCOME VARIABLE	PRESENT (%)	ABSENT (%)	TOTAL
MORNING SICKNESS IN INDEX PREGNANCY	274 (67.7)	131 (32.3)	405
MINOR COMPLICATIONS OF INDEX PREGNANCY	64 (15.6)	345 (84.4)	409
MAJOR COMPLICATIONS OF INDEX PREGNANCY	121 (29.6)	288 (70.4)	409
ANY COMPLICATIONS OF INDEX PREGNANCY	185 (45.2)	224 (54.8)	409
PRETERM INDEX DELIVERY	27 (6.6)	382 (93.4)	409
INDUCED INDEX DELIVERY	95 (23.5)	310 (76.5)	405
PRESENTATION DIFFICULTIES	33 (8.2)	371 (91.8)	404
PROLONGED FIRST STAGE (>720 MINS.)	70 (26.1)	198 (73.9)	268
PROLONGED SECOND STAGE (>90 MINS.)	75 (27.8)	195 (72.2)	270
PROLONGED THIRD STAGE (>20 MINS.)	61 (25.1)	182 (74.9)	243
PROLONGED TOTAL DURATION (>830 MINS.)	79 (25.2)	234 (74.8)	313
SLOW PROGRESS OF LABOUR	26 (6.4)	382 (93.6)	408
FOETAL DISTRESS	32 (7.8)	376 (92.2)	408
UMBILICAL CORD DIFFICULTIES	13 (3.2)	395 (96.8)	408
FORCEPS DELIVERY	60 (14.8)	346 (85.2)	406
PLANNED CAESAREAN DELIVERY	19 (4.7)	388 (95.3)	407
EMERGENCY CAESAREAN DELIVERY	46 (11.9)	342 (88.1)	388
GENDER OF INFANT (FEMALE / MALE)	186 (45.5)	223 (54.5)	409
INFANT SMALL FOR GESTATIONAL AGE	9 (2.4)	372 (97.6)	407
BIRTH DEFECTS	17 (4.2)	390 (95.8)	407
COMPLICATED THIRD STAGE OF LABOUR	25 (6.1)	383 (93.9)	408
NEONATAL DIFFICULTIES	9 (2.2)	399 (97.8)	408
PUERPERAL COMPLICATIONS	24 (5.9)	384 (94.1)	408

TABLE 8.4 CATEGORY COUNTS FOR DICHOTOMOUS OBSTETRIC OUTCOMES.

It is well established that labour variables, especially duration of labour and the need for assisted delivery, vary substantially following a first delivery during which the birth canal is altered, so facilitating subsequent deliveries (Sweet, 1988). This was confirmed in the present study by significant relationships between a dichotomous variable which comprised the categories has existing children and does not have existing children ("nulliparity") and all variables associated with the progress of labour. These relationships are shown in Table 8.5. Nulliparity was associated with a small number of other (non-labour) outcome measures, and these relationships are included in Table 8.5. None of the symptom measures was significantly associated with nulliparity. Chi-squared statistics include a correction for continuity, and have one degree of freedom. Whether observed values were greater than expected values for nulliparae is shown in each case. Mann-Whitney U statistics are accompanied by the mean rank of the group of subjects giving birth for the first time followed by the mean rank of the group of subjects with existing children.

OUTCOME VARIABLE	TOTAL N	STATISTIC (= VALUE)	OBS. > EXP. (NULLIPARAE)	MEAN RANKS	p
MORNING SICKNESS IN INDEX PREGNANCY	405	χ^2=6.21	No	-	0.013
ANY COMPLICATIONS OF INDEX PREGNANCY	409	χ^2=4.38	Yes	-	0.037
DURATION OF FIRST STAGE OF LABOUR	268	U= 4567	-	159/96	<0.001
PROLONGED FIRST STAGE (>720 MINS.)	268	χ^2=33.0	Yes	-	<0.001
DURATION OF SECOND STAGE OF LABOUR	270	U= 3640	-	167/88	<0.001
PROLONGED SECOND STAGE (>90 MINS.)	270	χ^2=20.9	Yes	-	<0.001
DURATION OF THIRD STAGE OF LABOUR	243	U= 5112	-	136/102	<0.001
PROLONGED THIRD STAGE (>20 MINS.)	243	χ^2=13.3	Yes	-	<0.001
TOTAL DURATION OF LABOUR	313	U= 5169	-	193/105	<0.001
PROLONGED TOTAL DURATION (>830 MINS.)	313	χ^2=39.0	Yes	-	<0.001
SLOW PROGRESS OF LABOUR	408	χ^2=4.83	Yes	-	0.028
FORCEPS DELIVERY	406	χ^2=26.6	Yes	-	<0.001
EMERGENCY CAESAREAN DELIVERY	388	χ^2=7.96	Yes	-	0.005
ANALGESIA SCORE	321	U= 6219	-	193/113	<0.001
PUERPERAL COMPLICATIONS	408	χ^2=5.71	Yes	-	0.017

TABLE 8.5 SIGNIFICANT RELATIONSHIPS BETWEEN NULLIPARITY AND OUTCOME MEASURES.

Bivariate statistical tests between each biographic variable and each outcome measure are reported next. Because of the large number of calculations involved, only significant relationships are reported. Results pertaining to obstetric outcome precede those pertaining to symptoms. Outcome measures that preceded others in the maternity cycle were included as biographic measures with respect to later outcomes (e.g., labour variables with respect to symptoms at one and eight weeks post-partum). Pregnancy variables were not included as biographic with respect to pregnancy symptom measures as the temporal relationships between morning sickness, complications and symptoms were not precisely established (with the exception of morning sickness in relation to symptoms at 36 weeks pregnancy as morning sickness accompanies early, not late pregnancy). In respect of biographic variables pertaining to obstetric history, calculations do not include subjects who had never been pregnant before the index pregnancy. In respect of outcome measures significantly associated with nulliparity (please see Table 8.5), separate calculations are reported for nulliparae and remaining subjects. Chi-squared statistics have one degree of freedom. Fisher's Exact tests are two-tailed.

Among nulliparae, subjects who had morning sickness in the index pregnancy were younger than those who did not ($t=2.30$; DF 252; $p=0.022$). Among other subjects, a greater than expected proportion of those with a history of morning sickness had morning sickness in the index pregnancy ($\chi^2=21.05$; $p<0.001$).

A greater than expected proportion of subjects with minor complications of pregnancy were gainfully engaged at conception ($\chi^2=7.09$; $p=0.008$) and had a partner who was gainfully engaged at conception ($\chi^2=8.52$; $p=0.004$).

A greater than expected proportion of subjects with major complications of pregnancy had a child aged less than a year at conception ($\chi^2=4.02$; $p=0.045$).

Among nulliparae, a greater than expected proportion of subjects with any complications of the index pregnancy had histories of premenstrual syndrome (χ^2=4.39; p=0.036), and morning sickness (χ^2=5.17; p=0.023). In addition, nulliparae with any complications of the index pregnancy had more previous pregnancies than those without complications (U=7057; mean ranks 136/119; p=0.015).

Among other subjects, those with any complications were older (t=2.26; DF 151; p=0.025) and left full-time education at a later age (U=2115; mean ranks 87/70; p=0.018). In addition, a greater than expected proportion of subjects with complications had a partner who was gainfully engaged at conception (χ^2=5.76; p=0.016) and a smaller than expected proportion of subjects with complications had a history of breech delivery (Fisher's Exact p=0.044).

Greater than expected proportions of subjects whose index delivery was preterm had major complications of the index pregnancy (χ^2=5.78; DF 1; p=0.016), any complications of the index pregnancy (χ^2=4.48; p=0.034) and a history of preterm delivery (Fisher's Exact p=0.027).

Greater than expected proportions of subjects whose index delivery was induced had major complications of the index pregnancy (χ^2=11.29; p<0.001), any complications of the index pregnancy (χ^2=9.87; p=0.002), a history of induced delivery (χ^2=10.56; p=0.001) and a history of stillbirth (Fisher's Exact p=0.044).

A greater than expected proportion of subjects with presentation difficulties had a history of breech presentation (χ^2=4.59; p=0.032).

Among nulliparae, subjects who had morning sickness in the index pregnancy had longer first stages (U=2358; mean ranks 88/70; p=0.014). In addition, there was a positive correlation (r=0.16; DF 160; p=0.043) between duration of the first stage of labour and number of previous pregnancies.

Among other subjects, subjects with presentation difficulties had longer first stages (U=142; mean ranks 80/52; p=0.031) and subjects whose index delivery was induced had shorter first stages (U=583; mean ranks 40/57; p=0.025).

Among nulliparae, there were no significant relationships between biographic variables and prolonged first stage, although the greater prevalence of morning sickness among subjects who had prolonged first stages approached significance (χ^2=3.66; p=0.056).

Among other subjects, greater than expected proportions of subjects with prolonged first stages had presentation difficulties (Fisher's Exact p=0.003), had no partner present at delivery (Fisher's Exact p=0.028) and had no history of the Blues (Fisher's Exact p=0.033). As with nulliparae, the relationship with morning sickness approached significance (Fisher's Exact p=0.068).

Among nulliparae, subjects with a history of premenstrual syndrome had shorter second stages (U=2192; mean ranks 67/81; p=0.039) as did subjects whose deliveries were not induced (U=1427; mean ranks 76/104; p=0.002). Among other subjects, those with morning sickness had longer second stages (U=615; mean ranks 58/38; p=0.003) whereas subjects with a history of multiple delivery had shorter second stages (U=38.5; mean ranks 15/56; p=0.026).

Among nulliparae, there were no significant relationships between biographic variables and prolonged second stage. Among other subjects, a greater than expected proportion of those with prolonged second stages had minor complications of pregnancy (Fisher's Exact p=0.024).

Among nulliparae, there was an inverse correlation between age and duration of the third stage of labour (r=-0.20; DF 143; p=0.014). In addition, longer third stages were experienced by subjects with unplanned pregnancies (U=1659; mean ranks 84/69; p<0.050) and who were not gainfully engaged at conception (U=1974; mean ranks 78/64; p=0.047).

Among other subjects, longer third stages were experienced by subjects who had minor complications of pregnancy (U=407; mean ranks 64/47; p=0.030) and subjects who had any complications of pregnancy (U=839; mean ranks 57/45; p=0.030).

Among nulliparae, subjects with prolonged third stage of labour were younger (t=2.20; DF 143; p=0.029). In addition, greater than expected proportions of subjects with prolonged third stage of labour had unplanned pregnancies (χ^2=7.52; p=0.006), were not gainfully engaged at conception (χ^2=6.01; p=0.014) and had partners who were not gainfully engaged at conception (χ^2=5.91; p=0.015).

Among other subjects, those with prolonged third stage of labour had fewer previous pregnancies (U=339; mean ranks 35/52; p=0.037). In addition, greater than expected proportions of subjects with prolonged third stage of labour had minor complications of pregnancy (Fisher's Exact p=0.018) and any complications of pregnancy (Fisher's Exact p=0.009).

Among nulliparae, there was a positive correlation between total duration of labour and number of previous pregnancies (r=0.20; DF 184; p=0.007). In addition, subjects with morning sickness in the index pregnancy had longer total durations (U=3154; mean ranks 100/81; p=0.016).

Among other subjects, those with morning sickness also had longer total durations (U=982; mean ranks 66/50; p=0.030), as did subjects with presentation difficulties (U=249; mean ranks 92/62; p=0.024).

Among nulliparae, there were no significant relationships between biographic variables and prolonged total duration of labour. Among other subjects, greater than expected proportions of subjects with prolonged third stage of labour had presentation difficulties (Fisher's Exact p=0.008), did not have a partner present at delivery (Fisher's Exact p=0.042) and had no history of the Blues (Fisher's Exact p=0.016).

Among nulliparae, there were no significant relationships between biographic variables and slow progress of labour. Among other subjects, a greater than expected proportion of subjects with slow progress of labour had a history of "other" obstetric complications (Fisher's Exact p=0.041).

A greater than expected proportion of subjects reporting foetal distress had a history of premenstrual syndrome (χ^2=4.36; p=0.037).

There were no significant relationships between biographic variables and umbilical cord difficulties.

Among nulliparae, a greater than expected proportion of subjects who had a forceps delivery had presentation difficulties (Fisher's Exact p=0.024). In addition, subjects who had a forceps delivery had a longer second stage of labour (U=1312; mean ranks 108/74; p<0.001).

Among other subjects, greater than expected proportions of subjects who had a forceps delivery had presentation difficulties (Fisher's Exact p=0.032) and had induced deliveries (Fisher's Exact p=0.020).

Subjects who had a planned Caesarean left full-time education when they were younger (U=2636; mean ranks 149/206; p=0.035). In addition, greater than expected proportions of subjects who had a planned Caesarean had a history of emergency Caesarean delivery (Fisher's Exact p=0.001), a child aged less than one year at conception (Fisher's Exact p=0.048) and presentation difficulties (Fisher's Exact p<0.050).

Among nulliparae, greater than expected proportions of subjects who had an emergency Caesarean had presentation difficulties (Fisher's Exact p=0.044) and had their deliveries induced (χ^2=7.49; p=0.006).

Among other subjects, a greater than expected proportion of subjects who had an emergency Caesarean also had presentation difficulties (Fisher's Exact p=0.010). In addition, the mean age of subjects who had an emergency Caesarean was greater than that of subjects who did not (t=2.28; DF 142; p=0.024).

Among nulliparae, analgesia scores were lower in subjects with a history of termination (U=130; mean ranks 17/26; p=0.022) and greater for subjects with a history of "other" psychiatric problems pertaining to previous pregnancies (U=45; mean ranks 34/20; p=0.007). Analgesia scores were greater in subjects with major complications of pregnancy (U=3153; mean ranks 111/91; p=0.019) and subjects with any complications of pregnancy (U=3834; mean ranks 106/89; p=0.035). Analgesia scores were greater in subjects whose deliveries were induced (U=1632; mean ranks 133/84; p<0.001), and lower in subjects whose deliveries were preterm (U=543; mean ranks 60/99; p=0.029). There were positive correlations between analgesia score and duration of the first stage of labour (r=0.47; DF 150; p<0.001), duration of the second stage of labour (r=0.17; DF 150; p=0.041) and total duration of labour (r=0.45; DF 173; p<0.001). Analgesia scores were greater in subjects whose first stage of labour exceeded 720 minutes (U=1600; mean ranks 96/65; p<0.001) and whose total duration of labour exceeded 830 minutes (U=2198; mean ranks 109/76; p<0.001). Analgesia scores were greater for subjects who had slow progress of labour (U=785; mean ranks 127/95; p=0.046).

Among other subjects, analgesia scores were lower in subjects with a history of termination (U=710; mean ranks 47/67; p=0.023) and greater in subjects with a history of breech delivery (U=169; mean ranks 100/62; p=0.005) and subjects with a history of birth defects (U=44; mean ranks 112/63; p=0.016). There were positive correlations between analgesia score and duration of the first stage of labour (r=0.38; DF 95; p<0.001) and total duration of labour (r=0.32; DF 116; p<0.001).

A greater than expected proportion of mothers of female infants had prolonged (exceeding 830 minutes) total duration of labour (χ^2=4.01; p=0.045).

Birthweights were greater among subjects who lived with a partner (t=2.47; DF 379; p=0.014) and for subjects whose partners had professional occupations (t=2.37; DF 370; p=0.018). Birthweights were less for smokers (t=2.41; DF 379; p=0.016) and subjects with a history of "other" psychiatric problems pertaining to previous pregnancies (t=2.09; DF 195; p=0.038).

A greater than expected proportion of subjects who gave birth to infants small for gestational age had their deliveries induced (Fisher's Exact p=0.035), and a smaller proportion than expected had morning sickness during pregnancy (Fisher's Exact p=0.007). Duration of the first stage of labour and total duration of labour were both shorter for mothers of small infants (U=58; mean ranks 21/129; p=0.012 and U=103; mean ranks 36/150; p=0.023 respectively).

One-minute Apgar scores were greater in subjects with a history of "other" psychiatric problems pertaining to previous pregnancies (U=485; mean ranks 92/69; p=0.046), and lower in subjects with a history of forceps delivery (U=1390; mean ranks 60/74; p<0.050).

Five-minute Apgar scores were greater in subjects with professional occupations (U=2105; mean ranks 158/128; p=0.041) and a history of treatment for depression (U=4113; mean ranks 138/118; p=0.041). There was a negative correlation between 5-minute Apgar scores and duration of the third stage of labour (r=-0.15; DF 175; p=0.047).

Greater than expected proportions of subjects who had infants with birth defects had a history of treatment for depression (Fisher's Exact p=0.037), minor complications of the index pregnancy (Fisher's Exact p=0.036) and any complications of the index pregnancy (χ^2=11.36; p<0.001). Third stage of labour durations were shorter in women who had infants with birth defects (U=612; mean ranks 62/123; p=0.003).

A greater than expected proportion of subjects with a complicated third stage of labour had preterm infants (Fisher's Exact p=0.018).

Subjects who gave birth to infants with neonatal difficulties had a shorter first stage of labour (U=280; mean ranks 59/136; p=0.028).

Among nulliparae, a greater than expected proportion of subjects with puerperal complications had a professional occupation (Fisher's Exact p=0.008) as did their partners (Fisher's Exact p=0.002). Subjects with puerperal complications had more previous pregnancies (U=1938; mean ranks 153/126; p=0.032) and a shorter third stage of the index labour (U=425; mean ranks 48/75; p=0.049).

Among other subjects, those with puerperal complications left full-time education at a greater age (U=38; mean ranks 137/75; p=0.012).

At 12 weeks pregnancy, all symptom scores were greater in professional subjects (Cognitive-affective: U=6; mean ranks 12/7; p=0.037; Somatic: U=6; mean ranks 14/7; p=0.024; EPDS: U=8; mean ranks 14/8; p=0.040). In addition, Cognitive-affective and EPDS scores were greater in smokers (Cognitive-affective: U=2; mean ranks 13/6; p=0.009; EPDS: U=4; mean ranks 15/7; p=0.012).

At 24 weeks pregnancy, all symptom scores were greater in subjects who had a history of treatment for depression (Cognitive-affective: U=105; mean ranks 38/23; p=0.003; Somatic: U=138; mean ranks 35/24; p=0.015; EPDS: U=117; mean ranks 37/23; p=0.004). All symptom scores were negatively correlated with age at leaving full-time education (Cognitive-affective: r=-0.26; DF 55; p=0.048; Somatic: r=-0.26; DF 54; p=0.049; EPDS: r=-0.29; DF 54; p=0.031). Somatic scores were negatively correlated with age (r=-0.34; DF 55; p=0.009). Among subjects with previous pregnancies, Somatic scores were greater in subjects with a history of the Blues (U=134; mean ranks 25/17; p=0.029), and EPDS scores were greater in those with a history of induced delivery (U=119; mean ranks 27/19; p=0.039).

At 36 weeks pregnancy, all symptom scores were greater in subjects with a history of treatment for depression (Cognitive-affective: U=834; mean

ranks 75/56; p=0.013; Somatic: U=831; mean ranks 79/56; p=0.003; EPDS: U=901; mean ranks 78/58; p=0.008) and smokers (Cognitive-affective: U=601; mean ranks 86/61; p=0.008; Somatic: U=513; mean ranks 94/61; p<0.001; EPDS: U=689; mean ranks 87/63; p=0.013). In addition, all symptom indices were negatively correlated with age at leaving full-time education (Cognitive-affective: r=-0.20; DF 125; p=0.024; Somatic: r=-0.21; DF 127; p=0.019; EPDS: r=-0.19; DF 129; p=0.034). Among subjects with previous pregnancies, all symptom scores were greater in those with a history of termination (Cognitive-affective: U=391; mean ranks 53/38; p=0.013; Somatic: U=422; mean ranks 53/39; p=0.022; EPDS: U=446; mean ranks 55/41; p=0.024). All symptom scores were greater in subjects who had unplanned pregnancies (Cognitive-affective: U=1140; mean ranks 77/60; p=0.029; Somatic: U=1178; mean ranks 78/62; p=0.035; EPDS: U=1112; mean ranks 82/62; p=0.009). All symptom measures were negatively correlated with age (Cognitive-affective: r=-0.23; DF 124; p=0.011; Somatic: r=-0.18; DF 128; p=0.04; EPDS: r=-0.17; DF 130; p=0.048). Cognitive-affective scores were greater in subjects who had morning sickness in pregnancy (U=1279; mean ranks 67/53; p=0.045) and Somatic scores were lower in subjects with professional occupations (U=652; mean ranks 46/69; p=0.016).

Maternity Blues scores were greater in subjects who smoked during pregnancy (U=933; mean ranks 96/72; p=0.022), had preterm deliveries (U=246; mean ranks 115/73; p=0.007) and, among subjects with previous pregnancies, had a history of postnatal depression (U=572; mean ranks 60/46; p=0.047).

Inadequacy scores were greater in subjects who had unplanned pregnancies (U=1596; mean ranks 90/71; p=0.012), had any complications of the index pregnancy (U=2215; mean ranks 81/67; p=0.042), had preterm deliveries (U=308; mean ranks; p=0.028) and had a prolonged (exceeding 20 minutes) third stage of labour (U=407; mean ranks 57/41; p=0.020). In addition, there was a positive correlation between Inadequacy scores and duration of the third stage of labour (r=0.28; DF 86; p=0.008) and a negative correlation between Inadequacy scores and age (r=-0.22; DF 148; p=0.006). Among subjects with previous pregnancies, Inadequacy scores were lower in subjects with a history of miscarriage (U=721; mean ranks

40/53; p=0.023) and greater in subjects with a history of postnatal depression (U=507; mean ranks 63/45; p=0.009).

Pessimism scores were greater in subjects who had unplanned pregnancies (U=1627; mean ranks 90/71; p=0.010), were not gainfully engaged at the beginning of the index pregnancy (U=1997; mean ranks 86/72; p=0.049), had major complications of the index pregnancy (U=1794; mean ranks 89/69; p=0.005), had preterm deliveries (U=290; mean ranks 110/74; p=0.011) and had a planned Caesarean section (U=294; mean ranks 108/73; p=0.014). In addition, there was a negative correlation between Pessimism scores and age (r=-0.19; DF 149; p=0.017). Among subjects with previous pregnancies, Pessimism scores were greater in subjects with a history of postnatal depression (U=594; mean ranks 59/46; p=0.044).

Contentment scores were greater in subjects who had a partner present at delivery (U=319; mean ranks 67/40; p=0.038).

Sleep disturbance scores were greater in subjects who had presentation difficulties (U=478; mean ranks 99/70; p=0.019), had an emergency Caesarean section (U=560; mean ranks 93/68; p=0.022), delivered an infant small for gestational age (U=27; mean ranks 127/70; p=0.042) and delivered an infant with a birth defect (U=189; mean ranks 115/73; p=0.016). Sleep disturbance scores were lower in those who had a child aged less than one year at conception (U=782; mean ranks 55/78; p=0.032). There was a positive correlation between Sleep disturbance and the duration of the first stage of labour (r=0.22; DF 95; p=0.033). Among subjects with previous pregnancies, Sleep disturbance scores were lower in subjects with a history of morning sickness (U=852; mean ranks 44/55; p=0.049).

Regrets scores were greater in subjects who had a history of treatment for depression (U=1332; mean ranks 86/67/ p=0.007), had unplanned pregnancies (U=1697; mean ranks 88/71; p=0.018), did not live with a partner (U=552; mean ranks 99/74; p=0.024), smoked during the index pregnancy (U=824; mean ranks 99/72; p=0.002), had major complications of the index pregnancy (U=1950; mean ranks 85/71; p=0.031) and delivered

infants with a birth defect (U=261; mean ranks 109/73; p=0.012). Among subjects with previous pregnancies, Regrets scores were greater in subjects with a history of postnatal depression (U=549; mean ranks 60/45; p=0.013).

Duration of the first stage of labour and total duration of labour were both negatively correlated with Activity scores (r=-0.22; DF 96; p=0.028 and r=-0.18; DF 114; p=0.048 respectively). In addition, Activity scores were greater in subjects whose foetuses were distressed during labour (U=442; mean ranks 100/73; p=0.0465).

Appetite disturbance scores were greater in subjects who had unplanned pregnancies (U=1667; mean ranks 89/71; p=0.022), were not gainfully engaged at the beginning of the index pregnancy (U=1784; mean ranks 90/70; p=0.006), were smokers (U=859; mean ranks 100/72; p=0.005) and delivered preterm infants (U=277; mean ranks 112/74; p=0.011). Age, and age at which subject left full-time education were negatively correlated with Appetite disturbance (r=-0.31; DF 149; p<0.001 and r=-0.21; DF 148; p=0.010 respectively).

EPDS scores at one week post-partum were greater in subjects who: smoked during pregnancy (U=943; mean ranks 96/73; p=0.023), delivered preterm infants (U=254; mean ranks 115/73; p=0.009), had unplanned pregnancies (U=1485; mean ranks 94/70; p=0.003), had induced deliveries (U=1411; mean ranks 89/68; p=0.010), did not live with a partner (U=473; mean ranks 106/73; p=0.013), had major complications of pregnancy (U=1805; mean ranks 89/70; p=0.012), had any complications of pregnancy (U=2165; mean ranks 83/66; p=0.021) and delivered infants small for gestational age (U=20; mean ranks 132/71; p=0.037). In addition, there was a negative correlation between EPDS scores and age at leaving full-time education (r=-0.17; DF 148; p=0.040).

At eight weeks post-partum, all symptom scores were greater in subjects whose pregnancies were unplanned (Self-esteem: U=2508; mean ranks 117/89; p=0.002; Tension: U=2713; mean ranks 113/91; p=0.013; EPDS: U=2452; mean ranks 121/90; p<0.001). Self-esteem and Tension scores were

greater in subjects with a history of premenstrual syndrome (U=2617; mean ranks 93/74; p=0.012 and U=2782; mean ranks 91/76; p=0.048 respectively). Self-esteem and EPDS scores were greater in subjects with a history of treatment for depression (U=2093; mean ranks 114/86; p=0.003 and U=2372; mean ranks 110/89; p=0.023 respectively). Self-esteem scores were greater in subjects who had morning sickness during the index pregnancy (U=2859; mean ranks 100/80; p=0.020). EPDS scores were greater in subjects with major complications of pregnancy (U=3115; mean ranks 108/91; p=0.044) and any complications of pregnancy (U=3802; mean ranks 104/88; p<0.050). Self-esteem scores were greater in subjects who did not live with a partner (U=806; mean ranks 131/94; p=0.012), but Tension scores were greater in subjects who had a partner present at delivery (U=434; mean ranks 45/86; p=0.007). Tension scores were greater in subjects who were not gainfully engaged at the beginning of the index pregnancy (U=3195; mean ranks 110/90; p=0.026) and Self-esteem scores were greater in subjects whose partners were not gainfully engaged (U=1315; mean ranks 122/93; p=0.023). There were negative correlations between age and Self-esteem (r=-0.21; DF 190; p=0.004) and EPDS (r=-0.22; DF 192; p=0.002) scores, and there was a positive correlation between EPDS scores and total duration of labour (r=0.17; DF 150; p=0.037). Among subjects with previous pregnancies, Tension scores were greater in those who had a history of the Blues (U=1359; mean ranks 66/54; p=0.044) and lower in those with a history of breech delivery (U=94; mean ranks 26/61; p=0.046).

Finally, chi-squared analyses were conducted in order to evaluate the distribution of subjects with a history of treatment for depression across subjects with and without professional occupations at conception, and across subjects who were and were not gainfully engaged at conception. In neither case did observed values deviate substantially from expected values, or the value of χ^2 exceed 0.4.

8.4 Discussion

A substantial proportion of the significant relationships between biographic variables and obstetric outcome measures were unsurprising,

being corollaries of having had previous pregnancies or repetitions of specific experiences in previous pregnancies. For example, Caesarean deliveries were associated with presentation difficulties, and presentation difficulties in turn were significantly associated with having had a previous breech delivery. There were, nevertheless, additional observations of psychological interest.

The results of the chi-squared analyses in which the distributions of subjects with a history of treatment for depression across occupational categories were evaluated were not consistent with the notion that a specific form of postnatal depression might exist for professional or gainfully engaged women, as there was no evidence for a relative absence of chronic depression in these subjects.

The occupational status of the subject, and that of her partner, were, however, implicated in both obstetric and symptom outcomes. Subjects who were gainfully engaged at conception, as well as subjects who had gainfully engaged partners, were over-represented amongst those that reported minor complications of pregnancy. In addition, subjects with a professional partner were more likely to report either minor or major complications of pregnancy. All symptom indices at 12 weeks pregnancy were higher in professional subjects, and this was consistent with the notion that professional women experience a particular kind of conflict, possibly relating to the potential impact of motherhood on a career. By 36 weeks pregnancy, however, Somatic symptoms were lower in professional subjects, and the birthweight of infants born to subjects with professional partners was greater than that of infants born to subjects without a professional partner. Women who were gainfully engaged and nulliparae at conception had a shorter third stage of labour and, along with subjects who had gainfully engaged partners, were less likely to have had a prolonged third stage. Five-minute Apgar scores were higher in professional subjects, although among subjects without children prior to the index delivery, professional subjects were over-represented among those with puerperal complications (chiefly infections). This was also true of women in the same group who had professional partners.

With regard to post-partum symptoms, subjects who were gainfully engaged at conception scored lower on Appetite disturbance and Pessimism during the first week post-partum and lower on Tension at eight weeks post-partum, whilst those with gainfully engaged partners had lower Self-esteem scores at eight weeks post-partum. If there is a "specific" postnatal depression experienced by working women, it would at best appear to be characterised by lower Tension scores at the end of the puerperium. Whilst the onset of pregnancy appeared more troublesome for subjects with a high occupational status, or who had partners with a high occupational status, the progression of the maternity cycle was accompanied by several more favourable outcomes for these subjects. This could be attributable to economic advantage and what this bestows in the way of quality of housing, diet, *etc.*, but could also reflect the enhancement of well-being via social support and enhanced societal integration. Further data pertaining to post-partum symptoms in working subjects are presented in Chapter 11.

The effects of occupational status did not appear to be attributable to age at leaving full-time education, as the overlap between the outcomes with which the two variables were significantly associated was minimal. There were negative correlations between age at leaving full-time education and all symptom measures at 24 and 36 weeks pregnancy, as well as Appetite disturbance, Somatic and EPDS scores at one week post-partum. Whereas occupational status was associated with a majority of first, but not second or third trimester symptom outcomes, the reverse was true for educational status. It would appear possible that, as far as symptoms during pregnancy are concerned, a professional subject who left education early might expect an elevated level of symptoms throughout pregnancy, whereas a non-professional subject with a longer period in full-time education might expect the reverse.

Subjects who did not live with a partner delivered infants with lower birthweights, had higher Regrets and EPDS scores at one week post-partum and had higher Self-esteem scores at eight weeks post-partum. In addition, Contentment scores at one week post-partum were greater in subjects whose partners were present at delivery. These findings appeared to reflect the favourable effects of social support. Anomalously, however, Tension scores at eight weeks post-partum were

lower in subjects whose partners were not present at delivery. Subjects who were not nulliparae at conception, who had a prolonged first stage of labour or prolonged total duration of labour also had no partner present at delivery and, like subjects with low Tension scores at eight weeks post-partum, no history of the Blues. Prolonged labour was associated with presentation difficulties, and this, rather than subject or partner choice may have precipitated the departure of the partner during delivery. Thus, low Tension scores at eight weeks post-partum were not necessarily attributable to the partner's absence during delivery but, counter-intuitively, to having had a long labour, perhaps in conjunction with not having a history of the Blues.

Smoking was positively associated with symptom outcomes during the first and third trimesters of pregnancy and at one week post-partum, including three of the eight one-week-post-partum symptom factors (Blues, Regrets and Appetite disturbance). It is not clear why there were no significant relationships between smoking and symptoms during the second trimester. Although smokers delivered infants with lower birthweights, smoking was not implicated in other obstetric outcomes.

Subjects who had unplanned index pregnancies scored higher on all symptom measures at 36 weeks pregnancy and eight weeks post-partum, as well as four of the one-week-post-partum-specific measures (Inadequacy, Pessimism, Regrets and Appetite disturbance). Since an unplanned pregnancy was not significantly associated with any of the symptom measures at 12 and 24 weeks pregnancy, it would appear that the psychological effects of an unplanned pregnancy accrue as the maternity cycle progresses. Unplanned pregnancies were significantly associated with a longer third stage of labour among women who were nulliparae at conception. Since the duration of the third stage of labour depends on uterine efficiency (please see Chapter 1), this relationship does implicate psychological factors in physiological mechanisms.

Previous studies reported mixed findings between parity and post-partum symptoms, and in the present study there was not a single significant difference in symptom score at any stage of pregnancy and the first eight weeks post-partum between women who were nulliparae at conception

and those who were not. Previous studies have also reported mixed findings with respect to age, but where significant relationships emerged among the present data, they were all in the same direction. There were negative correlations between age and nine of the 18 symptom indices between 24 weeks pregnancy and eight weeks post-partum, including three of the eight one-week-post-partum symptom factors (Inadequacy, Pessimism and Appetite disturbance). Since there were no overall differences in symptom scores between women who did and did not have at least one child prior to the index delivery, these age effects are not simply explained by previous maternity experience in older women. They could, nevertheless, be attributable to a general acquisition of confidence in confronting life events that accrues with age. There was a modest number of obstetric outcomes that were also associated with age, including those relating to duration of the third stage of labour. Since these were also associated with unplanned pregnancy and not being gainfully engaged at conception, subjects with prolonged third stages of labour may have comprised a group of young, unemployed women whose pregnancies were accidental.

Several observations supported the notion of continuity of depression. First, a history of treatment for depression was significantly associated with all symptom indices at 24 weeks pregnancy, all symptom indices at 36 weeks pregnancy, Regrets at one week post-partum and two of three symptom measures at eight weeks post-partum (Self-esteem and EPDS scores). Second, a history of postnatal depression (among subjects who had previous pregnancies) was associated with four of the eight one-week-post-partum symptom factors (Blues, Inadequacy, Pessimism and Regrets). Third, a history of the Blues was associated with Somatic symptoms at 24 weeks pregnancy and Tension at eight-weeks post-partum. Surprisingly, a history of the Blues was related to symptoms at eight, but not one week post-partum, and a history of postnatal depression was related to symptoms at one, but not eight weeks post-partum (this latter observation was consistent with Stein, 1980). Not all pregnancy and post-partum symptoms were associated with a history of psychopathology, however. In any event, continuity of depression does not infer that depressions occurring at different stages of life are phenomenologically identical. The data presented in Chapter 3 militated against the likelihood that postnatal symptoms resemble those in non-maternal women.

Gotlib *et al* (1989) reported that antenatal cases were younger and less well educated than antenatal non-cases, but no such differences were observed between postnatal cases and postnatal non-cases. A comparison of biographic variables associated with symptoms at 36 weeks pregnancy and eight weeks post-partum in the present study revealed that there were common biographic variables associated with EPDS scores on both occasions (age, history of depression and unplanned index pregnancy). EPDS scores at 36 weeks pregnancy were, unlike those at eight weeks post-partum however, associated with age at leaving full-time education (consistent with Gotlib *et al*), being a smoker and having a history of termination. Whereas pregnancy-specific components at 36 weeks pregnancy were associated with a similar set of biographic variables to concurrent EPDS scores, the post-partum-specific components were associated with other biographic variables (history of premenstrual syndrome, living with a partner and having a gainfully engaged partner in the case of Self-esteem and history of premenstrual syndrome, being gainfully engaged at conception and having a partner present at delivery in the case of Tension). These dissimilarities also militated against the argument that postnatal and pregnancy depressions are similar because they are respectively associated with similar biographic variables.

Nulliparae who had morning sickness during the index pregnancy were younger than nulliparae who did not, and had a longer first stage of labour and a longer total duration of labour. Subjects who had at least one child prior to the index pregnancy and morning sickness during the index pregnancy had a longer second stage of labour and a longer total duration of labour. Thus morning sickness during pregnancy was associated with a longer total duration of labour regardless of parity. Morning sickness during the index pregnancy was positively associated with Cognitive-affective scores at 36 weeks pregnancy and Self-esteem scores at eight weeks post-partum. A history of premenstrual syndrome was positively associated with both Self-esteem and Tension scores at eight weeks post-partum. Both morning sickness and premenstrual syndrome are possibly hormonally related, but morning sickness during the index pregnancy was not significantly associated with a history of premenstrual syndrome. A history of premenstrual syndrome was associated with pregnancy complications, foetal distress, but a shorter second stage of labour in nulliparae. A greater than expected proportion of subjects who delivered female infants had a prolonged total duration of

labour. Collectively, these results could be taken to infer that a history of premenstrual syndrome, morning sickness, a female foetus, symptoms during pregnancy, longer duration of labour, foetal distress and post-partum symptoms have some endocrinological basis, but any such reasoning could only be tentatively founded on the present data.

Analgesia scores were associated with several predictors, although many of these were obstetric outcome measures pertaining to the index pregnancy and delivery. In addition to the positive relationship between morning sickness during the index pregnancy and Analgesia scores, duration of the first stage of labour and total duration of labour were also positively associated with Analgesia scores regardless of parity. Because of the strong relationship between length of labour and analgesia score, the association between morning sickness and Analgesia scores was likely to have been mediated by that between morning sickness and protracted labours.

The inclusion of obstetric variables pertaining to the index pregnancy and delivery as biographic with respect to symptoms at one and eight weeks post-partum resulted in the emergence of several significant relationships, all of which suggested that obstetric events can be stressful precedents of post-partum symptoms. For example: pregnancy complications were associated with Inadequacy, Pessimism, Regrets and EPDS scores at one week post-partum (Yalom *et al*, 1968, reported that complications of pregnancy were unrelated to depression in the first 10 days post-partum), as well as EPDS scores at eight weeks post-partum; subjects with preterm deliveries scored higher on the EPDS at one week post-partum as well as on Blues, Inadequacy, Pessimism and Appetite disturbance; subjects who had induced deliveries had higher EPDS scores at one week post-partum; protracted labours were associated with higher Inadequacy and Sleep disturbance, and lower Activity scores, and subjects who delivered infants with birth defects had higher Sleep disturbance and Regrets scores.

The following two chapters report on the extent to which outcome measures can be predicted prospectively from data available earlier in the maternity cycle. Chapter 9 reports on the prediction of obstetric

outcome variables and Chapter 10 reports on the prediction of symptom measures at one and eight weeks post-partum. Biographic variables with which each outcome measure were significantly associated are accounted for in the relevant regression equations, except for those outcome measures confounded with the dichotomous nulliparity index (please see Table 8.5), where the biographic variables are accounted for indirectly by statistical control of whether the index delivery was a first one.

CHAPTER 9. PREDICTING OBSTETRIC OUTCOMES

9.1 Introduction

The prospective prediction of obstetric outcome from psychosocial measures is a challenging objective, not least because the interaction of psychological events and physiological variables such as uterine efficiency are not fully understood. The most plausible model is probably an endocrine one because of the known effects of hormones, especially oestrogens and progesterone, on the uterus. As discussed in Chapter 1, excessive activity in the human hypothalamic-pituitary-adrenal axis has been associated with longer labours, with one study (Burns, 1976) reporting a positive relationship between plasma levels of cortisol and duration of the first stage of labour. Elevated levels of particular hormones, especially adrenalin and cortisol, are known to accompany prolonged activity in the hypothalamic-adrenal-axis (e.g., Asterita, 1985), and Lederman *et al* (1978) found that elevated plasma levels of adrenalin were associated with both state and trait anxiety and a longer second stage of labour. Crandon (1979a; 1979b) implicated antenatal anxiety in a variety of outcomes pertaining to both labour and the neonate and, although there have been non-confirmatory reports, life events during pregnancy have been implicated in preterm delivery and low birthweight (e.g., Newton and Hunt, 1984).

The benefits of social support have been well documented with respect to illness including psychopathology (please see Chapter 1 - *1.15 Social support as a protective asset*), but there have been very few reports on whether social support provides a buffer against stress with respect to obstetric outcomes. A summary of social support data reported by Cobb (1976) was shown in Table 1.1, but this pertained to complications of pregnancy which can only be associated prospectively with psychosocial data procured prior to pregnancy. Data obtained during pregnancy can, however, be used prospectively with respect to perinatal events such as complications of labour and variables pertaining to the neonate.

Aside from there having been no satisfactory individual differences scales specifically designed for maternal respondents until now (please see Chapter 2), few other attitude or personality scales have been used prospectively in the context of maternity. Although MAPI scales have been significantly associated with obstetric outcomes (please see Chapter 1 - *1.16 Individual differences as diathesis*), the MAPI has psychometric shortcomings, particularly with respect to its factor structure, and there were both expected and counter-intuitive (thus mutually inconsistent) findings reported.

Validation studies associated with the Emotion Control Questionnaires (e.g., Roger, 1988) have shown that Rehearsal was significantly associated with cortisol levels at the time of a stressful event. In view of the likelihood that uterine function and efficiency are dependent on endocrine activity, and the availability of a new Emotion Control Questionnaire with maternity-specific subscales intended specifically for an antenatal sample (ECQ-A - please see Chapter 2), investigation of the potential relationships between ECQ-A scores and obstetric outcomes seemed prudent.

The present chapter reports on the prospective relationships between life events, social support and emotion control during pregnancy and the obstetric outcome measures described in Chapter 8.

9.2 Method

9.2.1 Materials

Data for the present analyses were obtained from the following questionnaires: Biographic questionnaire (Appendix 4), Life events questionnaire (Appendix 13), Social support questionnaire (Appendix 14), ECQ-A (Appendix 10) and Obstetric outcome questionnaire (Appendix 12).

9.2.2 Design and Procedure

Obstetric outcomes comprised both scores and dichotomous variables. Following the computation of correlations between life events, social support and individual differences variables during pregnancy and obstetric outcome scores, the latter were regressed on the former.

Dichotomous variables can be included in linear regression equations as dummy variables (e.g., Dunn and Clark, 1987; Chatterjee and Price, 1991) using the code 0 as a reference level and the code 1 for the remaining level. This technique was used to account for variance attributable to the dichotomous "nulliparity" index with which several of the obstetric outcomes were confounded (please see Table 8.5). This strategy had two benefits: first, it obviated separate calculations for women with and without children prior to the index pregnancy so avoiding diminution in sample sizes; second, it indirectly controlled for the biographic variables with which the obstetric outcome germane was significantly associated among women with and without children prior to the index pregnancy respectively. The nulliparity index was forced into the regression equations first. The forced entry of nulliparity was not necessary in the case of birthweight and Apgar scores because these outcomes were not confounded with it. For these outcomes, the biographic variables with which they were significantly associated were first forced into the regression equations.

In keeping with evaluation of a diathesis-stress model, life events scores were forced into the regression equations following the forced entry of the nulliparity index or the biographic variables. The life events "Stress" index was selected since the results of the pilot study (please see Chapter 5) suggested that there was little utility in carrying out separate analyses using "Stress" and "Undesirable" as alternative life events indices. All remaining predictors, including all possible cross-product terms, were subsequently entered stepwise at a significance criterion of $p<0.05$. The sequence of blocks of variables made available for stepwise entry was equivalent to that in the pilot study (please see Chapter 5).

With respect to dichotomous obstetric outcome variables, the frequencies of adverse outcomes (e.g., emergency Caesarean section, birth defects) were too low to allow for the feasibility of logistic regression, especially taking into account constraints on sample sizes (please see 9.2.3 *Subjects* below). Accordingly, bivariate analyses were carried out in order to give a preliminary indication of which antenatal measures might be predictive of obstetric difficulties in a larger sample.

9.2.3 Subjects

Prospective designs depend on the availability of data from the same subjects on at least two separate occasions. Obstetric outcome data was procured from subjects participating in the longitudinal study at eight weeks post-partum, and the largest sample of pregnant subjects was at 36 weeks pregnancy (please see Chapter 6). This antenatal stage was consequently deemed most likely to yield maximal within subjects data. Although ample subject numbers participated at each of 36 weeks pregnancy and eight weeks post-partum, trans-parturition attrition reduced the number of subjects who yielded data on both occasions.

In stepwise regression, a variable (or an interaction term) is selected at each step to enter the regression equation if it, amongst several stipulated variables and interaction terms, offers the maximum reduction in deviance on so entering (thus maximising, on that step, the shared variance with the criterion measure). Since each subject must provide data for not just the criterion measure but for each of the predictors, missing data for any of these eliminates subjects from the sample.

The ECQ-A, owing to the time taken for its development, was incorporated into the longitudinal study after the latter's implementation. Thus, emotion control data were available for only a sub-sample of subjects who yielded life events and social support data at 36 weeks pregnancy.

All of the foregoing tended to constrain the number of subjects from whom data were sufficient to carry out prospective tests. The number of

subjects yielding data for each calculation varied according to missing data, including the availability of ECQ-A scores. The regression analyses tended to eliminate large numbers of subjects whereas bivariate tests not involving ECQ-A scores eliminated few. The range of subject numbers for the various prospective tests was so large that presentation of biographic details for either some or all of them would be of restricted relevance. Biographic details of subjects participating at each stage of the longitudinal study were shown in Table 6.2.

9.3 Results

Please see Table 8.3 for descriptive statistics pertaining to obstetric outcome scores in the full sample of subjects. Please see Table 8.4 for category counts of dichotomous obstetric outcomes. Separate details are not presented for sub-samples because the range of subject numbers available for each of the prospective tests was so extensive.

Descriptive statistics for the predictor variables at 36 weeks pregnancy are shown in Table 9.1.

	Mean	SD	Minimum	Maximum	N
LIFE EVENTS "STRESS"	13.00	8.09	0	40	136
SUPPORT (IDEAL)	34.79	5.61	23	56	158
SUPPORT (RECEIVED)	32.60	4.97	22	45	156
SUPPORT (SHORTFALL)	2.16	4.59	-9	25	154
SUPPORT (SATISFACTION)	33.67	5.61	20	47	155
REHEARSAL	24.36	5.13	14	38	75
EMOTIONAL INHIBITION	22.96	3.92	13	31	74
AGGRESSION CONTROL	25.15	3.01	13	31	73
BENIGN CONTROL	16.81	2.69	10	26	74
MATERNAL AUTONOMY	23.27	3.07	17	31	73
MATERNAL ANXIETY	23.07	3.48	16	32	75

TABLE 9.1 DESCRIPTIVE STATISTICS FOR PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY.

Correlations between the predictor variables at 36 weeks pregnancy and obstetric outcome scores are shown in Table 9.2.

1 = DURATION OF FIRST STAGE OF LABOUR	5 = ANALGESIA SCORE
2 = DURATION OF SECOND STAGE OF LABOUR	6 = INFANT'S BIRTHWEIGHT
3 = DURATION OF THIRD STAGE OF LABOUR	7 = 1-MINUTE APGAR SCORE
4 = TOTAL DURATION OF LABOUR	8 = 5-MINUTE APGAR SCORE

	1	2	3	4	5	6	7	8
LIFE EVENTS "STRESS"	0.18 (72)	-0.07 (73)	0.14 (65)	0.20 (87)	0.09 (86)	-0.16 (104)	0.21 (86)	-0.02 (84)
SUPPORT (IDEAL)	0.18 (83)	-0.09 (84)	-0.02 (76)	0.17 (99)	0.09 (96)	-0.09 (119)	-0.02 (98)	0.01 (96)
SUPPORT (RECEIVED)	0.19 (82)	-0.07 (83)	0.00 (75)	0.16 (95)	0.02 (92)	0.04 (117)	-0.15 (97)	-0.02 (95)
SUPPORT (SHORTFALL)	0.03 (82)	-0.05 (83)	-0.03 (75)	0.04 (95)	0.05 (92)	-0.18* (115)	0.14 (96)	0.05 (94)
SUPPORT (SATISF.)	0.23* (81)	-0.17 (82)	0.04 (74)	0.18 (94)	-0.01 (91)	0.06 (116)	-0.17 (96)	0.01 (94)
REHEARSAL	-0.00 (31)	-0.24 (32)	-0.04 (28)	-0.00 (40)	0.12 (37)	0.03 (51)	0.09 (43)	-0.07 (44)
EMOTIONAL INHIBITION	-0.06 (30)	-0.04 (31)	0.00 (27)	-0.05 (39)	0.11 (36)	-0.17 (50)	-0.25 (42)	-0.15 (43)
AGGRESSION CONTROL	0.13 (30)	-0.31 (31)	0.15 (27)	0.03 (39)	0.14 (36)	0.10 (50)	0.14 (42)	0.18 (43)
BENIGN CONTROL	0.14 (30)	-0.21 (31)	0.01 (27)	0.04 (39)	-0.08 (36)	-0.20 (50)	-0.08 (42)	0.12 (43)
MATERNAL AUTONOMY	0.23 (30)	-0.07 (31)	0.06 (27)	0.12 (39)	0.00 (36)	0.10 (50)	0.07 (42)	-0.10 (43)
MATERNAL ANXIETY	0.01 (31)	0.01 (32)	-0.04 (28)	0.07 (40)	0.00 (37)	0.05 (51)	-0.07 (43)	-0.19 (44)

* $p<0.05$

TABLE 9.2 CORRELATIONS (DF) BETWEEN PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY AND OBSTETRIC OUTCOME SCORES.

A Life events x Maternal Autonomy interaction was the only stepwise entry into the regression equation predicting duration of the first stage of labour following the forced entry of the nulliparity index and life events. Forced and stepwise additions are shown in Table 9.3, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	4036660.87	22					
NULLIPARITY[a]	3470185.71	21	566475.16	1	3.43	ns	0.140
LIFE EVENTS[a]	3443773.67	20	26412.04	1	<1	ns	0.007
LIFE EVENTS x MATERNAL AUTONOMY[b]	2624471.80	19	819301.87	1	5.93	0.025	0.203
TOTAL	2624471.80	19	1412189.07	3	3.41	0.039	0.350

The regression equation is:

Duration of the first stage of labour = 150.60 + 459.06 (Nulliparity)[a] - 80.72 (Life events)[a] + 4.33 (Life events x Maternal Autonomy)[b]

The regressors explained 35.0% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 9.3 REGRESSION OF DURATION OF THE FIRST STAGE OF LABOUR ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF NULLIPARITY.

An Ideal social support x Benign Control interaction was the only stepwise entry into the regression equation predicting duration of the second stage of labour following the forced entry of the nulliparity index and life events. Forced and stepwise additions are shown in Table 9.4, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	353084.96	23					
NULLIPARITY[a]	324464.62	22	28620.34	1	1.94	ns	0.081
LIFE EVENTS[a]	298449.04	21	26015.58	1	1.83	ns	0.074
SUPPORT (IDEAL) x BENIGN CONTROL[b]	232857.23	20	65591.81	1	5.63	0.028	0.186
TOTAL	232857.23	20	120227.73	3	3.44	0.036	0.341

The regression equation is:

Duration of the second stage of labour = 261.24 + 135.65 (Nulliparity)[a] - 3.59 (Life events)[a] - 0.31 (Ideal social support x Benign Control)[b]

The regressors explained 34.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 9.4 REGRESSION OF DURATION OF THE SECOND STAGE OF LABOUR ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF NULLIPARITY.

Two interactions featured as stepwise additions into the regression equation predicting duration of the third stage of labour following the forced entry of the nulliparity index and life events: Life events x Shortfall in social support and Aggression control x Shortfall in social support. Forced and stepwise additions are shown in Table 9.5, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	5796.80	19					
NULLIPARITY[a]	5782.02	18	14.78	1	<1	ns	0.003
LIFE EVENTS[a]	5268.19	17	513.83	1	1.66	ns	0.088
LIFE EVENTS x SUPPORT (SHORTFALL)[b]	3271.47	16	1996.72	1	9.77	0.007	0.345
AGGRESSION CONTROL x SUPPORT (SHORTFALL)[b]	2463.52	15	807.95	1	4.92	0.042	0.139
TOTAL	2463.52	15	3333.28	4	5.07	0.009	0.575

The regression equation is:

Duration of the third stage of labour = 5.77 - 10.09 (Nulliparity)[a] + 1.28 (Life events)[a] - 0.29 (Life events x Shortfall in social support)[b] + 0.17 (Aggression Control x Shortfall in social support)[b]

The regressors explained 57.5% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 9.5 REGRESSION OF DURATION OF THE THIRD STAGE OF LABOUR ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF NULLIPARITY.

A Life events x Maternal Autonomy interaction was the only stepwise entry into the regression equation predicting total duration of labour following the forced entry of the nulliparity index and life events. Forced and stepwise additions are shown in Table 9.6, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	4805455.74	30					
NULLIPARITY[a]	4052918.10	29	752537.64	1	5.39	0.028	0.157
LIFE EVENTS[a]	3988970.52	28	63947.58	1	<1	ns	0.013
LIFE EVENTS x MATERNAL AUTONOMY[b]	3342296.07	27	646674.45	1	5.22	0.030	0.135
TOTAL	3342296.07	27	1463159.67	3	3.94	0.019	0.305

The regression equation is:

Total duration of labour = 217.74 + 417.77 (Nulliparity)[a] - 65.91 (Life events)[a] + 3.67 (Life events x Maternal Autonomy)[b]

The regressors explained 30.5% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 9.6 REGRESSION OF TOTAL DURATION OF LABOUR ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF NULLIPARITY.

There were no stepwise entries into the regression equations predicting Analgesia score and Birthweight. The forced entry of life events was, moreover, not a significant addition in both cases.

An Ideal social support x Emotional Inhibition interaction was the only stepwise entry into the regression equation predicting 1-minute Apgar score following the forced entry of biographic variables and life events. Forced and stepwise additions are shown in Table 9.7, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	69.06	33					
BIOGRAPHIC VARIABLES[a]	68.65	32	0.41	1	<1	ns	0.006
LIFE EVENTS[a]	65.62	31	3.03	1	1.43	ns	0.044
IDEAL SUPPORT x EMOTIONAL INHIBITION[b]	56.94	30	8.68	1	4.57	0.041	0.126
TOTAL	56.94	30	12.12	3	2.13	ns	0.176

The regression equation is:

1-minute Apgar score = 9.93 - 0.31 (History of forceps delivery)[a] + 0.05 (Life events)[a] - 0.003 (Ideal social support x Emotional Inhibition)[b]

The regressors explained 17.6% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 9.7 REGRESSION OF 1-MINUTE APGAR SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

There were no stepwise entries into the regression equation predicting 5-minute Apgar score. The forced entry of life events was, moreover, not a significant addition.

Among dichotomous obstetric outcome measures, seven were not significantly associated with any of the predictor variables at 36 weeks pregnancy (preterm delivery, prolonged third stage of labour, prolonged total duration of labour, complicated third stage of labour, slow progress in labour, forceps delivery and emergency Caesarean delivery).

Subjects who delivered infants with a birth defect had a greater Shortfall in social support (U=78; mean ranks 103/61; p=0.021). Among subjects who had no children prior to the index delivery, Satisfaction with social support was lower in subjects who had a prolonged second stage of labour (U=77; mean ranks 13/22; p=0.012), and Life events were greater in subjects who had puerperal complications (U=91; mean ranks 39/26; p=0.023). Among subjects with one or more children prior to the index delivery, Ideal social support was lower in subjects who had puerperal complications (U=10; mean ranks 6/33; p=0.042).

Benign Control scores at 36 weeks pregnancy were higher in subjects whose foetuses were distressed during labour (t=3.41; DF 52; p=0.001) and whose neonates had post-partum complications (t=2.10; DF 52; p=0.041). Maternal Autonomy scores were lower in subjects who had infants small for gestational age (t=2.28; DF 50; p=0.027). Among subjects who had no children prior to the index delivery, Maternal Autonomy scores were higher in subjects who had a prolonged first stage of labour (t=2.40; DF 10; p=0.037). Rehearsal scores were higher in subjects who had presentation difficulties (t=2.80; DF 51; p=0.007).

9.4 Discussion

There were marked discrepancies between social support scores at 36 weeks pregnancy and those featuring in the pilot study (please see Tables 9.1 and 5.2 respectively). Ideal, Received and Satisfaction scores in late pregnancy were all in excess of twice the size of those in the pilot sample at various stages during the first post-partum year. The larger Ideal scores suggested that social support is valued more in late pregnancy than during the first post-partum year, and the larger

Received scores suggested that women were generally successful in attaining that support. The larger Satisfaction scores suggested that the larger amount of Received support is attained with little or no compromise of quality. The Shortfall in support means were comparable in the two studies, and this was consistent with the interpretation that larger requirements were satisfied with commensurately larger receipts.

None of the correlations between predictor variables at 36 weeks pregnancy and obstetric outcome scores was significant, with the exception of those between Satisfaction with social support and duration of the first stage of labour, and between Shortfall in social support and the infant's birthweight. The former was counter-intuitive as the positive correlation meant that longer first stages of labour were preceded by larger Satisfaction scores. The latter was intuitively correct, but neither correlation was sufficiently large to explain more than six per cent of shared variance.

The regression equations predicting length of labour all featured significant interactions, although in no case did the forced entry of life events feature as a significant main effect. The equations predicting duration of the first stage and total duration both featured a Life events x Maternal autonomy interaction. These inclusions do implicate life events in longer labours, but this effect is qualified by Maternal Autonomy scores. Reference to Table 9.2 reveals that Maternal Autonomy was positively (but not significantly) associated with duration of the first stage and total duration. These results are intriguing because higher Maternal Autonomy scores were expected to be associated with favourable outcomes, including less prolonged labours. Precipitate labours can be obstetrically problematic, however, and the degrees of freedom associated with the regressions were not sufficient for more than tentative conclusions to be drawn.

The Ideal social support x Benign Control interaction which featured in the regression equation predicting duration of the second stage of labour is difficult to interpret, especially given the meagre size of the correlation between Ideal support and duration of the second stage. The correlation between Benign Control and the criterion measure was

negative, however, and since Benign Control is an index of impulsivity, extraversion (and in turn an arousal mechanism) could be implicated in the time taken from full cervical dilation to the infant's delivery. Both of the interactions featuring in the equation predicting duration of the third stage of labour included Shortfall in social support. The inclusion of two interaction terms having an identical component is notable because the second interaction must have explained a significant amount of variance unexplained by the first term. An Ideal social support x Emotional Inhibition interaction featured in the regression equation predicting 1-minute Apgar score, but the non-significant correlations between the predictor and criterion measures, together with the insufficiency of the number of subjects yielding all relevant data, are troublesome for further interpretation.

The bivariate tests, especially those that did not include an ECQ-A score, were less compromised by the erosion of sample sizes than the regression analyses. Although subjects who delivered an infant with a birth defect had a greater Shortfall in social support, it is unlikely that this could have contributed to the defect. Social support probably has sufficient inertia, however, that shortfalls late in pregnancy could have been preceded by shortfalls prior to and following conception. Social support was also implicated in prolonged second stage of labour, but this was only among subjects who were nulliparae at conception, and did not corroborate any findings relating to duration of the second stage as a score. Ideal support was related to puerperal complications among remaining subjects, but the nature of any influence that preference for social support late in pregnancy might have on the likelihood of puerperal complications is not immediately clear, and the finding was only marginally significant. The potential role of life events is more readily admitted, but this relationship was only present among subjects who were nulliparae at conception.

The association between Benign Control and foetal distress could have been accountable for that between Benign Control and neonatal complications. The data suggested that introverts (i.e., those likely to have low impulsivity or high Benign Control scores) were more likely to experience these difficulties. Foetal distress may accompany a prolonged labour, and although the correlation between Benign Control and duration

of the first stage of labour was not significant (please see Table 9.2), its sign was consistent with that proposition. These were also the only data to support the argument that uterine efficiency is related to an arousal mechanism, although that invoked to explain behavioural differences between introverts and extraverts is usually predicated on cortical rather than autonomic or endocrine arousal.

There were a small number of additional findings relating to ECQ-A subscale scores. Maternal Autonomy scores were lower in subjects who delivered infants small for gestational age. This was an intuitively acceptable finding, in so far that a pregnant woman who is confident and perceives control is likely to be attentive to her and her foetus's well-being. Maternal Autonomy scores were higher in subjects who were nulliparae at conception and had a prolonged first stage of labour. This was counter-intuitive, and consistent with the regression equations predicting duration of the first stage of labour and total duration of labour (in which the nulliparity index was statistically controlled). The finding that Rehearsal scores were higher in subjects who had presentation difficulties was intriguing, and further investigation might help to discover whether presentation difficulties could be associated with activity in the hypothalamic-pituitary-adrenal axis.

There were very few, if any, unambiguous or unquestioningly reliable conclusions available from the analyses in which obstetric outcome was predicted prospectively. What significant findings there were tended to contradict those of earlier studies (e.g., life events were not significantly associated with preterm delivery and low birthweight as reported by Newton and Hunt, 1984), and the anticipated relationships between emotion control, especially Rehearsal, and indices relating to uterine function such as duration of labour failed to emerge. Although sample sizes were compromised for the reasons discussed previously, the present results can be regarded as preliminary and awaiting confirmation. In addition, the groundwork for a methodology which could be invoked in future larger scale studies has been provided.

CHAPTER 10. PREDICTING SYMPTOM OUTCOMES

10.1 Introduction

Several studies have reported on the relationship between recent life events and postnatal depression (please see Chapter 1 - *1.14 Stress and aetiology*). The majority were confirmatory, few were non-confirmatory and none was negative. Notwithstanding this overall consensus, even the most well conducted studies were not true prospective ones. Rather, the reporting of life events was concurrent with the evaluation of post-partum symptoms and impact ratings were assessed *a priori* (e.g., Paykel *et al*, 1980). Paykel *et al* also reported buffering effects for social support, but Monroe *et al* (1986), in a true prospective design, reported main effects for life events and social support, but no interaction. Indeed, even the main effects disappeared when initial symptoms were statistically controlled. Although the subjects in this latter study were women, they were not recruited as a maternal sample. Because they were targeted from newspaper birth announcements, however, they were probably mothers of young children. To the extent that this placed them in a high stress category, buffering effects were less likely to be uncovered due to the absence of a low stress condition. The follow-up period was also rather protracted at one year. An antenatal individual differences measure (the SCQ) was shown, nevertheless, by O'Hara *et al* (1991) to interact with stress in predicting post-partum BDI scores after the statistical effects of sociodemographic variables and life events had already been accounted for. This study was one of the few to counter the possibility that diathesis-stress interactions are thwarted in maternal samples owing to a uniformly elevated level of stress.

The Eysenck personality dimensions appear to be unstable in maternal respondents (Chapple and Furneaux, 1964; Coppen and Metcalfe, 1965 - please see Chapter 1), and there were disconcertingly discrepant reports on the extent to which Neuroticism scores during pregnancy predict post-partum symptoms (Meares *et al*, 1976; Watson *et al*, 1984; Kumar and Robson, 1984; Boyce *et al*, 1991). It is possible that Extraversion and Neuroticism are of too high an order of extraction for the successful prediction of post-partum symptoms during pregnancy.

Bridge *et al* (1985) reported that first trimester HDHQ scores were a powerful predictor of depression at six weeks post-partum, but no results were reported for the predictive power of third trimester HDHQ scores. (please see Chapter 1 - *1.16 Individual differences as diathesis*) Components of the HDHQ were identified by several sources, but only Hayworth *et al* (1980) reported findings pertaining to them in the context of maternity. A significant correlation was found between Direction of Hostility (Dir H) scores at 36 weeks pregnancy and depression scores at six weeks post-partum, but this was only true for Dir H scores above the mean (i.e., extrapunitive subjects).

The emotion control questionnaires (ECQ - Roger and Nesshoever, 1987; ECQ2 - Roger and Najarian, 1989 - please see Chapter 1 - *1.16 Individual differences as diathesis*) measure Aggression Control, and this construct was also observed in maternal samples (please see Chapter 2). In Chapter 1, a case was made for the potential role of emotion control in psychopathology, and this rested especially on its association with poor coping and elevated adrenal activity which in turn has been associated with depression (Checkley, 1992). The pilot for the longitudinal study (please see Chapter 5) demonstrated that Rehearsal featured ubiquitously in regression equations predicting symptoms during the first post-partum year. The pilot was not a true prospective design, however, and there were very few interactions featuring in the regression equations which would support a diathesis-stress model of susceptibility.

The present analyses are true prospective designs in which the statistical effects of biographic variables, initial symptoms and life events were taken into account before the evaluation of a diathesis-stress model by the stepwise inclusion of interaction terms in the relevant regression equations. The life event measures reflected the subjects' own stress ratings, and the vulnerability measures included both social support and pertinent (i.e., emotion control) individual differences variables. The follow-up period transited parturition - intervals sufficient to avoid the contamination of ante-partum predictor measures by post-partum symptoms, but not so large that the possible influence of the predictors on the criterion measures would have elapsed (cf. Monroe *et al*, 1986).

Obstetric stress is unlikely to be a significant contributor to postnatal depression (please see Chapter 1 - *1.14 Stress and aetiology*) and, in any event, the inclusion of obstetric data pertaining to the index delivery in the present analyses would have undermined sample sizes owing to missing data. It would also have compromised one important objective, i.e., establishment of the extent to which post-partum symptoms can be predicted during pregnancy - an exercise of potential importance to health professionals in primary care settings. For this reason, symptoms at one week post-partum were not included as predictor variables with respect to later post-partum symptoms, but they were included as dependent variables, as there have been no prospective studies relating to the maternity Blues.

10.2 Method

10.2.1 Materials

Data for the present analyses were obtained from the following questionnaires: Biographic questionnaire (Appendix 4), Life events questionnaire (Appendix 13), Social support questionnaire (Appendix 14), ECQ-A (Appendix 10), 70-item self-report symptom checklist (Appendix 9) and Edinburgh Postnatal Depression Scale (Appendix 6).

10.2.2 Design and Procedure

Following the computation of correlations between life events, social support and individual differences variables at 36 weeks pregnancy on the one hand, and post-partum symptom scores on the other, the latter were regressed on the former. The eight-week-post-partum symptom scores were selected as those most suitable to represent postnatal depression (please see Chapter 3). The one-week-post-partum symptom scores were included as dependent variables.

Dichotomous biographic variables were included in regression equations as dummy variables (please see Chapter 9 - *9.2.2 Design and Procedure*). Dichotomous and non-dichotomous biographic variables with which each post-partum symptom score was significantly associated (please see Chapter 8) were first forced into each regression equation. This step served two purposes: it included all regressors that were likely to add to the predictive power of the regression equation and it contended the possibility that the variance explained by subsequent stepwise entries could be accounted for by those biographic variables.

Initial symptoms (i.e., at 36 weeks pregnancy) were next forced into the regression equations. In regression equations predicting symptoms at eight weeks post-partum, the initial symptom score corresponded with the criterion measure (Self-esteem and Tension scores at 36 weeks pregnancy were computed using the appropriate items from the 70-item symptom checklist). In regression equations predicting symptoms at one week post-partum, no initial symptom scores were included (with the exception of EPDS score) as the eight one-week-post-partum symptom factors were deemed too specific to be matched with a non-equivalent baseline measure. Life events were next forced into the regression equations, followed by the stepwise entry of the remaining predictors (in blocks corresponding with those reported in Chapters 5 and 9).

10.2.3 Subjects

Sample sizes were affected by erosion attributable to the same causes as those discussed in Chapter 9 (please see *9.2.3 Subjects*), although missing data were less prevalent on the post-partum symptom questionnaires than on the obstetric outcome questionnaire. The number of subjects yielding data for each analysis varied substantially for the same reasons as those discussed in Chapter 9 (please see *9.2.3 Subjects*). Biographic details of subjects participating at each stage of the longitudinal study (including 36 weeks pregnancy and one and eight weeks post-partum) were shown in Table 6.2.

10.3 Results

Please see Table 7.3 for descriptive statistics pertaining to symptom scores at 36 weeks pregnancy and one and eight weeks post-partum. Descriptive statistics for the predictor variables at 36 weeks pregnancy were shown in Table 9.1.

Correlations between predictor variables at 36 weeks pregnancy and symptoms at one week post-partum are shown in Table 10.1. Correlations in brackets pertain to subjects who yielded complete data at 36 weeks pregnancy and at one week post-partum (N=121). Unbracketed correlations pertain to the subset of subjects who also yielded complete individual differences (ECQ-A) data at 36 weeks pregnancy (N=50). There were no serious discrepancies in the magnitudes of corresponding correlations between the two groups, and the regression analyses that follow were confined to the smaller group yielding individual differences as well as stress and support data.

1 = LIFE EVENTS
2 = SOCIAL SUPPORT (IDEAL)
3 = SOCIAL SUPPORT (RECEIVED)
4 = SOCIAL SUPPORT (SHORTFALL)
5 = SOCIAL SUPPORT (SATISFACTION)
6 = REHEARSAL
7 = EMOTIONAL INHIBITION
8 = AGGRESSION CONTROL
9 = MATERNAL AUTONOMY
10 = MATERNAL ANXIETY
11 = BENIGN CONTROL

	BLUES	PESSIMISM	INADEQUACY	CONTENTMENT	SLEEP	REGRETS	ACTIVITY	APPETITE	EPDS
1	0.34* (0.34‡)	0.40† (0.34‡)	0.42† (0.32‡)	0.20 (0.09)	0.39† (0.19*)	0.41† (0.22*)	0.34* (0.31‡)	0.32* (0.30‡)	0.23 (0.23*)
2	0.04 (0.05)	0.17 (0.04)	0.04 (0.06)	0.11 (0.00)	0.20 (0.18*)	0.08 (-0.03)	0.07 (-0.03)	0.00 (0.07)	0.13 (0.13)
3	-0.19 (-0.10)	-0.09 (-0.09)	-0.26 (-0.06)	0.16 (0.13)	0.08 (0.19*)	-0.11 (-0.11)	-0.15 (-0.12)	-0.30* (-0.24†)	-0.18 (-0.07)
4	0.29* (0.17)	0.34* (0.14)	0.37† (0.13)	-0.05 (-0.14)	0.17 (0.01)	0.25 (0.08)	0.28 (0.09)	0.38† (0.33‡)	0.40† (0.23*)
5	-0.16 (-0.13)	-0.09 (-0.11)	-0.28* (-0.11)	0.21 (0.19*)	0.08 (0.12)	-0.08 (-0.13)	-0.14 (-0.15)	-0.34* (-0.32‡)	-0.19 (-0.16)
6	0.43†	0.37†	0.23	-0.02	0.40†	0.46‡	0.10	0.18	0.46‡
7	0.21	0.22	0.11	0.02	0.15	0.15	0.06	0.13	0.20
8	-0.24	-0.00	-0.03	-0.16	-0.06	-0.26	-0.02	-0.03	0.02
9	-0.34*	-0.32*	-0.15	0.01	-0.38†	-0.15	0.01	-0.22	-0.41†
10	0.59‡	0.56‡	0.36†	-0.10	0.33*	0.22	0.12	0.37†	0.58‡
11	-0.23	-0.13	-0.19	0.15	-0.13	-0.21	0.12	0.05	-0.26

* p<0.05
† p<0.01
‡ p<0.001

TABLE 10.1 CORRELATIONS BETWEEN PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY AND SYMPTOMS AT ONE WEEK POST-PARTUM. CORRELATIONS HAVE 48 DF (119 DF).

Stepwise entries into the regression equation predicting Blues score were Maternal Anxiety, a Life events x Aggression Control interaction and a Maternal Anxiety x Aggression Control interaction. Forced and stepwise additions are shown in Table 10.2, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	4780.48	41					
BIOGRAPHIC VARIABLES[a]	3923.80	39	856.68	2	4.26	0.021	0.179
LIFE EVENTS[a]	3813.61	38	110.19	1	1.10	ns	0.023
MATERNAL ANXIETY[b]	2401.87	37	1411.74	1	21.75	<0.001	0.295
LIFE EVENTS x AGGRESSION CONTROL[b]	2118.35	36	283.52	1	4.82	0.035	0.059
MATERNAL ANXIETY x AGGRESSION CONTROL[b]	1871.95	35	246.40	1	4.61	0.039	0.051
TOTAL	1871.95	35	2908.52	6	9.06	<0.001	0.608

The regression equation is:

Blues score = - 27.12 + 6.94 (Smoker during pregnancy)[a] - 0.11 (History of postnatal depression)[a] + 2.37 (Life events)[a] + 0.43 (Maternal Anxiety)[b] - 0.10 (Life events x Aggression Control)[b] + 0.06 (Maternal Anxiety x Aggression Control)[b]

The regressors explained 60.8% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.2 REGRESSION OF BLUES SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

Maternal Anxiety was the only stepwise entry into the regression equation predicting Inadequacy score. Forced and stepwise additions are shown in Table 10.3, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	1255.62	41					
BIOGRAPHIC VARIABLES[a]	1057.00	38	198.62	3	2.38	ns	0.158
LIFE EVENTS[a]	934.43	37	122.57	1	1.10	ns	0.098
MATERNAL ANXIETY[b]	505.16	36	429.27	1	30.59	<0.001	0.342
TOTAL	505.16	36	750.46	5	10.70	<0.001	0.598

The regression equation is:

Inadequacy score = - 13.05 - 5.11 (Planned pregnancy)[a] - 3.05 (History of miscarriage)[a] - 0.83 (History of postnatal depression)[a] + 0.07 (Life events)[a] + 0.93 (Maternal Anxiety)[b]

The regressors explained 59.8% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.3 REGRESSION OF INADEQUACY SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

There were no stepwise entries into the regression equation predicting Pessimism score. Forced additions are shown in Table 10.4, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	101.91	41					
BIOGRAPHIC VARIABLES[a]	86.14	37	15.77	4	1.69	ns	0.155
LIFE EVENTS[a]	70.84	36	15.30	1	7.78	0.008	0.150
TOTAL	70.84	36	31.07	5	3.16	0.018	0.305

The regression equation is:

Pessimism score = 1.65 - 0.03 (Age)[a] - 0.91 (Planned pregnancy)[a] - 0.13 (Gainfully engaged at conception)[a] + 1.07 (History of postnatal depression)[a] + 0.08 (Life events)[a]

The regressors explained 30.5% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.4 REGRESSION OF PESSIMISM SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

Stepwise entries into the regression equation predicting Contentment score were Satisfaction with social support and a Rehearsal x Benign Control interaction. Forced and stepwise additions are shown in Table 10.5, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	318.39	30					
BIOGRAPHIC VARIABLES[a]	315.37	29	3.02	1	<1	ns	0.010
LIFE EVENTS[a]	277.45	28	37.92	1	3.83	ns	0.119
SUPPORT (SATISFACTION)[b]	216.67	27	60.78	1	7.57	0.011	0.191
REHEARSAL x BENIGN CONTROL[b]	185.05	26	31.62	1	4.44	0.045	0.099
TOTAL	185.05	26	133.33	4	4.68	0.006	0.419

The regression equation is:

Contentment score = - 8.15 + 0.46 (Partner present at delivery)[a] + 0.12 (Life events)[a] + 0.25 (Satisfaction with social support)[b] + 0.01 (Rehearsal x Benign Control)[b]

The regressors explained 41.9% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.5 REGRESSION OF CONTENTMENT SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES

Maternal Autonomy was the only stepwise entry into the regression equation predicting Sleep disturbance score. Forced and stepwise additions are shown in Table 10.6, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	516.97	41					
BIOGRAPHIC VARIABLES[a]	431.89	39	85.08	2	3.84	0.030	0.165
LIFE EVENTS[a]	407.71	38	24.18	1	2.25	ns	0.046
MATERNAL AUTONOMY[b]	351.98	37	55.73	1	5.86	0.021	0.108
TOTAL	351.98	37	164.99	4	4.36	0.006	0.319

The regression equation is:

Sleep disturbance score = 12.58 - 1.41 (Child less than a year at conception)[a] - 2.17 (History of morning sickness)[a] + 0.07 (Life events)[a] - 0.41 (Maternal Autonomy)[b]

The regressors explained 31.9% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.6 REGRESSION OF SLEEP DISTURBANCE SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

Stepwise entries into the regression equation predicting Regrets score were Maternal Autonomy and five interactions: Life events x Benign Control, Life events x Aggression Control, Ideal social support x Emotional Inhibition, Rehearsal x Maternal Anxiety and Rehearsal x Maternal Autonomy. Forced and stepwise additions are shown in Table 10.7, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	198.56	35					
BIOGRAPHIC VARIABLES[a]	96.89	30	101.67	5	6.30	<0.001	0.512
LIFE EVENTS[a]	88.57	29	8.32	1	2.72	ns	0.042
MATERNAL AUTONOMY[b]	72.71	28	15.86	1	6.11	0.020	0.080
LIFE EVENTS x BENIGN CONTROL[b]	61.39	27	11.32	1	4.98	0.034	0.057
LIFE EVENTS x AGGRESSION CONTROL[b]	52.01	26	9.38	1	4.69	0.040	0.047
SUPPORT (IDEAL) x EMOTIONAL INHIBITION[b]	41.51	25	10.50	1	6.32	0.019	0.053
REHEARSAL x MATERNAL ANXIETY[b]	32.14	24	9.37	1	7.00	0.014	0.047
REHEARSAL x MATERNAL AUTONOMY[b]	26.98	23	5.16	1	4.40	0.047	0.026
TOTAL	26.98	23	171.58	12	12.19	<0.001	0.864

The regression equation is:

Regrets score = 0.49 + 0.77 (History of treatment for depression)[a] - 1.26 (Planned pregnancy)[a] - 1.97 (Lives with partner)[a] + 7.21 (Smoker during pregnancy)[a] + 0.21 (History of postnatal depression)[a] - 1.13 (Life events)[a] + 0.68 (Rehearsal)[b] + 0.03 (Live events x Aggression Control)[b] + 0.03 (Life events x Benign Control)[b] - 0.01 (Ideal social support x Emotional Inhibition)[b] - 0.01 (Rehearsal x Maternal Anxiety)[b] - 0.01 (Rehearsal x Maternal Autonomy)[b]

The regressors explained 86.4% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.7 REGRESSION OF REGRETS SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

A Life events x Shortfall in social support interaction was the only stepwise entry into the regression equation predicting Activity score. Forced and stepwise additions are shown in Table 10.8, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	378.98	50					
LIFE EVENTS[a]	339.23	49	39.75	1	5.74	0.020	0.105
LIFE EVENTS x SUPPORT (SHORTFALL)[b]	312.66	48	26.57	1	4.08	0.049	0.070
TOTAL	312.66	48	66.32	2	5.09	0.010	0.175

The regression equation is:

Activity score = 0.95 + 0.06 (Life events)[a] + 0.01 (Life events x Shortfall in social support)[b]

The regressors explained 17.5% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.8 REGRESSION OF ACTIVITY SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

Stepwise entries into the regression equation predicting Appetite disturbance score were a Shortfall in social support and a Life events x Satisfaction with social support interaction. Forced and stepwise additions are shown in Table 10.9, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	166.10	40					
BIOGRAPHIC VARIABLES[a]	142.18	35	23.92	5	1.18	ns	0.144
LIFE EVENTS[a]	108.24	34	33.94	1	10.66	0.003	0.204
SUPPORT (SHORTFALL)[b]	85.38	33	22.86	1	8.84	0.006	0.138
LIFE EVENTS x SUPPORT (SATISFACTION)[b]	66.27	32	19.11	1	9.23	0.005	0.115
TOTAL	66.27	32	99.83	8	6.03	<0.001	0.601

The regression equation is:

Appetite disturbance score = 7.74 - 0.08 (Age)[a] - 0.38 (Age left full-time education)[a] + 1.67 (Planned pregnancy)[a] + 0.75 (Gainfully engaged at conception)[a] - 1.93 (Smoker during pregnancy)[a] + 0.49 (Life events)[a] + 0.19 (Shortfall in social support)[b] - 0.01 (Life events x Satisfaction with social support)[b]

The regressors explained 60.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.9 REGRESSION OF APPETITE DISTURBANCE SCORE ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES.

Stepwise entries into the regression equation predicting EPDS score at one week post-partum were Maternal Anxiety and a Life events x Shortfall in social support interaction. Forced and stepwise additions are shown in Table 10.10, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	779.81	40					
BIOGRAPHIC VARIABLES[a]	524.82	36	254.99	4	4.37	0.006	0.327
INITIAL SYMPTOMS[a]	423.22	35	101.60	1	8.40	0.006	0.130
LIFE EVENTS[a]	422.66	34	0.56	1	<1	ns	0.001
MATERNAL ANXIETY[b]	330.29	33	92.37	1	9.23	0.005	0.119
LIFE EVENTS x SUPPORT (SHORTFALL)[b]	289.73	32	40.56	1	4.48	0.042	0.052
TOTAL	289.73	32	490.07	8	6.77	<0.001	0.629

The regression equation is:

EPDS score at one week post-partum = 1.25 - 0.08 (Age left full-time education)[a] - 1.17 (Planned pregnancy)[a] - 3.89 (Lives with partner)[a] + 2.49 (Smoker during pregnancy)[a] + 0.19 (Initial symptom score)[a] - 0.15 (Life events)[a] + 0.51 (Maternal Anxiety)[b] + 0.02 (Life events x Shortfall in social support)[b]

The regressors explained 62.9% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.10 REGRESSION OF EPDS SCORE AT ONE WEEK POST-PARTUM ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES AND INITIAL SYMPTOMS.

Correlations between predictor variables at 36 weeks pregnancy and symptoms at eight weeks post-partum are shown in Table 10.11. Correlations in brackets pertain to subjects who yielded complete data at 36 weeks pregnancy and at eight weeks post-partum (N=106). Unbracketed correlations pertain to the subset of subjects who also yielded complete individual differences (ECQ-A) data at 36 weeks pregnancy (N=42). There were no serious discrepancies in the magnitudes of corresponding correlations between the two groups, and the regression analyses that follow were confined to the smaller group yielding individual differences as well as stress and support data. NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	SELF-ESTEEM	TENSION	EPDS
LIFE EVENTS	0.40‡ (0.37‡)	0.42‡ (0.35‡)	0.33 (0.31‡)
SUPPORT (IDEAL)	-0.10 (-0.11)	-0.10 (-0.13)	-0.15 (-0.05)
SUPPORT (RECEIVED)	-0.28 (-0.26†)	-0.30 (-0.22*)	-0.35* (-0.26†)
SUPPORT (SHORTFALL)	0.21 (0.14)	0.23 (0.07)	0.23 (0.21*)
SUPPORT (SATISFACTION)	-0.25 (-0.31‡)	-0.29 (-0.22*)	-0.32* (-0.29†)
REHEARSAL	0.52‡	0.50‡	0.56‡
EMOTIONAL INHIBITION	0.33*	0.28	0.30
AGGRESSION CONTROL	0.07	-0.01	0.02
MATERNAL AUTONOMY	-0.15	-0.16	-0.13
MATERNAL ANXIETY	0.49‡	0.53‡	0.56‡
BENIGN CONTROL	0.11	-0.06	-0.02

* p<0.05
† p<0.01
‡ p<0.001

TABLE 10.11 CORRELATIONS BETWEEN PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY AND SYMPTOMS AT EIGHT WEEKS POST-PARTUM. CORRELATIONS HAVE 40 DF (104 DF).

Stepwise entries into the regression equation predicting Self-esteem score at eight weeks post-partum were Benign Control, Ideal social support and a Life events x Maternal Anxiety interaction. Forced and stepwise additions are shown in Table 10.12, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	8810.56	24					
BIOGRAPHIC VARIABLES[a]	5506.57	19	3303.99	5	2.28	ns	0.375
INITIAL SYMPTOMS[a]	2810.50	18	2696.07	1	17.27	<0.001	0.306
LIFE EVENTS[a]	2417.26	17	393.24	1	2.77	ns	0.044
BENIGN CONTROL[b]	1342.36	16	1074.90	1	12.81	0.003	0.123
SUPPORT (IDEAL)[b]	950.06	15	392.30	1	6.19	0.025	0.044
LIFE EVENTS x MATERNAL ANXIETY[b]	578.76	14	371.30	1	8.98	0.010	0.042
TOTAL	578.76	14	8231.80	10	19.91	<0.001	0.934

The regression equation is:

Self-esteem score = 0.88 - 1.51 (Age)[a] + 10.81 (History of premenstrual syndrome)[a] - 1.78 (History of treatment for depression)[a] + 7.60 (Planned pregnancy)[a] + 0.78 (Partner gainfully engaged)[a] + 0.41 (Initial symptoms)[a] - 3.63 (Life events)[a] - 0.31 (Ideal social support)[b] + 2.55 (Benign Control)[b] + 0.16 (Life events x Maternal Anxiety)[b]

The regressors explained 93.4% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.12 REGRESSION OF SELF-ESTEEM SCORE AT EIGHT WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES AND INITIAL SYMPTOMS.

There were no stepwise entries into the regression equation predicting Tension score at eight weeks post-partum. Forced additions are shown in Table 10.13, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	8051.24	28					
BIOGRAPHIC VARIABLES[a]	6357.97	23	1693.27	5	1.23	0.329	0.210
INITIAL SYMPTOMS[a]	2529.86	22	3828.11	1	33.29	<0.001	0.476
LIFE EVENTS[a]	2487.43	21	42.43	1	<1	ns	0.006
TOTAL	2487.43	21	5563.82	7	6.71	<0.001	0.691

The regression equation is:

Tension score = - 4.65 + 6.54 (History of premenstrual syndrome)[a] - 7.54 (Planned pregnancy)[a] + 5.01 (Gainfully engaged at conception)[a] + 5.25 (Partner present at delivery)[a] + 0.69 (History of maternity Blues)[a] + 0.84 (Initial symptoms)[a] + 0.19 (Life events)[a]

The regressors explained 69.1% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.13 REGRESSION OF TENSION SCORE AT EIGHT WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES AND INITIAL SYMPTOMS.

Stepwise entries into the regression equation predicting EPDS score at eight weeks post-partum were Rehearsal, Emotional Inhibition, Maternal Anxiety and a Rehearsal x Maternal Anxiety interaction. Forced and stepwise additions are shown in Table 10.14, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	1444.00	35					
BIOGRAPHIC VARIABLES[a]	1135.59	32	308.41	3	2.90	0.050	0.214
INITIAL SYMPTOMS[a]	787.47	31	348.12	1	13.71	<0.001	0.241
LIFE EVENTS[a]	768.82	30	18.65	1	0.73	ns	0.013
REHEARSAL[b]	598.38	29	170.44	1	8.26	0.008	0.118
EMOTIONAL INHIBITION[b]	482.65	28	115.73	1	6.71	0.015	0.080
MATERNAL ANXIETY[b]	383.13	27	99.52	1	7.01	0.013	0.069
REHEARSAL x MATERNAL ANXIETY[b]	282.37	26	100.76	1	9.28	0.005	0.069
TOTAL	282.37	26	1161.63	9	11.89	<0.001	0.804

The regression equation is:

EPDS score = 46.12 - 0.66 (Age)[a] - 6.65 (History of treatment for depression)[a] - 9.80 (Planned pregnancy)[a] - 0.58 (Initial symptoms)[a] + 0.17 (Life events)[a] + 0.59 (Emotional Inhibition)[b] - 1.39 (Maternal Anxiety)[b] - 1.56 (Rehearsal)[b] + 0.09 (Rehearsal x Maternal Anxiety)[b]

The regressors explained 80.4% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 10.14 REGRESSION OF EPDS SCORE AT EIGHT WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT 36 WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES AND INITIAL SYMPTOMS.

10.4 Discussion

Whereas the bivariate relationships between predictors at 36 weeks pregnancy and obstetric outcomes were generally not, or only marginally significant, those between the predictors and symptom outcomes were frequently substantial (please see Tables 10.1 and 10.11). This was particularly true for Rehearsal and Maternal Anxiety, especially with respect to Blues, Inadequacy, Regrets and EPDS scores at one week post-partum, and all symptom scores at eight weeks post-partum. Similarly, life events were not significantly related to all but one of the obstetric outcomes (puerperal complications - please see Chapter 9), but the correlations between life events and many symptom outcomes were significant. In the regression equations, previous forced entries tended to mop up this variance, and this was particularly noticeable when initial symptoms were forced into the equations predicting symptoms at eight weeks post-partum. Social support was not strongly correlated with post-partum symptoms, with the possible exceptions of Appetite disturbance and EPDS scores at one and eight weeks post-partum.

Social support also featured relatively infrequently in the stepwise additions to the regression equations. There were two main effects at one week post-partum: quality of social support (Satisfaction) accounting for variance in Contentment scores and quantity (Shortfall) accounting for variance in Appetite disturbance scores. An Ideal social support main effect featured in the regression equation predicting Self-esteem at eight weeks post-partum, and reference to Table 10.11 shows that higher Self esteem symptoms were associated with lower Ideal support scores. This might suggest that subjects expected that social support would offset low self-esteem. There were three interactions which would support a diathesis-stress model of social support: quality of social support interacted with life events to account for variance in Appetite disturbance scores, and quantity with life events to account for variance in Activity and EPDS scores at one week post-partum. The final term featuring social support was an Ideal social support x Emotional Inhibition interaction accounting for variance in Regrets scores. This could have represented the procurement of preferred levels of support by those prepared to express their desire for them.

All other stepwise entries into the regression equations comprised either individual differences main effects, or interactions including an individual differences component. Only four (out of nine) of these included a life events component, thus lending only moderate support to the diathesis-stress model of susceptibility. Of these four interactions, two included an Aggression Control component (Blues and Regrets), one a Benign Control component (Regrets) and one a Maternal Anxiety component (Self-esteem). With the exception of the latter, these all represent interactions of extraversion with stress, rather than neuroticism with stress (Roger and Nesshoever, 1987, reported that Aggression Control and Benign Control are both part of the extraversion constellation). Bridge *et al* (1985) reported that first trimester HDHQ scores were predictive of postnatal depression, and reference to Table 10.1 shows that Blues and Regrets scores were negatively associated with Aggression Control. This suggested that subjects who tended to express rather than withhold hostile feelings were more likely to have high Blues and Regrets scores. Aggression Control scores require careful interpretation. High Aggression Control scores could be regarded as commensurate with lack of assertiveness or "Anger-In" components of the Type A and Type C personalities (e.g., Dembroski, MacDougall, Williams, Haney and Blumenthal 1985; Temoshok, 1987), and might be expected in depressed subjects if Seligman's theory of learned helplessness (please see Chapter 1 - *1.16 Individual differences as diathesis*) is tenable. Berkowitz (1993), however, has argued that negative affect can be at the root of emotional aggression (pp48-83), having cited, *inter alia*, Miller and Norman's (1979) study in which subjects who were exposed to Seligman's learned helplessness procedure unexpectedly reported and exhibited hostility in addition to depression.

Maternal Anxiety was the first stepwise addition to the regression equations predicting Blues, Inadequacy and EPDS scores at one week post-partum. It also featured in interaction terms with Aggression Control (Blues) and Rehearsal (Regrets). Maternal Anxiety additionally featured as both a main effect and a component of an interaction term in the regression equation predicting EPDS scores at eight weeks post-partum. The other component in that interaction term was Rehearsal which had, along with Emotional Inhibition, already entered the regression equation as a main effect. Rehearsal featured in interaction terms predicting Contentment (with Benign Control) and Regrets (with Maternal Autonomy).

Benign Control, in turn, was the first stepwise entry into the equation predicting Self-esteem, and Maternal Autonomy was the first stepwise entry into the equations predicting Sleep disturbance and Regrets.

Maternal Anxiety and Rehearsal were the two most prevalent individual differences components in the regression equations, and were predictors of EPDS scores at eight weeks post-partum as both main effects and, jointly, in interaction. The psychometric properties of the EPDS (please see Chapter 1 - *1.5 Assessment of postnatal depression*) make this an important calculation because it identified ante-partum precursors of postnatal depression. Reference to the ECQ-A (please see Appendix 10) shows that both Maternal Anxiety and Rehearsal involve preoccupation with undesirable future events, but they were empirically discriminable and shared only modest common variance (please see Chapter 2). The prevalence of Maternal Anxiety and Rehearsal in the regression equations generally, and the stepwise additions to the regression equation predicting EPDS scores at eight weeks post-partum particularly, have implications for the kinds of support strategies that could be implemented to ameliorate post-partum symptoms. Diminutions of Maternal Anxiety and Rehearsal during pregnancy could short-circuit post-partum symptoms, but that goal would be challenging because of the relative stability of ECQ-A components (please see Table 2.6). Roger (1992), nevertheless, described the development and evaluation of a work skills and stress management training programme (founded on strategies intended to control excessive Rehearsal), described more fully in the Manual for the emotion control training programme (Roger and Masters, 1993), and investigations are currently under way to establish whether this could be modified and applied in the context of maternity.

The regression equation predicting Tension score at eight weeks post-partum featured no stepwise regressors. This is consistent with the proposition forwarded in Chapter 3, that Tension could represent a hormonal component of postnatal depression (it is possible that psychosocial pressures are less relevant when a condition is hormonally influenced). The equation predicting Tension at eight weeks post-partum, nevertheless, accounted for 69.1% of the variance, with 33.8% of this explained by initial symptoms and part of the remainder accounted for by a history of premenstrual syndrome. Dalton (e.g., 1989) has argued that

premenstrual syndrome and postnatal depression are symptomatologically equivalent, and Tension's regressor, i.e., premenstrual syndrome, is also commonly thought to be hormonally influenced. As discussed in Chapter 1, the greatest problem for a hormonal account of postnatal depression is that the most swingeing endocrine variations associated with parturition are universal, yet only a proportion of women become depressed post-partum. Figure 3.3 indicated that Tension was higher in a post-partum sample than in a non-maternal sample, regardless of depression status. This was therefore consistent with the notion that Tension is a hormonally influenced component of symptoms experienced by the majority, if not all, post-partum women.

The combination of biographic variables with symptom, stress, support and individual differences measures at 36 weeks pregnancy in regression accounted for between 17.5% and 93.4% of variance in symptom outcomes at either one or eight weeks post-partum. The upper estimates of shared variance are substantial, and indicate that information obtained during pregnancy can be used with confidence to predict which women are most likely to develop post-partum symptoms. Although the present analyses were less affected by constraints on sample sizes than those in the previous chapter, the regressions would undoubtedly have benefited from greater subject numbers. As with the previous chapter, these results can, nevertheless, be regarded as preliminary, and a methodology for future related work has been formulated.

The prospective analyses in this chapter were confined to the prediction of symptoms at one and eight weeks post-partum. In the following chapter, symptoms at eight and 20 weeks post-partum are predicted using data available post-partum. There were greater numbers of subjects who yielded appropriate data on all relevant occasions (as is necessary for true prospective analyses), thus endowing the findings with a greater degree of confidence in their reliability.

CHAPTER 11. THE SHORT TERM PROGRESSION OF POST-PARTUM SYMPTOMS

11.1 Introduction

There have been very few studies that have reported on the progression of symptoms beyond a single post-partum occasion. Plotting the course of post-partum symptoms would allow for the evaluation of their stability. The extent to which symptoms beyond the puerperium can be predicted from information available shortly following childbirth should be of interest to health professionals engaged in primary care. From the researcher's perspective, factors associated with the short term amelioration or exacerbation of post-partum symptoms have not been identified. The greater the confidence with which symptoms can be predicted during the first post-partum year, the greater the justification for the allocation of health services resources according to their likelihood of assisting in the avoidance of depression post-partum.

The extent to which changes in the likelihood of diagnosis of depression during the first post-partum year occur is also of interest from the perspectives of both the researcher and the health practitioner. Nott (1987) used the semi-structured psychiatric interview (SPI) of Goldberg *et al* (1970) in order to identify caseness at three, nine and 15 months post-partum. With an overall severity rating of 2 or over as the criterion for caseness, the proportions of cases on the three testing occasions were 18.5%, 28% and 31%. Nott also presented prevalence rates for new cases of depression on each testing occasion. New cases were those that had not been a case on any previous testing occasion and had never had any contact with psychiatric services. The proportions of new cases on each testing occasion were 17%, 22% and 10.6%. Nott determined the probability of becoming a case or recovering between each testing occasion (having included the existence of a psychiatric history as a baseline caseness criterion). Most changes, including the probability of becoming a new case, occurred between three and nine months post-partum rather than in the first three months following childbirth. Approximately half of new cases at three months post-partum were also

cases at nine months post-partum, and the majority of these were still cases at 15 months post-partum.

The longitudinal study (please see Chapter 6) was designed, *inter alia*, to monitor symptoms across regular 12 week intervals during pregnancy and the first post-partum year. Post-partum stages included eight, 20 and 32 weeks post-partum, and the available data therefore allowed for the plotting of symptoms across these stages. In addition, symptoms at 20 and 32 weeks post-partum could be regressed on data available at eight weeks post-partum, so providing an indication of the extent to which symptoms beyond the end of the puerperium can be predicted. By invoking an EPDS criterion, caseness was established (please see Chapter 3 for a discussion), so allowing for comparison of changes in caseness with Nott's data, albeit across eight, 20 and 32 weeks post-partum rather than three, nine and 15 months post-partum.

11.2 Method

11.2.1 Subjects

Subjects participating in the longitudinal study at eight, 20 and 32 weeks post-partum yielded data for the present analyses. Numbers of subjects at each stage, along with their biographic characteristics, were presented in Table 6.2.

11.2.2 Materials

Data for the present analyses were obtained from the following questionnaires: Biographic questionnaire (Appendix 4), Life events questionnaire (Appendix 13), Social support questionnaire (Appendix 14), ECQ-P (Appendix 11), 70-item self-report symptom checklist (Appendix 9), Edinburgh Postnatal Depression Scale (Appendix 6) and Obstetric outcome questionnaire (Appendix 12).

11.2.3 Design and Procedure

Mean symptom scores (Self-esteem, Tension and EPDS) were plotted across eight, 20 and 32 weeks post-partum. Differences were evaluated with both oneway analyses of variance (between subjects) and repeated measures (within subjects) tests (subject numbers providing data across all three stages were sufficient to allow for within subjects analyses).

Bivariate tests between symptom scores at 20 and 32 weeks post-partum and biographic and obstetric variables were carried out in order to ascertain which of the latter might be useful regressors of the former (the statistical control of obstetric variables was now feasible because the data were available at eight weeks post-partum, and could be used prospectively with respect to outcomes at 20 and 32 weeks post-partum).

Following the computation of correlations between life events, social support and individual differences variables at eight weeks post-partum and symptom scores at 20 and 32 weeks post-partum, the latter were regressed on the former after biographic and obstetric variables with which each symptom score was significantly associated had already been forced into the equations. Initial symptoms and life events were also forced into the regression equations in order to facilitate the evaluation of a diathesis-stress model of susceptibility. Principles governing the stepwise addition of further terms into the regression equations were equivalent to those described in Chapters 5, 9 and 10.

Following the invocation of the EPDS criterion of 14.5 (please see Chapters 1 and 3 for a discussion), prevalence rates of caseness at each post-partum stage were calculated and, emulating the procedures employed by Nott (1987), the probabilities of onset and recovery from caseness between each stage, using history of treatment for depression as a baseline caseness criterion, were calculated.

11.3 Results

Table 11.1 shows descriptive statistics for the three symptom indices at eight, 20 and 32 weeks post-partum.

		N	Mean	SD	Min.	Max.
SELF-ESTEEM	08 WEEKS	195	12.31	14.33	0	66
	20 WEEKS	168	13.10	14.89	0	68
	32 WEEKS	144	12.19	14.68	0	68
TENSION	08 WEEKS	195	21.20	13.87	0	58
	20 WEEKS	167	21.44	13.36	0	59
	32 WEEKS	146	20.20	14.28	0	56
EPDS	08 WEEKS	197	8.32	5.61	0	27
	20 WEEKS	167	8.89	5.98	0	27
	32 WEEKS	146	8.17	5.97	0	27

TABLE 11.1 POST-PARTUM SYMPTOM SCORES - DESCRIPTIVE STATISTICS.

A graphical representation of the mean symptom scores from eight to 32 weeks post-partum is shown in Figure 11.1.

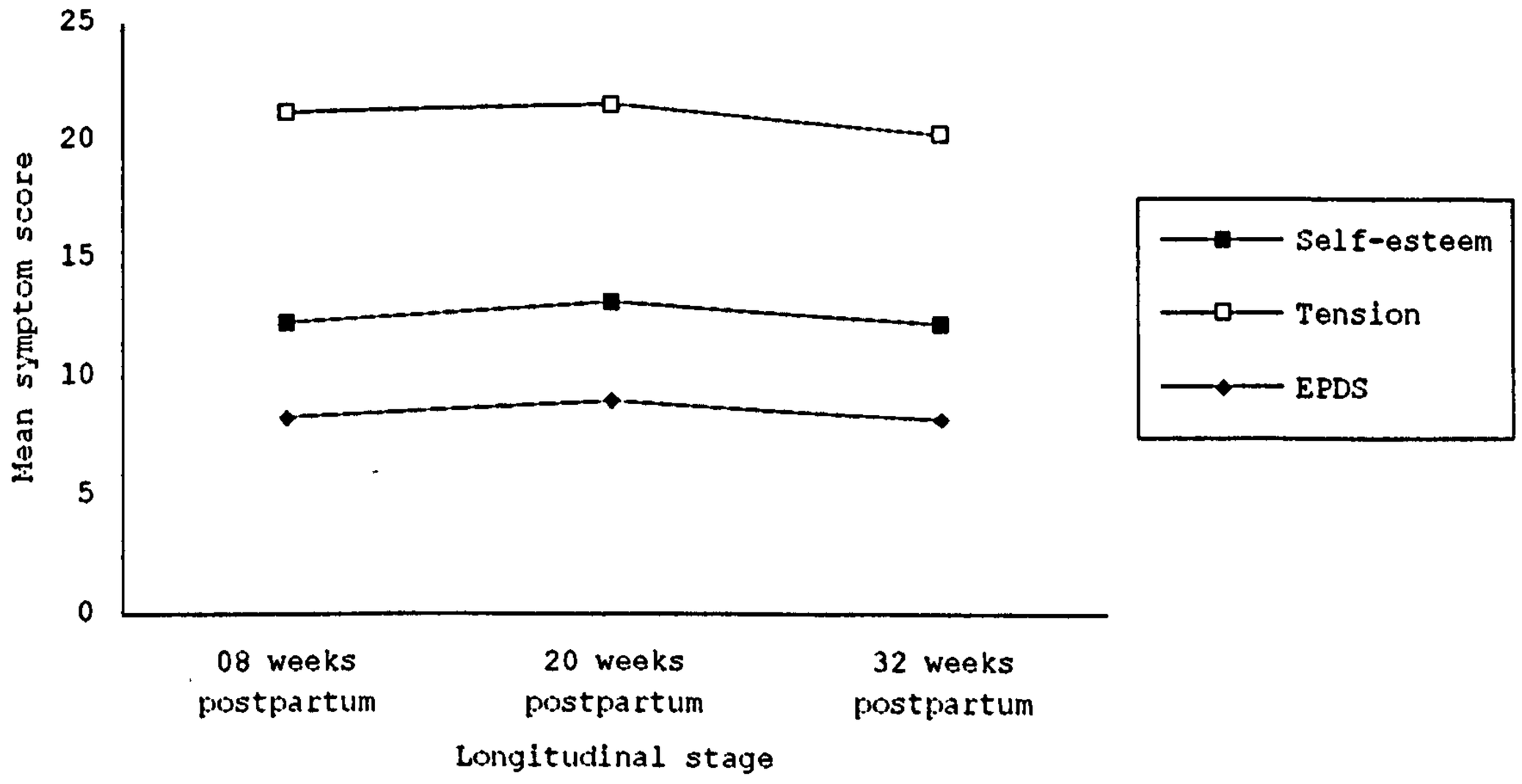


FIGURE 11.1 GRAPH OF MEAN SYMPTOM SCORES BY POST-PARTUM STAGE.

Each symptom's mean score was lowest at 32 weeks post-partum, and highest at 20 weeks post-partum. Neither oneway analyses of variance nor within subjects repeated measures analyses, however, yielded a significant F ratio.

Self-esteem scores at 20 weeks post-partum were greater in subjects who had a history of treatment for depression (U=1741; mean ranks 95/75; p=0.024), had any complications of the index pregnancy (U=2781; mean ranks 90/75; p=0.044), had presentation difficulties (U=713; mean ranks 108/78; p=0.012), delivered an infant with a birth defect (U=321; mean ranks 121/81; p=0.019) or had a history of preterm delivery (U=164; mean ranks 75/49; p=0.028).

Tension scores at 20 weeks post-partum were greater in subjects who had a history of premenstrual syndrome (U=2482; mean ranks 94/73; p=0.005), had a child aged less than a year at the beginning of the index pregnancy (U=783; mean ranks 107/81; p=0.049), had a partner present at delivery (U=436; mean ranks 85/49; p=0.021), had presentation difficulties (U=779; mean ranks 103/77; p=0.036) or had a history of preterm delivery (U=167; mean ranks 73/49; p=0.032). In addition, there was a negative correlation between Tension scores at 20 weeks post-partum and age at leaving full-time education (r=-0.16; DF 164; p=0.045).

EPDS scores at 20 weeks post-partum were greater in subjects who had a history of premenstrual syndrome (U=2597; mean ranks 92/74; p=0.014), were smokers during pregnancy (U=1080; mean ranks 105/81; p=0.031), presentation difficulties (U=735; mean ranks 106/77; p=0.019) or had a history of preterm delivery (U=149; mean ranks 77/49; p=0.016). In addition, there was a negative correlation between EPDS scores at 20 weeks post-partum and age at leaving full-time education (r=-0.16; DF 164; p=0.042).

Self-esteem scores at 32 weeks post-partum were greater in subjects who had a history of premenstrual syndrome (U=1950; mean ranks 79/65; p=0.035), had a history of treatment for depression (U=1103; mean ranks 85/64; p=0.006), had an unplanned index pregnancy (U=1599; mean ranks 84/68; p=0.037), were smokers during pregnancy (U=792; mean ranks 94/68; p=0.011), had morning sickness during the index pregnancy (U=1483; mean ranks 75/57; p=0.015) or delivered an infant with a birth defect (U=206; mean ranks 105/70; p=0.040). In addition, there was a negative correlation between Self-esteem scores at 32 weeks post-partum and age of the subject at delivery (r=-0.17; DF 141; p=0.047).

Tension scores at 32 weeks post-partum were greater in subjects who had a history of premenstrual syndrome (U=1831; mean ranks 83/63; p=0.005), had a history of treatment for depression (U=1158; mean ranks 86/65; p=0.011), were not gainfully engaged at the beginning of the index pregnancy (U=1797; mean ranks 84/68; p=0.033), did not have professional occupations at the beginning of the index pregnancy (U=903; mean ranks 76/54; p=0.025), were smokers during pregnancy (U=907; mean ranks 90/70; p=0.049), had a partner present at delivery (U=357; mean ranks 74/45; p=0.039), had morning sickness during the index pregnancy (U=1568; mean ranks 75/59; p=0.034) or delivered an infant with a birth defect (U=198; mean ranks 108/70; p=0.032).

EPDS scores at 32 weeks post-partum were greater in subjects who had a history of premenstrual syndrome (U=1913; mean ranks 82/64; p=0.012), had a history of treatment for depression (U=1143; mean ranks 86/65; p=0.008), had an unplanned index pregnancy (U=1520; mean ranks 88/67; p=0.007), were smokers during the index pregnancy (U=725; mean ranks 99/69; p=0.003) or had a history of postnatal depression (U=452; mean ranks 56/42; p=0.032). In addition, there was a positive correlation between EPDS scores at 32 weeks post-partum and Analgesia score (r=0.247; DF 108; p=0.009).

Correlations between predictor variables at eight weeks post-partum and symptoms at 20 and 32 weeks post-partum are shown in Table 11.2. Correlations in brackets pertain to subjects who yielded data at both eight weeks post-partum and at 20 weeks post-partum (N=110) and at both

eight weeks post-partum and 32 weeks post-partum (N=100). Unbracketed correlations pertain to the subset of subjects who also yielded complete individual differences (ECQ-P) data on the same occasions (N=68 and N=60 respectively). There were no serious discrepancies in the magnitudes of corresponding correlations between the larger and smaller groups, and the regression analyses that follow were confined to the smaller group yielding individual differences as well as stress and support data. NB: Self-esteem is a symptom component - there is an *inverse* relationship between Self-esteem scores and self-esteem.

	20 WEEKS POST-PARTUM			32 WEEKS POST-PARTUM		
	SELF-ESTEEM	TENSION	EPDS	SELF-ESTEEM	TENSION	EPDS
LIFE EVENTS	0.44‡ (0.42‡)	0.45‡ (0.42‡)	0.33† (0.38‡)	0.44‡ (0.45‡)	0.46‡ (0.40‡)	0.31* (0.40‡)
SUPPORT (IDEAL)	0.21 (0.17)	0.18 (0.13)	0.22 (0.17)	0.03 (-0.01)	0.05 (0.03)	0.06 (0.04)
SUPPORT (RECEIVED)	-0.13 (-0.07)	-0.02 (-0.02)	-0.02 (-0.07)	-0.16 (-0.19)	-0.06 (-0.11)	-0.18 (-0.22*)
SUPPORT (SHORTFALL)	0.33† (0.25†)	0.21 (0.16)	0.25* (0.25†)	0.19 (0.19)	0.12 (0.15)	0.18 (0.28†)
SUPPORT (SATISF.)	-0.18 (-0.12)	-0.06 (-0.03)	-0.08 (-0.14)	-0.20 (-0.24*)	-0.08 (-0.11)	-0.16 (-0.27†)
REHEARSAL	0.57‡	0.58‡	0.50‡	0.51‡	0.44‡	0.40†
EMOTIONAL INHIBITION	0.03	-0.02	-0.09	0.14	0.01	0.11
AGGRESSION CONTROL	-0.08	-0.03	-0.13	-0.11	-0.12	-0.19
MATERNAL DISCOMFORT	0.39†	0.41†	0.39†	0.39†	0.25	0.36†

* p<0.05
† p<0.01
‡ p<0.001

TABLE 11.2 CORRELATIONS BETWEEN PREDICTOR VARIABLES AT EIGHT WEEKS POST-PARTUM AND SYMPTOMS AT 20 AND 32 WEEKS POST-PARTUM. CORRELATIONS HAVE 66 DF (108 DF) AT 20 WEEKS POST-PARTUM AND 58 DF (98 DF) AT 32 WEEKS POST-PARTUM.

Stepwise entries into the regression equation predicting Self-esteem score at 20 weeks post-partum were Shortfall in social support and a Satisfaction with social support x Maternal Discomfort interaction. Forced and stepwise additions are shown in Table 11.3, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	16196.58	58					
BIOGRAPHIC VARIABLES[a]	13199.49	56	2997.09	2	6.36	0.003	0.185
OBSTETRIC VARIABLES[a]	11550.19	53	1649.30	3	2.52	ns	0.102
INITIAL SYMPTOMS[a]	6675.10	52	4875.09	1	37.98	<0.001	0.301
LIFE EVENTS[a]	6347.98	51	327.12	1	2.62	ns	0.020
SUPPORT (SHORTFALL)[b]	5337.58	50	1010.40	1	9.47	0.003	0.063
SUPPORT (SATISFACTION) x MATERNAL DISCOMFORT[b]	4857.47	49	480.11	1	4.84	0.033	0.030
TOTAL	4857.47	49	11339.11	9	12.71	<0.001	0.700

The regression equation is:

Self-esteem score = - 16.95 + 3.46 (History of treatment for depression)[a] + 24.33 (History of preterm delivery)[a] + 3.97 (Any complications of pregnancy)[a] + 13.88 (Presentation difficulties)[a] + 5.88 (Birth defect reported)[a] + 0.50 (Initial symptoms)[a] - 0.02 (Life events)[a] + 1.13 (Shortfall in social support)[b] + 0.02 (Satisfaction with social support x Maternal Discomfort)[b]

The regressors explained 70.0% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 11.3 REGRESSION OF SELF-ESTEEM SCORE AT 20 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

An Ideal social support x Rehearsal interaction was the only stepwise entry into the regression equation predicting Tension score at 20 weeks post-partum. Forced and stepwise additions are shown in Table 11.4, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	15091.17	66					
BIOGRAPHIC VARIABLES[a]	12926.77	61	2164.40	5	2.04	ns	0.143
OBSTETRIC VARIABLES[a]	11877.01	60	1049.76	1	5.30	0.025	0.070
INITIAL SYMPTOMS[a]	5343.27	59	6533.74	1	72.15	<0.001	0.433
LIFE EVENTS[a]	5298.51	58	44.76	1	2.04	ns	0.003
SUPPORT (IDEAL) x REHEARSAL[b]	4748.98	57	549.53	1	6.60	0.013	0.036
TOTAL	4748.98	57	10342.18	9	13.79	<0.001	0.685

The regression equation is:

Tension score = - 5.33 + 3.08 (History of premenstrual syndrome)[a] + 5.68 (Child less than a year at conception)[a] + 5.97 (Partner present at delivery)[a] - 0.36 (Age left full-time education)[a] + 7.99 (History of preterm delivery)[a] + 3.97 (Any complications of pregnancy)[a] + 13.88 (Presentation difficulties)[a] + 0.61 (Initial symptoms)[a] - 0.03 (Life events)[a] + 0.01 (Ideal social support x Rehearsal)[b]

The regressors explained 68.5% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 11.4 REGRESSION OF TENSION SCORE AT 20 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

Stepwise entries into the regression equation predicting EPDS score at 20 weeks post-partum were a Life events x Emotional Inhibition interaction and an Ideal social support x Maternal Discomfort interaction. Forced and stepwise additions are shown in Table 11.5, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	2752.61	64					
BIOGRAPHIC VARIABLES[a]	2496.22	60	256.39	4	1.54	ns	0.093
OBSTETRIC VARIABLES[a]	2169.98	59	326.24	1	8.87	0.004	0.119
INITIAL SYMPTOMS[a]	1291.38	58	878.60	1	39.46	<0.001	0.319
LIFE EVENTS[a]	1290.18	57	1.20	1	<1	ns	0.000
LIFE EVENTS x EMOTIONAL INHIBITION[b]	1155.35	56	134.83	1	6.54	0.013	0.049
SUPPORT (IDEAL) x MATERNAL DISCOMFORT[b]	1020.09	55	135.26	1	7.29	0.009	0.049
TOTAL	1020.09	55	1732.52	9	10.38	<0.001	0.629

The regression equation is:

EPDS score = - 2.64 + 2.73 (History of premenstrual syndrome)[a] + 1.64 (Smoker)[a] - 0.10 (Age left full-time education)[a] + 4.62 (History of preterm delivery)[a] + 2.15 (Presentation difficulties)[a] + 0.60 (Initial symptoms)[a] + 0.32 (Life events)[a] - 0.03 (Life events x Emotional Inhibition)[b] + 0.01 (Ideal social support x Maternal Discomfort)[b]

The regressors explained 62.9% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 11.5 REGRESSION OF EPDS SCORE AT 20 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

There were no stepwise entries into the regression equation predicting Self-esteem score at 32 weeks post-partum. Forced additions are shown in Table 11.6, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	8384.83	51					
BIOGRAPHIC VARIABLES[a]	7872.72	46	512.11	5	<1	ns	0.061
OBSTETRIC VARIABLES[a]	7745.48	44	127.24	2	<1	ns	0.015
INITIAL SYMPTOMS[a]	4063.47	43	3682.01	1	38.96	<0.001	0.439
LIFE EVENTS[a]	3737.63	42	325.84	1	3.66	ns	0.039
TOTAL	3737.63	42	4647.20	9	5.80	<0.001	0.554

The regression equation is:

Self-esteem score = - 2.21 - 0.70 (History of premenstrual syndrome)[a] - 0.33 (History of treatment for depression)[a] - 3.65 (Planned pregnancy)[a] + 1.05 (Smoker)[a] + 0.22 (Age)[a] - 0.83 (Morning sickness during the index pregnancy)[a] + 19.89 (Birth defect reported)[a] + 0.50 (Initial symptoms)[a] + 0.38 (Life events)[a]

The regressors explained 55.4% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry (p<0.05)

TABLE 11.6 REGRESSION OF SELF-ESTEEM SCORE AT 32 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

There were no stepwise entries into the regression equation predicting Tension score at 32 weeks post-partum. Forced additions are shown in Table 11.7, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	10154.31	51					
BIOGRAPHIC VARIABLES[a]	8890.27	45	1264.04	6	1.07	ns	0.125
OBSTETRIC VARIABLES[a]	8095.33	43	794.94	2	2.11	ns	0.078
INITIAL SYMPTOMS[a]	3866.20	42	4229.13	1	45.94	<0.001	0.416
LIFE EVENTS[a]	3634.96	41	231.24	1	2.61	ns	0.023
TOTAL	3634.96	41	6519.34	10	7.35	<0.001	0.642

The regression equation is:

Tension score = 6.61 + 5.77 (History of premenstrual syndrome)[a] + 1.09 (History of treatment for depression)[a] - 2.52 (Gainfully engaged at conception)[a] + 1.00 (Professional occupation at conception)[a] + 0.13 (Smoker)[a] - 6.55 (Partner present at delivery)[a] + 4.10 (Morning sickness during the index pregnancy)[a] + 6.62 (Birth defect reported)[a] + 0.55 (Initial symptoms)[a] + 0.34 (Life events)[a]

The regressors explained 64.2% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry (p<0.05)

TABLE 11.7 REGRESSION OF TENSION SCORE AT 32 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

Maternal Discomfort was the only stepwise entry into the regression equation predicting EPDS score at 32 weeks post-partum. Forced and stepwise additions are shown in Table 11.8, along with their associated F, p and ΔR^2 values.

ADDITION	DEVIANCE	DF	REDUCTION	DF	F	P	ΔR^2
NONE (MEAN)	1450.60	42					
BIOGRAPHIC VARIABLES[a]	1099.18	37	351.42	5	2.37	ns	0.242
OBSTETRIC VARIABLES[a]	1049.09	36	50.09	1	1.72	ns	0.035
INITIAL SYMPTOMS[a]	485.57	35	563.52	1	40.62	<0.001	0.388
LIFE EVENTS[a]	484.43	34	1.14	1	<1	ns	0.001
MATERNAL DISCOMFORT[b]	429.70	33	54.73	1	4.20	0.048	0.038
TOTAL	429.70	33	1020.91	9	8.71	<0.001	0.704

The regression equation is:

EPDS score = - 6.50 + 1.44 (History of premenstrual syndrome)[a] + 0.38 (History of treatment for depression)[a] - 0.57 (Planned pregnancy)[a] + 5.53 (Smoker)[a] + 3.80 (History of postnatal depression)[a] + 0.25 (Analgesia in labour)[a] + 0.55 (Initial symptoms)[a] - 0.07 (Life events)[a] - 0.33 (Maternal Discomfort)[b]

The regressors explained 70.4% of the variance in the outcome measure

[a] Forced entry
[b] Stepwise entry ($p<0.05$)

TABLE 11.8 REGRESSION OF EPDS SCORE AT 32 WEEKS POST-PARTUM ON PREDICTOR VARIABLES AT EIGHT WEEKS PREGNANCY WITH STATISTICAL CONTROL OF BIOGRAPHIC VARIABLES, OBSTETRIC VARIABLES AND INITIAL SYMPTOMS.

The EPDS criterion of 14.5 identified 25/197 cases (12.7%) at eight weeks post-partum, 26/167 cases (15.6%) at 20 weeks post-partum and 21/146 cases (14.4%) at 32 weeks post-partum.

The probabilities of becoming a case or recovering between each stage, with a history of treatment for depression as a baseline, are shown in Table 11.9.

	HISTORY OF TREATMENT > EIGHT WEEKS POST-PARTUM	EIGHT WEEKS POST-PARTUM > 20 WEEKS POST-PARTUM	20 WEEKS POST-PARTUM > 32 WEEKS POST-PARTUM	EIGHT WEEKS POST-PARTUM > 32 WEEKS POST-PARTUM
CASE > CASE	8/ 43=0.19	13/ 21=0.62	9/ 22=0.41	9/ 18=0.50
CASE > NON-CASE	35/ 43=0.81	8/ 21=0.38	13/ 22=0.59	9/ 18=0.50
NON-CASE > CASE	16/143=0.11	13/143=0.09	12/120=0.10	11/124=0.09
NON-CASE > NON-CASE	127/143=0.89	130/143=0.91	108/120=0.90	113/124=0.91

TABLE 11.9 PROBABILITIES OF BECOMING A CASE OR RECOVERING BETWEEN EACH POST-PARTUM STAGE.

The numbers of new cases (as proportions of total subjects neither with a history of treatment for depression nor having been identified as a case at a previous post-partum stage) were 16/143 (11.2%), 9/107 (8.4%) and 5/84 (6.0%) respectively.

Of the 16 new cases at eight weeks post-partum, seven were cases at 20 weeks post-partum, and four of these were cases at 32 weeks post-partum.

11.4 Discussion

Each post-partum symptom's mean score was highest at 20 weeks post-partum, lowest at 32 weeks post-partum, and intermediate at eight weeks post-partum. None of these differences was, however, statistically significant. The means, nevertheless, indicated that there is no reason to suppose that symptoms tend to be greatest sooner after childbirth than later in the first post-partum year. A further follow-up stage at which symptom scores were recorded several years later (perhaps confined to subjects who had not become pregnant in the interim) might shed light on whether these post-partum scores represent a general post-partum elevation over scores that could be expected in a non-maternal sample. Table 3.5 showed that Self-esteem scores in women at eight weeks post-partum were not significantly different from those in a non-maternal sample (with group differences in age, parity and EPDS scores having been statistically controlled), but that Tension scores were higher. Accordingly, a follow-up study would be expected to uncover a significant reduction in Tension scores with the passage of time, but no such diminution in Self-esteem scores. This would be consistent with the notion that Tension is, at least partly, a hormonal remnant from childbearing, and would not contend the possibility that for *depressed* post-partum women, Self-esteem is a special issue.

A history of premenstrual syndrome was significantly associated with five out of six symptom scores at 20 and 32 weeks post-partum. It was also associated with Self-esteem and Tension at eight weeks post-partum, but with none of the antenatal symptom scores (please see Chapter 8). This specificity of the relationship between a history of premenstrual syndrome and post-partum but not antenatal symptoms could be regarded as consistent with Dalton's version of the aetiology of postnatal symptoms. Dalton's account (please see Chapter 1 - *1.12 Hormones and postnatal depression*) supposes that progesterone and oestrogen during pregnancy are not only associated with the absence of menstruation, but protect a woman from symptoms typical of both premenstrual syndrome and postnatal depression. The rapid decline of these hormones across parturition, according to Dalton, allows for the return of such symptoms, and premenstrual syndrome often occurs for the first time following childbirth, or is exacerbated in women who have experienced it

previously. Implications of data presented in previous chapters for a hormonal account of postnatal depression have been discussed in those chapters (e.g., Chapters 3, 8 and 10), and a summary of the evidence is provided in the following chapter (Chapter 12 - Conclusions).

A history of treatment for depression was associated with all of the symptom scores at 32 weeks post-partum (as was being a smoker during pregnancy). This could be regarded as consistent with continuity of depression, but a history of treatment for depression was associated with only one symptom score at 20 weeks post-partum and two symptom scores at eight weeks post-partum (please see Chapter 8). In addition, a history of postnatal depression was associated with EPDS scores at 32 weeks post-partum only. As discussed previously (please see Chapter 8), continuity of depression does not in any event infer that maternal and non-maternal depressions are phenomenologically identical, and the data presented in Chapter 3 were interpreted in favour of that possibility.

Presentation difficulties were associated with all symptom scores at 20 weeks post-partum, but none of the symptom scores at either eight or 32 weeks post-partum. This could be taken to suggest that obstetric stress contributes to post-partum symptoms in a latent fashion, its influence expiring by around eight months post-partum. Few other obstetric indices were associated with post-partum symptoms, however, and this interpretation must therefore be confined to presentation difficulties only. A history of preterm delivery was also associated with all symptom measures at 20 weeks post-partum but none at either eight or 32 weeks post-partum. A check with the data revealed that only one subject had both a history of preterm delivery and presentation difficulties and, so, it is unlikely that the possible influence of presentation difficulties on symptoms at 20 weeks post-partum can be accounted for by a history of preterm delivery (*or vice versa*).

On each post-partum occasion (including eight weeks post-partum), Tension scores were *higher* in subjects who had a partner present at delivery. The proportions of subjects without a partner present at delivery were 11/155, 10/155 and 9/135 at eight, 20 and 32 weeks post-partum respectively. Whilst the numbers without partners present were

modest, the results were nevertheless intriguing. A check with antenatal data revealed that none of the pregnancy symptom scores were associated with partner's presence during delivery. Living with a partner was associated with Self-esteem scores at eight weeks post-partum only, and in that case the direction of the association was consistent with social support having a beneficial effect. These data are clearly antagonistic to the notion that partner's presence during delivery has a beneficial effect, although this observation pertains to Tension only. It is difficult to find an explanation for the present results, except to speculate that the presence of a partner tends to undermine a parturient woman's sense of autonomy over childbearing.

The correlations between predictor variables at eight weeks post-partum and symptoms at 20 and 32 weeks post-partum clearly showed that life events, Rehearsal and Maternal Discomfort were consistently associated with each symptom score (with the exception of the relationship between Maternal Discomfort and Tension at 32 weeks post-partum), whilst few remaining predictor variables were associated with symptoms. In the regression analyses, however, the forced entry of life events into the equations was not significant in any instance. The substantial proportion of variance explained by the prior forced addition of initial symptoms would readily have accounted for this, but would infer a degree of confounding between the two measures (life events and initial symptoms questionnaires were completed contemporaneously and, so, concurrent symptoms could have influenced the reporting of life events). The forced entry of initial symptoms might also have accounted for variance that would otherwise have been explained by Rehearsal and Maternal Discomfort in the regression equations, as neither featured as a significant stepwise main effect with the exception of Maternal Discomfort in the case of EPDS scores at 32 weeks post-partum. This infers confounding between individual differences and symptoms, although the direction of influence in these circumstances is more likely to have been the reverse, i.e., particular individuals were more likely to have had consistently higher symptom scores. There were no significant stepwise entries into the equations predicting Self-esteem and Tension scores at 32 weeks post-partum, and the variance explained by initial symptoms might also have accounted for these results.

A Shortfall in social support main effect and a Satisfaction with social support x Maternal Discomfort interaction were stepwise additions to the equation predicting Self-esteem at 20 weeks post-partum. These seemed to reflect the relevance of social support and reconciliation with the mothering role during the puerperium with respect to the regard with which mothers hold themselves by around five months post-partum. An Ideal social support x Rehearsal interaction was a significant stepwise addition to the equation predicting Tension at 20 weeks post-partum, and this could have reflected puerperal rumination on an unsatisfactory level of social support trans-parturition, perhaps especially related to the support garnered from a partner during delivery. The Life events x Emotional Inhibition and Ideal social support x Maternal Discomfort interactions that featured in the equation predicting EPDS score at 20 weeks post-partum were less easy to interpret, but in combination appeared to suggest that a propensity to express desire for a preferred level of social support in response to stress during the puerperium, in conjunction with a general level of satisfaction with motherhood, militated against the likelihood of depression at 20 weeks post-partum.

The variance in symptom scores at 20 and 32 weeks post-partum accounted for by data available at eight weeks post-partum ranged from 55.4% to 70.4%. Like the proportions of variance in symptoms at eight weeks post-partum accounted for by data available at 36 weeks pregnancy (please see Chapter 10), these percentages were substantial, and suggested that the symptom status of women during the first post-partum year could be predicted with some confidence from information available following the puerperium. The regression analyses, like those reported in Chapter 10, should be of interest to health professionals such as health visitors and general practitioners. The extent to which depression during the first post-partum year can be prospectively predicted determines the degree of justification of targeting health services resources according to need. If the costs of support strategies that prevent or ameliorate post-partum symptoms are less than those required for treatment, there is economic utility for these data, aside from any other considerations.

The EPDS criterion of 14.5 yielded prevalence rates of depression at each post-partum stage that were similar to prevalence rates generally reported for postnatal depression (please see Chapter 1 - *1.4 Postnatal*

depression) and those reported previously using the same EPDS criterion (please see Chapters 3 and 7). They were, nevertheless, lower than those reported by Nott (1987) who used an SPI criterion of 2. Nott's postpartum intervals were three, nine and 15 months postpartum; thus, the most proximate stages of the longitudinal study to those of Nott's were eight and 32 weeks postpartum. Nott's prevalence rates were higher than those reported presently, and the increase he reported from three to nine months postpartum (18.5% to 28%) was greater in proportion than the increase from eight to 32 weeks postpartum (12.7% to 14.4%) reported above. Nott's prevalence rates for new cases at three and nine months postpartum were 17% and 22%, whereas the prevalence rates of new cases at eight and 32 weeks postpartum were 11.2% and 6%, a sharp fall in comparison to Nott's increase. Nott reported that the probability of becoming a new case was greatest from three to nine months postpartum, whereas the probabilities of becoming a new case across all intervals in the longitudinal study was consistent at around 10%. Nott reported that half of new cases at three months postpartum were still cases at nine months postpartum, whereas the proportion of new cases at eight weeks postpartum that were still cases at 32 weeks postpartum was only a quarter. Although Nott's caseness criteria and postpartum intervals were not equivalent to those in the present study, Nott's data implied greater rates of onset of depression, and lower rates of remission, during the first postpartum year than the present data suggested.

Nott also noted that the symptom profiles of cases at three, nine and 15 months postpartum were similar, and concluded that "postnatal *depression* is probably an appropriate name for these disorders". He also said:

> In conclusion, we have found evidence which supports the idea that the post-partum period is a period of increased vulnerability for women, but the suggestion of a strict temporal relationship of disorder to delivery was not corroborated. This has implications for attempts to understand the cause of post-natal disorder. The findings of this study suggest that the causes of postnatal depression are more likely to be in the psychosocial aspects of the puerperium, and perhaps the mother's own predisposition in terms of personality and background, rather than in the hormonal and other physical changes associated with childbirth itself. (p527)

The data presented in this chapter for comparison with Nott's do not lend corroborative support to Nott's conclusion that women are more vulnerable post-partum, as both absolute prevalence rates, increases in prevalence rates and increments in new caseness across the period from approximately three to nine months post-partum were not as substantial as those reported by Nott. The persistence of new caseness across the same interval, moreover, was not as great as that reported by Nott. Regression analyses presented in previous chapters have had implications for the possible causes of post-partum symptoms, but these have not been interpreted in either hormonal or psychosocial contexts exclusively. A discussion of the possible causes of post-partum symptoms features in the following chapter.

CHAPTER 12. CONCLUSIONS

Arguments that have been forwarded to suggest that postnatal depression is not "atypical" have been founded chiefly on the notion of "continuity" of depression (i.e., that women depressed post-partum have either a psychiatric history or were depressed during pregnancy), failures to find that prevalence rates of depression were significantly higher post-partum than at other times, and that the symptom profiles of maternal and non-maternal subjects have been significantly different.

The notion that continuity of depression implicates equivalent symptom profiles in present (post-partum) and previous episodes is fundamentally flawed: there is simply no logic in such a deduction. It might, of course, imply that women who have had previous episodes of depression are especially susceptible to post-partum symptoms, but it does not follow that the pattern of post-partum symptoms must be equivalent to that in previous episodes. Continuity of depression does not, of itself therefore, mean that postnatal depression is not "atypical".

Although a psychiatric history was associated with post-partum depression in several studies, among the present analyses, a history of treatment for depression was unambiguously associated with symptoms at 24 and 36 weeks pregnancy (please see Chapter 8) and at 32 weeks postpartum (please see Chapter 11), but the relationships between a history of depression and symptoms at intermediate stages were patchy. Thus a history of treatment for depression was more associated with symptom scores outside the early post-partum period than within it. This suggests that continuity of depression from before pregnancy is more relevant to ante-partum and late post-partum symptoms than to symptoms during or proximate to the puerperium.

The degree of overlap between ante-partum and post-partum "caseness", moreover, varied substantially in the relevant studies. Even where the same diagnostic criteria were used, disparate results emerged. In Chapter 7, only 10 out of 26 "cases" (using the Edinburgh Postnatal Depression Scale criterion of 14.5) numbered among the 16 cases at eight

weeks post-partum. This degree of overlap is simply insufficient to suppose that women with depression post-partum are simply experiencing the continuation of a pre-existing episode of depression.

There has been consensus regarding prevalence rates of postnatal depression, with most studies reporting rates between 10 and 15%. The EPDS criterion of 14.5 produced prevalence rates of 14.5%, 12.2% and 12.7% at eight weeks postpartum (Chapters 3, 7 and 11 respectively) in different sample sizes, and these clearly are consistent with the consensus. The prevalence rate in a non-maternal sample using the same criterion was comparable, moreover, at 12.5% (please see Chapter 3). The argument that similar prevalence rates in maternal and non-maternal samples contests the possibility that postnatal depression is "atypical", however, is also fundamentally flawed. It simply does not follow that because a similar proportion of women in separate samples are depressed, their respective patterns of symptoms must be equivalent. Indeed, Elliott (1990) argued that prevalence rates say nothing about the clinical importance of postnatal depression.

Since Pitt's classic (1968) study in which the adjective "atypical" was coined for postnatal depression, there have been no systematic attempts to compare patterns of symptoms in maternal and non-maternal samples. In the majority of quarters, the contemporary view is that postnatal depression is, after all, typical, and a few studies have reported that the symptom profiles of maternal and non-maternal samples did not significantly differ. None of these studies, however, was sufficiently sensitive, with most using excessively stringent and / or global criteria for determining the presence or absence of a small number of symptoms. Usually such criteria lead to the diagnosis of a syndrome, and Costello (1992) has argued that research at the level of symptoms should be favoured over research conducted at the level of syndromes.

In contrast to such insensitivity, Chapter 3 reported on the relative severity of a large number of symptoms in maternal and non-maternal samples. Having statistically controlled overall levels of depression, the symptom scores that differed significantly in the two groups were, with few exceptions, remarkably consistent with Pitt's account of post-

partum symptoms. Factoring of the symptom scores yielded Self-esteem and Tension components. Whilst Tension was greater among maternal subjects regardless of their depression status, Self-esteem scores (which are greater the lower self-esteem) did not differ among non-depressed maternal and non-maternal subjects, but were significantly greater among depressed maternal subjects than depressed non-maternal subjects. This was the first indication that self-esteem may be a special issue for women who are depressed post-partum.

The Edinburgh Postnatal Depression Scale (EPDS) has good psychometric credentials (it is internally reliable and sensitive to changes in depression status), is versatile (it does not refer specifically to the puerperium and can be used with any sample) and has good concordance with diagnostic status (in contrast to the Beck Depression Inventory). It is, therefore, appropriate for monitoring depression in a post-partum sample, and can give a satisfactory indication of likely diagnostic status (although diagnostic systems themselves have little concurrent validity according to Costello, 1992). Its drawback, however, is that, having only ten items, it samples a narrow range of behaviour (notably lacking items that refer to fatigue and disturbances of appetite). The new symptom scales developed in Chapter 3 (Self-esteem and Tension) would serve as a useful alternative or adjunct to the EPDS.

The possibility that a specific form of postnatal depression might exist in women with gainful or professional occupations (in contrast to the chronic form of depression expected among working-class women) was not substantiated when the distributions of subjects with a history of treatment for depression were evaluated across occupational categories. Professional subjects did have elevated symptom scores at 12 weeks pregnancy, and this could have reflected conflict about interruption of a career, but the only other symptom score that varied by occupational status was Tension at eight weeks postpartum, with lower scores for subjects gainfully engaged at conception. There were, accordingly, few indications that a specific postnatal depression was detectable among working women, as distinct from a chronic depression due to poverty.

The data presented in Chapter 11 were among few that have represented the course of symptoms during the first post-partum year. Symptom scores did not vary significantly across eight, 20 and 32 weeks post-partum. Prevalence rates of caseness did not vary substantially across the same intervals, but the increase from eight to 32 weeks post-partum was consistent with Nott's increase from three to nine months post-partum. Whereas Nott found an increased rate of development of new cases of depression post-partum, the rate of onset of new cases in the present analyses was consistent at around 10%. These observations do not shed any direct light on the question whether postnatal depression is atypical - it is not clear that either symptom scores or propensity for caseness to develop increase as the first post-partum year begins and progresses and, as discussed previously, prevalence rates do not say anything about the *nature* of the underlying depression.

The nature of the Blues is less controversial. Unlike Kennerley and Gath's (1989a) study, no conditions (such as peaking) were set for the inclusion of symptoms in the analyses described in Chapter 4. Like Kennerley and Gath's study, nevertheless, a primary Blues component emerged in the factoring of symptoms during the first post-partum week. Whereas Kennerley and Gath's Blues component comprised only four items, the present Blues component comprised 15 items and had satisfactory face validity and internal reliability. The highest loading item was "Felt tearful", and "Cried frequently" was also included. The maternity Blues is clearly characterised chiefly by lachrymation, although other aspects included anxiety, difficulty in concentrating, sadness, tension and tiredness (please see Chapter 4). The new factor, along with its seven counterparts, comprise psychometrically sound indices of symptoms in the period immediately following childbirth.

Previous studies have not reached consensus about the possible relationships between sociodemographic or biographic variables and obstetric or symptom outcomes, although many studies have reported that no significant relationships exist. As a possible exception, social class and smoking have been occasionally implicated in obstetric outcomes. The occupational status of both the subject and her partner were indeed implicated in both obstetric and symptom outcomes in the present analyses. Birthweight was positively associated with having a

professional partner, and negatively with not having a partner at all. Birthweight was also one of very few obstetric indices associated (negatively) with smoking. In addition, five-minute Apgar scores were higher for professional subjects. High occupational status was associated with higher symptom scores early in pregnancy, but late pregnancy and post-partum symptom scores were, if anything, lower in these subjects. The effects were not attributable to educational status. Parity was not implicated in symptom outcomes, although younger subjects had higher scores on half of the symptom indices from 12 weeks pregnancy to eight weeks post-partum. Having an unplanned pregnancy was associated with symptoms more as the maternity cycle progressed, suggesting some latency in the manifestation of its effects. A history of premenstrual syndrome was associated with seven out of nine symptom outcomes from eight to 32 weeks post-partum, but not with any ante-partum measures.

Where appropriate, the biographic and obstetric variables with which outcomes were significantly associated were included in the prospective regression analyses. Obstetric variables were statistically controlled in the regression analyses predicting symptoms at 20 and 32 weeks post-partum only, as the relevant data were procured at eight weeks post-partum and could not have been used prospectively in predicting symptoms at earlier longitudinal stages. In any event, presentation difficulties and the existence of a birth defect were the only obstetric variables that were frequently associated with post-partum symptoms, and this militated in favour of the proposition that obstetric stress makes little contribution to post-partum symptoms. Please see Chapters 8 and 11 for a full account of the relationships between biographic and obstetric variables on the one hand and outcome measures on the other.

The regression analyses (please see Chapters 5, 9, 10, and 11) were structured so as to evaluate a diathesis-stress model of susceptibility. Life events were forced into each regression equation (which addition was frequently not significant, especially where initial symptoms had already been statistically controlled), following which interaction terms that included a life events component were next allowed to enter the equations stepwise. There were very few instances of significant additions to the regression equations that supported the diathesis-stress model. It remains possible that pregnancy, childbirth and the

impact of caring for an infant places all women experiencing that cycle in a uniformly high stress category, under which circumstances buffering effects would be foiled by the absence of a low stress category. Variables that would otherwise appear to moderate the stress-outcome relationship then appear as main effects, and this was often the case.

Cross-cultural studies have speculated that rituals can protect a new mother against depression because of the clear social identity accorded to her because of them (please see Chapter 1). Social support is usually regarded as a buffer against stress, and Sarason *et al* (1983, 1985), having distinguished between number of sources of social support and satisfaction with social support, concluded that satisfaction rather than mere quantity of support was more likely to govern stress-outcome relationships. Monroe *et al* (1986) insisted that the moderating effects of social support should be evaluated in prospective studies where the statistical control of initial symptoms was implemented. The regression analyses reported in Chapters 5, 9, 10 and 11 were conducted in this fashion (except that initial symptoms were not controlled when predicting obstetric outcomes - Chapter 9 or specific symptoms in the first post-partum week - Chapter 10). A Life events x Satisfaction with social support interaction did feature in the regression equations predicting Self-esteem in the pilot (please see Chapter 5), but no life events x social support terms featured in the regression equations predicting other outcomes. A Life events x Shortfall in social support interaction featured in the equation predicting Duration of the third stage of labour, but no life events x social support terms featured in the regression equations predicting other obstetric outcomes (please see Chapter 9). Only three life events x social support interactions featured in the regression equations predicting symptoms at one week post-partum, and none featured in the regression equations predicting symptoms at eight weeks post-partum (please see Chapter 10). There were, moreover, no life events x social support interactions in the equations predicting symptoms at 20 and 32 weeks post-partum. Of the total of five life events x social support terms that featured, three included a Shortfall in support term, and this was not consistent with Sarason *et al*'s argument that satisfaction with support rather than quantity of support was more likely to govern stress-outcome relationships.

Cobb's (1976) proposition that, because social support facilitates coping with crisis and adaptation to change, its moderating effects should be observed during the major transitions in life (please see Chapter 1), was thus rarely supported in the regression analyses. Cohen and Wills (1985 - please see Chapter 1) argued that buffering effects fail to emerge when there is no specific match between social support requirements and social support resources. Indeed, Paykel *et al*'s (1980) study that reported buffering effects for social support included support measures that represented specific aspects of the marital relationship. It is, therefore, possible that buffering effects failed to emerge in the present analyses because the aggregation of quantity and quality of support across many sources was insufficiently sensitive. The argument that moderators become main effects where stress is uniformly high was supported by the emergence of a small number of support main effects in the regression analyses, but the modest extent to which social support terms featured generally suggests that its role in the context of maternity can be overestimated.

Individual differences are also frequently thought to moderate the stress-outcome relationship, but scales that have been developed for or administered to maternal samples hitherto have been insufficiently specific, had psychometric shortcomings or yielded inconsistent results. The background to the development of the Emotion Control Questionnaires, and the rationale for the application of emotion control to maternity outcomes was described in Chapter 1. The development of Emotion Control Questionnaires for maternal samples (ECQ-A and ECQ-P) was described in Chapter 2, and with the exception of minor differences in the extent to which subscales were mutually correlated compared with the ECQ and ECQ2, the psychometric properties of the ECQ and ECQ2 were replicated in the new maternal samples. In addition, maternity-specific components emerged; Maternal Anxiety and Maternal Autonomy in the case of the ECQ-A and Maternal Discomfort in the case of the ECQ-P.

Concurrent correlations between subscales of the new Emotion Control Questionnaires and symptoms were presented in Tables 2.7, 2.8, 3.7 and 4.3. Subscales having the strongest relationships with symptoms were Rehearsal and the maternity-specific components, especially Maternal Anxiety and Maternal Discomfort. The regression analyses reported in

Chapters 5, 9, 10 and 11 included the stepwise addition of ECQ-A and ECQ-P subscales, together with all possible interaction terms, in the prediction of symptom and obstetric outcomes. In the pilot (please see Chapter 5), Rehearsal was the first stepwise entry into each regression equation, following which Maternal Discomfort and Aggression Control featured occasionally (a Rehearsal x Maternal Anxiety interaction also featured in the equation predicting Self-esteem when life events "Undesirable" rather than life events "Stress" were first forced into the equation). No life events x emotion control interactions featured, however. In contrast, the regression equations predicting obstetric outcomes (please see Chapter 9) featured no emotion control main effects, but several interactions that included an ECQ-A component (three of these also included a social support component, whilst a Life events x Maternal Autonomy interaction featured in the equations predicting Duration of the first of labour and Total duration of labour). Among ECQ-A components featuring in the prediction of post-partum symptoms (please see Chapter 10), Maternal Anxiety featured as a main effect in the equations predicting Blues, Inadequacy and EPDS scores at both one and eight weeks post-partum, and Rehearsal featured as a main effect in the equations predicting Regrets and EPDS scores at eight weeks post-partum (as did a Maternal Anxiety x Rehearsal interaction). There were life events x emotion control interactions in the equations predicting Blues, Regrets and Self-esteem scores at eight weeks post-partum, but not in any others. Taken together, the results suggest that emotion control, particularly Maternal Anxiety and Rehearsal, are important ante-partum predictors of post-partum symptoms, but their role as moderators of stress is questionable. There were no stepwise entries at all into the regression equations predicting symptoms at 32 weeks post-partum from data available at eight weeks post-partum, but each of the equations predicting symptoms at 20 weeks post-partum featured interactions, each of which included an ECQ-P component (only one of which also included a life events component).

The strength of the concurrent correlations between Rehearsal and Maternal Anxiety on the one hand and symptoms on the other, together with the prevalence of Rehearsal and Maternal Anxiety in the regression equations predicting symptoms raises the question of confounding between these emotion control components and psychopathology. There are several grounds for contending this possibility, however. First, the item

content of the Rehearsal and Maternal Anxiety subscales refer to rumination rather than psychopathology. Second, emotion control scores tend to be normally distributed rather than positively skewed as would be expected for indices of psychopathology (please see Figures 2.4 and 2.5 for frequency distributions of emotion control scores). Third, emotion control scores have substantial retest correlations (please see Tables 2.6 and 5.10 for retest correlations in the longitudinal and pilot studies respectively) and quantitative inertia in contrast to EPDS scores (please see Table 5.10). Finally, Rehearsal and Maternal Anxiety were stepwise additions to the regression equations even when initial symptoms had been statistically controlled.

The proportions of variance in symptom scores accounted for prospectively by the regressors were frequently substantial, suggesting that post-partum symptom scores can be predicted with tangible confidence. This information should be of interest to health professionals engaged in primary care, and could form the basis for a computer programme which, in general practitioner settings, would facilitate the targeting of resources according to the likelihood of need. The importance of Rehearsal and Maternal Anxiety as main effect regressors predicting post-partum symptoms suggests that the successful emotion control training programme written by Roger and Masters (1993) and evaluated by Roger (1992) could be modified for maternal participants in the expectation that post-partum symptoms would be ameliorated. The training programme might be especially useful to women identified as "at risk" according to the computer programme. It would be necessary, however, first to corroborate the findings of the regression analyses owing to the erosion of samples in the present studies (please see Chapter 9 for a discussion). The methodology adopted in the present analyses would form a useful foundation for confirmatory analyses.

The substantial proportions of variance in symptom scores accounted for by the psychosocial regressors militates against a hormonal explanation of postnatal depression (a purely physiological explanation of post-partum symptoms would not be expected to permit such strong associations with extraneous variables such as life events and social support on the one hand and individual differences in emotion control on the other). Dalton's version of the aetiology of postnatal depression was discussed

in Chapter 1, and implications of results reported in foregoing chapters for an endocrine explanation of postnatal depression were identified and discussed in those chapters (please see Chapters 3, 8, 9 and 11). By way of overview, Dalton argues that the swingeing hormonal changes across parturition are responsible for post-partum symptoms which conform to a particular pattern resembling that apparent during the premenstrual phase, and she claimed (e.g., 1985) to have successfully treated women prophylactically using progesterone. The data presented in Chapter 3 confirmed her view that irritability is the hallmark of post-partum symptoms, but there was no evidence for increased appetite. Tension could, however, represent a hormonal component of post-partum symptoms, especially as Tension scores were higher in post-partum subjects than in non-maternal subjects regardless of depression status (the rapid decline of oestrogens and progesterone across parturition are universal concomitants of childbirth yet only 10-15% of women become clinically depressed). Tension scores at eight weeks post-partum were, moreover, associated with a history of premenstrual syndrome, and the regression equation predicting Tension score at eight weeks post-partum featured no stepwise regressors. A history of premenstrual syndrome was, however, also associated with seven out of nine post-partum scores, yet there was nothing to suggest that non-Tension symptom scores were hormonally influenced. None of the data presented herein had direct implications for a hormonal account. As Kendell (1985) has said, a hormonal explanation of post-partum psychiatric disorders has eluded us for the primary reason that the relevant biochemistry is exceedingly complex and, in any event, no-one has known what to look for.

The present studies have shed new light on an old idea - that postnatal depression has "atypical" aspects. They have included the development of new individual differences scales specifically for maternal samples, although these were founded on the increasingly established notion of emotion control. Whilst the role of social support during the maternity cycle may be overestimated, the extent to which emotion control measures were prospectively associated with post-partum symptoms was substantial. This bodes well for health professionals engaged in primary care, as they can look forward with confidence to attaining a greater understanding of post-partum symptoms, together with the assets that will enable them to target resources according to need.

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APPENDICES

APPENDIX 1. PILOT INDIVIDUAL DIFFERENCES QUESTIONNAIRE

Please answer the following questions.

Some ask for personal information, but your name is not required, so please be as honest as you can.

If there isn't enough space to write everything you would like, feel free to continue on the other side.

Please try to answer everything you can.

1. What were your main CONCERNS:
   a) when you first knew that you were pregnant?
   b) during pregnancy?
   c) about labour
   d) about caring for a newborn baby?

2. In what ways do you want to have CONTROL:
   a) during pregnancy?
   b) during labour?
   c) at home with a newborn baby?

3. In what ways can other people (please say which others) SUPPORT you:
   a) during pregnancy?
   b) during labour?
   c) at home with a newborn baby?

4. In what ways would you prefer others NOT to behave:
   a) during pregnancy?
   b) during labour?
   c) at home with a newborn baby?

5. How are you expected to live up to OTHER PEOPLE'S EXPECTATIONS:
   a) during pregnancy?
   b) during labour?
   c) at home with a newborn baby?

6. What makes you ANGRY?

7. What can you DO about ANY of the feelings you have described?

Today's Date:

Your Age: yrs months

How many weeks pregnant are you?
or
How old is your baby in weeks?

How many pregnancies including this one?

THANK YOU FOR YOUR HELP.

APPENDIX 2. EXPLORATORY INDIVIDUAL DIFFERENCES QUESTIONNAIRE - ANTENATAL

PLEASE INDICATE HOW YOU FEEL ABOUT EACH OF THE FOLLOWING STATEMENTS BY CIRCLING EITHER:

1 = STRONGLY AGREE
2 = AGREE
3 = DISAGREE
4 = STRONGLY DISAGREE

IT IS VERY IMPORTANT THAT YOU ANSWER 1, 2, 3 OR 4 FOR EVERY STATEMENT.

1.	A woman who never becomes pregnant is never truly feminine.	1 2 3 4
2.	Even though I try to forget about things that have upset me, they keep coming back into my mind.	1 2 3 4
3.	I often buy things for my baby on the spur of the moment.	1 2 3 4
4.	It is important to me that I sometimes receive praise or reassurance about being a mother.	1 2 3 4
5.	If someone pushed me, I would push back.	1 2 3 4
6.	A friend made is a friend for life.	1 2 3 4
7.	I don't need to know the result of every single prenatal test.	1 2 3 4
8.	I don't mind if doctors keep information from me - they are the best judges of what I should know.	1 2 3 4
9.	I generally don't bear a grudge - when something is over, it's over and I don't think about it again.	1 2 3 4
10.	I make my greatest efforts when things are most difficult for me.	1 2 3 4
11.	It's up to me to find all the resources necessary to look after my baby.	1 2 3 4
12.	I don't worry about how my new baby will affect my other close relationships.	1 2 3 4
13.	If lots of troubles come my way, I rise above them and deal with them one at a time.	1 2 3 4
14.	I often feel I don't have the capacity to cope with all the problems in my life.	1 2 3 4
15.	I find it difficult to ask people close to me for favours, even if it helps me get some rest.	1 2 3 4
16.	I find long journeys boring - all I want to do is get there as quickly as possible.	1 2 3 4
17.	I don't worry about the cost of having a baby.	1 2 3 4
18.	On a bus or train, if I needed it, I would ask a young person to give up their seat for me.	1 2 3 4
19.	I frequently examine my body to check that everything is OK.	1 2 3 4
20.	I welcome offers from family and friends to help around the home, but I can easily get by on my own.	1 2 3 4
21.	If an unexpected bill arrives, I can forget about it until a reminder arrives.	1 2 3 4
22.	I frequently change my mind about things.	1 2 3 4

23.	I get "worked up" just thinking about things that have upset me in the past.	1	2	3	4
24.	I never doubt that I will love my baby.	1	2	3	4
25.	I don't need sympathy or understanding from others.	1	2	3	4
26.	There should be more public amenities for pregnant women and parents with very young children.	1	2	3	4
27.	Sometimes I just can't control my feelings.	1	2	3	4
28.	Motherhood comes naturally to me.	1	2	3	4
29.	I often wish I had never become pregnant.	1	2	3	4
30.	I consider myself in charge of almost every aspect of pregnancy, labour and caring for a newborn baby.	1	2	3	4
31.	I sometimes upset people because I say exactly what I mean.	1	2	3	4
32.	If you can't afford a baby, you shouldn't have one.	1	2	3	4
33.	I'd rather concede an issue than get into an argument.	1	2	3	4
34.	I don't feel embarrassed about expressing my feelings.	1	2	3	4
35.	When family or friends interfere, I don't object as I have learned by trial and error to listen to them.	1	2	3	4
36.	Once I have made a decision about something, I never change my mind.	1	2	3	4
37.	I prefer social events that happen spontaneously.	1	2	3	4
38.	If I'm badly served in a shop or restaurant, I don't usually make a fuss.	1	2	3	4
39.	I have been more anxious since I became pregnant.	1	2	3	4
40.	Having someone who is a "listening ear" is very important to me.	1	2	3	4
41.	Looking after a newborn baby is mostly a matter of instinct, so I don't try to plan everything in advance.	1	2	3	4
42.	If I enter a lottery, it comes as a complete surprise if I win a prize.	1	2	3	4
43.	If I buy a faulty product, I don't worry about confronting the shopkeeper who sold it to me.	1	2	3	4
44.	I wish I could banish from my mind the memories of past failures.	1	2	3	4
45.	I find it difficult to explain how I feel to others.	1	2	3	4
46.	I don't get in a flap about tomorrow, I'm happy living for today.	1	2	3	4
47.	I seldom feel irritable.	1	2	3	4
48.	I don't let it bother me if friends or relations criticise my behaviour.	1	2	3	4
49.	If a friend borrows something and returns it dirty or damaged, I usually just keep quiet about it.	1	2	3	4
50.	If I see someone pushing into a queue ahead of me, I usually just ignore it.	1	2	3	4
51.	If you have a partner, they should take equal responsibility for looking after a baby.	1	2	3	4

52.	If someone were to hit me, I would hit back.	1	2	3	4
53.	I can't help showing how I feel, even when it isn't appropriate to do so.	1	2	3	4
54.	I have had no trouble deciding whether to breast or bottle feed.	1	2	3	4
55.	In conversation, I tend to talk about my feelings more than other people do.	1	2	3	4
56.	I'm not easily distracted.	1	2	3	4
57.	I am sometimes overwhelmed by feelings of inadequacy.	1	2	3	4
58.	I find it easy to forget all my troubles from time to time.	1	2	3	4
59.	Although some women need a hand to hold in labour, that's something I can do without.	1	2	3	4
60.	I hate being stuck behind a slow driver.	1	2	3	4
61.	I don't worry about gaining too much weight - I can easily lose it again after my baby is born.	1	2	3	4
62.	For those who struggle financially with a baby, there should be government benefits to help.	1	2	3	4
63.	The ideal picture of motherhood given by the media is one I will try to live up to.	1	2	3	4
64.	Far too much fuss is made about smoking and drinking in pregnancy.	1	2	3	4
65.	When I first knew I was pregnant, I dismissed all thoughts of miscarriage from my mind.	1	2	3	4
66.	Doctors should not regard pregnant women as patients - pregnancy is not an illness.	1	2	3	4
67.	If someone tells me I'm doing something wrong, I ignore it and get on with things my own way.	1	2	3	4
68.	I find myself going over and over what doctors say about me or my baby.	1	2	3	4
69.	I have already worked out a routine that I will follow with my new baby.	1	2	3	4
70.	I welcome the interference of health professionals - they know best and I always take their advice.	1	2	3	4
71.	I seldom "put my foot in it".	1	2	3	4
72.	For me, the future seems to be full of troubles and problems.	1	2	3	4
73.	I have an enduring sense of guilt about the way my behaviour has affected people around me.	1	2	3	4
74.	If I am afraid someone will humiliate me, I feel overwhelmed by feelings of inferiority.	1	2	3	4
75.	For some women, there are more fulfilling things than motherhood.	1	2	3	4
76.	If anybody didn't approve of me becoming pregnant, that's their problem, not mine.	1	2	3	4
77.	The health of a baby is mostly a matter of how well a pregnant woman takes care of her own health.	1	2	3	4
78.	Expressing my feelings makes me feel very vulnerable and anxious.	1	2	3	4

79.	If I am upset, I keep it to myself - I don't expect other people to be interested in how I feel.	1	2	3	4
80.	I am always available to my family and friends if they need someone to talk to.	1	2	3	4
81.	I often think about the impact that having a baby might have on my own health.	1	2	3	4
82.	I sometimes wonder whether I am doing all the right things for my baby.	1	2	3	4
83.	I can already form a mental picture of how my baby will look.	1	2	3	4
84.	If I have to have a Caesarean, that's one of those things, and I won't worry about it beforehand.	1	2	3	4
85.	When I am upset, I often take it out on people close to me.	1	2	3	4
86.	No-one gets one over on me - I don't take things lying down.	1	2	3	4
87.	If someone treats me badly, I find it impossible to be angry in case it affects the relationship.	1	2	3	4
88.	I seldom show how I feel about things.	1	2	3	4
89.	I often do or say things I later regret.	1	2	3	4
90.	I worry about losing control of my behaviour in labour.	1	2	3	4
91.	I stay calm when dealing with people in authority.	1	2	3	4
92.	I sometimes think I might have an accident or illness that will prevent me looking after my baby.	1	2	3	4
93.	I often find myself thinking over and over about things that have made me angry.	1	2	3	4
94.	Almost everything I do is carefully thought out.	1	2	3	4
95.	What happens to you is mostly a matter of luck.	1	2	3	4
96.	I worry about the health of my baby.	1	2	3	4
97.	If a passing car splashes me, I shout at the driver.	1	2	3	4
98.	I find it hard to get thoughts about things that have upset me out of my mind.	1	2	3	4
99.	I dress for comfort and convenience - if I look presentable as well, that is a bonus.	1	2	3	4
100.	I find it difficult to comfort people who have been upset.	1	2	3	4
101.	I remember things that upset me or make me angry for a long time afterwards.	1	2	3	4
102.	I prefer to deal with my feelings alone rather than discuss them with others.	1	2	3	4
103.	If I receive bad news in front of others, I usually try to hide how I feel.	1	2	3	4
104.	If a job needs doing, I stick at it until it's done.	1	2	3	4
105.	Even though my baby isn't born yet, I am already wondering how I will cope.	1	2	3	4
106.	As a mother, I will live up to my own standards, not other people's.	1	2	3	4
107.	I often feel as if I'm just waiting for something bad to happen.	1	2	3	4

108.	I wouldn't try to avoid people who had seen me make a fool of myself - everyone can make mistakes.	1	2	3	4
109.	When things go haywire, I can always take a firm grip on the situation and put things right.	1	2	3	4
110.	I sometimes feel that I endure rather than enjoy motherhood.	1	2	3	4
111.	It should be up to the individual, and not doctors, to decide what pain relief to have in labour.	1	2	3	4
112.	I can't stand having to wait for anything.	1	2	3	4
113.	I am seldom preoccupied with thoughts about events which may happen in the future.	1	2	3	4
114.	Sometimes I get so involved thinking about things that have upset me I am unable to adopt a positive attitude towards anything.	1	2	3	4
115.	Becoming pregnant is the best thing that ever happened to me.	1	2	3	4
116.	I don't mind how long labour takes, I know it will be over eventually.	1	2	3	4
117.	Upsetting things quickly lose their power to affect me.	1	2	3	4
118.	I prefer the idea of bottle rather than breast feeding.	1	2	3	4
119.	I frequently imagine how painful childbirth might be.	1	2	3	4
120.	When something upsets me, I prefer to talk to someone about it than to bottle it up.	1	2	3	4
121.	When things go wrong, they all go wrong together.	1	2	3	4
122.	I am always aware of what other people expect of me.	1	2	3	4
123.	If it helps to keep the peace, I'll go along with other people's point of view.	1	2	3	4
124.	I never worry about money.	1	2	3	4
125.	If I get angry or upset, I usually say how I feel.	1	2	3	4
126.	Pregnant women are unreasonably expected to be always glowing, happy and content.	1	2	3	4
127.	I always want to know the full facts about my baby's health.	1	2	3	4
128.	I never forget people making me angry or upset, even about small things.	1	2	3	4
129.	If your family doesn't approve of you having a baby, life can be very difficult.	1	2	3	4
130.	I never worry about my past failures.	1	2	3	4

APPENDIX 3. EXPLORATORY INDIVIDUAL DIFFERENCES QUESTIONNAIRE - POSTNATAL

The postnatal exploratory individual differences questionnaire was identical to the antenatal one, except that 20 questions were substituted as follows:

7.	I frequently check that my baby is OK even when he / she is quiet.	1 2 3 4
12.	Sometimes I wonder whether I chose the right method of feeding my baby.	1 2 3 4
24.	I often look for signs of ill-health in my baby.	1 2 3 4
39.	A mother's duties are often tiresome and boring.	1 2 3 4
41.	Looking after a baby is mostly a matter of instinct, so I don't try to plan everything in advance.	1 2 3 4
59.	Even though my baby's birth is in the past, I often find myself thinking about the pain I suffered in labour.	1 2 3 4
61.	I resent the loss of freedom to enjoy my own interests that comes with having a baby.	1 2 3 4
63.	The ideal picture of motherhood given by the media is one I try to live up to.	1 2 3 4
64.	Motherhood is a lonely occupation - people don't understand how isolated a mother can be.	1 2 3 4
65.	I am less happy now than I imagined I would be when I was pregnant.	1 2 3 4
69.	My baby's behaviour is unpredictable, and I get frustrated because I can't plan each day as I would like to.	1 2 3 4
83.	I love people making a fuss over me.	1 2 3 4
84.	During pregnancy, I constantly worried about whether I would have a safe delivery.	1 2 3 4
90.	I am never sure I understand all my baby's needs.	1 2 3 4
105.	Even though tomorrow has not yet arrived, I am already wondering how I will cope.	1 2 3 4
111.	There's no point in having regrets about the past - you can't change what's already happened.	1 2 3 4
115.	Becoming a mother is the best thing that ever happened to me.	1 2 3 4
116.	I frequently wish I had more time to myself.	1 2 3 4
117.	Upsetting events quickly lose their power to affect me.	1 2 3 4
119.	I tend to remember the less pleasant side of my past.	1 2 3 4

NB: Item 117 was reworded because it became apparent that "Upsetting things" was ambiguous. It could be taken to mean spilling things over, whereas upsetting events was intended. The postnatal questionnaire was amended because this ambiguity was noticed before any post-partum subjects were recruited.

APPENDIX 4. BIOGRAPHIC QUESTIONNAIRE - ANTENATAL

Please complete the following sections. Be sure to answer ALL of the questions.

Today's Date: / /

Your Age: yrs months

Number of children and their age(s) in years?

Did you have a child less than a year old when you became pregnant?

If so, what is that child's age in months now?

How many weeks pregnant are you?

Have you had morning sickness in this pregnancy?

Please describe any general health problems (e.g., hypertension?)

At what age did you leave full-time education?

Your occupation when you became pregnant?

Do you plan to return to work?

If so, how long after childbirth?

Do you smoke?

Do you live with a husband or partner?

If so, what is their occupation?

Was this pregnancy planned?

Please tick ANY of the following that apply to PREVIOUS pregnancies and cross otherwise:

	Which pregnancy?				
	1st	2nd	3rd	4th	5th
Termination					
Morning sickness					
Miscarriage					
Pre-term (more than 3 weeks)					
Stillbirth					
Induction					
Breech Delivery					
Forceps					
Planned Caesarean					
Emergency Caesarean					
Multiple birth (twins, *etc.*)					
Congenital abnormalities (please describe)					
Other obstetric complications (please describe)					
Postnatal "Blues"					
Postnatal depression					
Other psychiatric problems (please describe)					

APPENDIX 5. COVERING LETTER - ANTENATAL

Dear Volunteer,

Thank you for agreeing to take part in this maternity study.

The aim of the project is to identify some of the characteristics of women that have unfavourable maternity outcomes such as obstetric complications and postnatal depression.

Your participation involves completion of the attached. The information you give will not be traced back to you personally, and it will not be possible to identify you from any summary results.

Please complete the attached ONLY IF YOU ARE PREGNANT. If you are not pregnant, please write your name and address below and return the remaining pages blank.

Please ANSWER ALL THE QUESTIONS. This is important in order to achieve the most reliable results.

Please return all completed pages in the S.A.E. provided after you have signed the consent form below.

Name: Date:

Address:

Declaration:

I have been informed about the aim of the study and what my participation entails.

I reserve the right to return the questionnaire uncompleted.

Any information given will not be traced to me personally and I will not be identified in any results.

Signed:

ARE YOU WILLING TO COMPLETE FURTHER QUESTIONNAIRES? YES / NO (Delete)

APPENDIX 6. AMENDED EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)

PLEASE UNDERLINE ONE ANSWER FOR EACH OF THE FOLLOWING STATEMENTS -

UNDERLINE THE ANSWER WHICH COMES CLOSEST TO HOW YOU HAVE FELT IN THE PAST 7 DAYS, NOT JUST HOW YOU FEEL TODAY.

In the past 7 days:

1. I have been able to laugh and see the funny side of things

   As much as I always could
   Not quite so much now
   Definitely not so much now
   Not at all

2. I have looked forward with enjoyment to things

   As much as I ever did
   Rather less than I used to
   Definitely less than I used to
   Hardly at all

3. I have blamed myself unnecessarily when things went wrong

   Yes, most of the time
   Yes, some of the time
   Not very often
   No, never

4. I have been anxious or worried for no good reason

   No, not at all
   Hardly ever
   Yes, sometimes
   Yes, very often

5. I have felt scared or panicky for no very good reason

   Yes, quite a lot
   Yes, sometimes
   No, not much
   No, not at all

6. Things have been getting on top of me

   Yes, most of the time I haven't been able to cope at all
   Yes, sometimes I haven't been coping as well as usual
   No, most of the time I have coped quite well
   No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping

   Yes, most of the time
   Yes, sometimes
   Not very often
   No, not at all

8. I have felt sad or miserable

Yes, most of the time
Yes, quite often
Only occasionally
No, never

9. I have been so unhappy that I have been crying

Yes, most of the time
Yes, quite often
Only occasionally
No, never

10. I have thought of deliberately harming myself

Yes, quite often
Sometimes
Hardly ever
Never

THANK YOU FOR YOUR HELP

Contents of this and previous page adapted from:
Cox, J.L., Holden, J.M. & Sagovsky, R. (1987)
Detection of Postnatal Depression: Development of the 10-item EPDS
British Journal of Psychiatry 150, 782-786

APPENDIX 7. BIOGRAPHIC QUESTIONNAIRE - POSTNATAL

Please complete the following sections. Be sure to answer ALL of the questions.

Today's Date: / /

Your Age: yrs months

Number of children and their age(s) in years?

Did you have a child less than a year old when you became pregnant?

If so, what is that child's age in months now?

How old is your baby in weeks?

What sex is your baby (give sexes of all babies if twins, *etc.*)?

Please describe any general health problems (e.g., hypertension?)

At what age did you leave full-time education?

Your occupation when you became pregnant?

Do you plan to return to work?

If so, how long after childbirth?

Do you smoke?

Do you live with a husband or partner?

If so, what is their occupation?

Was this pregnancy planned?

Please tick ANY of the following that apply to PREVIOUS pregnancies and cross otherwise:

	Which pregnancy?				
	1st	2nd	3rd	4th	5th
Termination					
Morning sickness					
Miscarriage					
Pre-term (more than 3 weeks)					
Stillbirth					
Induction					
Breech Delivery					
Forceps					
Planned Caesarean					
Emergency Caesarean					
Multiple birth (twins, *etc.*)					
Congenital abnormalities (please describe)					
Other obstetric complications (please describe)					
Postnatal "Blues"					
Postnatal depression					
Other psychiatric problems (please describe)					

APPENDIX 8. COVERING LETTER - POSTNATAL

Dear Volunteer,

Thank you for agreeing to take part in this maternity study.

The aim of the project is to identify some of the characteristics of women that have unfavourable maternity outcomes such as obstetric complications and postnatal depression.

Your participation involves completion of the attached. The information you give will not be traced back to you personally, and it will not be possible to identify you from any summary results.

Please complete the attached ONLY IF YOU HAVE A CHILD LESS THAN ONE YEAR OLD, AND YOU ARE NOT PREGNANT. If you are pregnant, or do not have a child less than one year old, please write your name and address below and return the remaining pages blank.

Please ANSWER ALL THE QUESTIONS. This is important in order to achieve the most reliable results.

Please return all completed pages in the S.A.E. provided after you have signed the consent form below.

Name: Date:

Address:

Declaration:

I have been informed about the aim of the study and what my participation entails.

I reserve the right to return the questionnaire uncompleted.

Any information given will not be traced to me personally and I will not be identified in any results.

Signed:

ARE YOU WILLING TO COMPLETE FURTHER QUESTIONNAIRES? YES / NO (Delete)

NB: The postnatal covering letter was identical to the antenatal one, except that the paragraph "Please complete the attached ONLY IF YOU ARE PREGNANT. If you are not pregnant, please write your name and address below and return the remaining pages blank." was replaced by "Please complete the attached ONLY IF YOU HAVE A CHILD LESS THAN ONE YEAR OLD, AND YOU ARE NOT PREGNANT. If you are pregnant, or do not have a child less than one year old, please write your name and address below and return the remaining pages blank."

APPENDIX 9. 70-ITEM SYMPTOM CHECKLIST

LISTED BELOW ARE A NUMBER OF SYMPTOMS AND FEELINGS.

FOR THOSE YOU HAVE EXPERIENCED IN THE PAST 7 DAYS, PLEASE INDICATE THE SEVERITY OR INTENSITY OF THAT SYMPTOM OR FEELING BY CIRCLING EITHER:

1 = VERY MILD
2 = A LITTLE SEVERE/INTENSE
3 = VERY SEVERE/INTENSE
4 = EXTREMELY SEVERE/INTENSE.

IF YOU HAVE NOT EXPERIENCED THE SYMPTOM OR FEELING LISTED, CIRCLE 0.

PLEASE REMEMBER - PAST 7 DAYS ONLY.

		SEVERITY/ INTENSITY
1.	HAD HEADACHE	0 1 2 3 4
2.	FELT TEARFUL	0 1 2 3 4
3.	DIDN'T WANT TO TALK TO ANYONE	0 1 2 3 4
4.	FELT SAD	0 1 2 3 4
5.	ATE TOO MUCH	0 1 2 3 4
6.	COULDN'T MAKE DECISIONS	0 1 2 3 4
7.	FELT IRRITABLE	0 1 2 3 4
8.	DIDN'T WANT TO EAT MEALS	0 1 2 3 4
9.	FELT GUILTY	0 1 2 3 4
10.	CRIED FREQUENTLY	0 1 2 3 4
(PLEASE REMEMBER - PAST 7 DAYS ONLY)		
11.	HAD FLUSHES	0 1 2 3 4
12.	FELT TENSED UP PHYSICALLY	0 1 2 3 4
13.	THOUGHT ABOUT DELIBERATELY HARMING YOURSELF	0 1 2 3 4
14.	FELT FRUSTRATED	0 1 2 3 4
15.	HAD NO ENERGY	0 1 2 3 4
16.	FELT INFERIOR	0 1 2 3 4
17.	DIDN'T CARE ABOUT ANYTHING	0 1 2 3 4
18.	FELT TIRED ALL THE TIME	0 1 2 3 4
19.	COULDN'T CONCENTRATE ON CHORES OR WORK	0 1 2 3 4
20.	FELT ANXIOUS	0 1 2 3 4
21.	COULDN'T SLEEP AT BEDTIME	0 1 2 3 4
22.	COULDN'T SLEEP IN THE MIDDLE OF THE NIGHT	0 1 2 3 4
23.	WOKE UP EARLY AND COULDN'T GO BACK TO SLEEP	0 1 2 3 4
24.	DRANK MORE ALCOHOL THAN USUAL	0 1 2 3 4
25.	FELT YOU HAD NOTHING TO LOOK FORWARD TO	0 1 2 3 4
26.	THOUGHT YOURSELF UNATTRACTIVE	0 1 2 3 4
27.	FELT BORED	0 1 2 3 4
28.	HAD PALPITATIONS	0 1 2 3 4
29.	FELT PESSIMISTIC ABOUT THE FUTURE	0 1 2 3 4
30.	DWELT ON PAST FAILURES	0 1 2 3 4

(PLEASE REMEMBER - PAST 7 DAYS ONLY)

31.	COULDN'T IMAGINE THE FUTURE AT ALL	0 1 2 3 4
32.	FELT VERY EXCITED	0 1 2 3 4
33.	HEARD VOICES OR SOUNDS THAT WEREN'T REAL	0 1 2 3 4
34.	BLAMED YOURSELF FOR EVERYTHING	0 1 2 3 4
35.	FELT LONELY	0 1 2 3 4
36.	FELT INTIMIDATED BY OTHER PEOPLE	0 1 2 3 4
37.	WAS MORE SOCIABLE THAN USUAL	0 1 2 3 4
38.	CRITICISED YOURSELF	0 1 2 3 4
39.	FELT CONFIDENT	0 1 2 3 4
40.	HAD LESS INTEREST IN SEX THAN USUAL	0 1 2 3 4
41.	FELT UNABLE TO CONTROL ANYTHING	0 1 2 3 4
42.	MOOD WORST LATE IN THE DAY	0 1 2 3 4
43.	MOOD WORST EARLY IN THE DAY	0 1 2 3 4
44.	FELT VERY IMPORTANT	0 1 2 3 4
45.	HAD ACHES AND PAINS	0 1 2 3 4
46.	FELT YOU DESERVED PUNISHMENT	0 1 2 3 4
47.	SLEPT LONGER THAN USUAL	0 1 2 3 4
48.	HAD NO APPETITE	0 1 2 3 4
49.	DAYDREAMED A LOT	0 1 2 3 4
50.	FELT VERY ENERGETIC	0 1 2 3 4
51.	HAD UNUSUAL BOWEL MOVEMENTS	0 1 2 3 4
52.	THOUGHT YOU COULDN'T DO ANYTHING RIGHT	0 1 2 3 4
53.	FELT EMOTIONALLY NUMB	0 1 2 3 4
54.	HAD UNPLEASANT DREAMS	0 1 2 3 4
55.	HAD DIFFICULTY SHOWING AFFECTION TO LOVED ONES	0 1 2 3 4
56.	FELT INADEQUATE	0 1 2 3 4
57.	FELT THAT OTHER PEOPLE DISLIKED YOU	0 1 2 3 4
58.	DID MORE WORK THAN USUAL	0 1 2 3 4
59.	FELT TENSED UP MENTALLY	0 1 2 3 4

(PLEASE REMEMBER - PAST 7 DAYS ONLY)

60.	WISHED YOU COULD CHANGE THE PAST	0 1 2 3 4
61.	DIDN'T GO OUT AS MUCH AS USUAL	0 1 2 3 4
62.	SAW THINGS THAT WEREN'T REAL	0 1 2 3 4
63.	FELT WORTHLESS	0 1 2 3 4
64.	DIDN'T WANT TO GET OUT OF BED	0 1 2 3 4
65.	DISLIKED YOURSELF	0 1 2 3 4
66.	FELT PANICKY	0 1 2 3 4
67.	HAD INTRUSIVE MEMORIES	0 1 2 3 4
68.	FELT AGITATED	0 1 2 3 4
69.	WAS MORE ACTIVE THAN USUAL	0 1 2 3 4
70.	FELT PEACEFUL AT TIMES	0 1 2 3 4

APPENDIX 10. ECQ-A WITH SCORING KEY

PLEASE INDICATE HOW YOU FEEL ABOUT EACH OF THE FOLLOWING STATEMENTS BY CIRCLING EITHER:

1 = STRONGLY AGREE
2 = AGREE
3 = DISAGREE
4 = STRONGLY DISAGREE

IMPORTANT: PLEASE GIVE ONE ANSWER FOR EVERY STATEMENT.

1.	I never doubt that I will love my baby.	1 2 3 4
2.	If I receive bad news in front of others, I usually try to hide how I feel.	1 2 3 4
3.	I find it difficult to explain how I feel to others.	1 2 3 4
4.	Sometimes I get so involved thinking about things that have upset me I am unable to adopt a positive attitude towards anything.	1 2 3 4
5.	If it helps to keep the peace, I'll go along with other people's point of view.	1 2 3 4
6.	I am seldom pre-occupied with thoughts about events which may happen in the future.	1 2 3 4
7.	I don't feel embarrassed about expressing my feelings.	1 2 3 4
8.	I never worry about my past failures.	1 2 3 4
9.	If someone pushed me, I would push back.	1 2 3 4
10.	I often think about the impact that having a baby might have on my own health.	1 2 3 4
11.	I never forget people making me angry or upset, even about small things.	1 2 3 4
12.	I worry about the health of my baby.	1 2 3 4
13.	Motherhood comes naturally to me.	1 2 3 4
14.	When something upsets me, I prefer to talk to someone about it than to bottle it up.	1 2 3 4
15.	I find it difficult to ask people close to me for favours, even if it helps me get some rest.	1 2 3 4
16.	If someone were to hit me, I would hit back.	1 2 3 4
17.	I seldom "put my foot in it".	1 2 3 4
18.	If someone tells me I'm doing something wrong, I ignore it and get on with things my own way.	1 2 3 4
19.	If I'm badly served in a shop or restaurant, I don't usually make a fuss.	1 2 3 4
20.	I'd rather concede an issue than get into an argument.	1 2 3 4
21.	I consider myself in charge of almost every aspect of pregnancy, labour and caring for a newborn baby.	1 2 3 4
22.	I often feel as if I'm just waiting for something bad to happen.	1 2 3 4
23.	If a passing car splashes me, I shout at the driver.	1 2 3 4
24.	I don't mind how long labour takes, I know it will be over eventually.	1 2 3 4

25.	For some women, there are more fulfilling things than motherhood.	1 2 3 4
26.	I often do or say things I later regret.	1 2 3 4
27.	If I see someone pushing into a queue ahead of me, I usually just ignore it.	1 2 3 4
28.	It is important to me that I sometimes receive praise or reassurance about being a mother.	1 2 3 4
29.	I sometimes wonder whether I am doing all the right things for my baby.	1 2 3 4
30.	If a friend borrows something and returns it dirty or damaged, I usually just keep quiet about it.	1 2 3 4
31.	I get "worked up" just thinking about things that have upset me in the past.	1 2 3 4
32.	In conversation, I tend to talk about my feelings more than other people do.	1 2 3 4
33.	I find it easy to forget all my troubles from time to time.	1 2 3 4
34.	I have already worked out a routine that I will follow with my new baby.	1 2 3 4
35.	I frequently change my mind about things.	1 2 3 4
36.	I never worry about money.	1 2 3 4
37.	No-one gets one over on me - I don't take things lying down.	1 2 3 4
38.	I seldom show how I feel about things.	1 2 3 4
39.	I'm not easily distracted.	1 2 3 4
40.	I find it hard to get thoughts about things that have upset me out of my mind.	1 2 3 4
41.	Looking after a newborn baby is mostly a matter of instinct, so I don't try to plan everything in advance.	1 2 3 4
42.	I prefer to deal with my feelings alone rather than discuss them with others.	1 2 3 4
43.	Once I have made a decision about something, I never change my mind.	1 2 3 4
44.	I generally don't bear a grudge - when something is over, it's over and I don't think about it again.	1 2 3 4
45.	I frequently imagine how painful childbirth might be.	1 2 3 4
46.	I sometimes upset people because I say exactly what I mean.	1 2 3 4
47.	Even though my baby isn't born yet, I am already wondering how I will cope.	1 2 3 4
48.	I remember things that upset me or make me angry for a long time afterwards.	1 2 3 4
49.	Almost everything I do is carefully thought out.	1 2 3 4
50.	I find it difficult to comfort people who have been upset.	1 2 3 4
51.	Becoming pregnant is the best thing that ever happened to me.	1 2 3 4
52.	If a job needs doing, I stick at it until it's done.	1 2 3 4

53. If I am upset, I keep it to myself - I don't expect other people to be interested in how I feel. 1 2 3 4

54. I often find myself thinking over and over about things that have made me angry. 1 2 3 4

SCORING KEY - ECQ-A

Recode the following answers (1=4) (2=3) (3=2) (4=1):

1, 2, 3, 4, 5, 10, 11, 12, 13, 15, 17, 18, 19, 20, 21, 22, 24, 27, 28, 29, 30, 31, 34, 38, 39, 40, 41, 42, 43, 45, 47, 48, 49, 50, 51, 52, 53, 54

Sum answer values on the following scales (Suffix "-A" denotes Antenatal):

REHEARSAL-A:

4, 8, 11, 22, 31, 33, 40, 44, 48, 54 (Range 10 to 40)

EMOTIONAL INHIBITION-A:

2, 3, 7, 14, 15, 32, 38, 42, 50, 53 (Range 10 to 40)

AGGRESSION CONTROL-A:

5, 9, 16, 19, 20, 23, 27, 30, 37, 46 (Range 10 to 40)

BENIGN CONTROL-A:

17, 26, 35, 39, 43, 49, 52 (Range 7 to 28)

MATERNAL AUTONOMY-A:

1, 13, 18, 21, 24, 25, 34, 41, 51(Range 9 to 36)

MATERNAL ANXIETY-A:

6, 10, 12, 28, 29, 36, 45, 47 (Range 8 to 32)

APPENDIX 11. ECQ-P WITH SCORING KEY

PLEASE INDICATE HOW YOU FEEL ABOUT EACH OF THE FOLLOWING STATEMENTS BY CIRCLING EITHER:

1 = STRONGLY AGREE
2 = AGREE
3 = DISAGREE
4 = STRONGLY DISAGREE

IMPORTANT: PLEASE GIVE ONE ANSWER FOR EVERY STATEMENT.

1.	I seldom show how I feel about things.	1 2 3 4
2.	If I'm badly served in a shop or restaurant, I don't usually make a fuss.	1 2 3 4
3.	I frequently wish I had more time to myself.	1 2 3 4
4.	I often find myself thinking over and over about things that have upset me.	1 2 3 4
5.	There's no point in having regrets about the past - you can't change what's already happened.	1 2 3 4
6.	I sometimes upset people because I say exactly what I mean.	1 2 3 4
7.	I have had no trouble deciding whether to breast or bottle feed.	1 2 3 4
8.	I find it easy to forget all my troubles from time to time.	1 2 3 4
9.	A mother's duties are often tiresome and boring.	1 2 3 4
10.	If a passing car splashes me, I shout at the driver.	1 2 3 4
11.	I remember things that upset me or make me angry for a long time afterwards.	1 2 3 4
12.	I generally don't bear a grudge - when something is over, it's over and I don't think about it again.	1 2 3 4
13.	If it helps to keep the peace, I'll go along with other people's point of view.	1 2 3 4
14.	If someone pushed me, I would push back.	1 2 3 4
15.	I resent the loss of freedom to enjoy my own interests that comes with having a baby.	1 2 3 4
16.	If I am upset, I keep it to myself - I don't expect other people to be interested in how I feel.	1 2 3 4
17.	Sometimes I get so involved thinking about things that have upset me I am unable to adopt a positive attitude towards anything.	1 2 3 4
18.	I sometimes feel that I endure rather than enjoy motherhood.	1 2 3 4
19.	In conversation, I tend to talk about my feelings more than other people do.	1 2 3 4
20.	If someone were to hit me, I would hit back.	1 2 3 4
21.	Motherhood is a lonely occupation - people don't understand how isolated a mother can be.	1 2 3 4
22.	I never forget people making me angry or upset, even about small things.	1 2 3 4

23.	No-one gets one over on me - I don't take things lying down.	1	2	3	4
24.	Motherhood comes naturally to me.	1	2	3	4
25.	I don't let it bother me if friends or relations criticise my behaviour.	1	2	3	4
26.	I get "worked up" just thinking about things that have upset me.	1	2	3	4
27.	I am never sure I understand all my baby's needs.	1	2	3	4
28.	I'd rather concede an issue than get into an argument.	1	2	3	4
29.	I prefer to deal with my feelings alone rather than discuss them with others.	1	2	3	4
30.	Upsetting events quickly lose their power to affect me.	1	2	3	4
31.	If a friend borrows something and returns it dirty or damaged, I usually just keep quiet about it.	1	2	3	4
32.	I often wish I had never become pregnant.	1	2	3	4
33.	If I receive bad news in front of others, I usually try to hide how I feel.	1	2	3	4
34.	I find it hard to get thoughts about things that have upset me out of my mind.	1	2	3	4
35.	I sometimes think I might have an accident or illness that will prevent me looking after my baby.	1	2	3	4
36.	Sometimes I wonder whether I chose the right method of feeding my baby.	1	2	3	4
37.	If I see someone pushing into a queue ahead of me, I usually just ignore it.	1	2	3	4
38.	I never worry about my past failures.	1	2	3	4
39.	Even though I try to forget about things that have upset me, they keep coming back into my mind.	1	2	3	4
40.	Becoming a mother is the best thing that ever happened to me.	1	2	3	4
41.	I am seldom pre-occupied with thoughts about events which may happen in the future.	1	2	3	4
42.	If someone treats me badly, I find it impossible to be angry in case it affects the relationship.	1	2	3	4
43.	During pregnancy, I constantly worried about whether I would have a safe delivery.	1	2	3	4
44.	When something upsets me, I prefer to talk to someone about it than to bottle it up.	1	2	3	4

SCORING KEY - ECQ-P

Recode the following answers (1=4) (2=3) (3=2) (4=1):

1, 2, 3, 4, 9, 11, 13, 15, 16, 17, 18, 21, 22, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 39, 42, 43

Sum answer values on the following scales (Suffix "-P" denotes Postnatal):

REHEARSAL-P:

4, 5, 8, 11, 12, 17, 22, 25, 26, 30, 34, 35, 38, 39, 41, 43 (Range 16 to 64)

EMOTIONAL INHIBITION-P:

1, 16, 19, 29, 33, 44 (Range 6 to 24)

AGGRESSION CONTROL-P:

2, 6, 10, 13, 14, 20, 23, 28, 31, 37, 42 (Range 11 to 44)

MATERNAL DISCOMFORT-P:

3, 7, 9, 15, 18, 21, 24, 27, 32, 36 40 (Range 11 to 44)

APPENDIX 12. OBSTETRIC OUTCOME QUESTIONNAIRE

PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT YOUR LAST PREGNANCY AND DELIVERY. THE INFORMATION ASKED FOR WILL BE AVAILABLE FROM YOUR "CO-OPERATION RECORD CARD FOR MATERNITY PATIENTS" AND, IF YOUR DELIVERY TOOK PLACE IN HOSPITAL, YOUR DISCHARGE SUMMARY SHEET.

Did you have "morning sickness" during pregnancy?

Please describe any medical problems or complications during pregnancy?

Was your baby more than three weeks premature?
If so, how many weeks premature?

Was your labour induced?

Was your labour augmented?

Was yours a breech delivery?

Was yours a forceps delivery?

Was your delivery by Caesarean?
If so, was this planned or emergency?

Were there any complications of labour not described above?

Did you have any analgesia in labour?

Please tick any of the following analgesics used in labour:
T.E.N.S.
Entonox ("Gas & Air")
Pethidine
Epidural (Bupivacaine)
Other

What was the duration of your labour?
First stage:
Second stage:
Third stage:

Were there any complications following labour?

What was your baby's 1-minute Apgar score?

What was your baby's 5-minute Apgar score?

Does your baby have any congenital abnormalities?
If so, please describe?

What was your baby's weight at birth?

What sex is your baby (give sexes of all babies if twins, *etc.*)?

What method of feeding your baby did you choose at first?
Are you still using this method?

Were you unemployed when you became pregnant?

Do you plan to return, or have you already returned to work?
If so, how long after childbirth?

Do you smoke?

Do you drink more than two alcoholic drinks per day (average)?

APPENDIX 13. LIFE EVENTS QUESTIONNAIRE

LISTED BELOW ARE A NUMBER OF THINGS THAT CAN HAPPEN IN PEOPLE'S LIVES.

FOR EACH ONE THAT HAS HAPPENED IN YOUR LIFE IN THE LAST TWELVE WEEKS, PLEASE INDICATE HOW DESIRABLE IT WAS BY CIRCLING EITHER:

1 = COMPLETELY POSITIVE
2 = NEUTRAL OR MIXED
3 = COMPLETELY NEGATIVE

AND INDICATE HOW STRESSFUL IT WAS BY CIRCLING EITHER:

1 = NOT STRESSFUL AT ALL
2 = QUITE STRESSFUL
3 = VERY STRESSFUL

For example, if you won the pools, you might circle 1 in the DESIRABILITY column next to "Major change in financial status". But you might have found all the publicity very stressful, so you would also circle 3 in the STRESSFUL column.

IF ANY OF THE FOLLOWING HAVE NOT HAPPENED IN THE LAST TWELVE WEEKS, PLEASE INDICATE THIS BY CROSSING OUT THE EVENT.

		DESIRABLE	STRESSFUL
1.	Becoming pregnant	1 2 3	1 2 3
2.	Complications of pregnancy	1 2 3	1 2 3
3.	Childbirth	1 2 3	1 2 3
4.	A difficult labour	1 2 3	1 2 3

(PLEASE REMEMBER - CROSS OUT THE EVENT UNLESS IT HAS HAPPENED IN THE LAST TWELVE WEEKS)

5.	Personal illness	1 2 3	1 2 3
6.	Illness of friend	1 2 3	1 2 3
7.	Illness of partner	1 2 3	1 2 3
8.	Illness of family member	1 2 3	1 2 3
9.	Death of friend	1 2 3	1 2 3
10.	Death of partner	1 2 3	1 2 3
11.	Death of family member	1 2 3	1 2 3
12.	Moving house or flat	1 2 3	1 2 3
13.	Major decoration/renovation of house or flat	1 2 3	1 2 3
14.	Examination/Driving test	1 2 3	1 2 3
15.	Major change in personal habits	1 2 3	1 2 3
16.	Self or partner made redundant	1 2 3	1 2 3
17.	Major change in financial status	1 2 3	1 2 3
18.	Leaving work because of pregnancy	1 2 3	1 2 3
19.	Difficult relationship(s) at work	1 2 3	1 2 3
20.	Making new friends	1 2 3	1 2 3
21.	Difficult relationship(s) with friends	1 2 3	1 2 3

22.	Difficult relationship (s) with family members	1	2	3		1	2	3
23.	Major family gathering	1	2	3		1	2	3
24.	Major change in social/church activities	1	2	3		1	2	3
25.	Engagement	1	2	3		1	2	3
26.	Marriage	1	2	3		1	2	3
27.	Difficult relationship with partner	1	2	3		1	2	3
28.	Separation from partner	1	2	3		1	2	3

(PLEASE REMEMBER - CROSS OUT THE EVENT UNLESS IT HAS HAPPENED IN THE LAST TWELVE WEEKS)

29.	Divorce	1	2	3		1	2	3
30.	Reconciliation with partner	1	2	3		1	2	3
31.	Holiday	1	2	3		1	2	3
32.	Own children on school holiday	1	2	3		1	2	3
33.	Own child started school/nursery	1	2	3		1	2	3
34.	Difficulty repaying debts	1	2	3		1	2	3
35.	New mortgage or bank loan	1	2	3		1	2	3
36.	Loss of valuable possessions/Insurance claim	1	2	3		1	2	3
37.	Road traffic accident	1	2	3		1	2	3
38.	Arrest or caution by police officer	1	2	3		1	2	3
39.	Court appearance as defendant/witness	1	2	3		1	2	3
40.	Jury service	1	2	3		1	2	3

IF YOU THINK THERE HAVE BEEN OTHER SIGNIFICANT EVENTS IN YOUR LIFE IN THE LAST TWELVE WEEKS, PLEASE LIST THESE BELOW (MAXIMUM OF 4).

41.		1	2	3		1	2	3
42.		1	2	3		1	2	3
43.		1	2	3		1	2	3
44.		1	2	3		1	2	3

APPENDIX 14. SOCIAL SUPPORT QUESTIONNAIRE

LISTED BELOW ARE A NUMBER OF DIFFERENT SOURCES OF SOCIAL SUPPORT.

SOCIAL SUPPORT MEANS THE HELP THAT YOU GET FROM OTHER PEOPLE IN COPING WITH STRESS, OR THE CONTRIBUTION OTHER PEOPLE MAKE TO YOUR GENERAL WELL-BEING. SOCIAL SUPPORT CAN BE PRACTICAL AND EMOTIONAL.

FOR EACH OF THE SOURCES LISTED, PLEASE CIRCLE ONE NUMBER IN EACH OF THE THREE COLUMNS THAT REFLECTS SUPPORT IN THE LAST TWELVE WEEKS.

COLUMN A is the AMOUNT OF SUPPORT YOU WOULD IDEALLY HAVE LIKED.
COLUMN B is the AMOUNT OF SUPPORT YOU ACTUALLY RECEIVED.
COLUMN C is your SATISFACTION WITH THE SUPPORT YOU ACTUALLY RECEIVED.

IN EACH COLUMN:
1 = NONE
2 = VERY LITTLE
3 = QUITE A LOT
4 = A GREAT DEAL

For example, you might prefer to live in a large community where you meet your neighbours frequently. But you might live in a remote area where your only neighbour is not very friendly. So, for Neighbours, you might circle 4 in COLUMN A, 2 in COLUMN B and 1 in COLUMN C.

		COLUMN A	COLUMN B	COLUMN C
1.	Doctor (GP)	1 2 3 4	1 2 3 4	1 2 3 4
2.	Midwife/Health visitor	1 2 3 4	1 2 3 4	1 2 3 4
3.	Hospital doctors and nurses	1 2 3 4	1 2 3 4	1 2 3 4
4.	Social services	1 2 3 4	1 2 3 4	1 2 3 4
5.	Parents/Brothers/Sisters	1 2 3 4	1 2 3 4	1 2 3 4
6.	Husband or partner	1 2 3 4	1 2 3 4	1 2 3 4
7.	Children	1 2 3 4	1 2 3 4	1 2 3 4
8.	In-laws	1 2 3 4	1 2 3 4	1 2 3 4
9.	Friends who are not neighbours	1 2 3 4	1 2 3 4	1 2 3 4
10.	Neighbours	1 2 3 4	1 2 3 4	1 2 3 4
11.	Employer	1 2 3 4	1 2 3 4	1 2 3 4
12.	Work colleagues	1 2 3 4	1 2 3 4	1 2 3 4
13.	Maternity support group	1 2 3 4	1 2 3 4	1 2 3 4
14.	Church/Clubs/Societies	1 2 3 4	1 2 3 4	1 2 3 4

IF YOU THINK YOU HAVE RECEIVED SOCIAL SUPPORT FROM OTHER SOURCES IN THE LAST TWELVE WEEKS, PLEASE LIST THESE BELOW (MAXIMUM OF 2)

15.	1 2 3 4	1 2 3 4	1 2 3 4
16.	1 2 3 4	1 2 3 4	1 2 3 4