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Day-to-Day Mood Changes after Childbirth: Further Data

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Summary: The depression and lability of mood which have been previously reported on the fifth day after childbirth are largely restricted to women with high neuroticism scores. The pattern of day-to-day mood changes is the same after Caesarian section as after vaginal delivery, but there is no 'day five' phenomenon after hysterectomy. Post-partum mood disturbance is less prominent in women who return home 48 hours after delivery.

We have previously reported the day-to-day mood changes described by an unselected series of 81 women in the first three weeks after childbirth (Kendell, McGuire *et al,* 1981). These 81 women were asked to rate their mood on a set of six visual analogue scales—concerned respectively with happiness, depression, weeping, anxiety, irritability, and lability—every day for the first 21 days after delivery. Their ratings on the depression, tears, and lability scales showed a sharp peak on the fifth post-partum day, and declined steadily thereafter (Figure 1). This 'day five' peak was the same in primiparae and multiparae, and in breast- and bottle-feeders, but women who became clinically depressed later in the puerperium had higher depression and lability ratings, and a more pronounced day-five peak, than those who did not. This relationship between transient depression or lability of mood in the first week after childbirth and later, more serious and sustained depression, together with the fact that the timing of these transient mood disturbances coincides with the peak time of onset of puerperal psychoses, suggests that the phenomenon may merit more detailed study. The investigations reported here were designed to determine whether these transient mood disturbances are specific to childbirth, to what extent they are dependent on the milieu of a post-natal ward or on the transition from hospital to home, and what relationship they have to personality traits like neuroticism and extraversion.

Methods and Results

The 81 mothers referred to above all had their babies in Edinburgh's main obstetric unit, the Simpson Memorial Maternity Pavilion. As in most British obstetric units, the majority were discharged home on the fifth, sixth, or seventh post-partum day, which obviously raises the possibility that the day-five mood disturbance might simply be a manifestation of apprehension at the prospect of returning home, or perhaps of dismay on first doing so. To find out to what extent the mood changes that had previously been observed were produced by the transition from hospital to home, or by the emotional atmosphere of a post-natal ward, we studied two further series, one of women having their babies delivered by Caesarian section (who remain in hospital for ten days) and the other of women discharged from hospital 48-72 hours after delivery.

Women having Caesarian sections were studied for two reasons: partly because they all stayed in hospital for ten days after delivery, and partly because of the evidence that Caesarian section may be associated with a raised incidence of puerperal psychosis (Kendell, Rennie *et al,* 1981). A complete set of ratings was obtained from 30 mothers, all of whom had elective Caesarian sections at the Western General Hospital. Their mean ratings on the six visual analogue scales for the first ten days after delivery are shown in Table I, and their depression ratings in Fig. 1. The general pattern is very similar to that of the original 81 women, all but seven of whom had had vaginal deliveries. The highest mean ratings on the depression, tears, and lability scales are all on day four, with a steady decline thereafter, and the highest rating on the happiness scale is on day ten. The reason the peak mood disturbance is on day four rather than day five is at least partly technical. In our original (1981) study, following the normal convention of British obstetric units, the day of delivery was counted as day one if the baby was born before 12 noon but the following day as day one if the baby was born after midday. Because most of the Caesarian sections were performed between 11 am and 1 pm, the following day was regarded as day one in every case, regardless of whether the birth had occurred before or after midday. So on average, there is a 12-hour difference in scoring between the two series.

We had originally hoped to obtain daily mood ratings from a series of women having home deliveries, but these are now rare in most parts of Britain. Moreover, the handful of women who do persuade their doctors to allow them to have their babies at home are mostly so firmly convinced of the benefits of home confinement that they would be unlikely to admit to any post-partum mood disturbance they did

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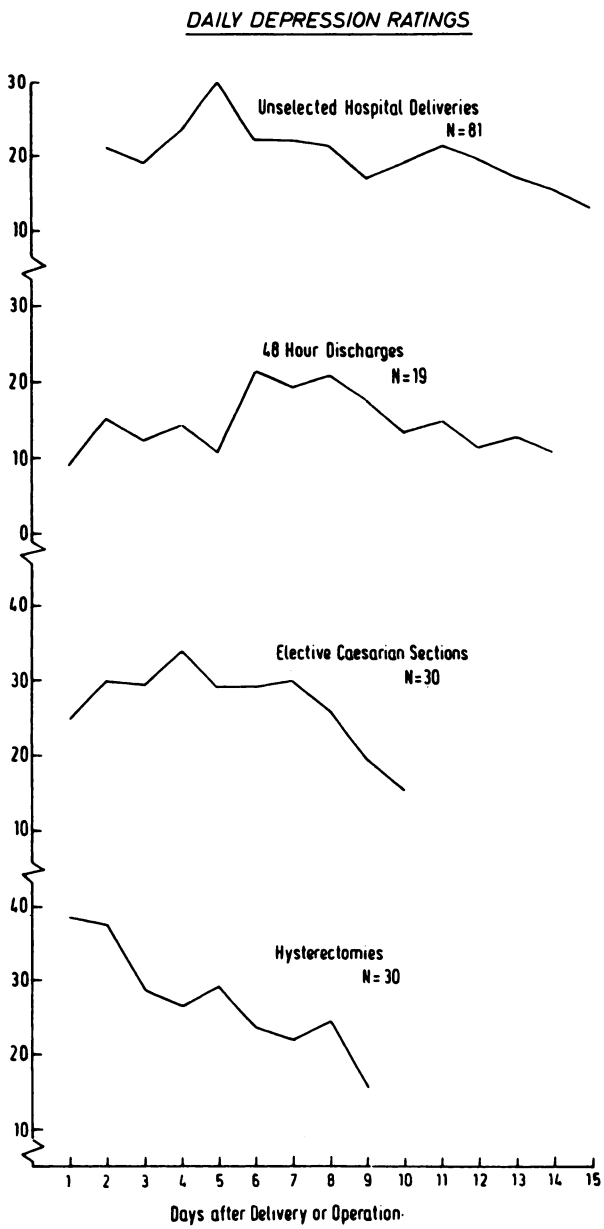


FIG. 1—Daily depression ratings after childbirth or hysterectomy.

experience. So we studied 'early discharges'—women returning home 48-72 hours after a hospital confinement—instead. We were only able to obtain a complete set of ratings from 19 women, all but two from the Simpson Memorial Maternity Pavilion. Their mean ratings on the six scales from days one to 14 are shown in Table II, and their depression ratings in Fig 1. Probably because of the small number of subjects, the pattern is less clear-cut and the highest mean rating is on day six on the depression scale, day seven on the tears scale, and day eight on the lability scale. Perhaps of greater significance is the fact that the ratings of these 48-hour discharge mothers are consistently lower than those of the 81 women studied previously, most of whom remained in hospital for five to seven days after delivery. Day-by-day comparisons of the mean ratings of the two for the first fourteen days after delivery show that the mean rating of the 48-hour discharge mothers is lower on the depression, tears, anxiety and lability scales, and higher on the happiness scale, on 93% of occasions—an average of thirteen days out of the fourteen.

So far as we are aware, no-one has ever studied day-to-day mood changes after any uterine or pelvic event other than childbirth, which raises the possibility that the transient disturbances we and others have observed after delivery are not in fact specific to childbirth. For this reason, we asked a series of women who were having hysterectomies for dysfunctional bleeding or other benign conditions to complete the same six mood ratings every day post-operatively until they left hospital. Completed ratings were obtained from 30 women for the first nine days after a hysterectomy in which at least one ovary was preserved. The mean ratings of these 30 women on the six scales are shown in Table III, and their depression ratings in Figure 1. There is no hint of a day-five peak. Apart from happiness, which increases steadily day by day, the highest rating on every scale is on the first or second post-operative day, with a steady decline thereafter. For the first two days, the hysterectomy patients have higher scores on the five mood disturbance scales and lower scores on the happiness scale than Caesarian section patients, presumably because they do not have a baby to compensate them for their pelvic discomfort. But on the third, fourth, and fifth days the situation is reversed, with the Caesarian section patients now having higher scores on both the mood disturbance scales and the happiness scale.

The majority of the 81 mothers in our original study were re-interviewed at home when their children were three years-old, partly to find out whether maternal depression in the puerperium had had any lasting effects on the child (Wrate *et al*, in press) and partly to establish the duration of post-natal depression (Cox, 1983). The interviewer also asked these mothers to complete the Eysenck Personality Questionnaire (EPQ) and 51 of them did so, thus providing a set of personality ratings at a time when they were neither depressed nor in the throes of childbirth. The EPQ generates scores on three hypothetical dimensions of personality—neuroticism (N), psychoticism (P), and introversion/extraversion (E)—as well as a lie score (L) which is probably best regarded as a measure of the subject's liability to give socially desirable responses (Eysenck & Eysenck, 1975). The relationship between these personality variables and the original daily mood ratings obtained three years previously was investigated by comparing the daily mood ratings, between day two and day 11, of those scoring above and below the mean on each of the four variables N, P, E and L. In the case of neuroticism, for example, this meant comparing the daily mood ratings of the 24 women with an N score of 11 or more with those of the 27 women with an N score of ten of less. .

The results are shown in Figure 2. There is little difference

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TABLE I

Mean daily mood ratings after Caesarian section (n = 30)

	Day									
	1	2	3	4	5	6	7	8	9	10
Happiness	48.3	45.1	46.3	54.3	51.7	51.2	57.0	58.5	66.0	**71.0**
Depression	24.6	29.9	29.2	**33.8**	28.9	28.8	29.8	25.7	19.3	15.3
Tears	16.7	20.5	19.9	**33.2**	26.3	23.6	22.8	19.6	20.3	15.6
Anxiety	**29.8**	25.8	27.2	28.3	27.2	27.7	25.6	22.5	19.4	21.6
Irritability	21.0	22.3	**29.1**	23.4	22.5	22.4	20.9	18.5	17.4	15.6
Lability	22.3	33.6	30.2	**34.7**	33.1	29.6	27.8	23.1	19.4	19.9

TABLE II

Mean daily mood ratings of women leaving hospital 48-72 hours after delivery (n = 19)

	Day													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Happiness	68.9	63.7	68.0	66.6	**71.3**	62.5	56.1	60.6	66.3	61.3	59.2	58.4	64.5	62.7
Depression	9.1	15.0	12.3	14.1	10.8	**21.2**	19.2	20.6	17.6	13.1	14.7	11.4	12.5	10.7
Tears	8.6	9.1	10.4	11.5	11.3	15.1	**20.8**	18.5	10.4	10.1	10.0	10.3	8.4	11.1
Anxiety	13.4	10.1	14.2	11.5	10.8	15.2	**16.1**	15.3	11.3	11.9	13.5	12.3	10.4	10.9
Irritability	10.3	10.8	13.4	19.0	13.7	17.1	18.1	19.7	**23.3**	17.9	16.9	12.5	12.0	11.6
Lability	16.1	11.3	11.2	13.3	14.8	20.0	19.1	**23.5**	16.4	15.5	16.5	12.8	11.6	10.9

TABLE III

Mean daily mood ratings after hysterectomy (n = 30)

	Day								
	1	2	3	4	5	6	7	8	9
Happiness	34.4	33.6	39.4	45.5	44.0	53.3	52.0	55.7	**62.0**
Depression	**38.3**	37.1	28.4	26.5	29.1	23.5	22.0	24.3	15.4
Tears	19.4	**22.5**	18.6	21.6	20.9	20.9	22.2	17.2	15.6
Anxiety	30.6	**31.6**	25.5	26.6	25.7	26.4	20.5	18.3	15.8
Irritability	20.2	**25.1**	18.2	20.1	18.4	17.2	16.3	14.4	12.6
Lability	33.3	**34.7**	29.3	30.1	27.1	26.7	22.7	22.4	18.8

Note: The highest mean rating on each scale is shown in bold type.

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between the ratings of high and low scorers on P. The day-five peak is more pronounced on the depression, tears, and lability scales in women who score high on E, and also in those who score low on L, but the most striking difference is provided by the N scores. Women with high N scores have a very sharp day-five peak on all three mood scales, while the

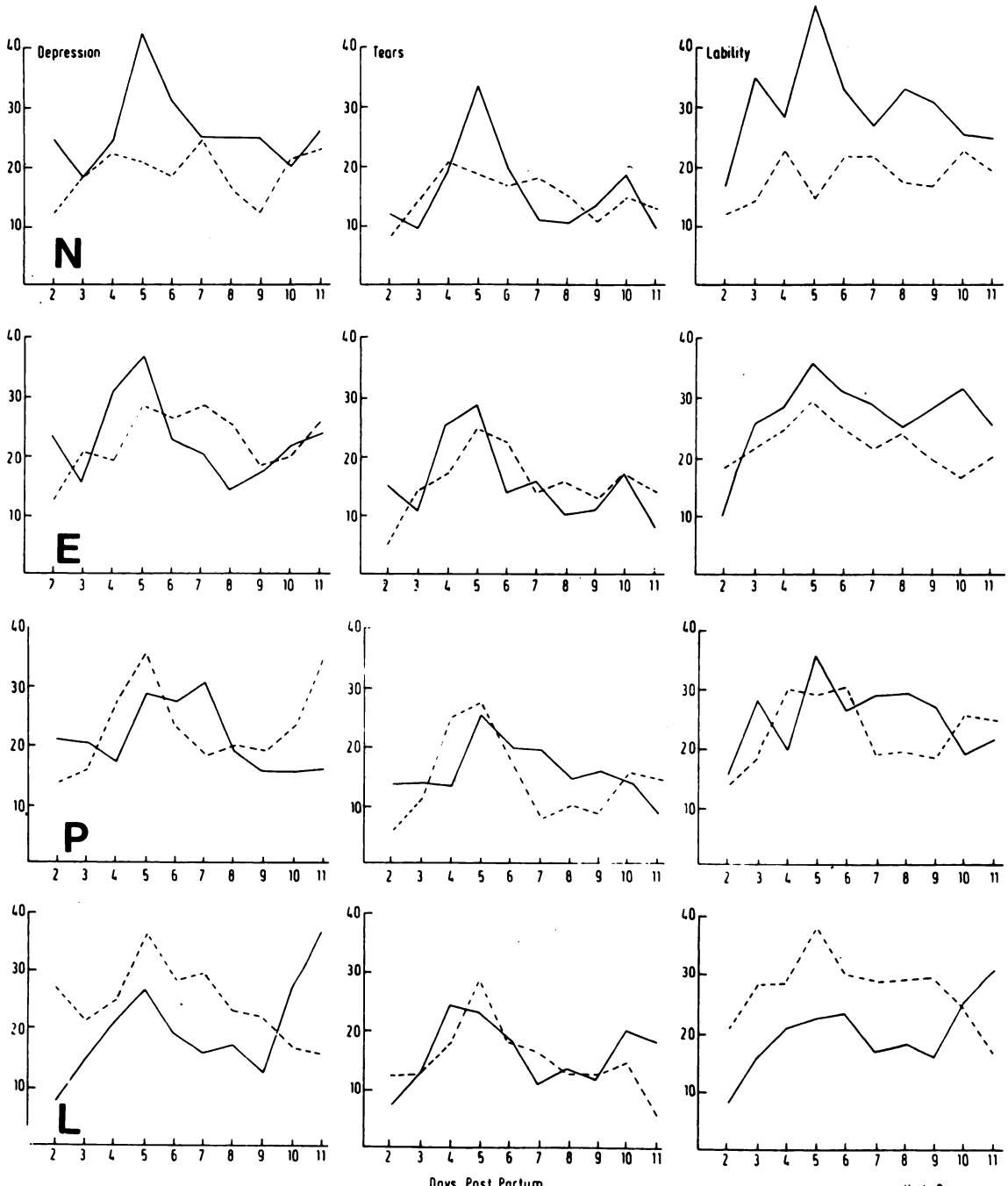


FIG. 2—Relationship between N, E, P and L and daily mood ratings after childbirth.

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low N scorers show no peak at all. There is also a statistically significant difference between the mean scores of the two on day five on the depression scale ($t = 2.75$, $P < 0.01$) and the lability scale ($t = 4.91$, $P < 0.001$) and almost on the tears scale as well ($t = 1.93$, $P < 0.1$). Twenty-three of the 30 women delivered by Caesarian section referred to above had completed the Eysenck Personality Inventory (EPI)—a similar self-report questionnaire to the EPQ, except that it contains no P scale—before admission to hospital. It was therefore possible to compare the daily mood ratings of women with high and low neurotism in this population also. The high N women had higher ratings on the depression, tears, and lability scales every day from the third to the tenth, and a more prominent peak on day four or five, though the difference between high and low neuroticism was rather less striking than in Figure 2.

In our original study, we had found a relationship between temporary mood disturbance on or near the fifth post-partum day and the development of more serious and prolonged depressive symptoms later in the puerperium. The day-five peak had been significantly higher, on both the depression and lability scales, in the 22 women who became depressed at some stage during the first five months of the puerperium than in the other 59. However, the relationship was not strong enough to provide a clinically useful predictor of puerperal depression; a variety of possible criteria derived from the mood ratings made on the fifth, sixth, or seventh post-partum days all gave at least 30% false positives and 30% false negatives. The striking relationship between neuroticism (N) and day-five mood disturbance which now emerges in the same women raises the possibility that neuroticism is a major determinant both of the temporary mood disturbance occurring in the first few days after delivery and of later depression. We therefore examined the relationship between N, E, P, and L scores and puerperal depression. EPQ ratings were available for 16 of the 22 women who had developed puerperal depressions; their mean scores, and those of the other 35 women who had not become depressed, are shown in Table IV. Although the mean N and P scores of the depressed women are somewhat higher and the mean L score lower than those of the non-depressed women, none of these differences is statistically significant. These personality traits are therefore not important determinants of puerperal depression and these ratings do not provide, individually or corporately, any useful prediction of the development of puerperal depression. (The use of the word 'predict' here does, of course, involve the assumption that, had these women completed the EPQ *before* childbirth rather than three years afterwards, their ratings would have been similar).

TABLE IV

Mean personality ratings of women who did and did not develop puerperal depressions.

	N	E	P	L
Puerperal depression ($n = 16$)	11.25	9.75	2.50	7.19
No puerperal depression ($n = 35$)	9.03	9.66	1.74	9.00

Note: The mean N, E and P scores of these 51 women are significantly lower, and their L scores significantly higher, than the norms for young English women given by Eysenck and Eysenck (1975). This may be because the questionnaires were not completed anonymously.

Discussion

The fact that the pattern of day-to-day mood changes is substantially the same in women delivered by Caesarian section as it is in women having a normal vaginal delivery, despite the fact that the former remain in hospital for ten days afterwards whereas the latter return home on the fifth, sixth, or seventh post-partum day, effectively disposes of the possibility that the peak disturbance on day five is a reaction to the prospect of leaving hospital. The fact that after hysterectomy all five mood disturbance ratings fall steadily from day two onwards, with no hint of a day-five peak, likewise confirms that this phenomenon is not a non-specific response to uterine or pelvic trauma or part of the aftermath of any operative procedure.

It is less clear what conclusions can be drawn from the day-to-day mood changes reported by the 19 women who returned home 48 or 72 hours after delivery. There are definite increases in their mean ratings a few days after childbirth, but the peak varies on different scales from day six to day eight. This may be chance; 19 subjects is really too small a number to generate a stable pattern. The most interesting finding in this early discharge group is their consistently low mean ratings on all five pathology scales and their high ratings on the happiness scale, rather than the timing of the peak ratings. There are several possible explanations for this. The first, which would almost certainly commend itself to the women concerned, is environmental: it is easier to feel happy and relaxed at home than in a hospital ward. There may, however, be important differences between the minority of women who return home after 48 hours and those who remain in hospital for five to seven days. The former have nearly always had at least one uneventful delivery previously and are to some extent a hand-picked group of sensible, emotionally stable women whose home circumstances are particularly favourable. There was little evidence in this study, though, that the women who left hospital after 48 hours were particularly stable. All 19 had completed Form A of the EPI during the last trimester of pregnancy, and although their mean E score was significantly lower than that of the general population (10.1 *v.* 12.1; $t = 2.01$ and $P < 0.05$) their mean N score was no different (9.9 *v.* 9.1). The only satisfactory way of distinguishing between these alternative explanations, therefore, is to obtain ratings from a group of women having home confinements or 48-hour discharges in a setting in which this is the norm, and we know nowhere in this country at present where this is so.

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The most unexpected, and perhaps the most important, finding of this study was the fact that the day-five phenomenon was much more prominent in, indeed virtually confined to, women with neuroticism scores of 11 or more. Neuroticism is generally regarded as a measure of differences, which are at least partly hereditary, in the lability and excitability of the autonomic nervous system. However, this heightened autonomic responsiveness is elicited both by internal biochemical changes and by external sensory stimuli, so the fact that the day-five phenomenon is much more prominent in women with high neuroticism tells us little about its causation. Despite this relationship between neuroticism and the day-five phenomenon, and the previously established relationship between the day-five phenomenon and depressive symptoms later in the puerperium, there was no significant relationship between neuroticism, or any of the other personality variables studied, and puerperal depression.

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