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POSTPARTUM DEPRESSION: EPIDEMIOLOGY AND THEORY

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POSTPARTUM DEPRESSION: EPIDEMIOLOGY AND THEORY

by

Margaret Chandler Salinger

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The etiology of postpartum depression was investigated within the framework of Aaron Beck's cognitive theory of depression and within the framework of previous research on postpartum depression. One hundred thirty-two women completed questionnaires during the eighth month of pregnancy and during the second postpartum month. The prepartum questionnaires included a measure of depression, a measure of dysfunctional cognitions, and a prenatal questionnaire. The prenatal questionnaire assessed (a) the factors which purportedly lead to dysfunctional cognitions and (b) other social and psychological variables whose importance has been suggested by previous research on postpartum depression. During the puerperium, the depression and dysfunctional cognitions measures were readministered, along with a postpartum questionnaire that distinguished normal versus depressive features of the postpartum period.

The study provided little support for Beck's cognitive theory. Neither rigid, perfectionistic standards nor deaths experienced in childhood made women more susceptible to depression, as Beck has hypothesized. In fact, women were less likely to exhibit puerperal depression if they had experienced many deaths or had lost a parent or other significant person. Women who had lost a sibling, however, were more likely to exhibit postpartum depression.

According to Beck, dysfunctional cognitions are a predisposing and essential feature of depression. Prenatal dysfunctional cognitions

were positively related to postpartum depression; however, a large portion of their predictive value arose from their concurrent relationship to prenatal depression, which was the most significant predictor of postpartum depression. Many of the women who were depressed prenatally or puerperally did not display a high level of dysfunctional thinking; therefore, dysfunctional cognitions may be a symptom rather than a causal or central condition of depression.

Other significant predictors that were not associated with Beck's theory suggested that prenatal ambivalence about the baby is related to postpartum depression. Also, women who were prenatally unhappy with their marital situation were more likely to exhibit postpartum depression. These variables may have been related to prenatal depression, which could account for their predictive power. The high incidence of prenatal depression in this sample suggests the need for further investigation of this phenomenon.

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INTRODUCTION

Overview

Postpartum depression received very little attention in psychological and medical research until the past 15 years. The paucity of research on the topic may have stemmed from misconceptions about the frequency and severity of the disorder. In the past, the prevailing opinion seems to have been that severe mental disturbances after childbirth are extremely rare and that any symptoms short of psychosis belong in the category of temporary disturbances in mood known as "blues." Although there is evidence implying that many practitioners still hold this view, researchers are now recognizing that postpartum depression is a fairly frequent disorder that can be quite severe and not necessarily brief. Nevertheless, even a cursory encounter with the literature in this area reveals that methodological problems in the previous research have made it difficult to obtain an accurate picture of the overall severity and frequency of postpartum disorders.

Previous research on the etiology of postpartum depression can be divided into two areas of focus: (a) social and psychological factors associated with the disorder, and (b) biochemical factors associated with the disorder. Due to the methodological problems and the obvious complexity of the problem, the research in this area has produced an overall picture that is rather confusing. It seems that, for every study that identifies a predictor of postpartum depression, there is another study with conflicting results.

Although some studies have looked for etiological variables among the circumstances that are peculiar to childbirth, most of the studies have searched among the variables that are thought to be active also in other forms of depression. That is, most researchers believe that the same etiological factors are involved in postpartum depression as other forms of depression. It is this view that provides the rationale for investigating, in the present study, the etiology of postpartum depression from the perspective of a prominent theory of "standard" clinical depression: Aaron Beck's cognitive theory.

An investigation of puerperal depression from Beck's theoretical perspective should be valuable for two reasons. First, if one assumes that the etiological variables involved in postpartum depression are the same as those involved in "regular" depression, then the validity of the general theory of depression can be examined by using a sample of women with postpartum depression. And second, if the theory is valid, some predisposing factors could be revealed for postpartum depression.

A major criticism of most theories of depression is that etiological hypotheses have been formulated from observations of people who were already depressed. Hence, the factors considered etiological in nature could actually be a product or a correlate of the very disorder they are expected to cause. Perhaps the main reason why adequate tests of etiological predictors have not generally been conducted is that researchers do not usually have the opportunity to measure these variables before the onset of an individual's first depressive episode. It is this problem of identifying the depression-prone individual before he or she gets depressed that makes pregnant women an appealing

population for conducting a longitudinal investigation of etiological theories of depression. Previous research has revealed that, within this population, it can be expected that some portion of these women will become depressed within a given period of time (e.g., the first six puerperal months). Since childbirth is common to all of these women, the event itself cannot account for the occurrence of depression in some women but not in others. It seems logical to expect that those factors which distinguish the vulnerable from the invulnerable women are the same as those that determine which people exhibit depression in response to a particular life (or biochemical) event.

According to Beck, an individual who displays distorted cognitions about his or her experiences is susceptible to depression when faced with a personally significant life event. Thus, distorted cognitions are considered the source of depressive affect. While investigating variables that predispose women to depression after childbirth, this study evaluated Beck's etiological hypotheses by assessing his predisposing variables at the time they are presumably active—before the women became depressed.

In the discussion to follow, previous research on postpartum depression is examined, and Beck's theory is presented along with research that is relevant to his etiological hypotheses. Before examining the research on postpartum depression, however, it is important to point out the methodological problems in the literature that have obscured even the basic issues of definition and prevalence of postpartum disorders.

Definition and Incidence of Postpartum Depression

Psychological changes occurring in women after childbirth may resemble almost any form of mental disorder. Puerperal syndromes range in severity from prominent mood changes ("the blues") to full-blown psychoses. The most serious syndromes entail symptoms characteristic of mania, endogenous depression, schizophrenia and delirium, and are generally referred to as postpartum psychosis. Nonpsychotic syndromes generally fall under the heading of "postpartum depression" and may include such symptoms as emotional sensitivity, crying, irritability, insomnia, loss of appetite, fatigue, depression, confusion, suspicion, thoughts of suicide or thoughts of injuring the child (Hamilton, 1962; Yalom, Lunde, Moos, & Hamburg, 1968).

The incidence of postpartum psychosis, based on hospitalizations or outpatient psychiatric treatment, has been fairly consistently estimated at one to two cases per thousand births (e.g., Brewer, 1977; Hamilton, 1962; Kendall, Rennie, Clark, & Dean, 1981; Sims, 1963). Estimates of the incidence of postpartum depression, on the other hand, have been incredibly variable. To illustrate, a study by Dalton (1971) identified postpartum depression in 7% of the women in her survey, while Frate, Cowen, Rutledge, and Glasser (1980) estimated that 84.3% of the women in their survey suffered from some degree of postpartum depression.

When one delves into the existing literature on postpartum depression, some of the reasons for the discrepant estimates of its occurrence soon become apparent. One of the problems is that researchers

seem to disagree about the period of time after delivery in which an emotional disturbance should be considered postpartum depression (or attributed principally to childbirth). Some limit their sample to women who experience depressive symptoms (or psychiatric problems) within the first weeks after delivery (e.g., Yalom, Lunde, Moos, & Hamburg, 1968), while some include women who experience affective disorders within six months (e.g., Brown & Shereshefsky, 1973), or even a year, postpartum (e.g., Frate, Cowen, Rutledge, & Glasser, 1980).

Another methodological problem that affects estimates of the disorder's occurrence is the way investigators locate their samples, as well as the data they use to establish their estimates. Some estimates are based on prospective (e.g., Dalton, 1971; Yalom et al., 1968) or retrospective (e.g., Frate et al., 1980) data from surveys of the women themselves, while some are based on patient statistics from psychiatric hospitals or other mental health professionals.

Implicit in the decision to estimate the incidence of postpartum depression from mental health contacts is the judgment that only cases severe enough to require treatment should be taken into account. Dalton (1971), for example, deliberately made a distinction between "depression" and "mild depression" on the basis of psychiatric or medical attention. Of the 189 women followed in her study, 14 received outpatient psychiatric treatment or drugs prescribed by a general practitioner, while 48 women suffered from some degree of depression that did not require treatment, or for which they did not receive treatment.

Since the receipt of treatment may not accurately reflect the severity of depression, a more logical, direct route to assessing

severity would be through an examination of symptoms. Using this strategy, Frate et al. (1980) placed subjects in three categories of depression using scores from a questionnaire concerning the occurrence and frequency of particular depressive symptoms. According to Frate et al.'s measures, 54% experienced mild depression, 25% experienced moderate depression, and 21% experienced severe depression. Though they did not identify women who had received psychotherapy or ECT, they did obtain the incidence of pharmacotherapy for postpartum depression. Of the 91 women experiencing some degree of depression, only nine received some form of medication for depression. If these nine women are subtracted from the severely depressed group, 10 severely depressed women are left who did not receive medication, along with 23 moderately depressed women and 49 mildly depressed women. If only the women who received treatment had been considered, the incidence of severe postpartum depression would have been grossly underestimated.

A study by Meares, Greinwade, and Wood (1976) considered separately the symptom severity and treatment criteria as a means of classifying subjects. After participating in the prenatal portion of the study, 129 married women who had been solicited from an antenatal clinic were asked, between 6 and 18 months after their deliveries, to complete a self-report measure of depression. Forty-nine of the women completed and returned the questionnaire. The questionnaire consisted of only four self-statements which were rated on visual analogue scales to indicate the frequency with which they applied to subjects' feelings during the first six months after delivery. In addition, subjects who did experience depression were asked to give an estimate of the length of

time they were depressed and to indicate whether or not they had received treatment for depression. The questionnaire's self-statements were constructed by the authors to measure previous feelings of guilt, hopelessness, and self-deprecation. Subjects were labeled depressed according to the symptom criteria if they reported that they (a) had felt "miserable and depressed" more than half of the time, (b) had believed more than half the time that they were a burden to others, and (c) had experienced these feelings continuously for a month or more.

Considering only those who had received treatment, 10% of the 49 subjects were labeled depressed. Using the symptom severity criterion, the estimate of postpartum depression was again 10%. However, only two women who qualified as depressed cases according to symptom criteria also qualified according to the treatment criterion. Thus, when the symptom severity and treatment criteria were both used to classify subjects, the incidence of postpartum depression rose to 16 percent. As in the Frate et al. (1980) study, symptom severity criteria were used to classify the remaining subjects in terms of affective or mood disturbance. Twelve percent of the sample showed a "profound and persisting mood change" which was defined as feeling miserable more than half the time during a period of a month or more. These subjects were labeled differently from the depressed subjects only by virtue of the fact that they did not meet the criterion of feeling like a burden to others more than half of the time. The postpartum "blues" label was assigned to 42% of the women because they experienced transitory feelings of depression with frequent crying in the absence of other depressive symptoms. The remaining subjects--only 30%--experienced no affective or mood

disturbance during the puerperium. These findings suggest that estimates of postpartum depression derived from the incidence of treatment underestimate the frequency of the depressive syndrome, since it seems that many women who experience depressive symptoms do not receive treatment.

Even when women do seek treatment, it seems that often the disorder is incorrectly diagnosed and/or inadequately treated. Bonham Carter and her associates became aware of these problems in a study of some biochemical factors associated with postpartum depression (Bonham Carter, Reveley, Sandler, Dewhurst, Little, Hayworth, & Priest, 1980). They reported the outcome of four women's attempts to gain treatment in the following manner:

> It is worth noting that three of the four patients saw a general practitioner for the postpartum depression, but received only reassurance and diazepam or a nighttime hypnotic. One was referred to a psychiatrist for "sexual maladjustment," but did not attend follow-up visits and remained untreated for a depressive episode that lasted six months. The patients recognized themselves as depressed, but accepted it as a necessary sequel to parturition, not as an illness requiring specific treatment. (p. 19)

In response to these findings, Bonham Carter et al. urge professionals who have contact with puerperal women to increase their awareness of the symptoms and treatment of postpartum depression. It is surprising that such an admonishment could refer to a psychological disturbance as prevalent as postpartum depression. How could puerperal disorders escape recognition by professionals? Hamilton (1962) offered three reasons: (a) professional responsibility for treatment falls between

the obstetrician and the psychiatrist so that neither set of specialists attends to treatment; (b) the incidence of the disorder is typically underestimated because those cases severe enough to be brought to the attention of a psychiatrist are so evenly dispersed in the population that one psychiatrist comes in contact with only a few cases; and (c) the postpartum syndromes so closely resemble "standard" varieties of mental disorders that they are likely to be treated without regard to postpartum factors.

Another interesting finding from the Frate et al. (1980) study has implications regarding women's pursuit of treatment as well as professionals' recognition of the disorder. This finding concerns women's knowledge of postpartum depression. Sixty-seven percent of the women in the Frate et al. survey learned of postpartum depression by reading about it, 31.5% learned from a friend, 27.8% learned from a relative, 21.3% learned from a prenatal course, and only 10.1% learned from a physician. Perhaps, due to the type of knowledge they receive, some women do not seek treatment because their conception of the syndrome is one of a mild but "irrational" depression that must be tolerated until it passes. Also, at a time when the mother should be overjoyed with the new member of the family, there is perhaps some guilt and fear associated with the admission that she is sufficiently disturbed to require psychiatric or medical attention. Another impediment to seeking treatment might be implicitly and inadvertently supplied by the women's doctors, since the fact that so few women are educated by professionals suggests that doctors are not providing their patients with easy access to treatment. Certainly by disregarding the possibility of postpartum

depression, physicians are not encouraging women to seek treatment for the disorder.

Perhaps another reason why postpartum depression receives so little recognition from professionals is that the prevailing conception of the disorder seems to be that it is a mild, relatively uncommon syndrome whose duration is typically brief. Just as the issues of severity and incidence are clouded by discrepancies in the literature, so is the issue of duration. In the Frate et al. (1980) study, the duration of depression ranged from one day to six months, with a mean of about four weeks. In the Dalton (1971) study, however, 11 of the 14 women who were depressed early in the postpartum period were diagnosed by a psychiatrist as depressed six months after delivery. Pitt (1968) reported that postpartum depression lasted up to a year in 4% of his sample.

As illustrated above, methodological inconsistencies have made it difficult to determine the frequencies of the various forms of depression in the puerperium (e.g., psychotic depression versus nonpsychotic depression versus blues). At the heart of this problem is a lack of objective criteria for distinguishing the various forms of this disorder from each other. An abundance of homemade measures has made it difficult if not impossible to compare the results of one study with those of another because the subjects' conditions seem to be quite inconsistent across samples. Since there are no observable differences between the symptoms of postpartum depression and other forms of depression, researchers should rely on existing measures of the nonpuerperal depressive syndrome. In accordance with this idea, the present study used the Zung Self-Rating Depression Scale to assess the degree of

affective disturbance in women both before and after delivery. This measure not only allowed an examination of the subjects' conditions with respect to each other, but also with respect to other individuals who have suffered from nonpuerperal depression. Furthermore, a meaningful comparison can be made between the results of this study and the results of future studies which choose to measure postpartum depression with a validated, standardized assessment device.

Previous Research on the Etiology of Postpartum Depression

Because investigators have been so inconsistent in their definitions of postpartum depression, the data from studies of etiological factors present quite a confusing picture. The etiological data amassed so far can be divided into two general areas of focus: the social/psychological correlates of postpartum depression, and the biochemical correlates of postpartum depression. Investigations of the social/psychological variables, on the one hand, have received little structure or guidance from theoretical formulations of standard (nonpuerperal) clinical depression, even though the majority of the investigators view these two forms of depression as arising from common etiological variables. Investigations of biochemical factors, on the other hand, have been guided either by the etiological hypotheses of neurochemical theories of depression or by the hypothesis that postpartum depression arises from biochemical factors that are peculiar to childbirth. In the sections to follow, a review of the biochemical research on the etiology of postpartum depression will be presented, followed by a review of the research on social and psychological predictors of the disorder.

Biochemical correlates of postpartum disorders. One of the most likely causes of postpartum depression would seem to be changes in the levels of reproductive hormones, since rapid, drastic fluctuations occur in these biochemicals from the end of pregnancy to the first days postpartum. Nott, Franklin, Armitage, and Gelder (1976) investigated five of the most apparent hormonal candidates before and after delivery to determine how these changes might be related to puerperal mood. Plasma levels of progesterone, total entrogen, lutenizing hormone (LH), follicle-stimulating hormone (FSH), and pro lactin were assessed in 27 women. Blood samples from each woman were collected three times during the weeks before delivery and sixteen times during the six weeks following delivery. At the time of each blood sample, several measures of "emotional disturbance" were collected, including the Wakefield Inventory and a measure of "blues" used by Pitt (1966) in a previous study of postpartum depression. Also, in a predelivery interview, subjects completed Form A of the Eysenck Personality Inventory.

Nott et al. made an observation that is very important to consider in either evaluating or planning research in this area. They found that the incidence of "blues" depends on the method of assessment that one chooses. According to Pitt's criteria, most of the subjects qualified as "blues subjects;" however, according to the Wakefield Inventory, only 11 of the 27 subjects fell into the blues category. As far as can be ascertained from the researchers' description, none of the blues subjects could be classified as clinically depressed.

Nott et al. chose to group their subjects according to maximum scores on the Pitt questionnaire. Those whose scores reached a peak within the first ten days postpartum were placed in one group, and the remaining subjects were placed in a "non-peak" group. The two groups were compared with respect to pre- and postdelivery levels of progesterone, total estrogen, LH, FSH, and prolactin. No significant differences between the groups were found for any of these hormones.

It is not clear why Nott et al. decided to group their subjects according to the presence or absence of "peak" mood scores rather than absolute levels of mood scores. Logically, it seems possible that some subjects could consistently display a high blues score without showing a peak in their ratings during the first ten days postpartum. Furthermore, the fact that none of their subjects was labeled clinically depressed seems important. Regardless of whether the postpartum blues syndrome is qualitatively or quantitatively distinct from more severe puerperal disorders, it is possible that abnormalities exist in the reproductive hormones of women who manifest the more severe clinical symptoms of depression and/or psychosis.

The idea that more severe forms of puerperal mental disorders are associated with disturbances in reproductive hormones seems to be supported by treatment studies of postpartum psychosis. Bower and Altschule (1956), for example, used progesterone successfully to treat postpartum psychosis. Sixteen women received progesterone therapy either alone or in combination with other "standard" forms of therapies such as insulin therapy, electroshock, or psychotherapy. The progesterone treatments were administered either during a relapse of

psychosis or during a remission induced by one of the other forms of therapy. The course of progesterone therapy entailed daily intramuscular injections of 100 mg progesterone for about 10 days, followed by oral doses of 150 mg daily which continued for weeks or months after the patient's discharge. Most of the women had been administered one or more of the standard therapies prior to the commencement of progesterone therapy. For five subjects, progesterone was the initial form of treatment, and for the remaining 11 subjects, progesterone treatment followed other forms of therapy. In both of these groups, most subjects' progesterone treatments were accompanied by another form of therapy. The authors reported that the relapse rate for "other" therapies alone was 50%, while the relapse rate for progesterone therapy (alone or in combination with other therapies) was 6.3%. In light of the overwhelming success of progesterone therapy in comparison with other treatments in this study, it is curious that progesterone has not been used more often and gained more recognition as the treatment of choice for severe puerperal disorders.

In a more recent study by Wakok and Hatotani (1973), hormones other than progesterone were found to be successful in treating some cases of postpartum as well as other forms of psychosis. There were 277 in-patients presenting several types of psychoses, and each patient was administered the hormone that seemed indicated by endocrinological tests. Twenty-four of the patients had been diagnosed as suffering from postpartum psychosis. Thyroid hormones were used to treat 14 of these patients with mixed results. Six of those receiving thyroid treatment improved dramatically and one was rated as merely "improved."

Four showed a partial or temporary improvement, and three showed no improvement at all with thyroid treatments. Although many of these patients did not display abnormal levels of thyroid hormone in the pretreatment laboratory tests, some showed abnormalities in androgen and estrogen metabolism. The reason that thyroid hormone was selected to treat these patients, according to Wakok and Hatotani, is that imbalances in androgens or estrogens can be normalized through thyroid administration. Given that estrogen disturbances were noted in some of these cases, however, it is not clear why thyroid hormone was selected over an estrogen/progesterone combination that was used to treat other non-postpartum patients in the sample.

Of the remaining ten cases of postpartum psychosis in the Wakok and Hatotani study, eight were treated with anterior-lobe hormones (prehormone, an extract of animal anterior pituitary gland). One of the eight improved dramatically, five merely "improved," and two showed no improvement. As for the last two cases, one woman was treated with corticoids, and she showed a dramatic improvement; the other one, however, received the estrogen/progesterone combination and showed no improvement. Because only one case of postpartum psychosis was treated with reproductive hormones, it is not possible to evaluate the effectiveness of this treatment mode in relation to Bower and Altschule's (1956) results. It is, however, interesting to note that in a group of non-postpartum psychotic patients, those who responded best to the estrogen/progesterone combination included some who had displayed a long-standing pattern of periodic psychotic episodes associated with the premenstrual period. (Others in this group who responded well to

the estrogen/progesterone combination had a history of periodic psychosis not associated with the premenstrual period.) Thyroid hormones and anterior-lobe hormones (the drugs used to treat postpartum psychosis) were also successful with some members of this "periodic psychosis" group.

The finding that estrogen/progesterone therapy can be effective in the treatment of psychotic symptoms associated with the premenstrual syndrome is consistent with an hypothesis advanced by Dalton (1977). According to this hypothesis, symptoms of the premenstrual syndrome result from a "sensitivity" to decreases in progesterone occurring in the days before menstruation. In addition, administration of progesterone during that time is purported to alleviate the symptoms of the premenstrual syndrome. As for women who develop postpartum depression, Dalton claims that they too are sensitive to the decrease in progestrone which occurs in the wake of delivery. These progesterone-sensitive women also exhibit euphoria in the late stages of pregnancy when progesterone levels are high. Furthermore, in menstrual cycles subsequent to delivery, they experience the symptoms of the premenstrual syndrome.

Dalton's hypotheses appear to fit with the findings of Bower and Altschule (1956), since their cases of postpartum psychosis responded well to progesterone therapy. The Wakok and Hatotani (1973) study also seems to support Dalton's hypotheses because cases of nonpuerperal, periodic psychosis associated with the premenstrual period responded to an estrogen/progesterone combination and because cases of postpartum psychosis responded to thyroid hormones, which have a normalizing effect

on androgens and estrogens. Dalton (1977) herself does not specify the data from which these hypotheses are derived or tested. Furthermore, it is not clear whether she uses the term, postpartum depression, to refer to the blues, a nonpsychotic form of depression, or a psychotic form of depression. It will be recalled that the subjects in the two treatment outcome studies were diagnosed as psychotic, but the particular forms of psychosis were not distinguished (e.g., depression, mania, schizophrenia). So even if Dalton intends to include psychotic depression under her label of "postpartum depression," it is not possible to discern whether the psychoses in the outcome studies were even depressive in character.

Rather than focusing on the biochemical conditions that are peculiar to postpartum disorders (e.g., dramatic fluctuations or disturbances in hormones), some researchers have searched for biochemical factors that postpartum disorders might have in common with other clinical disorders. Because postpartum disorders are so often manifest in a depressive form, some researchers have chosen to study these disorders from the perspective of a prominent biochemical theory of depression, such as the catecholamine or the indolamine hypothesis.

According to the catecholamine hypothesis, depression results from a functional deficit in the neurotransmitter, norepinephrine. This neurotransmitter is synthesized in a sequence of biochemical processes that most often begins with the amino acid, tyrosine. Another amino acid, tyramine, can be synthesized from tyrosine (or obtained through the diet) and can either serve itself as a precursor to norepinephrine or bind with other molecules to take on a conjugated form. The

relationship of tyramine to postpartum depression has received attention because previous research on nonpuerperal depression has revealed some interesting data. In studies of patients diagnosed as chronic unipolar depressives, oral doses of tyramine have produced significantly lower urinary excretion of conjugated tyramine in these patients than in controls (Sandler, Bonham Carter, Cuthbert, & Pare, 1975; Bonham Carter, Sandler, Goodwin, Sepping, & Bridges, 1978). In addition, conjugated tyramine appears to remain low in these patients even with improvement or recovery from depression (Bonham Carter et al., 1978).

In a recent study, Bonham Carter and her colleagues (Bonham Carter, Reveley, Sandler, Dewhurst, Little, Hayworth, & Priest, 1980) investigated the possibility that the "oral tyramine test" could serve as a predictor of past and future depression in normal pregnant women. On the morning of their appointments with the obstetrician, 74 women who were between 28 and 36 weeks pregnant took an oral dose of 100 mg tyramine and collected a urine sample three hours later. Six weeks after delivery, 85.5% of these subjects completed the Zung Self-Rating Depression Scale. Interviews were also conducted at six weeks or more postpartum to assess the incidence of psychopathology during the patients' lifetimes. Two groups containing 15 subjects each were formed from those who performed the oral tyramine test: one group contained subjects with the highest values of tyramine excretion and the other contained those with the lowest values of tyramine excretion. In the low tyramine group, 73.3% of the women had experienced primary or secondary depression at some point in their lives. In the high tyramine group, however, 26.7% had a history of depression. There were four women

who experienced an episode of postpartum depression at some point in their lives, and all four were members of the low tyramine group. As for the incidence of postpartum depression during the study, two (6.7%) of the 30 subjects who were interviewed postpartum were considered clinically depressed according to stringent diagnostic criteria. Both of these were among the four who had experienced a previous episode of puerperal depression.

The results of this study seem to indicate that low levels of urinary tyramine may be associated with a susceptibility to depression. However, they do not show that the "oral tyramine test" can be used as a prospective device to identify susceptible people with no history of depression, since the two women who developed postpartum depression after the tyramine test had a previous history of depression. If a deficit in urinary tyramine is a lasting biochemical consequence of depression, then the "oral tyramine test" would have no more predictive value for future episodes of depression than information about previous depressive episodes. If the two women who developed postpartum depression had had no previous episodes of depression, then the oral tyramine test would be a practical means of identifying people at risk for depression. As it stands from the results of this study, however, the only advantage of the tyramine procedure over asking the subject about previous depressive episodes is that it is more objective.

A number of studies concerning the biochemistry of puerperal depression have arisen from the indolamine theory of affective disorders. According to this theory, depression is related to a functional deficiency in the neurotransmitter, serotonin (5-hydroxytryptamine, or

5-HT). The principal strategy of these studies has been to examine puerperal mood in relation to plasma levels of tryptophan, the precursor to serotonin. In one study conducted by Stein and his colleagues (Stein, Milton, Bebbington, Wood, & Coppen, 1976), 18 women rated themselves daily for the first postpartum week on five subjective scales which were intended to measure depressive symptoms. (The word "intended" was used here because the scales were not quantified or validated.) Possible scores ranged from 0 to 4 on each of the five scales: Depression (0 = no depression, 4 = very depressed); Anxiety (0 = normal anxiety, 4 = desperately anxious); Appetite (0 = normal appetite, 4 = complete loss of appetite); Insomnia (0 = good night's sleep, 4 = very disturbed sleep); and Tearfulness (0 = no tears, 4 = cried for more than 30 minutes). For each woman, an average was computed of her daily scores on each scale. These daily averages were summed across scales to provide a "total affective score" for each subject. Biochemical measures involved the assessment of total and free plasma tryptophan from 30 ml. of venous blood collected daily.

When results from the biochemical and psychological measures were compared, it was found that women who rated themselves as severely depressed (15-18 total affective score) had free tryptophan levels similar to that of other clinically depressed patients. Furthermore, postpartum levels of free plasma tryptophan were significantly correlated with the total affective scores and with scores on the "Depression" scale. None of the other four scales, however, was significantly correlated with free tryptophan levels.

While the study does seem to reveal an interesting relationship between affective state and plasma levels of free tryptophan, one must still ask what degree of depression was associated with this biochemical condition. Because Stein et al. used unvalidated, unstandardized devices to measure depression, it is impossible to delineate the bounds of these data. If these women were suffering from postpartum blues, there is always the possibility that these results would not hold up among clinically depressed or psychotic postpartum women, as suggested earlier.

Another study by Handley et al. (Handley, Dunn, Baker, Cockshott, & Gould, 1977) examined the relationship between mood and plasma levels of free and total tryptophan in 18 women during the second through fifth days postpartum. In contrast to Stein et al.'s "homemade" tools for psychological assessment, Handley et al. used validated measures of affect, such as the Multiple Affect Adjective Checklist, the Beck Depression Inventory, and the Hildreth Feeling Scale. Although none of the 18 subjects met the criteria for clinical depression, the results were consistent with the findings of Stein et al.--that is, comparatively low levels of free tryptophan corresponded with declines in mood.

A later study by Handley, Dunn, Waldron, and Baker (1980) examined a larger sample of women (N = 71) and began psychological and biochemical assessment at 36 weeks gestation. Psychological measures included the Multiple Affect Adjective Checklist, the Beck Depression Inventory, a Visual Analogue Test, and a semistructured interview to assess emotional disturbance. These measurements were repeated periodically through the sixth week postpartum. Subjects were labeled

depressed if they scored in the 80th percentile or greater on three or four of these scales during the first five days postpartum. Those who scored at or above the 80th percentile on one or two scales were considered blues cases. Ten subjects met the criteria for depression and 18 met the criteria for blues.

The results of this study showed that the correlation between tryptophan levels and mood depended on the time of measurement in relation to delivery and in relation to the season of the year. The mothers who delivered during the months of January through April showed 50% less plasma-free tryptophan than those who delivered during the months of July through December. (There was no difference between these two groups in total plasma tryptophan, however.) During the time that free tryptophan levels were high (July-December), women who experienced postpartum blues or depression showed significantly lower levels of free tryptophan than those without either form of emotional disturbance.

In relation to the time of delivery, Handley et al. (1980) found that total tryptophan rose in the majority of subjects from a low level antenatally to a peak on the first or second day postpartum. In 37% of the women, however, this postpartum peak was absent. A follow-up of their subjects six months later revealed a significant relationship between the missing peak in postpartum total tryptophan and the incidence of blues and depression during the six months after delivery.

Using an experimental rather than a correlational design, Harris (1980) investigated the role of tryptophan levels in puerperal mood

changes. In his double-blind study, subjects were administered 3 g. L-tryptophan or placebo each day for ten days postpartum while daily scores of depressive symptoms were obtained. Although 70% of his subjects experienced postpartum blues, Harris did not find a significant difference between the experimental and placebo groups in the incidence of blues. He concludes that the low levels of tryptophan observed by Stein et al. (1976) and by Handley et al. (1977) in women with the blues are an epiphenomenon rather than a causal factor in postpartum mood changes. Although it has been documented that a rise in free and total plasma tryptophan results from loading doses of L-tryptophan (e.g., Coppen, Brooksbank, Eccleston, Peet, & White, 1974; Moller, Kirk, Fremming, 1976), Harris did not actually obtain confirmation that free or total tryptophan did in fact increase in his experimental subjects.

Two other biochemical substances, cortisol and cyclic AMP, have been examined in relation to postpartum depression. In the two studies mentioned above by Handley and her colleagues, plasma cortisol levels were measured in addition to total and free tryptophan levels. In the first study, which involved only postpartum measurements, Handley et al. (1977) found that all subjects showed a decline in plasma cortisol from the second to the fifth day postpartum; however, there was a positive correlation between subjects' moods and their cortisol levels. When cortisol levels declined, so did subjects' moods. In the second study (Handley et al., 1980), where biochemical measurements were obtained antenatally, there was a significant correlation between high levels of cortisol during the 38th week of gestation and the incidence of blues or depression in the puerperium. Although the incidence of blues and the

levels of cortisol showed seasonal variations, the relationship between high antenatal cortisol and depressed puerperal mood was present regardless of the season.

The relationship of cyclic AMP (adenosine 3'5' cyclic monophosphate) to puerperal mood was investigated by Ballinger, Buckley, Naylor, and Stansfield (1979). They collected psychological measurements and 24-hour urine specimens on Day 1 and 3 postpartum. To obtain their psychological measurements, subjects were interviewed on the topics of mood, family, and personal history, as well as marital and sexual relationships. At the time of the interview, the examiner rated subjects on 0-4 scales in the areas of depression, elation, anxiety, lability of mood, and impairment of concentration. The scores given to subjects by observers on the five affective areas were summed to give each subject a total score. Ballinger et al. found that those subjects with a total score of six or more showed a significant increase in urinary levels of cyclic AMP from Day 1 to Day 3, while subjects with total scores in the 0-5 range showed very little change in cyclic AMP. Furthermore, cyclic AMP on the third day was significantly higher in the "six or more" group than in the 0-5 group. Though the relationship between cyclic AMP and observed depressive-type symptoms seem to point to a biochemical contribution to puerperal mood changes, it is also possible, as Ballinger et al. point out, that cyclic AMP is more directly associated with arousal or activity levels, so that its fluctuations are an epiphenomenon of mood changes.

To summarize, the biochemical research on the etiology of postpartum depression reflects two types of assumptions about the nature of

the disorder. Some studies approach the etiological question from the perspective that the precipitating biochemical factors are unique to childbirth. Other studies approach the etiological question from the viewpoint that postpartum depression involves the same biochemical conditions as depressive disorders outside the puerperium.

The question of whether postpartum depression involves unique or common biochemical conditions has important implications for prevention and treatment; however, at this early stage of investigation, the question merely serves as a useful scheme for organizing research. As more data come in, it is quite possible that the heuristic value of this scheme will dissipate, since it may be revealed that postpartum depression possesses both unique and common features with respect to other forms of depression. At this point, the biochemical research has provided several "leads" in the search for etiological variables, but the data are no more conclusive than the psychological/social data described in the next section.

Although this study did not measure directly the biochemical factors associated with postpartum depression, it attempted to expose predisposing hormonal factors by inquiring about the behavioral and emotional correlates of certain hormonal circumstances. This inquiry was conducted in the form of a questionnaire administered to the subjects during pregnancy. The questions dealt with subjects' behavioral and emotional responses to such "hormonal circumstances" as a thyroid disorder, particular times of the menstrual cycle, pregnancy, or the use of oral contraceptives. If one or more of these factors predict postpartum depression, an additional clue might be provided in the search for the biochemical bases of the disorder.

Social/psychological correlates of postpartum depression. The viewpoint that certain psychological variables may predispose women to postpartum depression has led researchers to measure women's personality characteristics through projective tests (e.g., Hakansson-Zaunders & Uddenberg, 1975; Klatskin & Eron, 1970) and personality tests (verines & Lyon, cited in Braverman & Roux, 1978). Braverman and Roux (1978) desired a simpler, more practical tool for identifying the woman "at high risk" for postpartum depression, so they constructed a scale whose 19 questions were based on "clinical intuition, . . . current knowledge concerning psychopathology in general, and in particular female psychology, and the theoretical dynamics apparently involved in postpartum reactions (e.g., personality factors, immaturity, female role rejection, hostility towarh mother, family, past history, and heredity)" (p. 731). From their 19 questions, the response that seemed to predict best the appearance of postpartum depression was an affirmative answer to the question, "Do you often feel that your husband (boyfriend) does not love you?" Other prenatal factors that seemed related to postpartum depression were regret about the pregnancy, accidental pregnancy, lack of desire for a child, and marital problems. The results from the Braverman and Roux study, therefore, suggest that negative cognitions about the woman's marriage and childbearing might be associated with postpartum depression.

In relation to the woman's perception of her marriage, the study by Frate et al. (1980) found, through retrospective report, that women who received more emotional and physical support from their husbands

during the six months after delivery were less likely to experience depression. The same findings are reported by Paykel, Emms, Fletcher, and Rassaby (1980), who obtained data from 120 women during the sixth week postpartum. They found that subjects who were depressed at the time of assessment rated both the adequacy and the availability of communication with their husbands as significantly poorer than non-depressed subjects. Depressed subjects also reported that they received less help from their husbands with household chores and childcare. Another variable on which depressed women produced lower ratings was the availability of a confidant. Whether the depressed women in these studies actually received less support from their husbands and friends than nondepressed women is impossible to know. It seems logical that deficits in social and familial support would be antecedents of depression, but it must be remembered that reports of deficient support could represent a symptom or correlate of the disorder rather than a contributor.

The marital status of women seems to be a more objective form of data than women's perception of support from their partners; and, unlike negative perceptions, marital status cannot be considered part of the depressive symptom configuration. Several studies have pointed to a relationship between marital status and postpartum depression. In a study by David, Rasmussen, and Holst (1981), statistics on all women who delivered babies in Denmark during 1975 were compiled. From those who gave birth that year (N = 71,378), 12 out of every 10,000 women experienced their <u>first</u> admission to a psychiatric hospital within three months after delivery; and the majority of these first admissions were

among women who were separated, divorced, or widowed. Kendell et al. (1981) also found a higher percentage of single, widowed, or divorced women among postpartum psychiatric admissions.

Two other studies examined predictors of less severe forms of psychological disturbance than the preceding studies and failed to find a relationship between marital status and postpartum depression. In the research of Paykel et al. (1980), where subjects suffered from non-psychotic puerperal depression, marital status did not differentiate the depressed from the nondepressed women. Another study by Hayworth, Little, Bonham Carter, Raptopoulos, Priest, and Sandler (1980) used comparable subjects and found no relationship between marital status and postpartum depression. Whether marital disruption is a good predictor of postpartum depression remains unclear. Perhaps marital disruption is a fairly good predictor of postpartum psychosis, but not a good predictor of nonpsychotic forms of postpartum depression.

Although marital disruption did not seem to play a part in the nonpsychotic depression of Paykel et al.'s (1980) subjects, an excess of recent negative events did. Prior to data collection, each of the 64 items in the Interview for Recent Life Events was assigned a rating of "objective negative impact." An event received a score of one to five which indicated "the degree of negative impact the event would be expected to have on someone when its full nature and particular circumstances were taken into account, but completely ignoring the patient's subjective report of reaction" (p. 340). Women who were depressed at six weeks postpartum reported more frequently than nondepressed women that, during or after pregnancy, they had experienced negative events

with moderate to severe objective ratings. The proportion of women experiencing one or more undesirable events was 75% among depressed subjects and 35% among nondepressed subjects.

Paykel et al. (1980) also investigated the idea held by many (e.g., Abraham, 1966; Beck, 1976; Bowlby, 1961; Freud, 1950) that severe losses in childhood increase one's susceptibility to depression. Their results showed no support for this notion in puerperal subjects, however. Women who suffered from postpartum depression were not more likely than nondepressed women to have experienced the loss of a mother or father during childhood. Thus, it seems that negative events in the recent rather than the distant past might render women more vulnerable to postpartum depression.

Recent negative events directly associated with the pregnancy and delivery do not seem to correlate with postpartum depression. For example, in the Yalom et al. (1968) study, depression scores on the Nowlis Mood Adjective Checklist were not significantly related to conditions of the pregnancy, the labor, the delivery, or the baby. The mother's reproductive history did seem related to postpartum depression in the sense that low parity was positively correlated with depression. Yalom et al. proposed that this correlation arises from the fact that the first child's arrival constitutes a "unique stress" that requires psychological preparation for the process of procreation, the assumption of a new maternal role, and the unavoidable change in lifestyle.

More recent studies have produced conflicting data on the relationship of parity to postpartum depression. The findings by Kendell et al. (1981) concerning postpartum psychiatric admissions were

consistent with the findings of Yalom et al. However, the Meares et al. (1976) study as well as the Hayworth et al. (1980) study examined women who were more similar to Yalom et al.'s subjects in terms of symptom severity (i.e., nonpsychotic cases), and in neither group of these subjects was there a relationship between parity and postpartum depression. It is not clear, therefore, what relationship, if any, exists between parity and postpartum disorders.

It seems possible that correlations between parity and postpartum disorders could be an artifact of a relationship between women's ages and postpartum disorders, since younger, more immature subjects, who are more likely than older subjects to be having their first child, might be more susceptible to these disorders. This hypothesis does not receive much support, however, because the data relating to age are just as confusing. For example, the Paykel et al. (1980) study found that depressed subjects were younger than nondepressed subjects, while the David et al. (1981) study found the highest incidence of psychiatric admissions among puerperal women in the 35-and-over age range. The study by Kendell et al. (1981), however, showed no difference in the number of younger and older subjects with severe postpartum disturbances. Age, therefore, serves no better than parity as a predictor of postpartum disorders.

Results from two studies have revealed a curious aspect of reproductive history whose relationship to postpartum depression might arise from psychological rather than physiological factors. In both the Yalom et al. (1968) study and a study by Jacobson, Kaij, and Nilsson (1965), time since the last pregnancy was positively related to

the occurrence of postpartum depression. Perhaps the demands of child-care and lifestyle change as existing offspring mature. The qualitative and quantitative shifts in responsibilities associated with caring for an infant, with the increased (and renewed) restrictions on lifestyle, could provide sufficient stress for the onset of depression.

It is possible that certain characteristics of the baby constitute negative events that have an impact on the mother's emotional state. In a study by Dalton (1971), subjects were categorized as depressed (requiring psychiatric treatment), having the blues (depressive feelings, not requiring psychiatric treatment), and normal. Depressed mothers and normal mothers were compared with respect to their babies' behavior and no difference was found; however, a comparison of the blues group with normal mothers revealed a significantly higher proportion of blues mothers with babies who cried a lot, vomited, or were troublesome during the night. Since Dalton's data were based on the mothers' report of their babies' behavior, it is possible that the mildly depressed mothers exaggerated their babies' exasperating behaviors in attempting to account for their depressive feelings.

Many studies have investigated the possibility of predicting postpartum disorders from previous episodes of psychological disturbance. The types of previous psychological disturbance examined have included anxiety and depression during pregnancy, blues during the first few days postpartum, previous episodes of postpartum disorders, and previous episodes of nonpostpartum psychiatric disorders. Studies that have looked at emotional state during pregnancy as a predictor of postpartum depression have had mixed results. Three studies (Atkinson & Rickel,

1984; Nott, Franklin, Armitage, & Gelder, 1976; O'Hara, Rehm, & Campbell, 1982) have found a positive relationship between depression levels during pregnancy and depression levels in the puerperium. A study by Pitt (1973), however, found no relationship between depression before and after delivery. As for antenatal anxiety, Pitt observed no relationship between anxiety during pregnancy and postpartum depression; but Dalton (1971) found that anxiety only in the first trimester of pregnancy correlated with puerperal depression.

The findings from the Pitt and Dalton studies are criticized in a later study on the grounds that their findings were derived from inadequate assessment devices. Pitt's device contained only one item addressed to anxiety and Dalton's device was a simple binary measurement presumed to lack sensitivity. The critics of these two studies, Meares, Greinwade, and Wood (1976), conducted a more comprehensive and thorough examination of antenatal anxiety as a predictor of postpartum depression. They used the Taylor Manifest Anxiety Scale (TMAS) and the Eysenck Personality Inventory (EPI) to assess anxiety and neuroticism (respectively) during pregnancy. Of 49 women who completed the study, nine achieved an MAS score sufficient to indicate "high anxiety." Five of these high anxiety subjects subsequently developed postpartum depression. High levels of neuroticism during pregnancy were observed in 10 subjects, and six of these developed postpartum depression. Similarly, the 16% who suffered from severe postpartum depression had significantly higher scores on the MAS and the EPI neuroticism scale than the remainder of the subjects.

In a study by Hayworth and her associates (Hayworth, Little, Bonham Carter, Raptopoulos, Priest, & Sandler, 1980), anxiety and several other psychological factors were examined in pregnant women to determine their predictive value for postpartum depression. Postpartum depression was measured with Zung's Self-Rating Depression Scale (SDS). Antenatal anxiety and depression were measured with a brief self-report scale derived from the Delusions Symptoms States Inventory. In accordance with previous studies, the data revealed a significant relationship between anxiety during pregnancy and puerperal depression. When the relationship between depression during pregnancy and depression during the puerperium was examined retrospectively, there was also a significant relationship. Three of seven women with moderate to severe postpartum depression and four of 21 women with mild postpartum depression had been depressed before delivery.

Two other assessment devices were used in the Hayworth et al. study to measure the psychological attributes of their pregnant subjects. The first was the Hostility Questionnaire (HDHQ). This scale is designed to measure the degree of hostility and the extent to which the hostility is directed toward others (extrapunitiveness) or toward oneself (intropunitiveness). The data collected from the HDHQ showed that high scorers on the prenatal hostility scale were more likely than low scorers to develop moderate to severe postpartum depression. As for the direction of hostility, a significant relationship was found between high extrapunitive scores and subsequent depression, but there was no relationship between intrapunitive scores and depression. Since both anxiety and hostility seemed to predict postpartum depression,

Hayworth et al. (1980) looked at the relationship between these two variables and found that anxious subjects were also likely to be hostile. Further analysis revealed, however, that hostility did not have to be accompanied by anxiety to serve as a predictor of puerperal depression. The researchers concluded that prenatal hostility is associated with an increased risk of postpartum depression, but the risk may be even greater if the hostility is accompanied by anxiety.

The final measure of prenatal psychological factors in the Hayworth et al. research was Rotter's Locus of Control Scale. The purpose of this scale is to determine the degree to which an individual perceives events as products of his or her own behavior versus the products of people or events outside himself or herself. Women who scored high on the Locus of Control Scale (indicating a perception of external control) were more susceptible to postpartum depression than those who scored low on this scale. One might expect that the women who directed hostility outward (extrapunitive) would also be likely to view factors outside themselves as responsible for events in their life. However, when Hayworth et al. examined the relationship between locus of control and direction of hostility, they found that the perception of external control was only associated with postpartum depression in women who directed their hostility inward (intropunitive). The conceptual significance of this finding is a mystery.

The only study which has examined the relationship of blues in the immediate postpartum period to severe depression in later stages of the puerperium is the Paykel et al. (1980) study mentioned earlier. Of the 24 subjects who suffered from depression on the sixth puerperal

week, 63% reported that they had experienced moderate to severe depression with frequent crying during the first few days after delivery. In contrast, only 34% of the nondepressed women reported that they had had these feelings. While early postpartum blues seemed to differentiate depressive from nondepressive cases, statistical tests revealed postpartum blues to be a good predictor of depression only for depressed subjects who had not experienced an undesirable event during or after pregnancy. Paykel et al. suggest that the subjects in this group represent an "hormonal subgroup" which is susceptible to postpartum depression in the absence of stressful life events.

One finding that has been demonstrated consistently across studies is that a prior history of postpartum psychosis seems to predict a recurrence of the syndrome. There has been some inconsistency, however, in the estimated frequencies with which a second episode of the disorder will occur. In some research, the risk of recurrent postpartum psychosis has been estimated at one in seven (Foundeur, Fixsen, Triebel, & White, 1957; Protheroe, 1969). Other estimates have gone as high as one in five (Hatrick, 1976) and one in three (Paffenbarger, 1964). Evidence pertaining to nonpsychotic forms of puerperal disturbance suggests that women with a history of postpartum depression are also likely to experience a future episode (Braverman & Roux, 1978; Yalom et al., 1968).

It seems that both psychotic and nonpsychotic puerperal disturbances indicate a higher risk for future episodes; however, it does not seem that one can generally conclude that a history of nonpostpartum psychiatric disturbance indicates greater susceptibility to postpartum

disorders. On the one hand, the study by Paykel et al. (1980) showed that 63% of the postpartum depression cases had a history of psychiatric symptoms which were treated by either a psychiatrist or a general practitioner. On the other hand, the Braverman and Roux (1978) as well as the Yalom et al. (1968) studies showed no relationships between previous psychiatric treatment and postpartum depression. Braverman and Roux speculate that dishonesty on their self-report questionnaire and/or a preventative effect of ongoing psychotherapy in some cases might account for the absence of a relationship in their study.

According to Hatrick (1976), women with a history of nonpuerperal psychosis carry a one in ten risk of exhibiting a psychotic episode during the puerperium. However, the data base from which this estimate is drawn is not specified, and neither are the forms of nonpuerperal psychosis from which the vulnerability estimate is drawn. Some reports from other scientists suggest that the form of nonpuerperal psychosis could have a bearing on the risk of a psychotic episode occurring in the puerperium. The incidence of postpartum psychosis among women with a cyclic disorder such as bipolar depressive illness is particularly high, but the risk associated with other types of psychosis may not be so high.

Severe postpartum disturbances are quite likely among women with a history of bipolar depressive illness. A study by Riech and Winkour (1970), for example, showed that, among 20 women with a history of bipolar depressive illness, 40% (eight subjects) developed postpartum psychosis. A report of three cases by Targum, Davenport, and Webster (1979) revealed a similar pattern. They followed through pregnancy and

delivery three women who had been euthymic during the course of prophylactic treatment with lithium carbonate. The lengths of time that the three women had taken lithium were 10 years, 7 years, and 3 1/2 years. At the beginning or just prior to their pregnancies, the women's lithium maintenance therapies were withdrawn, and their conditions remained stable throughout their pregnancies. During the two weeks following delivery, two of the women developed manic disorders. Targum et al. stressed the importance of a continuing relationship between expectant parents and therapists, and they recommend that lithium therapy be reinstated during the 3rd trimester of pregnancy or immediately prior to delivery (presumably due to the delay in its therapeutic effects).

From the research discussed so far on psychological and social predictors of depression, it is difficult to derive a clear impression of the etiological variables that might be operative because of methodological problems in defining the disorder and because of the diversity of questions being asked in the literature. A more fruitful approach might be to investigate in postpartum depression the etiological variables endorsed by current theories of nonpuerperal depression. Such an approach has potential not only for revealing new predisposing factors in postpartum depression, but also for providing a conceptual framework in which to evaluate the existing data. Furthermore, the validity of a theory's etiological hypotheses may be tested with respect to postpartum depression.

Contemporary Theories of Depression as Guides to Etiological Considerations

Though some (e.g., Hamilton, 1962) feel that symptom configurations associated with postpartum disorders are qualitatively distinct from other psychiatric disorders, most researchers seem to believe that there are no differences phenomenologically between mental disorders occurring during the postpartum period and those occurring at other times in life (e.g., Braverman & Roux, 1978; Brown & Shereshefsky, 1973; Grundy & Roberts, 1975; Protheroe, 1969). From this latter group's perspective, childbirth functions etiologically as a nonspecific stressful event which interacts with preexisting factors to result in an emotional disorder. In line with this view, it is suggested here that some of the factors that predispose a new mother to postpartum depression may be the same factors that predispose other individuals to become depressed in reaction to stressful events.

During the course of the present study, two studies have emerged which embody the idea that postpartum depression and standard clinical depression could have etiological factors in common. The most recent study, by Atkinson and Rickel (1984), examined the etiological postulates of two theories of depression in a prospective investigation of postpartum depression. The study's approach to the disorder was novel in that postpartum depression was measured in primiparous mothers and fathers.

Two theories of depression determined the measurements used as predictors of postpartum depression in new parents. The two theories

were the behavioral theory of depression (Lewinsohn, Youngren, & Grosscup, 1979) and the social stress theory of depression (Dohrenwend & Dohrenwend, 1974). Some etiological postulates of the behavioral theory were represented in the Pleasant Events Schedule - Mood-Related Scale, which is designed to measure the frequency and enjoyment of reinforcing events. Expectant mothers and fathers completed this measure both prenatally and postnatally. Social stress was assessed through three measures which compared prenatal expectations to postnatal perceptions. The first compared the parent's prenatal expectation of her(his) baby's behavior to her(his) postnatal perception of its behavior. The second compared the amount of time the parent expected to spend caring for the infant to the amount of time she(he) actually spent. The third compared the degree to which the parent expected the baby to bother her(him) to the degree to which she(he) was actually bothered. The level of prepartum and postpartum depression in mothers and fathers was assessed with the beck Depression Inventory.

Of the five prenatal measures, the only significant predictor of postpartum depression scores for men or women was the prenatal depression score. As for postpartum measures, only the pleasant events schedule was significantly related to postpartum depression scores for women. Women who scored high on the depression scale reported a low number of reinforcing events. For men, when prenatal and postnatal predictors were considered together, four variables demonstrated a significant relationship with postpartum depression scores. These four variables suggested that elevated postpartum depression levels in men were associated with high prepartum depression scores, a high level of

potentially reinforcing events prepartum, expectations that their baby would be better than average, and the perception that their baby's actual behavior was worse than average.

Atkinson and Rickel (1984) interpret their results as support for the behavioral and social stress theories of depression, but in some cases their findings are actually in conflict with the predictions of a behavioral theory. To illustrate, the behavioral theory would predict that individuals who are able to experience a low number of reinforcing events would be more susceptible to depression, so that few reinforcing events should be associated with depression levels in a predictive and a concurrent fashion. For the women in the Atkinson and Rickel study, the measure of few reinforcing events showed a concurrent relationship to postpartum depression scores, but it was of no value in predicting those scores. For the men in the study, there was no concurrent relationship between reinforcing events and depression scores in either the prepartum or the postpartum period. There was for men a predictive relationship between these two measures when the prepartum measure of reinforcing events was considered in the context of both prepartum and postpartum measures; however, the nature of this relationship was exactly the opposite of the prediction made by the behavioral theory. That is, men with elevated postpartum depression scores reported a high number of reinforceable events prepartum. According to the behavioral theory, a high number of reinforceable events should decrease one's vulnerability to depression.

Some aspects of the Atkinson and Rickel results seem better suited to a cognitive interpretation than a behavioral one. For

example, the concurrent relationship between reinforcing events and postpartum depression scores in women could be due to the fact that mood levels affected the women's report of the frequency and reinforceability of pleasant events. Likewise, some data from the men have distinctly cognitive implications. The discrepancy between their expectations of the baby's behavior and their perception of its actual behavior suggests that unrealistic prepartum cognitions could have contributed to postpartum depression levels in men.

Unrealistic expectations and maladaptive interpretations of the environment play a key role in depression according to cognitive theorists. In a study by O'Hara, Rhem, and Campbell (1982), the etiological postulates from both cognitive and behavioral theories were examined with respect to postpartum depression. The theories investigated were the cognitive theory (Beck, 1974), the behavioral theory (Lewinsohm et al., 1979), the self-control theory (Rhem, 1977), and the learned helplessness theory (Abramson, Seligman, & Teasdale, 1978). The etiological hypotheses of these theories were represented in four self-report measures completed by women in their second trimester of pregnancy. The four measures were the Dysfunctional Attitudes Scale (cognitive theory), an abbreviated version of the Interpersonal Events Schedule (behavioral theory), an abbreviated version of the Attributional Style Questionnaire (learned helplessness theory), and the Self-Control Questionnaire (self-control theory). In addition to these "theoretical measures," three other self-report measures were obtained during the prenatal assessment. These included a measure of depression (the Beck Depression Inventory), a measure of social, familial, and

vocational functioning (the Social Adjustment Scale), and a measure of premenstrual tension constructed by the experimenters.

After the delivery, subjects completed a self-report measure of stressful life events that had occurred during the pregnancy (the Social Readjustment Scale) and repeated the measure of depression (the Beck Depression Inventory). Using the subject's birth record, the experimenters assigned to the delivery a stress value of 1 to indicate a spontaneous delivery, 2 to indicate a forceps or Cesarean delivery, or 3 to indicate a rotation or breach delivery.

The results of the O'Hara et al. (1982) study revealed that prenatal depression scores were by far the best predictor of postpartum depression scores. Alone, prenatal depression scores accounted for 26% of the variability in postpartum depression scores. Of the four theoretical measures, only the measure associated with the learned helplessness theory (the Attributional Style Questionnaire) was a significant predictor of postpartum depression scores. It could only account, however, for 2 to 3% of the variability in postpartum depression scores. When the four theoretical variables were combined into one predictive unit, the unit was a significant predictor of postpartum depression scores.

Although the group of four measures was a statistically significant predictor, the combination contributed only 4% to the variability in postpartum depression scores above and beyond that accounted for by prenatal depression scores. Thus, this combination of measures added relatively little to the information that could be gained from a prenatal administration of the depression scale alone. When prenatal

depression scores were omitted from the regression analysis, the combination of theoretical measures accounted for 17% of the variability in postpartum depression scores--still less than the 26% of variability accounted for by prenatal depression scores.

O'Hara et al. interpret the statistical significance of this theoretical unit as support for all four theories represented by these measures. However, the correlation coefficient relating depression scores to dysfunctional attitudes scores was negative ($r = -.283$), which indicates that high postpartum depression scores were associated with a low number of dysfunctional cognitions. This is exactly opposite the prediction made by the cognitive theory of depression. According to the theory, a high level of dysfunctional thoughts should be present both before and during a depressive episode. The concurrent relationship between depression and dysfunctional cognition was not examined by O'Hara et al. during the prepartum or postpartum period.

The number of negative life events reported by the subject (on the Social Readjustment Scale) was positively correlated with the postpartum depression measure. But, as O'Hara et al. point out, this measure could have reflected the subject's affective state rather than actual life events, since the stressful events were reported retrospectively at the same time that postpartum depression was being assessed.

The delivery stress ratings were inversely related to postpartum depression scores, indicating that the more stressful the delivery, the lower the postpartum depression score. A logical interpretation of this finding is lacking. The delivery stress ratings together with the stressful life events scores accounted for 9% of the variability in

postpartum depression scores above and beyond the variability accounted for by prenatal depression scores. Therefore, these two measures accounted for more variability than the group of four theoretical variables.

Although the design of the present study resembles that of the O'Hara et al. (1982) study, numerous procedural differences may be critical to comparative interpretations of the two studies' findings. In the O'Hara study, prenatal measures were collected in the second trimester rather than the third trimester. Also, O'Hara et al.'s subjects completed the prenatal questionnaires at home and returned them by mail. This procedure was avoided in the present study because there is no control over the assessment situation in the home, and because the decrease in subject compliance with that procedure could affect the representativeness of the sample. In this study, nothing was required of the subjects apart from filling out the questionnaires during their regular obstetric appointment. Another difference between the O'Hara et al. study and this study concerns the time in which postpartum measures were collected. In the O'Hara et al. study, postpartum measures were obtained within a broad band of time. The time of assessment ranged from 5.6 to 20.1 weeks after delivery with a mean of 11.7 weeks. In this study, postpartum assessment occurred within a range of 4 to 12 weeks after delivery with a mean of 6 weeks.

The method of collecting the postpartum data in the O'Hara et al. study constitutes the greatest procedural drawback for interpreting their data. The Beck Depression Inventory, which served as the dependent measure, was administered orally by a stranger over the telephone.

This method of data collection could have affected subjects' responses on the postpartum depression measure. As the authors point out, subjects may have been reluctant to reveal their true condition to a stranger on the phone. Such reluctance could account for the fact that postpartum depression scores were lower than prepartum depression scores, which were obtained through written administration of the Depression Inventory. It is also possible that physical or psychological factors associated with pregnancy could be responsible for the high prenatal depression scores. The inconsistency in assessment strategies makes it impossible to interpret these results. In the present study, a standardized method of administration was used to collect depression data both pre- and postpartum.

Finally, a point of concern might be raised with regard to the instrument that O'Hara et al. selected to measure depression. The Beck Depression Inventory (BDI) is statistically associated with the Dysfunctional Attitudes Scale (DAS), and perhaps this association arises from common theoretical underpinnings. Previous research (Weissman, 1980) has shown that DAS scores correlate positively with BDI scores on a concurrent basis and, to a limited extent, on a short-term predictive basis. The correlation between these two measures might be perpetuated by a theoretical component represented in both measures. To further investigate Beck's hypothesis that DAS scores predict the onset of the depressive syndrome, it would seem desirable to employ a different, valid measure of depression that does not run the risk of being theoretically associated with a predictor variable. With this concern in mind, the Zung Self-Rating Depression Scale was selected as a valid, theoretically "neutral" dependent measure for the present study.

The methodological drawbacks of O'Hara et al.'s study make a further investigation of Beck's theory appropriate and necessary. This study, therefore, examined the etiology of postpartum depression according to the cognitive theory of depression. In the following section, Beck's theory is presented and then evaluated in the context of additional research that is relevant to the etiological hypotheses endorsed in the theory.

Beck's cognitive theory. Beck's (1974, 1976) cognitive model of depression is based on the assumption that individuals' affective responses are determined by the way they perceive and structure their experiences. The manner in which a depressed person interprets experiences is reflected in three types of cognitive schema, known as the "cognitive triad." The cognitive triad consists of a negative view of oneself, a negative view of the world, and a negative view of the future. Those symptoms that are typical of the depressive syndrome (e.g., loss of appetite, sleep disturbance, sadness, suicidal ideation) are secondary to the emergence of the cognitive schema in this triad.

In addition to the cognitive triad, various patterns of distorted thought processes are present in the depressed individual. Furthermore, they are presumed to be active prior to the emergence of the cognitive triad and depressive affect. These distorted thought processes serve to screen, integrate, and categorize experiences in a way that predisposes the individual to depression; and, having contributed to the development of the disorder, they serve to maintain the depressive thoughts in the cognitive triad.

Six types of maladaptive thought patterns contributing to depression are (a) selective abstraction, which involves responding to a relatively insignificant detail without regard to its context, thereby distorting the significance of the total situation; (b) arbitrary inference, which involves drawing a conclusion either without evidence to support it or in the presence of contradictory evidence; (c) overgeneralization, which involves forming a general rule or belief on the basis of one incident and applying that rule inappropriately to other situations; (d) polarized or dichotomous thinking, which involves thinking in absolutes or extremes such as "always" or "never;" (e) magnification/minimization, which refers to the tendency to exaggerate the magnitude or importance of negative events and to discount the significance of positive events (Beck, 1976; Hollon & Beck, 1979); and (f) personalization, which refers to the tendency to relate negative events to oneself without justification for doing so (Coleman & Beck, 1981).

There is a good deal of ambiguity in Beck's theory with regard to the role of these predisposing cognitions. While he proposes that those distorted cognitive patterns are the basis of an individual's vulnerability to depression, he downplays their etiological significance by portraying them as "relatively inactive" before the onset of depressive affect: "These (cognitive) schemas, relatively inactive during the nondepressed period, become progressively more potent as the depression develops" (1967, p. 285). If the distorted cognitions are not present until depressive affect appears, then they could easily be an epiphenomenon or a result of the affective disturbance. From a theoretical perspective, there would be no reason to postulate these

predisposing cognitions in the first place if they were functionally nonexistent. If the distorted cognitive patterns exist prior to the onset of depression, as Beck claims they do, then it must be possible to measure them. Otherwise their existence (and Beck's etiological hypothesis) would be untestable.

According to Beck (1976), the maladaptive thought processes have their origin early in life. Pervasive traumatic situations in childhood (such as death of a parent or chronic isolation by peers) may result in a negative view of the self, the world, and the future (the cognitive triad). Arising from this negative outlook are the maladaptive cognitive assumptions described above. While the assumptions continue to be present to some degree in the thinking of the depression-prone individual, the cognitive triad becomes dormant until the individual is faced later in life with a similar situation to which he/she overreacts (Coleman & Beck, 1981). The excessive reaction to analogous situations reflects the tendency of the depression-prone individual to draw "extreme, absolute" conclusions about these situations: "A loss is viewed as irrevocable; indifference as a total rejection" (Beck, 1976, p. 107).

In addition to those who experienced traumatic events early in life, individuals who, during childhood, set rigid, perfectionistic goals for adulthood are predisposed to depression. They also show a tendency to overreact, so that their life falls apart when they are faced with situations that are inconsistent with their lofty goals (Beck, 1974; Beck, 1976).

The events which precipitate depression in the susceptible individual may be present in the form of an acute or chronic stress. However, the necessary requirement for an event to be considered precipitating is that the individual perceive that event as a significant loss to his "personal domain." The significance of an event has no meaning in absolute terms, since a trivial event for one person may constitute a significant loss for another (Beck, 1974, 1976).

In therapy, the patient and the therapist work backward from the patient's dysfunctional beliefs in order to identify the maladaptive thought processes underlying those beliefs. The beliefs and thought processes are then logically analyzed and empirically tested. Another technique Beck advocates as a means of realigning thinking with reality is to have the patient complete behavioral assignments that increase his or her sense of mastery over problems or situations that previously seemed insurmountable (Shaw & Beck, 1977; Rush, Beck, Kovacs, & Hollan, 1977).

Beck's principal assumptions concerning the etiology of depression can be evaluated by reviewing previous research on the relationship of depression to (a) traumatic childhood events and (b) maladaptive cognitions. With respect to the former area of research, Beck is among many who have postulated that a significant loss in childhood can predispose an individual to adulthood depression (e.g., Abraham, 1966; Bowlby, 1961; Freud, 1950). Consequently, this idea has received a fair amount of attention in the research literature. In a review article by Lloyd (1980), 11 retrospective studies were cited in which the incidence of parental loss during childhood was compared in depressives

versus controls. Although differences exist among the studies in terms of the methodology or the composition of depressive and control groups, the majority of the studies lend support to the notion that childhood loss increases one's susceptibility to depression. Eight of the 11 studies found that depressives reported early parental loss more frequently than controls. One of the supporting studies was conducted by Beck, Sethi, and Tuthill (1963). It found that the incidence of childhood bereavement was 27% in severely depressed subjects compared to 12% in subjects with few depressive symptoms.

A synopsis of the eight studies with positive results indicates that the death of a parent before the age of 17 increases the risk of adulthood depression by a factor of two or three. Furthermore, subjects with a history of childhood bereavement seem to develop more severe forms of unipolar depression than subjects without such a history. Some of the studies reviewed by Lloyd suggest that maternal loss at any point in childhood is relevant to subsequent depression, but parental loss is relevant only if it occurs in later childhood (especially in females).

A logical explanation seems to exist for why the remaining three studies found no relationship between childhood bereavement and subsequent depression. In two of these studies, the depressed group of subjects consisted solely of manic-depressive patients. In the third study, manic-depressives comprised a portion of the depressed group. The inconsistency between the results of these studies and the results of the other eight studies suggests that the risk of <u>bipolar</u> depression is not increased by parental loss in childhood.

As Lloyd (1980) points out, many who suffer childhood bereavement do not experience depression in adulthood. Therefore, there are some unknown variables that determine one's response to loss. In postulating only one reaction to loss, Beck's theory does not consider the possibility of additional variables mediating one's reaction. The role of variables that are responsible for "exceptions" to Beck's conclusion would be an interesting and important area of investigation for the etiology of depression.

A second important principle in Beck's etiological account of depression concerns the existence of maladaptive cognitions which antedate and foster the onset of a depressive episode. Presumably these cognitions represent enduring patterns of thought in the depression-prone individual. A study by Altman and Wittenborn (1980) was intended to be an examination of the enduring "personality" features of depression-prone women, but it seems that the data from this study are actually more representative of predisposing cognitive features. (Whether these cognitive features actually reflect a susceptibility to depression is an issue that will be addressed shortly.)

Eighty-eight women who had been admitted and treated for depression in New Jersey psychiatric hospitals served as subjects in the study. All of these subjects were considered remitted on the basis of their responses to a six-item "inventory" of depressive symptoms. All had been discharged at least one month prior to the study, but most had been discharged for more than three months. A control group, which consisted of women with no history of psychiatric disturbances, was matched to the remitted group in terms of several demographic features.

Subjects from both groups filled out a 134-item inventory of self-statements which were followed by the responses, "true," "partly true," "partly false," and "false," It was assumed that the items distinguishing the two groups would reflect a susceptibility to depression in the remitted group.

The results showed that nearly one-half of the items distinguished the remitted from the control group. When the distinguishing items were factor analyzed, six factors emerged. The sixth factor was discarded because it only contained two items, which made it difficult to interpret. The other five factors, in descending order, were labeled self-esteem, preoccupation with failure/helplessness, unhappy pessimistic outlook, narcissistic vulnerability, and confidence/general sense of competence. Not surprisingly, the remitted group more frequently rated items in the first four factors as true of them, and the control group more frequently rated items in the confidence/competence factor as true of them.

While the cognitive or personality features represented in these factors distinguish remitted cases from normals, one should be cautious about inferring that, prior to any depressive episode, these features would distinguish susceptible from nonsusceptible women. It is quite possible that Altman and Wittenborn's assessment tapped self-perception cognitions that were altered by the circumstances surrounding an episode of depression, hospitalization, and discharge. It would not be surprising if a person who had recently been through these experiences displayed (a) lower self-esteem, (b) a more pessimistic or unhappy outlook, (c) a decreased sense of competence, (d) greater emotionality and

self-centeredness, and (e) a preoccupation with failure and helplessness. The five factors might therefore be consequences, rather than predictors, of severe depressive episodes.

A second study was conducted by Cofer and Wittenborn (1980) to validate and add to the factors of the Altman and Wittenborn (1980) study. In contrast to the previous study, the median interval since the last discharge was 39 months. This would seem to be enough time for subjects to recover from the traumatic circumstances surrounding their severe depressive episodes so that "enduring personality features" would be exposed (unless, of course, there were permanent alterations in self-perception as a result of the depressive episode). A similar design was used in this study; however, a new assessment device was constructed. This measure consisted of 150 self-report items--50 concerning the subject's perception of herself, 50 concerning her perception of her mother, and 50 concerning her perception of her father. Fifteen of the self-perception items were drawn from the previous inventory, and the remaining 35 were new.

The 15 items from the original self-perception scale again distinguished the remitted from the normal subjects. In addition, 14 of the new self-perception items were discriminatory. Of the 100 items measuring subjects' perceptions of their mother and father, only 14 distinguished the remitted from the control subjects. When all of the discriminatory items were factor analyzed, five factors were revealed whose items reflected significantly more pathological responses on the part of remitted subjects than normals. In descending order, the five factors were: unhappy outlook, narcissistic vulnerability, low self-esteem, critical mother, and dependency-fostering father.

Neither the Altman and Wittenborn nor the Cofer and Wittenborn study obtained specific measurements of Beck's predisposing cognitions; however, some of the factors from both studies seem representative of the cognitive triad, which is presumably active in ongoing depression. Negative views of the world and the future seem to be reflected in the items of the "unhappy pessemistic outlook" factor, while a negative view of oneself seems to be reflected in the items of the other four self-perception factors ("low self-esteem," preoccupation with failure/ helplessness," "narcissistic vulnerability," and "confidence and a general sense of competence"). The two parental factors, "critical mother" and "dependency-fostering father," might be interpreted as indicative of a negative view of the world (i.e., a negative recollection of interactions with one's parents).

Technically, women who are truly in remittance would not be displaying this cognitive pattern, according to Beck. One might speculate, nevertheless, that this cognitive triad type of thinking might be a chronic or enduring consequence of the severe depressive episode experienced by these patients. However, a study by Lewinsohn and his colleagues (Lewinsohn, Steinmetz, Larson, & Franklin, 1981) does not support the notion that distortions in thinking remain after the depressive episode has ended. Although Lewinsohn et al. did use cognitive measures that resembled the factors in the preceding two studies, the severity and circumstances of subjects' previous depressive episodes were probably not as intense on the average as subjects' previous depressive episodes in the other two studies. It is possible that a constellation of variables surrounding severe depressive episodes could lead to chronic cognitive distortions that are not produced by less severe cases.

The subjects in Lewinsohn et al.'s (1981) study consisted of 998 Oregon residents who were paid to participate in the project. Rather than looking at behavioral predispositions to depression, the objective of the study was to determine the direction of causality between maladaptive cognitions and depression. At the beginning of the study, subjects were mailed a depression scale (the Center for Epidemiologic Studies Depression Scale, CES-D) and five types of cognitive scales. The cognitive areas which these five scales were intended to measure included (1) locus of control, (2) expectations of positive and negative outcomes, (3) irrational beliefs, (4) perception of control, and (5) self-esteem. The scale measuring expectations of positive and negative outcomes was intended to operationalize Beck's cognitive triad. Lewinsohn et al. constructed this scale by selecting four negative statements and six positive statements from the Subjective Probability Questionnaire.

Around nine months after the initial assessment, subjects again completed the depression scale and cognitive scales. The question of predisposing cognitions in the etiology of depression was examined in the group of subjects who were not depressed at the time of the initial assessment (T_1) but were depressed at the time of the second assessment (T_2). There were 85 individuals in this group, nine of whom were experiencing their first episode of depression at T_2 and 76 of whom had experienced depression prior to the T_1 study. Among those with a history of the disorder, the data suggest that previous spisodes of depression did not produce permanent alterations in cognitive patterns because a retrospective analysis of the T_1 data revealed no difference

in the predepression (premorbid) cognitions of "new" cases and "repeat" cases of depression. When a retrospective comparison was made of T_1 cognitive measures in depressed versus nondepressed subjects, the depressed subjects' premorbid cognitions did not differ significantly from the cognitions of nondepressed subjects along any of the five cognitive dimensions. Correlations between cognitive and depression scores at T_2, however, showed that subjects with ongoing depression did show significantly more distorted cognitions than nondepressed subjects on all five cognitive measures. Lewinsohn et al. (1981) summed up their findings in the following manner:

> Prior to becoming depressed, these future depressives did not subscribe to irrational beliefs, they did not have lower expectancies for positive outcomes or higher expectancies for negative outcomes, they did not attribute success experiences to external causes and failure experiences to internal causes, nor did they perceive themselves as having less control over the events in their lives. (p. 218)

Though the adequacy of the abbreviated assessment devices might be questioned, the results seem to indicate that maladaptive cognitions are a consequence or epiphenomenon, rather than an antecedent, of depression. Lewinsohn et al. were quick to add, however, that their results do not foreclose the possibility that cognitions could contribute to the onset of a depressive episode through the individual's interpretation of life events.

Assessment devices have been constructed to measure the specific patterns of cognitive distortion to which Beck attributes both causal and sustaining roles in depression. Krantz and Hammen (1979) constructed the Cognitive Distortion Questionnaire (CDQ) for this purpose,

and their investigation of its psychometric properties has provided some data concerning the relationship between distorted cognitions and depression (Krantz & Hammen, 1979). The CDQ consists of six stories depicting potentially problematic situations, with three or four multiple-choice questions about each situation. Subjects are instructed to put themselves in the place of the main character while reading the story and then answer the questions by trying to imagine how the main character felt. The responses to the questions are designed to capture such maladaptive assumptions as arbitrary inference, magnification, and minimization. Every question has four possible responses, and each of these responses reflects both an affective and a cognitive reaction to the situation in the story. For each question, then, there is a depressive-distorted response, a depressive-nondistorted response, a nondepressive-distorted response and a nondepressive-nondistorted response. Subjects are assigned scores on the basis of the number of depressive-distorted answers given.

To obtain reliability and validity data, the CDQ was administered concurrently with the Beck Depression Inventory (BDI) to three groups of subjects: depressed college students, a mixed group of psychiatric inpatients, and a group of depressed outpatients. In all subject groups, these measures were repeated eight weeks after the initial administration, and in the depressed outpatient group, these measures were taken a third time as a one-month follow-up to treatment.

The concurrent validity of the CDQ was established by a significant positive correlation between the depression scores and the depressive-distortion scores in all subject groups. In addition, a

decline in the BDI scores of the depressed outpatient sample was accompanied by a decline in CDQ depressive-distortion scores. Similar relationships were observed in other subjects whose BDI scores decreased from the first administration to the second; however, those whose depression scores increased did not exhibit a corresponding increase in depressive-distorted cognitions. These results seem to support Beck's conceptualization of maladaptive thought processes that promote and maintain depressive affect. The maladaptive cognitions of these subjects accompanied depression and remained constant in the face of further deterioration in mood, and when the cognitions declined so did depressive affect. However, it is not possible to determine from these correlational data the direction of causation between cognitions and affect.

Some additional data from the Krantz and Hammen (1979) study suggest that the degree of distortion exhibited by the depressed individual may predict his or her response to treatment. In the clinically depressed group, two subgroups were formed: those who had the highest pretreatment depressive distortion scores (three or greater) and those who had the lowest depressive-distortion scores (under three). Then the two groups were compared with respect to their BDI scores from the one-month posttreatment follow-up. This comparison revealed that the subjects manifesting high pretreatment distortion exhibited significantly more depression at follow-up than subjects with low pretreatment distortion. However, greater depression at follow-up was also associated with higher pretreatment depression scores, suggesting that more severely depressed subjects tend to remain depressed longer. Thus, it

seems that both the degree of depression and the degree of cognitive distortion determine the persistence of a depressive episode.

Although the Krantz and Hammen measure of cognitive distortion did reliably distinguish between depressed and nondepressed subjects, not all of the depressed individuals exhibited distorted thinking, and not all of the distorted thinkers were depressed. The authors conclude that depression without cognitive distortion is more "benign" than depression accompanied by cognitive distortion. They further speculate that cognitive distortion in the absence of depression indicates a susceptibility to develop the disorder when a personally significant loss or failure is experienced. While the latter speculation is consistent with Beck's theory, the former is inconsistent with his theory. From Beck's perspective, it is possible for distorted thinking to occur in the absence of depression (in the susceptible individual), but it is not possible for depression to occur in the absence of distorted thinking. Since maladaptive cognitions are presumed to lie at the root of the affective disorder, the absence of distorted thinking in depressed individuals constitutes a major problem for Beck's theory.

In addition to the Cognitive Distortion Questionnaire, the Dysfunctional Attitudes Scale (DAS) has been designed to assess the maladaptive thought processes that presumably lead to depression. Research on the psychometric properties of the DAS (Weissman, 1980) has supplied data that bear on the direction of causality between distorted thinking and affect. Alternate versions of the DAS and the BDI were administered eight weeks apart to undergraduate and graduate students who were not undergoing psychotherapy. To investigate Beck's notion

that distorted cognitions precede depressive affect, cross-lagged partial correlations were used to determine the extent to which DAS scores predicted future BDI scores above and beyond the preceding BDI scores. To investigate the possibility that depressive affect precedes distorted cognitions, the same analysis was used to determine the extent to which BDI scores predicted the second set of DAS scores above and beyond the previous DAS scores. A borderline relationship between previous DAS scores and future BDI scores suggested that depressive affect followed distorted cognitions. The relationship between previous BDI and future DAS scores was not significant.

Weissman plans to investigate the ontogeny of Beck's predisposing cognitions in some future research. The study she proposes will examine the development of maladaptive thought patterns by administering the DAS to children (a childhood version) and their immediate family. The study will attempt to show that dysfunctional cognitions are learned (Weissman, 1980).

The results from studies of postdepression cognitions seem to support Beck's notion that depression-prone individuals exhibit maladaptive cognitions. Studies which have examined the predictive validity of cognitive assessment devices have also lent some support to this notion. However, neither of these research strategies has provided a direct approach to the question of predisposing cognitions in depression. A direct approach to this question would involve measuring these predisposing cognitions before the individual experiences a depressive episode. Lewinsohn et al. (1981) utilized this strategy and found that cognitive distortions did not predict future depression. The adequacy

of their cognitive measures was, however, questionable for a test of Beck's hypothesis.

The strategy of the present study resembled the direct approach of the Lewinsohn et al. study, but a measure of distorted cognitions (the DAS) that Beck himself would consider appropriate (Weissman & Beck, 1978) was used to assess the predisposing cognitive patterns in depression-prone individuals. The presence of traumatic childhood events in the subjects' histories was also examined. The ability of these two factors (cognitive distortions and traumatic childhood events) to predict depression after childbirth were compared to the predictive power of other social and psychological variables.

Statement of Purpose

The purpose of this study was two-fold. The first major objective was to evaluate the etiological postulates of Beck's (1976) cognitive theory of depression. The second, but no less important, objective of this research was to identify factors that predispose women to postpartum depression. To evaluate the postulates of Beck's theory, those factors that are purported to predispose individuals to depression were examined in pregnant women to see how well they predict the occurrence of postpartum depression. There is a consensus in the literature that postpartum depressive disorders and other forms of depression are not distinguishable on the basis of symptomatology. Therefore, pregnant women seemed to be an appropriate population in which to study etiological variables in both puerperal and nonpuerperal depression.

The factors that make one susceptible to depression, according to Beck, are dysfunctional cognitive patterns. The Dysfunctional Attitudes Scale (DAS) (Weissman, 1980), a measure of maladaptive thought patterns, was used to examine the relationship between women's cognitions during pregnancy and their postpartum affect. If Beck's assumptions about the etiology of depression are correct, high DAS scores during pregnancy should predict the occurrence of depression in the puerperium, because a high level of cognitive distortion creates a susceptibility to depression. The DAS was also administered puerperally to examine the concurrent relationship between distorted cognitions and any depressive affect that might have developed after delivery. From Beck's perspective, distorted cognitions are a key feature of the depressive state. If distorted cognitions do not predict postpartum depression, but they do occur concurrently with the disorder, then a possible conclusion would be that distortions in thinking are a symptom rather than a cause of depression.

Other factors that are presumed by Beck to be causally related to the formation of dysfunctional attitudes and subsequent depression were examined through a prenatal questionnaire constructed by this author. Certain items on the questionnaire dealt with such predisposing factors as significant losses in childhood, lofty expectations, and rigid self-imposed standards. According to Beck, these factors should be present to a greater extent in women who develop postpartum depression than those who do not.

In addition to evaluating Beck's hypotheses concerning the etiology of clinical depression, a second objective of the study was to

identify factors that predispose women specifically to postpartum depression. One of the ways this was pursued was by examining the predisposing variables indicated by the cognitive theory. Another way this objective was pursued was by examining some of the social/psychological and biochemical variables that have been implicated in previous studies of predisposing factors. These variables were measured in the prenatal questionnaire constructed by the author. The prenatal questionnaire assessed variables relating to demographic characteristics, reproductive history, self-perception, marriage, and history of mental disturbance. This questionnaire also indirectly assessed possible hormonal contributions to postpartum depression by soliciting information from subjects about their history of emotional reactions to particular hormonal conditions. If any of the social/psychological or the biochemical variables measured in this questionnaire did in fact predispose women to postpartum depression, then there would be a strong relationship between these variables and postpartum depression scores.

To overcome a deficiency of many studies in the past, a valid, standardized instrument, the Zung Self-Rating Depression Scale, was used to measure depression. Because this instrument was not designed specifically for postpartum women, it is conceivable that normal aspects of the postpartum period could affect women's responses to several items on the scale (e.g., "I have difficulty sleeping at night."). Therefore, a second questionnaire was constructed by the author which provided a more complete distinction between normal and depressive aspects of the postpartum period than the depression scale could provide. This questionnaire made it possible to examine the relationship of depression

scale scores to normal versus depressive features of the postpartum period. If certain items on the depression scale measured normal postpartum features rather than the subject's affective state, there should be a correlation between depression scores and the normal postpartum features on the author's questionnaire. If, however, these items are indicative of the subject's affective state rather than normal postpartum features, there should be a high correlation between depression scores and the more explicit depressive symptoms represented on the postpartum questionnaire. The pattern of responding to individual items on the depression scale was also examined to determine whether the items in question were measuring normal or depressive features.

CHAPTER II

METHOD

Subjects

With permission from the appropriate sources, it was possible to recruit subjects from the public health clinic, the private practice of obstetricians, and prenatal classes in the vicinity of Greensboro, North Carolina. Women who were between 32 and 36 weeks pregnant were requested orally and in writing to participate in the study. The request is depicted in Appendix A. In addition to providing a brief description of the study's rationale and procedure, the request for volunteers explained to the woman that she would be able to withdraw from the study at any time, that her relationship with her doctor (or instructor) would not be affected by her decision, that her answers would remain confidential, and that she could receive a report of the study's outcome. Women who were unwilling to participate simply returned the form to the experimenter.

Those who agreed to participate filled out a consent form which asked the woman to sign her name and to indicate her husband's name if she were married. (The husband's name was necessary to identify the delivery when it was announced in the newspaper.) The participant was further asked to indicate her due date, the hospital where she planned to deliver, the name of her doctor, the date and time of her next appointment, and the date on which she filled out the form.

One hundred and fifty-five women agreed to participate in the study; however, only those women who completed both the prenatal and postpartum measurements could serve as subjects in the study, since both sets of measurements were essential. One hundred and thirty-two women qualified as subjects by completing both sets of measurements. Eleven percent of the subjects were under 20 years of age, and 83% were between the ages of 20 and 34. Six percent were 35 years of age or older. Eighty-nine percent of the women were married. Eighty-one percent of the subjects were white, 17% were black, and 2% were Hispanic or other. Eighty percent had at least a high school education, and 26% had at least a college degree. Yearly income (from all sources) was less than $10,000.00 for 20% of the subjects, between $10,000.00 and $24,999.00 for 39% of the subjects, and greater than $25,000.00 for 41% of the subjects. Thirty-three percent were not employed at the time of the prenatal assessment, and 6% worked 20 hours per week or less. Fifty percent of the women worked 21 to 40 hours per week, and 11% worked more than 40 hours per week. These demographic characteristics of the sample are presented in more detail in Table G-4 (Appendix G).

Procedure

Questionnaires were administered during pregnancy and during the postpartum period. Three questionnaires were completed by the subjects in the prenatal assessment phase: the Self-Rating Depression Scale (Zung, 1965; 1973), the Dysfunctional Attitudes Scale (Weissman, 1980), and a prenatal questionnaire designed by the author. These questionnaires were presented to the subject in a folder, and she began filling

them out during the free time before her obstetric examination (or prenatal class) commenced. If the subject was unable to finish the questionnaires, she was allowed to finish them after the obstetric exam (class) or two weeks later at her next appointment (class). To insure consistency in the procedure, only prenatal classes that met at intervals of two weeks or less were considered for subject recruitment. In addition, questionnaires were always administered in the following order: the Self-Rating Depression Scale, the Dysfunctional Attitudes Scale, and the author's prenatal questionnaire.

The times of the subjects' deliveries were ascertained by checking the birth announcements in the local newspaper and by consulting with the obstetric practice. The subject was not asked to complete the postpartum measurements if her baby did not survive or if it manifested a serious congenital disorder. One woman was omitted from the subject pool for this reason.

Mothers of normal babies were given another folder containing three questionnaires when they came to their obstetrician's office for the postpartum examination. This folder of postpartum measures contained the Self-Rating Depression Scale, the Dysfunctional Attitudes Scale, and a postpartum questionnaire constructed by the author. Again, the subject was asked to fill out the questionnaires while she waited to see the doctor or before she left the office. If it was inconvenient for her to complete the forms at the office or if the experimenter missed her postpartum appointment, the experimenter took the questionnaires to the subject's home at a time suitable to her (usually within one week). The average time of the postpartum

assessment was six weeks after delivery, with a range of 4 to 12 weeks. Twenty-two women were inaccessible by either phone or travel after the experimenter missed them at their postpartum check-ups. Consequently, they were dropped from the study.

Pre- and Postdelivery Measures

Prenatal questionnaire. The prenatal questionnaire was designed by the author to incorporate variables that have been found by the previously discussed studies to be predictive of postpartum depression (Appendix B). It also contains variables that pertain to Beck's hypotheses concerning the etiology of depression. Basically the questionnaire contains items relating to six categories of potentially predictive factors: (1) demographic characteristics, (2) quality of life, (3) psychiatric history, (4) hormonal predispositions, (5) attitudes toward the baby, and (6) Beck's predispositions. Conceptually, there was some overlap in the items of the first two categories. For example, demographic items assessed such subject characteristics as age, race, income, and marital status. To gain information about the quality of the subject's life, some demographic items, such as marital status and income, were used along with other items, such as happiness with the marital situation. The third category of items concerned the subject's psychiatric history, the nature of any psychological disturbances she might have experienced, and the type of treatment she received, if any. The items in the fourth category were designed to identify hormonal factors that might predict postpartum depression by examining preexisting behavioral and affective correlates of certain hormonal conditions (e.g.,

menstruation or pregnancy). In the fifth category the items were designed to assess the subject's feelings about having the baby. The final category contained items that were designed to tap two factors which predispose one to depression according to Beck: significant losses in childhood and self-imposed, perfectionistic standards.

Self-Rating Depression Scale. The degree of depressive symptoms in subjects was measured before and after delivery with Zung's (1965, 1973) Self-Rating Depression Scale (SDS). The concurrent validity of the SDS has been established through significant correlations between this measure and depression scores from the Hamilton Rating Scale (Brown & Zung, 1972), the Beck Depression Inventory (Zung, 1969), the MMPI's "D" scale (Zung, Richards, & Short, 1965; Zung, 1967), and the Depression Adjective Checklist (Marone & Lubin, 1968). The discriminant validity of this scale has been demonstrated in studies which show that patients with a diagnosis of depression are distinguished from patients with other types of psychiatric diagnoses on the basis of their SDS scores (Zung, 1965, 1967; Zung, Richards, & Short, 1965). The split-half correlation between odd and even items (.73) has shown the SDS to be internally consistent (Zung, 1975). Zung (1965, 1973) does not report test-retest reliability data for the depression scale.

The SDS (Appendix C) consists of 20 self-statements which are rated in terms of their applicability to the subject (a little of the time, some of the time, a good part of the time, and most of the time). Four categories of depressive symptoms are represented: (a) pervasive affective disturbance (two items), (b) physiological disturbances (eight items), (c) psychomotor disturbances (two items), and

(d) psychological disturbances (eight items). To score the SDS, the response to each item is assigned a score of 1 to 4, with one indicating the least depressive response and four indicating the most depressive response. The item scores are then summed, and this sum is divided by 80 to arrive at a percentage score. This percentage score is called the "index." Thus, a high SDS index reflects a high level of depression. An index of 50-59 is indicative of mild depression, and an index of 60 or greater is indicative of moderate to severe depression.

Dysfunctional Attitude Scale. Form A of the Dysfunctional Attitude Scale (DAS) was used to measure the magnitude of cognitive distortion in women before and after their deliveries. The concurrent validity of the DAS has been demonstrated through a significant correlation ($r = .52$, $p < .001$) with the Story Completion Test, which is another measure of cognitive distortion. The relationship of DAS scores to depressive affect has been established by significant correlations with both the Beck Depression Inventory ($r = .47$, $p < .001$) and the D-scale of the Profile of Mood States ($r = .44$, $p < .001$). The discriminant validity of the DAS has been demonstrated by Weissman (1980) on two different occasions. Subjects who were labeled depressed (according to their scores on the Beck Depression Inventory) scored significantly higher on the DAS than subjects who were not considered depressed ($t(353) = 4.63$, $p < .001$ and $t(353) = 5.42$, $p < .001$). Item-total correlations have demonstrated the internal validity of both the A and B forms of the DAS. Item-total correlations ranged from .25 to .76, and all were significant at the .001 level. Significant alpha correlations were also found on two administrations of Form A (.89 and .92)

and two administrations of Form B (.89 and .90). The reliability of the DAS is good, as illustrated by a test-retest coefficient of .84 ($p < .001$) for a period of eight weeks.

The DAS (Appendix D) consists of 40 self-report items depicting beliefs or attitudes. The types of attitudes represented in the items of the DAS concern approval, love, achievement, perfectionism, entitlement, omnipotence, and autonomy (Weissman, 1980). For each item, the subject has a choice of seven response categories (totally agree, agree very much, agree slightly, neutral, disagree slightly, disagree very much, and totally disagree). The responses are scored on a modified Likert scale, with the response at the adaptive end of the scale receiving a score of one and the response at the maladaptive end receiving a score of seven. (A response is scored zero if it is omitted.) The item scores are summed to arrive at the total DAS score, so that the higher the total score, the more distorted the individual's thinking.

Postpartum questionnaire. The postpartum questionnaire was administered, along with the Self-Rating Depression Scale and the Dysfunctional Attitudes Scale, at the time of the postpartum obstetric examination. It was constructed by the author to identify behavioral, cognitive, and physical features that are typical of the postpartum period and to distinguish the features of a normal postpartum period from those of a depressive postpartum period. While investigating the existence of depressive symptoms, it takes into account environmental and physiological conditions of the postpartum period that could affect the woman's response to items on a measure of standard, nonpuerperal depression. In relation to the Depression Scale, items on this

questionnaire provide more elaborate data on normal postpartum versus depressive behavior patterns. For example, one group of questions was designed to distinguish between sleep loss arising from baby's needs versus sleep loss arising from an affective disturbance. Other groups of questions with a similar objective pertain to weight changes, libido, mood or cognitive changes, physical discomforts associated with the postpartum period, breast feeding, and behavior of the newborn. Appendix E contains a copy of the postpartum questionnaire.

CHAPTER III

RESULTS

Data collected in the prepartum and postpartum assessments were analyzed in eight regression analyses. In all eight analyses, postpartum depression scores served as the dependent measure. The strategy used to select predictor variables for each analysis differed for the prepartum and postpartum data. For each analysis involving prenatal data, a conceptual "theme" was used to guide the selection of predictor variables. The themes were derived from conceptually related items on the prenatal questionnaire. Six themes, and therefore six analyses, were derived from the prenatal data. They concerned (a) demographic characteristics of the sample, (b) quality of the subject's life situation, (c) behavioral and emotional correlates of particular hormonal conditions, (d) present and past psychological conditions, (e) factors pertaining to Beck's theory of depression, and (f) thoughts and events concerning the baby (this analysis actually included predictor variables from both the prenatal and the postpartum questionnaires). From the six regression analyses involving prenatal data, significant and potentially significant prenatal predictors were extracted and combined to serve as predictor variables in one large regression analysis of postpartum depression scores.

The principal strategy for establishing predictor variables from the postpartum data was a statistical, rather than a conceptual, one. Instead of using single items from the postpartum questionnaire, nearly

all of the questionnaire items were factor analyzed to organize and to condense them into conceptually relevant factors. Then these factors served as predictors with several other postpartum variables in one regression analysis of postpartum depression scores.

In addition to the eight regression analyses of postpartum depression scores, several other statistical computations were performed. To examine the relationship between concurrent measures of depression and dysfunctional attitudes, a Pearson product-moment correlation coefficient was computed for both the prenatal and the postnatal administration of these measures. A correlation coefficient was also computed between postpartum depression scores and the age of the subject's last child, for those who had children at the time of the prenatal assessment. To determine whether some items on the depression scale were measuring factors related to the prenatal or postnatal condition rather than symptoms of depression, means and standard deviations were calculated for every item on both administrations of the scale.

The results are arranged so that subjects' prepartum and postpartum performance on the depression scale is described first. Then the seven regression analyses involving prenatal data are presented, followed by the regression analysis involving postpartum data. The factor analysis of postpartum variables is described in the context of the postpartum regression analysis. The auxiliary correlation coefficients are also described in the context of the regression analyses to which they are conceptually related.

For each regression analysis, there are two tables--one depicting the outcome of the analysis and one depicting the response frequency

data for each variable in the analysis. The response frequency data are expressed in terms of the number and proportion (percentage and cumulative percentage) of women who responded in particular ways to each assessment question or scale. In addition to the variables involved in a particular analysis, the frequency tables portray variables that were conceptually related to that analysis but did not meet certain criteria for inclusion in the regression equation.

Analysis of Prepartum and Postpartum Depression Scores

Women's scores on the prepartum and postpartum administration of the Zung Depression Scale are shown in Figures 1 and 2, respectively (Appendix F). The depression scale index is represented on the abscissa of these frequency histograms. Using the cutoff scores recommended by Zung (1965), indices ranging from .50 to .59 are indicative of mild depression, while indices greater than .59 indicate moderate to severe depression. According to this classification strategy, 29.5% of the women experienced a mild form of depression at the time of the prepartum assessment (Figure 1), and 16.7% experienced moderate to severe depression. At the time of the postpartum assessment (Figure 2), 17.4% of the women were mildly depressed, and 5.3% were moderately or severely depressed.

The incidence of postpartum depression was much higher in women who were depressed at the time of the prepartum assessment than in those who were not. Of the 22 women who experienced a moderate to severe level of depression during the prepartum assessment, 4 experienced the same degree of depression postpartum. Of the 110 women who

did not experience moderate to severe prepartum depression, 3 experienced this degree of depression at the time of the postpartum assessment. These findings are represented in the frequency matrix in Table G-1. Appendix G contains this and all subsequent tables.

To investigate whether prepartum or postpartum depression scores could have been elevated by nondepressive aspects of pregnancy or the puerperium, individual items from the two assessments were examined with respect to typical response patterns. If responses to particular items on the Zung Depression Scale were influenced by conditions that are typically associated with pregnancy or the puerperium, the variability of those particular Zung items would be low. Furthermore, the scores on those items would, in most cases, deviate from low (nondepressive) values toward high (depressive) values. To determine whether certain items were affected in this manner, the mean and standard deviation were calculated for each item on the Zung Depression Scale from both the prenatal and the postpartum administrations. These calculations are shown in Tables G-2 and G-3 with the items ranked according to decreasing values of their standard deviations.

With respect to the prenatal administration, the four items that a priori would seem most susceptible to influence from pregnancy factors were: Item 4, "I have trouble sleeping at night;" Item 10, "I get tired for no reason;" Item 8, "I have trouble with constipation;" and Item 7, "I notice that I am losing weight." The weight item exhibited the lowest degree of variability on the scale (SD = .400); and the mean response to this item was the lowest of any item (M = 1.091). As might be expected, the low mean indicates that answers to the question about

weight loss tended to be in the "little of the time" response category indicating that most of these pregnant women were not losing weight. Responses to the constipation item showed more than twice as much variability (SD = .869), with a mean of 1.674. The items concerning fatigue and insomnia had relatively high means (M = 2.432 and 2.356, respectively), but there was a relatively high degree of variability in the responses to these items (SD = 1.020 and 1.071, respectively). Looking at the overall pattern of variability among the prenatal items, there is no obvious group of low-variability items that would be influenced by factors related to pregnancy. Apart from the weight question, the items that exhibited low variability seem unrelated to pregnancy.

The overall pattern of variability looked the same for responses to the postpartum Zung scale items. There was no conspicuous group of low-variability items whose consistency could be accounted for by ubiquitous postpartum conditions. The items which might have been most likely to reflect postpartum conditions were "I still enjoy sex," "I notice that I am losing weight," "I have trouble sleeping at night," and "I have trouble with constipation" (caused, perhaps, by breast feeding or hemorrhoids). The item concerning sex is the most variable of these four items (SD = 1.146), with an average score of 2.0 ("some of the time" response category). The weight item is the next most variable item (SD = 1.048), also with a mean score of 2.0. The insomnia item (SD = .774) and the constipation item (SD = .711) are not distinguished as low variability items; furthermore, the average score on both of these items (M = 1.4 for both) fell between the "little of the time" and "some of the time" response categories which are nondepressive in

administration, there appears to be no constellation of low-variability items that would be indicative of postpartum rather than depressive features.

Demographic Predictors

The first multiple regression analysis examined the relationship of demographic variables to postpartum depression levels. The prenatal questionnaire (constructed by the author) contains seven items that may be considered demographic in character. The seven items concern the subject's age, race, marital status, existence of children, income, education, and number of hours she worked weekly. These variables are represented in Table G-4 which shows the response frequency for each level of the variable (that is, number of women who replied in each category), as well as the percentage and cumulative percentage of the response frequency.

Before entering the variable, race, into the regression analysis, the "black," "hispanic," and "other" levels of the variable were collapsed to form a dichotomous variable consisting of "white" and "not white" categories. This reconstruction of the race variable was necessitated by the low response frequencies in the "hispanic" and "other" categories. For the same reason, this procedure was used to reconstruct the variable, marital status, before entering it into the regression equation. The "married" level remained, while all other categories were collapsed to form a "not married" level of the variable. These two reconstructed variables, along with the five remaining demographic variables, served as predictors in a regression analysis of postpartum depression scores. The variable, "job description," was omitted from

the analysis to avoid using too many categorical variables as predictors. (The maximum number of categorical variables for any particular analysis was no more than one half the total number of variables in that analysis.)

The results of this regression analysis are represented in Table G-5. The table lists six values for each predictor variable in the regression analysis. The first value, "r," is a correlation coefficient which indicates the independent relationship between the predictor variable and postpartum depression scores. The second value, partial r, can be squared to indicate the amount of variability in postpartum depression scores that can be predicted by the variable in the context of all the other predictor variables. The squared partial r is represented in the third column. The standardized β value provides a standardized measure of the change in postpartum depression scores that corresponds to a one-unit increase in the predictor variable. The next column represents the t value of each variable's β, and the probability value, p, indicates the two-tailed significance level of t for that variable.

The probability values for this analysis indicate that none of the demographic variables was a statistically significant predictor of postpartum depression scores. Consequently, the combined predictive power of all variables in the regression equation was not significant, $F(7,123) = 1.17$, $p = .33$.

Life Situation Predictors

Four variables from the demographic analysis were used in a regression analysis that was designed to look at the relationship

between the subject's postpartum depression score and her life situation (i.e., variables that could be related to the quality of her life). The four demographic variables repeated in this analysis were marital status (married/not married), income, existing children, and hours working weekly. A fifth predictor variable consisted of an item from the prenatal questionnaire in which the subject was asked to rate her happiness in the living situation associated with her marital status. Table G-6 shows the response frequencies and percentage measures frequency for this variable.

As shown in Table G-7, the degree of happiness associated with one's marital situation was significantly related to postpartum depression scores, t (130) = -2.145, p = .03. Happiness with the marital situation was negatively correlated (r = -.216) with postpartum depression scores, indicating that low happiness scores were associated with high depression scores. None of the other variables was significant, which is consistent with the demographic regression analysis. The overall predictive power of the regression equation was not significant, ($F(5,125) = 1.96$, p = .09. Altogether, the life quality variables accounted for 7.3% (r squared = .073) of the variability in postpartum depression scores, with the happiness in marital situation variable accounting alone for 3.5% of the variability.

One variable that has been found in other studies (Yalom et al., 1968; Jacobson, 1965) to be related to postpartum depression could not be included in the analysis of life situation variables. This variable was the amount of time since the subject's last delivery. In previous research, postpartum depression was associated with long intervals

since the last delivery. Since many of the subjects in this study did not have children at the time of the prenatal assessment, only a portion of the sample answered the question, "In what month and year was your last child born?." To ascertain the relationship between the age of the last child and postpartum depression levels, a Pearson product-moment correlation coefficient was computed between these two measures using only the portion of the sample who answered the question. The correlation was not significant, however, r (51) = -.192, p = .09. Table G-8 shows the response frequencies for the question concerning the birth of the last child.

Hormonal Predictors

To determine whether physical and emotional correlates of hormonal conditions are associated with postpartum depression, nine variables were selected from the prenatal questionnaire to serve as predictor variables in a regression analysis of postpartum depression scores. Three predictors concerned physical and emotional correlates of pregnancy. These were emotional reactions during this pregnancy, physical problems during this pregnancy, and number of miscarriages during previous pregnancies. The remaining six variables concerned physical and emotional correlates of menstruation. These included pain of menstrual cramps, tension during menstruation, irritability during menstruation, mood swings during menstruation, number of emotional reactions during menstruation, and regularity of periods. A tenth variable "no change in mood during periods" was represented in the constant of the regression equation. A variable concerning unhappiness during

menstruation and two other variables pertaining to hormonal factors were omitted from the analysis because so little variability was manifested in the response frequencies. In addition, questions pertaining to birth control pills were omitted because of statistical complications caused by missing data from subjects who had no experience with birth control pills. Table G-9 contains raw and percentage frequency measures for the variables included in the "hormonal" regression analysis as well as those that were omitted from the analysis.

Table G-10 illustrates the results of the analysis. As shown in this table, none of the hormonal variables was a significant predictor of postpartum depression scores. Consequently, the overall predictive power of the regression equation was not significant, $F(9,121) = .86$, $p = .56$.

Psychological Predictors

The predictive value of the subject's past and present psychological condition was examined in a regression analysis employing four variables as predictors of postpartum depression scores. Two of these variables consisted of questions from the prenatal questionnaire concerning the subject's history of psychological problems. The first question asked subjects to report whether they had ever suffered from a serious psychological or emotional problem, and the second asked them to report whether they had ever received treatment for such a problem. The other two predictor variables concerned the subject's psychological condition at the time the prenatal measures were taken, namely, the prenatal Zung depression score and the prenatal dysfunctional attitudes (DAS) score.

Table G-12 shows that the variables concerning the subject's psychological history were not significant predictors of postpartum depression. However, it is hard to assess the true predictive value of these variables because so little variability was reflected in subjects' responses to these questions as illustrated in the frequency Table G-11.

The two variables concerning the subject's existing psychological state were both highly significant predictors of postpartum depression scores. The prenatal depression score (Zung SDS) showed a positive correlation (r = .531) with postpartum depression that was highly significant, t (130) = 5.851, $p < .000$. Alone, prenatal depression scores accounted for 21.3% of the variability in postpartum depression scores. The prenatal DAS scores also showed a significant positive correlation (r = .378) with postpartum depression scores, t (130) = 2.987, p = .003. Prenatal DAS scores accounted for an additional 6.5% of the variability in postpartum depression scores. So, together, the DAS and Zung scores uniquely accounted for 27.8% of the variability, resulting in a highly significant regression equation, $F(4,127) = 15.59$, $p < .00001$.

Four prenatal questions concerning the subject's present and past psychological condition were omitted from the "psychological" regression analysis because there was so little variability in the responses to these questions. The response frequencies for these questions are represented in Table G-11. As shown in the table, no subjects indicated that they were receiving treatment of a psychological problem at the time of the prenatal assessment. Of the eight subjects who had received

treatment in the past, none had ever been treated for postpartum depression.

Beck's Theory of Depression

Etiological variables. The fifth regression analysis involved nine predictor variables pertaining to Aaron Beck's theory of depression. The nine predictor variables are listed in the summary of the regression analysis in Table G-14. Six of the variables in the regression analysis were derived from the questions concerning death (PRE Q23-25) in Table G-13. These questions arose from Beck's notion that the loss of a significant other during childhood predisposes one to depression. For the regression analysis, a variable labeled "death of a parent" (Table G-14) was formed by combining the data in the mother and father response categories of question 25 (Table G-13). The same procedure was used to form the "death of a sibling" variable from the mother and sister response categories. The "death of others" variable represents the number of deaths experienced which were neither parents nor siblings. Two other death-related variables were established from the prenatal question (Q24) concerning the age at which the death was experienced. The "childhood death" variable was formed by combining the data from the 18 years and under response categories, while the "adult death" variable was formed by combining data from the over-18-years response categories. These variables were designed to determine whether death of a loved one in childhood is a better predictor of postpartum depression than death of a loved one in adulthood. The sixth variable relating to death of loved ones was the total number of

significant deaths reported by the subject regardless of the age at which they were experienced.

The seventh predictor variable examined the idea that a pattern of setting high standards predisposes one to depression. The variable, "sets high standards," reflects the subject's estimate of the frequency with which she self-imposes high standards. The eighth variable reflects the ease with which the subject reaches the goals she imposes on herself. The ninth predictor in this regression analysis was prenatal DAS scores, which are a measure of Beck's predisposing dysfunctional cognitions.

The prenatal DAS score was the most significant predictor of postpartum depression levels, t (130) = 4.736, $p < .000$. As in the analysis of psychological variables, the prenatal DAS scores showed a positive correlation with postpartum depression scores (r = .381), indicating that high DAS scores were associated with high depression scores. The proportion of variability in the dependent measure that this variable uniquely accounted for was 15.6%.

Several of the variables concerning death were significant predictors of postpartum depression scores. The most significant of these predictors was the "death of others" variable, which uniquely accounted for 8% of the variability in postpartum depression scores, t (130) = 3.247, p = .012. Since this variable was negatively correlated (r = -.014) with the dependent variable, the fewer the number of deaths in the "other" category, the higher the postpartum depression score.

Death of a sibling and death of a parent were also significant predictors of postpartum depression levels. Death of a sibling accounted for 7% of the variability in postpartum depression scores, t (130) = 3.095, p = .002, while death of a parent accounted for 6.7% of the variability, t (130) = 2.950, p = .004. Death of a sibling was positively correlated with the dependent measure (r = .016), so that women who had lost one or more siblings were more likely to have a high postpartum depression score. Death of a parent, however, was negatively correlated with the dependent measure (r = -.047), so that women who had not lost a parent were more likely to have high postpartum depression scores.

The "number of deaths experienced" was a significant predictor variable, t (130) = -3.018, p = .003, accounting for 7% of the variability in postpartum depression scores. Its negative correlation with the dependent measure (r = -.088) indicates that, the greater the number of deaths experienced, the lower the postpartum depression score.

Although the relationship of the deceased and the number of deaths were significant in predicting postpartum depression, the age at which the death(s) occurred did not seem to be important. In contrast to Beck's hypothesis, death(s) experienced during childhood was not a significant predictor of postpartum depression. The variable reflecting significant deaths in adulthood was not significant either.

The "ease of reaching goals" variable very nearly reached conventional levels of significance, t (130) = -1.848, p = .067. Its correlation with postpartum depression scores was negative (r = -.203), which suggests a tendency for high postpartum depression

scores to be associated with difficulty in reaching goals. This variable accounted for only 2.8% of the variability in postpartum depression scores. Altogether, the nine variables accounted for 20.8% of the variability in postpartum depression scores $F(9,121) = 4.900$, $p < .000$.

Beck's conceptualization of ongoing depression. To test Beck's premise that dysfunctional cognitions are a central feature of depression, the concurrent relationship between depression levels and dysfunctional cognitions was determined for both the prenatal and the postnatal assessment periods. A Pearson product-moment correlation coefficient was computed for DAS and depression scores within each assessment. The correlation coefficient for the prenatal assessment was highly significant, reflecting a positive relationship between dysfunctional attitudes and depression levels, $r(132) = .335$, $p < .000$. The correlation between postpartum administrations of the DAS and the Zung depression scale also revealed a highly significant, positive relationship between dysfunctional attitudes and depression levels, $r(132) = .446$, $p < .000$.

To further examine Beck's cognitive conceptualization of ongoing depression, the DAS scores of women who were moderately to severely depressed pre- or postpartum were individually examined with regard to the DAS characteristics of the entire sample. DAS scores which were greater than one standard deviation above the sample mean were labeled high, and scores which were less than one standard deviation below the mean were labeled low. Scores which fell between these two values were labeled average.

Table G-15 shows the DAS scores and corresponding labels of depressed pregnant women and depressed postpartum women. Sample statistics for the prenatal and postpartum DAS distributions are also represented. As shown in the table, seven (32%) of the 22 women who were depressed prenatally had a high DAS score, two (9%) had a low DAS score, and the remaining 13 (59%) had an average DAS score. Of the seven women who were moderately to severely depressed during the postpartum assessment, four (57%) had a high DAS score, and the remaining three (43%) had an average DAS score. Thus, depression was not consistently associated with a high degree of dysfunctional thinking.

Baby Predictors

The sixth regression analysis examined the relationship of postpartum depression to the subject's prenatal and postnatal feelings about the baby as well as some temporal aspects of the baby's arrival. One predictor variable for this analysis consisted of the question "Was this pregnancy planned?," which was an item from the prenatal questionnaire. The other predictor variables pertaining to thoughts about the baby came from the postpartum questionnaire. Two of these variables concerned the subject's prenatal intention to breast-feed and the subject's estimate of the baby's daily crying time. Two other variables in the regression analysis reflected agreement or disagreement between the baby's actual gender and the gender preference stated before delivery. These variables were labeled "agreement" and "disagreement." ("No preference" was not included in the analysis because it is represented in the constant of the regression equation.)

In order to have a sufficient number of continuous variables in the regression equation, two variables were included which pertained to the temporal aspects of baby's arrival. They were (a) the arrival in relation to the due date (delivery date minus due date) and (b) the arrival in relation to the postpartum assessment (date of postpartum assessment minus delivery date). The purpose of the first variable was to determine whether there were physiological or psychological correlates of premature deliveries that had an affect on postpartum mood. The purpose of the second was to determine whether susceptibility to postpartum depression varied as a function of time since the delivery. Table G-16 shows the response frequencies for all variables in the "baby" regression analysis. The relationship of these variables to postpartum depression scores is illustrated in Table G-17.

As shown in the regression table, the seven variables together accounted for 12.6% of the variance in postpartum depression scores, which resulted in a regression equation of significant predictive value, $F(7,123) = 2.54$, $p = .02$. Three of the variables were significant predictors of postpartum depression scores. The most highly significant predictor was the question, "Was this pregnancy planned?," $t\ (130) = 2.73$, $p = .007$. The partial correlation coefficient indicates that this predictor uniquely accounted for 5.7% of the variability in postpartum Zung scores. The negative correlation ($r = -.194$) between this variable and postpartum depression scores indicates that a negative response to this question was associated with an increase in depression scores. Looking at Table G-16, it can be seen that 46.2% of the responses to the planned pregnancy question were negative.

The next most significant predictor in the "baby" regression analysis (Table G-17) was the subject's intention to breast-feed t (130) = 2.59, p = .01. This variable uniquely accounted for 5.2% of the variability in postpartum depression scores. The negative correlation (r = -.197) indicates that subjects who did not intend to breast-feed were likely to exhibit high scores on the postpartum depression measure. The response frequencies in Table G-16 show that 37.9% of the women did not plan before delivery to breast-feed.

The third significant predictor in this analysis (Table G-17) was the time since delivery of the postpartum assessment, t (130) = 2.03, p = .04, though it accounted for only 3.2% of the variability in postpartum depression scores. Its negative correlation with the dependent variable (r = -.099) indicates that the earlier in the postpartum period the assessment was performed, the higher the postpartum depression scores tended to be.

Table G-16 depicts frequencies for postpartum assessment times as well as the "baby" variables that were not significant predictors of postpartum depression levels. This table also displays response frequencies for the prenatal question concerning "doubts about having a child." Although this question is conceptually related to the subject's feelings about the baby, it was not included in the "baby" analysis because of low response variability. As indicated in the table, only nine subjects reported having doubts about their desire to have a child. An informal investigation of the relationship between this variable and depression was performed by examining the frequency of depression in women who experienced doubts. The prepartum and postpartum depression

scores of these women are represented in Table G-18. Using Zung's (1965) criterion score for moderate to severe depression (60 or greater), four of the women who had doubts about having the child were depressed during pregnancy, and two of these women were also depressed after childbirth.

Combination of Prenatal Predictors from Other Analyses

A seventh regression analysis was conducted in an effort to assemble a collection of prenatal predictors that could account for a greater proportion of variability in postpartum depression scores than the variability accounted for in any of the component analyses. The predictors for this analysis consisted of prenatal variables from all six component analyses. Any prenatal variable that was a significant predictor in its component analysis was selected. Also, a prenatal variable whose correlation with postpartum depression scores was $\pm$ .1 or greater served as a predictor in this regression analysis. (Exceptions to the latter rule were made in the case of the three variables depicting emotional reactions during menstrual periods, "tense," "irritable," and "mood swings." Rather than including each of these variables separately, the variable incorporating them, "number of emotional reactions during periods," was selected for the combination regression.) Using these criteria, 16 variables were chosen for the collection of prenatal predictor variables. These variables are represented in Table G-19, which illustrates the results of the regression analysis.

As indicated by the value of r squared for this regression equation, 39.4% of the variability in postpartum depression scores was accounted for by all 16 variables, $F(16,112) = 4.55$, $p < .00001$. The prenatal depression score accounted uniquely for 9.9% of that variability, t (130) = 3.52, p = .001, while the prenatal DAS score accounted for 8.5% of the variability t (130) = 3.23, p = .002. Both of these variables were positively correlated with postpartum depression scores, so that a high score on the postpartum measure was associated with a high prenatal depression score (r = .519) and a high prenatal DAS score (r = .382).

The only other significant predictors were the four variables concerning the death of significant others. As in the analysis of Beck's predictors, only death of a sibling was positively related to postpartum depression scores (r = .017). It accounted uniquely for 3.5% of the variability in the dependent measure, t (130) = 2.02, p = .05. The other three death-related variables were negatively correlated with postpartum depression scores. Death of a parent (r = -.047), death of others (r = -.012), and number of deaths experienced (r = -.072) were all associated with lower scores on the postpartum depression measure. Death of a parent uniquely accounted for 3.7% of the variability in the dependent measure, t (130) = 2.08, p = .04; death of others accounted for 3.9% of the variability, t (130) = 2.13, p = .04; and number of deaths experienced accounted for 4.2% of the variability, t (130) = 2.22, p = .03.

Factor Analysis of Postpartum Variables

A factor analysis was performed on 23 postpartum variables to examine interrelationships among items on the postpartum questionnaire to determine the conceptual relevance of the interrelationships, and to derive a condensed list of postpartum variables to serve as predictors in a multiple regression analysis of postpartum depression scores. Of the 23 variables in the factor analysis, 21 were items on the postpartum questionnaire. The remaining two were the variables representing relationship between the delivery and the due date and the relationship between the delivery and the postpartum assessment. The response frequencies for the 23 variables in the factor analysis are provided in Table G-20. This table also includes response frequencies for three variables that were not included in the factor analysis. One of the variables pertains to the sex of the baby (babies) and the other two pertain to the subject's desired weight. These three variables were omitted from the factor analysis because of restrictions on the number of categorical variables that can be incorporated in such an analysis.

The factor matrix which emerged from a varimax rotation is illustrated in Table G-21. As indicated in the factor matrix, eight factors emerged with eigenvalues of 1.0 or greater. These eight factors together account for 67.2% of the total variability exhibited by all of the variables. In labeling these factors, the general strategy was to take into account only the variables whose loading coefficient was .50 or greater for the factor in question. As illustrated in Table G-21, all but two of the 23 variables (Post Q10 and Post Q14 total) loaded .50 or greater on one of the factors. Therefore, nearly all of the

variables played a significant role in the emergence of the eight factors.

The factor which incorporates the greatest proportion of total variability (18.3% eigenvalue = 4.216) was labeled "explained sleeplessness." This label takes into account the four variables that loaded most highly on this variable. They are, in descending order, the number of times the baby awakens the subject in the night (r = .834), the amount of time the subject spends tending to the baby at night (r = .804), the amount of time the subject is kept awake by physical discomforts of a postpartum nature (r = .552), and the amount of time the subject spends resting in bed during the day (r = .541). Positive correlation coefficients for these four variables indicate a positive relationship among them, so that high scores on one variable were associated with high scores on the other three.

The factor which incorporates the second largest proportion of total variability (11.1%, eigenvalue = 2.558) was labeled "physical discomforts," since the four items which loaded heavily on the factor all pertain to physical discomforts. Breast soreness loaded most heavily on this factor (r = .811), followed by the total number of physical discomforts indicated on the postpartum questionnaire (r = .776). Abdominal discomfort was the next most highly weighted variable in the factor (r = .598). The number of physical discomforts affecting the subject's mood was considered an important contributing variable because it is conceptually related to the other three variables and because its factor loading coefficient is only slightly lower than the usual criterion (r = .490). Like variables in the first factor, these physical discomfort variables were positively related. The more

physical discomforts the subject experienced, the more likely her mood would be affected by the discomforts.

The third factor, labeled "food consumption," accounted for 8.7% of the total variability displayed by the variables. Three variables loaded heavily on this factor, namely, appetite during the past week (r = .890), amount eaten during the past week (r = .850), and weight change over the past week (r = .698). Again all of the loading coefficients were positive so that the greater the appetite, the more the subject ate, and the higher her weight.

The three variables pertaining to sexual interest were the greatest contributors to the fourth factor (7.2% of the variability, eigenvalue = 1.654). Consequently, it was labeled "low libido." The variable which contributed most to this factor is the degree to which the subject's physical discomforts interfered with her "interest in sex" during the preceding week (r = .816). The next largest contribution came from the variable concerning the degree to which the subject anticipated a dampening of "sexual interest" due to physical discomforts (r = .793). And the final significant contributor was the degree of "sexual interest" at the time of assessment (r = -.526). The negative loading coefficient of this last variable indicates a negative relationship to the other two variables. That is, high interference with sexual interest in the past week and in the coming week (anticipated) was associated with low libido in the present. Furthermore, the more physical discomforts had interfered with libido over the past week, the more interference the subject anticipated for the coming week.

The fifth factor, which subsumed 6.2% of the total variability (eigenvalue = 1.429), was labeled "unexplained sleeplessness." The three variables that account for this label are the number of times the subject awakened per night when baby was not crying (r = .808), early morning awakenings without the baby's crying (r = .701), and time spent awake while not tending to the baby (r = .628). These three variables were positively related. Apart from maternal duties, the more times the subject awakened, the greater the amount of sleep she lost, and the more likely she was to experience early morning awakenings.

The sixth factor was labeled "constipation" because the only variable that loaded highly on this factor was the degree of discomfort caused by constipation during the preceding week (r = .795). This factor accounted for 6.1% of the total variability (eigenvalue = 1.396).

Two variables were heavily weighted on the seventh factor, which accounted for 5.1% of the total variability (eigenvalue = 1.183). These two variables were the time of delivery in relation to the due date (r = .725) and the time of delivery in relation to the postpartum assessment (r = -.714). The factor was therefore named "delivery data." The discrepancy between the signs of the two correlation coefficients reveals that late deliveries were associated with earlier postpartum assessment.

The eighth factor accounted for 4.5% of the total variability (eigenvalue = 1.025). It was labeled the "depressive symptoms" factor because the two variables that loaded most highly on this factor are the number of depressive symptoms indicated on question 25 of the postpartum questionnaire (r = .662) and the subject's libido at the time of the

assessment (r = -.614). A third variable, estimated time baby cries, had a factor loading of .474. Taking this variable into consideration, the three correlation coefficients indicate that a high number of depressive symptoms was associated with low libido and a high estimate of baby's daily crying.

Postpartum Predictors

The seventh regression analysis examined the relationship between postpartum factors and postpartum depression levels. It will, therefore, be referred to as the "postpartum analysis." The predictor variables in this analysis consisted of subjects' scores on each of the eight factors derived from the factor analysis of the postpartum questionnaire. The eight factors, it will be recalled, were labeled "explained sleeplessness" (factor 1), "physical discomforts" (factor 2), "food consumption" (factor 3), "low libido" (factor 4), "unexplained sleeplessness" (factor 5), "constipation" (factor 6), "delivery data" (factor 7), and "depressive symptoms" (factor 8). Five other variables were derived from the postpartum questionnaire to serve as predictors in the regression equation. Two of these predictors were constructed from the question (Post Q26) in which subjects were asked if their mother experienced postpartum depression. The question was dummy coded so that the "yes" response category and the "no" response category each served as predictor variables, while the "don't know" response category was represented in the constant of the regression equation. Two more predictors from the postpartum questionnaire were constructed from the two questions concerning the subject's prenatal intentions to breast-feed (Post Q2) and her actual feeding method (Post Q3). Responses to these two

questions were combined to form a third variable which reflected both the feeding plans and the outcome. Though four combinations of plans and outcomes are possible, no subjects were represented in the category reflecting no plans to breast-feed but doing so postpartum. Therefore, this category was dropped. Two of the remaining three categories served as predictors in the postpartum regression, with the third being represented in the constant of the regression equation. The two categories serving as predictors were "plans to breast-feed/not breast-feeding" and "no plans to breast-feed/not breast-feeding." "Plans to breast-feed/breast-feeding" was reflected in the constant. The fifth predictor derived from the postpartum questionnaire was the subject's estimate of her baby's daily crying (Post Q27). The final predictor in the postpartum analysis consisted of the subject's postpartum DAS score. Altogether, 14 variables were used as predictors in this regression analysis of postpartum depression scores.

Table G-22 displays the results of the postpartum regression analysis. As shown in the table, 55.3% of the variability in postpartum depression scores was accounted for by all of the predictor variables, resulting in a highly significant equation, $F(14,116) = 10.24$, $p < .00001$. Seven of the predictors were significant. The factor labeled "depressive symptoms" was the most significant predictor, $t\ (130) = 6.55$, $p < .000$, accounting alone for 27.0% of the variability in postpartum depression scores. The depressive symptom factor, it will be recalled, represents a high number of depressive symptoms on the postpartum questionnaire (sum of Post Q25a-e), a loss of interest in sex (Post Q23), and a high estimate of baby's daily crying (Post

Q27). This factor showed a high positive correlation with postpartum depression scores (r = .487), indicating that high scores on this factor were associated with high postpartum depression scores.

The factor labeled "unexplained sleeplessness" was also a highly significant predictor of postpartum depression scores, t (130) = 3.76, p = .0003. This factor uniquely accounted for 10.9% of the variability in the dependent measure. A high score on the "unexplained sleeplessness" factor indicates that the subject reported a high frequency of early morning awakenings (without baby's help) and reported that she spends a large amount of time awake at night apart from the time tending to baby and the time baby cries. The positive correlation between this factor and postpartum depression scores (r = .337) indicates that subjects who awakened frequently in the night and early morning (independent of baby) tended to score high on the depression measure.

The subject's postpartum DAS score was also a good predictor of her postpartum depression scores, t (130) = 3.11, p = .002. This predictor accounted for 7.7% of the total variability through a positive correlation (r = .446) with the dependent variable. Thus, high DAS scores were associated with high postpartum depression scores.

A fourth variable was also a highly significant predictor of postpartum depression. This variable was the subject's estimate of her baby's daily crying, t = 2.65, p = .009. Though this variable had a low positive correlation with postpartum depression scores (r = .017), its partial correlation coefficient reflects a synergistic relationship between this variable and the other predictor variables (partial r = -.239). Therefore, baby's daily crying accounts for more variability

(5.7%) in the context of the other predictors in this equation than it can account for in isolation. Since the correlation between this variable and the dependent variable is positive, high estimates of baby's crying were associated with high scores on the postpartum depression measure.

The fifth significant predictor of postpartum depression levels was Factor 3, which was labeled "food consumption," t (130) = 2.17, p = .032. This factor showed a negative correlation (r = -.181) with postpartum depression scores, uniquely accounting for 3.9% of the variability in these scores. Subjects who scored high on the food consumption factor indicated on the psotpartum questionnaire that their appetite was high, their food consumption was high, and their weight had increased over the preceding week. These high scorers on the food consumption factor tended to score low on the postpartum depression measure, as revealed by the negative correlation between these two variables.

The sixth significant predictor in this regression equation was the "low libido" factor, which accounted uniquely for 3.6% of the variability in postpartum depression scores, t (130) = 2.07, p = .04. Subjects who scored high on the low libido factor reported that postpartum physical discomforts had interfered greatly with their interest in sex during the preceding week, and they anticipated interference from these discomforts in the coming week. Furthermore, they reported little interest in sex at the time of the assessment. These same subjects tended to score high on the postpartum depression measure, as indicated by the positive correlation (r = .143) between these two variables.

The factor labeled "explained sleeplessness" was the seventh significant predictor of postpartum depression scores, t (130) = 2.05, p = .04. Four variables loaded highly on this factor: times awakened by baby per night, amount of time tending to baby at night, amount of time kept awake by postpartum physical discomforts, and amount of time resting in bed daily. Subjects who scored high on the explained sleeplessness factor scored high on each of these variables. They also tended to score high on the postpartum depression measure, according to the positive correlation (r = .064) between the explained sleeplessness factor and postpartum depression scores. The explained sleeplessness factor uniquely accounted for 3.5% of the variability in postpartum depression scores.

CHAPTER IV

DISCUSSION

The results of this study provide little support for Beck's etiological account of depression. Neither perfectionistic standards nor childhood bereavement was significantly related to postpartum depression. Although the timing of the bereavement was not an important factor, the number of deaths experienced and the relationship of the deceased to the subject were related to postpartum depression; but, with the exception of sibling deaths, the relationship of these variables to postpartum depression was the opposite of that predicted by Beck's theory. Prenatal dysfunctional cognitions were a significant predictor of postpartum depression; however, much of their predictive power arose from their concurrent relationship with prenatal affect, which was the strongest predictor of postpartum depression.

Although the predictive power of prenatal dysfunctional thinking was diminished by its association with prenatal depression, the concurrent relationship between dysfunctional thoughts and depression is important to Beck's conceptualization of ongoing depression. From Beck's cognitive perspective, maladaptive thinking is the essence of depression. The examination of individual data revealed, however, that dysfunctional cognitions are not an essential feature of ongoing depression.

Some of the variables that were significant predictors of postpartum depression were not associated with a major theory of depression.

These variables pertained to the subject's prenatal thoughts about the baby and her satisfaction with the marital situation in which she lived. Other variables which pertained to the subject's demographic characteristics, her psychiatric history, and her reations to hormonal conditions were not significantly related to postpartum depression levels.

In addition to the prenatal predictors of postpartum depression, the study examined concurrent features of the disorder. The women who obtained high scores on the postpartum depression measure reported such symptoms as sleep disturbance, decreased libido, and decreased appetite, as well as depressive mood. Thus, the investigation reaffirms the notion that, symptomologically, postpartum depression resembles "standard" forms of clinical depression.

All of the prepartum and postpartum variables under investigation were analyzed through regression analyses to reveal the extent to which they were related in a consistent, linear fashion to postpartum depression scores. To establish the clinical significance of the results, however, it is necessary to determine whether there actually were some cases of clinical depression after childbirth. Therefore, the clinical significance of depression scores in this sample is discussed before examining the variables which demonstrated a predictive or concurrent relationship to postpartum depression.

Incidence of Postpartum Depression

In previous research on postpartum depression, little attention has been paid to the representativeness of the sample. Although a

formal stratification procedure was not employed in the present study, an attempt was made to sample from diverse sources. Recruitment sources included public health clinics, private obstetric practices, and prenatal classes of varying expense. Consequently, a wide variety of incomes, education, and races were represented in the sample.

Another inadequacy in previous research has been the use of non-standardized measures to assess depression. The pervasiveness of such measures in the literature has made it difficult to determine the extent to which clinically significant affective disturbances are actually present in postpartum women. Using Zung's Self-Rating Depression Scale, which is a validated, standardized measure of depression, the present study found that 5.3% (n = 7) of the sample (n = 132) was suffering from moderate to severe depression at the time of the postpartum assessment. This figure resembles the 6.7% estimate of postpartum depression determined by Bonham Carter et al. (1980) using the Zung Depression Scale and other stringent diagnostic criteria for clinical depression (e.g., the Research Diagnostic Criteria). These estimates are substantially lower than most estimates derived from homemade measures. Meares et al. (1976), for example, estimated from a homemade visual analogue scale that 16% of their sample suffered from postpartum depression. Frate et al. (1980) used a retrospective survey to derive a frequency of 21% severe depression after childbirth. This estimate of severe depression resembles the proportion of 22.7% that would arise from the present sample if cases of mild depression were combined with cases of moderate to severe depression.

The instrument used to measure depression was not the only respect in which this study and the Bonham Carter et al. study differed from the other two studies. The timing of the measurement represents an important distinction which could have bearing on the frequency of depression reported by the studies. Both the Meares et al. study and the Frate et al. study involved retrospective reports of depression that were provided by the subjects at six months and more than one year postpartum (respectively). In contrast, this study and the Bonham Carter et al. study involved assessment of ongoing affective states around six weeks postpartum. Thus, it seems that vast discrepancies in the estimates of postpartum depression could be attributed to differences in the quality of the assessment device, and/or in the current versus retrospective nature of the assessment.

Incidence of Prepartum Depression

One of the most striking outcomes of this study is the incidence of prepartum depression. As shown in Figures 1 and 2, the incidence of depression was actually greater during the third trimester of pregnancy than it was during the postpartum period. At the time of the prenatal assessment, 16.7% of the women (22 out of 132) were moderately to severely depressed, compared to 5.3% at the time of the postpartum assessment. These results resemble those of O'Hara et al. (1982) and Atkinson and Rickel (1984) in which depression scores were higher during pregnancy than during the postpartum period.

O'Hara et al. suggest that the elevation of prepartum depression scores could be attributed to "normal physical complications of pregnancy" which might have influenced responses to somatic items on the

depression measure. This does not seem to be a plausible explanation for the high prepartum depression scores in this study, however, because somatic items on the depression scale do not show the consistency of responding that would result from some "normal" conditions of pregnancy (except for the item concerning weight loss, which was influenced in a nondepressive fashion by pregnancy).

Another finding which suggests that the prenatal depression score reflects the subject's psychological rather than physical condition is the positive correlation between her prenatal scores on the depression scale and the Dysfunctional Attitudes Scale (DAS). This correlation suggests that the depression scores do in fact reflect the affective state of the subject because cognitions are a psychological rather than a physical characteristic of the subject. When physical complaints are associated with a high level of dysfunctional thinking in pregnancy, it might be appropriate to regard them as possible symptoms of depression, since physical complaints can be symptomatic of depression at other times of a person's life.

Despite its apparent frequency, depression during pregnancy has not received the degree of attention that has been received by depression after childbirth. Perhaps depression during pregnancy is more easily explained than postpartum depression because of the physical discomforts and limitations of pregnancy. Postpartum depression may have received more attention not only because the disorder seems incongruous with the arrival of a new baby, but also because its consequences for the mother-infant relationship make it seem more grave than prepartum depression. The high incidence (16.6%) in this sample of moderate to

severe depression during pregnancy suggests that prepartum depression deserves further investigation.

The finding of this study and others that prepartum depression levels are significantly higher than postpartum depression levels suggests that some of the traditional etiological hypotheses of postpartum depression should be reconsidered. Such postpartum conditions as increased responsibility, physical and emotional stress, changes in lifestyle, or hormonal disturbance may not be the most appropriate hypothesized causes of postpartum depression. Prenatal factors may prove to be more important in the etiology of postpartum depression. In fact, the relationship observed in this study between pre- and postpartum depression suggests that some cases of postpartum depression may be extensions of prepartum depression.

Predictors of Postpartum Depression

Two strategies were employed in this study to investigate prenatal conditions which predispose women to postpartum depression. One strategy, which has only recently appeared in the literature, is to address the etiology of postpartum depression from the perspective of a theory of standard clinical depression. The other strategy is an atheoretical one that has traditionally been used in the social/psychological research on postpartum depression. This approach relies for the most part on clues from past research and the speculation of investigators regarding possible etiology of postpartum depression. The following discussion deals first with the theoretical predictors derived from Aaron Beck's cognitive conceptualization of depression and then with the atheoretical predictors derived from previous research.

Theoretical predictors of postpartum depression. Predictors of postpartum depression were derived from Aaron Beck's cognitive theory with two objectives in mind. The most obvious objective was to discover factors which increase a woman's susceptibility to postpartum depression. The second objective was to test the validity of Beck's etiological hypotheses in the context of postpartum depression. According to Beck, an individual's susceptibility to depression is increased by three factors: (a) the death of a significant other in childhood, (b) the tendency to set unrealistically high standards for oneself, and (c) the existence of dysfunctional cognitive patterns.

The regression analysis of Beck's predictors (Table G-14) offered no support for the notion that one's susceptibility to depression is increased by the death of a significant other in childhood. Death of a significant other in adulthood bore no relationship to postpartum depression either. However, there was a significant negative relationship between the total number of deaths experienced throughout the subject's life and her level of depression. That is, low depression scores were associated with a high number of significant deaths in the subject's lifetime, regardless of the age at which they were experienced. It is possible that the experience of many deaths has an effect on cognitive patterns that is opposite to the effect predicted by Beck. Perhaps, the experience of many significant deaths contributes to the development of strategies for coping with stress rather than dysfunctional cognitions.

Although the timing of the subject's bereavement does not predict postpartum depression, the relationship of the deceased to the subject appears to be important in estimating her susceptibility to depression.

On the one hand, women who had experienced the death of a parent or the death of some other significant person had lower postpartum depression scores than women who had not had these experiences. On the other hand, women who had experienced the death of a sibling scored higher on the depression scale than women who had not lost siblings. It seems curious that women who experienced the death of a sibling would be more vulnerable to postpartum depression, while women who experienced the death of a parent or other significant person would be less vulnerable. Although plausible explanations might be offered for either of these findings alone, the two in conjunction make it difficult to speculate on the differential effects of these deaths. Perhaps the death of a sibling increases one's vulnerability to depression by producing a familial environment that leads to guilt and self-deprecation in the remaining siblings, while the death of a parent or other significant person prompts the development of coping skills on the individual's part.

On the basis of Beck's theory, it was predicted that women who frequently set high standards would more frequently fail to reach their goals, which would increase their susceptibility to depression. This prediction was not supported, however. Neither the frequency with which a subject set high standards nor the ease with which she reached her goals bore a significant relationship to postpartum depression scores.

Though not statistically significant, there was a modest negative relationship ($p = .067$) between postpartum depression and the ease of reaching goals; that is, women who reported difficulty in reaching their goals showed some tendency toward high postpartum depression scores. If one were willing to treat this modest relationship as a reliable finding,

it would be necessary to explain why a difficulty in reaching goals is related to postpartum depression, while the frequency of self-imposed high standards is not. Beck might explain the incongruity between these variables by saying that some of the subjects who set high standards do not have trouble meeting their goals because the standards they set are realistic; therefore, high standards per se would not increase one's vulnerability to depression unless the standards are unrealistic. From Beck's perspective, the ease of reaching goals might be a more accurate indication of the extent to which a person's goals are realistic. An alternative explanation for the incongruity between these two variables, however, might be that some people have trouble reaching their goals, not because they are related to unrealistically high standards, but simply because some factor has intervened to thwart the attainment of these goals. The goals themselves may be meager or grand. In this case, it would be the mere obstruction of goals that is the key feature in predicting depression scores rather than the nature of the goals the person establishes. This is an important distinction because Beck's focus on the unrealistic nature of the goals implies distorted cognitive processes, whereas a focus on the obstruction of goals implies interference from the environment or from conflicting activities which are not necessarily related to the person's cognitive style.

The notion that is central to Beck's etiological account of depression is that dysfunctional cognitions exist prior to the onset of depression, rendering the individual susceptible to the disorder. On the basis of this hypothesis, it was predicted that dysfunctional cognitions during pregnancy would be related in a predictive fashion to postpartum depression levels.

The regression analysis involving predictors from Beck's theory (Table G-14) revealed that prenatal dysfunctional attitudes were a significant predictor of postpartum depression levels. Women who exhibited a high level of dysfunctional cognitions before the baby was born were more likely to exhibit depressive affect puerperally. However, most of the predictive power of dysfunctional cognitions stems from their association with prenatal depression, which was a much better predictor of postpartum depression (Table G-13). Prenatal depression accounted for twice as much variability (28.2%) in postpartum depression scores as dysfunctional attitudes (14.3%). When their concurrent relationship to depression was eliminated, prepartum dysfunctional attitudes accounted for only 6.5% of the variability in postpartum depression scores. By comparison, the amount of variability uniquely accounted for by prenatal depression scores was 21.3%. Thus, the accuracy of predicting postpartum depression from a single prenatal measure would be much greater if depression rather than dysfunctional cognitions were assessed. Furthermore, the concurrent relationship between these two measures suggests that dysfunctional cognitions play a symptomatic rather than a predisposing role in depression.

Data which cast dysfunctional cognitions in a symptomatic rather than predisposing role are problematic for Beck's etiological account of depression. However, the symptomatic role of dysfunctional cognitions is important to Beck's assumptions about the nature of ongoing depression. According to the cognitive theory, the dysfunctional cognitions are present during as well as before the depressive episode. In fact, distorted thinking is a central and necessary feature of ongoing

depression from Beck's perspective. The premises of his theory lead to the assumption that it is possible for an individual to exhibit dysfunctional cognitions in the absence of depression (during the vulnerable state), but it is not possible for an individual to exhibit depression in the absence of dysfunctional cognitions. The concurrent relationship between distorted thinking and depression was investigated in two ways: first, through correlational computations and second, through an examination of individual data.

The correlations hetween concurrent measures of dysfunctional attitudes and depression revealed a strong relationship between the two variables. The value of the correlations closely resembled the correlations observed by Weissman (1980) in her validation of the Dysfunctional Attitudes Scale. In Weissman's study, two concurrent correlations between the DAS and the Beck Depression Inventory were .36 and .47. In this study, the concurrent correlations between the DAS and the Zung Self-Rating Depression Scale were .34 and .45 for prepartum and postpartum administrations respectively.

The correlational analyses support Beck's premise that distorted cognitions are the central feature of depression. However, it is not possible to determine from correlation coefficients whether all of the depressed subjects exhibited a high level of dysfunctional thinking. Consequently, the DAS scores of depressed woemn were singled out for investigation. This investigation of the individual scores revealed that there were a substantial number of women in this study who exhibited a moderate to severe level of depression without exhibiting a high level of dysfunctional thinking. Of the women who were depressed during

pregnancy, 32% exhibited a high level of dysfunctional thinking, as Beck would predict. However, the majority (68%) of the depressed women exhibited either an average or low level of distorted cognitions. Of the women who were depressed puerperally, the level of dysfunctional thinking was high in 57% and average in 43%.

These findings point to the fact that individual rather than group statistics provide a proper test of Beck's premise that dysfunctional cognitions are a central and necessary feature of depression. The correlation coefficients support Beck's premise, but when the relationship between dysfunctional cognitions and depression is examined in individuals, it seems that distorted cognitions are not an integral feature of depression. If they were, then distorted thinking would be present in all depressed women. Taking both the group and the individual data into consideration, one can merely conclude that distorted thinking often accompanies depression. The inconsistency in its relationship to depression suggests that it is a symptom rather than a cause of the disorder.

Atheoretical predictors of postpartum depression. Although the remaining prenatal predictors are not affiliated with a formal theory of depression, they are conceptually organized into themes which are potentially significant in the prediction of postpartum depression. These themes were used to select predictors for five regression analyses of postpartum depression scores which focused on (a) the subject's demographic characteristics, (b) the quality of her life, (c) her past and present psychological condition, (d) her reactions to certain hormonal conditions, and (3) her prepartum thoughts about the baby.

Demographic characteristics of the subject such as age, race, and education bore no relationship to postpartum depression scores. Even demographic variables that seemed to reflect the subject's lifestyle, such as marital status, the existence of other children, and hours working showed no relationship to postpartum depression levels.

Although the marital situation itself was not a predictor of postpartum depression scores, the subject's happiness in that situation was a significant predictor (Table G-7). The more unhappy or dissatisfied the subject felt about her marital situation, the higher her postpartum depression score was likely to be. This finding seems consistent with the findings of Braverman and Roux (1978) that women who reported marital problems and who often felt unloved by their husband (boyfriend) were more likely to experience postpartum depression. A feeling of unhappiness with the marital situation might also coincide with an absence of physical and emotional support which seems to be associated with postpartum depression (Frate et al., 1980; Paykel et al., 1980).

Since biochemical assays were not performed, the hormonal characteristics of the subjects were assessed indirectly. The indirect assessment of hormonal characteristics consisted of measuring physical and emotional correlates of hormonally relevant events such as menstruation and pregnancy. The relationship of postpartum depression to physical and psychological correlates of menstruation was examined through questions pertaining to the regularity of menstrual periods, the pain of menstrual cramps, and the occurrence of emotional changes during menstruation. None of these variables showed a relationship with

postpartum depression levels. Physical and emotional problems of pregnancy were measured by asking the subject to indicate her experience of such problems in the current pregnancy as well as the number of previous pregnancies resulting in miscarriages. None of these pregnancy-related variables was related to postpartum affect.

These findings do not, of course, rule out the possibility that postpartum depression is associated with some biochemical predisposition. In fact, some predisposing biochemical factor might be present during menstruation or pregnancy that has either no psychological correlates or different correlates from the ones assessed in this study. These questions can only be answered with certainty through direct assessment of biochemical states. A correlational strategy like that used in the present study, nonetheless, seems useful to further investigate psychological "markers" of hormonal conditions that might predispose women to postpartum depression. The premenstrual syndrome, for example, is an area of research that might expose psychological markers of biochemical predispositions. Not only would the discovery of such markers provide direction for biochemical research, it would provide a practical, nonintrusive means of assessing predisposing physical conditions.

Another class of variables requiring further investigation concerns the subject's thoughts about the baby before its arrival. In the present study, three questions pertaining to thoughts about the baby were significantly related to postpartum depression scores. In the analysis of baby-related predictors (Table G-17), the question, "Was this pregnancy planned?" was the most significant predictor. Women who

answered no to this question scored higher on the postpartum depression measure than women who indicated that their pregnancy was planned. Braverman and Roux (1978) also found that unplanned pregnancies were related to postpartum depression. Perhaps some psychological "preparation" and commitment make a woman less vulnerable to the stresses of infant care.

The prenatal question concerning doubts about having the child was designed to assess the presence or absence of psychological preparation during pregnancy. Only nine subjects reported that they were experiencing doubts about having the child, so this item was omitted from the regression analysis of postpartum depression scores. However, the pre- and postpartum depression scores of women who reported doubts were examined individually (Table G-18). This examination revealed that four of the nine women (44%) were moderately to severely depressed during pregnancy. Three of the remaining five women scored in the mildly depressed range during pregnancy. At the time of the postpartum assessment, two (22%) of the women who reported doubts about having the child were moderately to severely depressed, and both of these women had experienced a similar level of depression during pregnancy. The other two women who had been moderately to severely depressed during pregnancy scored in the mildly depressed range on the postpartum measure. Thus, the incidence of both prepartum and postpartum depression seems to be elevated in women who have prenatal doubts about having their child. The high frequency of depression in women who have doubts and in women who did not plan their pregnancy could lead one to speculate that vulnerability to depression both before and after delivery is increased by an unwanted pregnancy.

The third baby-related question that was associated with postpartum depression (Table G-17) was whether or not the woman planned before delivery to breast feed. Women who did not intend to breast feed scored higher on the depression measure than women who did intend to breast feed. One might speculate that some women's intentions not to breast feed reflected some ambivalent feelings about the baby that were sustained in the postpartum period.

As is true for all prenatal predictors of postpartum depression, the relationship between prenatal thoughts about the baby and postpartum depression is not necessarily causal in nature. A correlational analysis only reveals associations between variables. Caution must be exercised in interpreting the association between two variables because that association could be mediated by a third variable. For example, the subject's thoughts about her marital situation and the baby could have been related to prenatal depression, which was the most significant predictor of postpartum depression.

Even if the regression analysis permitted one to verify the relationship of prenatal depression to thoughts about the baby and satisfaction with the marital situation, the direction of these relationships would still be subject to speculation. For example, an unsatisfactory marital situation could lead to doubts about having a child and depression; or depression could lead to an unsatisfactory marital situation and doubts about having a child. The direction of the relationships among these variables requires further investigation.

Postpartum Correlates of Depression

The postpartum questionnaire was designed to provide a more detailed description of the woman's postpartum behavior than the Zung Depression Scale could provide alone. Some items on the questionnaire pertained to behaviors which are symptomatic of depression, and some items pertained to behaviors which are presumed to be nonsymptomatic features of the postpartum period. It was anticipated that the factor analysis would reveal differential patterns of responding such that symptomatic items would be distinguished from nonsymptomatic items by clustering together into conceptually relevant groupings. By relating the item clusters to scores on the depression scale, it is possible to determine whether the measurement of depression was affected by non-symptomatic postpartum features. This issue can be simultaneously addressed by examining the results of the item analysis performed on postpartum depression scores. Then, having ascertained that the depression scale is a sound measure of affect in a postpartum context, it is possible to distinguish depressive components from normal components of the postpartum period.

Not only did responses to the postpartum questionnaire cluster into conceptually relevant factors, but the conceptual significance of the factors corresponded well with the objectives of the questionnaire. For example, one purpose of the questionnaire was to distinguish between sleep lost due to normal postpartum factors and sleep lost due to abnormal psychological factors. In accordance with this objective, two separate factors emerged which were related to sleep disruption--one nonsymptomatic factor reflecting postpartum conditions (e.g., baby's

needs or mother's physical discomforts) and one symptomatic factor reflecting other, presumably psychological factors (e.g., early morning awakenings, unexplained insomnia).

The symptomatic factor called unexplained sleeplessness showed a highly significant positive relationship to postpartum depression scores (Table G-22). This relationship indicates that women with high depression scores experienced early morning awakenings and sleep disturbances unrelated to baby, while women with low depression scores did not suffer from such sleep disturbances. This result implies that the depression measure accurately reflected the kind of sleep disturbances that are relevant to a diagnosis of depression; however, the nonsymptomatic factor also showed a significant positive relationship with postpartum depression scores. Women who lost a lot of sleep as a consequence of the baby or physical discomforts tended to score high on the depression scale.

Although the symptomatic as well as the nonsymptomatic sleep factor were significantly related to postpartum depression scores, the relationship of the symptomatic factor was greater than that of the nonsymptomatic factor. When all the other variables in the postpartum regression equation were taken into account, the explained sleeplessness factor accounted for only 3.5% of the variability in postpartum depression scores, compared to the unexplained sleeplessness factor, which accounted for 10.9% of the variability. Together, these results suggest that most women who exhibited high depression scores suffered from sleep disturbance that is symptomatic of depression, while a smaller proportion of these women suffered from sleep disturbance that is not

inherently symptomatic of the disorder. Perhaps in the latter group, vulnerability to depression is increased by sleep deprivation from maternal duties. An alternative speculation from a cognitive perspective might be that women with elevated depression levels would tend to exagerate the amount of sleep lost to unpleasant postpartum obligations.

The item analysis of postpartum responses on the depression scale (Table G-3) suggests that subjects' responses to the item concerning sleep were not uniformly affected by typical postpartum circumstances. The average response to the statement, "I have trouble sleeping at night," was between "A little of the time" and "Some of the time," which are at the nondepressive end of the response scale. A mean of 1.44 and a standard deviation of .77 for this item indicates that the distribution of responses was positively skewed such that the great majority of women gave the least depressive response (scored 1), while the minority gave more depressive responses. Therefore, it would seem that this item did not contribute to artificial elevations in depression scores. The relationship between depression scores and reports of sleep disturbance on the postpartum questionnaire suggests that the few elevated responses to the depression scale's sleep item were accurate reflections of an affective disturbance rather than an artifact of normal postpartum conditions.

Another purpose of the postpartum questionnaire was to determine whether physical discomforts associated with childbirth had some bearing on the woman's affective state during the postpartum period. This objective arose from the idea that a great deal of physical discomfort from postpartum conditions might increase a woman's susceptibility to

depression. Except for the item concerning discomfort from constipation (which stood alone in the sixth factor) the items pertaining to physical discomforts were clustered in one factor. This factor was unrelated to postpartum depression levels, which suggests that the woman's affective state is not influenced by the degree of discomfort caused by postpartum factors.

A third objective of the postpartum questionnaire was to determine whether postpartum libido was more related to affect or to the degree of physical discomforts experienced. In the factor analysis, all three questions concerning the level of sexual interest clustered together in the low libido factor. Thus, women who had little interest in sex at the time of the assessment reported that postpartum physical discomforts had interfered with their libido in the preceding week and that they anticipated similar interference in the coming week. These results might lead to speculation of a causal relationship between physical discomforts and low libido; however, this apparent relationship is probably attributable to the wording of the libido questions.

Two of the three libido questions asked women if their interest in sex had been or would be diminished by postpartum physical discomforts. Although the questions were intended to distinguish symptomatic from nonsymptomatic declines in libido, the mention of physical discomforts may have allowed women with low libido to attribute their lack of sexual interest to physical discomforts. Several findings support this hypothesis. First, low libido was shown in the regression analysis to be associated with high depression scores. Thus, it seems just as likely that libido was diminished by depression as by physical discomforts.

Another finding also suggests that depression is more likely than physical discomforts to account for low libido. The factor analysis revealed that there was little relationship between the degree of physical discomforts experienced by a woman and the amount of sexual interest she reported. If libido had been associated with physical discomforts, high correlations between the two classes of items would have caused them to cluster in one factor. Instead, two distinct factors emerged with negligible loadings of libido-related items in the physical discomforts factor and vice versa (Table G-21). The question concerning the woman's present interest in sex did, however, cluster with the psychological symptoms represented in the depressive symptom factor. Furthermore, low libido was significantly related to postpartum depression, while physical discomforts were not (Table G-22). Both of these findings indicate that the women who experienced decreased sexual interest were not the women who experienced a high level of physical discomforts from postpartum factors. The findings also show that low libido was associated with other depressive symptoms.

The item analysis of the postpartum depression measure shows that women's responses to the item, "I still enjoy sex" varied greatly, since this item had the second highest standard deviation (Table G-3). The value of the item's mean in relation to its standard deviation suggests that the distribution of responses to this item was positively skewed so that the majority of women responded in a nondepressive fashion (i.e., "Good part of the time" or "Most of the time"). Since all women presumably refrained from intercourse until the postpartum check-up, the distribution of responses suggests that this item

generally measured libido rather than the frequency of sexual intercourse.

A fourth objective of the postpartum questionnaire was to determine whether women's reports of weight loss on the depression scale could be attributed to affective disturbance or to some nondepressive aspect of the postpartum period. It is possible that the weight loss reported by these women was either an inherent feature of the postpartum period or the result of some voluntary behavior such as dieting (which is a concern that could be raised for any individual that completes the scale). Because a decline in appetite is critical to a diagnosis of depression, it is important to examine the relationship between weight loss and appetite. One would not expect weight loss from dieting or inherent postpartum conditions to be accompanied consistently by a diminished appetite.

The factor analysis (Table G-21) revealed that food consumption and weight loss were strongly correlated with appetite. That is, in women who experienced a diminished appetite, food intake and body weight declined. Although it is not possible to specify the direction of causality among these variables, the association of appetite loss with a decrease in eating and body weight is consistent with depressive symptomatology.

Another finding which suggests that weight loss is as much related to affect in these postpartum subjects as it is in other populations is the correlation between the weight loss factor and postpartum depression. The regression analysis (Table G-22) revealed that women whose appetite, food intake, and body weight decreased also scored high

on the depression scale. These results suggest that weight loss during the postpartum period is just as symptomatic of depression as weight loss during other times in a person's life.

If weight loss were an inherent feature of the postpartum period, the weight loss factor would bear no statistical relationship to postpartum depression scores. Furthermore, women's responses to the weight loss item on the depression scale would have been inflated in a depressive fashion, since weight loss is one symptom of affective disturbance. The item analysis of the postpartum depression measure (Table G-3) reveals that the average response to this item was at the nondepressive end of the response continuum. Furthermore, the responses to this item were highly variable, which would not be the case if weight loss were an ubiquitous feature of the postpartum period.

The postpartum questionnaire contained five statements which represented psychological symptoms of depression. The symptoms represented in these five statements were decreased energy, difficulty concentrating, nervousness, irritability, and depressed mood. The subject indicated whether or not each statement applied to her, and a depressive symptom score was derived by adding the number of applicable statements. As shown in the factor analysis (Table G-21), women who experienced a high number of these symptoms reported a decrease in libido, which is also symptomatic of depression. Consequently, this factor was labeled the depressive symptom factor. In the postpartum regression analysis (Table G-22), the relationship of this factor to postpartum depression levels was the strongest of any predictor variable. This finding is not surprising since the depressive symptoms

represented in this factor are also represented on the Zung Depression Scale. However, because psychological symptoms are the least likely class of symptoms to reflect some postpartum artifact, the concordance between these two measures suggests further that subjects' scores on the Zung Depression Scale were indicative of their affective condition.

The depressive symptoms factor (Table G-21) also indicates that the more psychological symptoms a woman experienced, the greater her estimate of her baby's daily crying. This positive relationship between affect and estimates of baby's crying was further confirmed in the regression analysis of postpartum variables (Table G-22). Although a causal relationship cannot be assumed from a correlational analysis, one might hypothesize a causal interaction between these two variables. As speculated earlier, babies who cry a lot may account for increased stress in the mother, which could lead to a decline in mood or to an increased susceptibility to depression. Alternatively, a cognitive theorist such as Beck might propose that women who are depressed or susceptible to depression would be more likely to give high estimates of their baby's daily crying because they would tend to maximize the negative aspects of their environment.

The delivery question factor (Table G-22) showed an inverse relationship between the length of pregnancy and the timing of the postpartum assessment. Women who delivered late in their pregnancy completed the postpartum questionnaires early in the postpartum period. The relationship between these two variables can probably be attributed to the fact that late deliveries are often performed by C-section, and women who have had C-sections are typically examined by obstetricians

earlier in the postpartum period than women who have vaginal deliveries. The factor that was composed of these two variables bore no relationship to postpartum depression scores. The regression analysis of postpartum variables (Table G-22) examined the predictive power of these two variables independently. Though the length of pregnancy was not related to postpartum depression levels, the timing of the assessment was. A priori, one might have predicted that the tendency toward postpartum depression would increase over time, since there might be some euphoria in the first weeks or months after delivery. However, the relationship between these two variables was inverse. Women whose affect was assessed early in the postpartum period were more depressed than women whose affect was assessed later in the postpartum period. This finding might lead to the speculation that adjustment to the maternal role is an important factor in avoiding or overcoming postpartum depression. But, other studies in which depression was assessed long after childbirth (Frate et al., 1980; Meares, 1976) have found a higher incidence of the disorder than this study found. Because the measurement devices in those studies were unvalidated, it is not possible to determine whether the high incidence of depression in these studies reflects an increase in women's vulnerability over time or an artifact of the measurement devices.

The design of the present study could be enhanced by a second assessment of postpartum depression. With only a single assessment in the second postpartum month, cases of depression developing later could have gone unrecorded. Although the possibilitiy of unrecorded depression cannot be disputed, the inverse relationship between the timing of

assessment and affect suggests that women became less vulnerable over time to postpartum depression.

Summary and Conclusions

The incidence of moderate to severe postpartum depression in this sample was 5.3%. Although the figure is low compared to the estimates of some previous studies, the disorder was sufficiently prevalent in this sample to reaffirm the need for continued research on the causes and prevention of postpartum depression. The results of the study also point to the need for research on prepartum depression, which was actually more prevalent than postpartum depression (16.6%). This is not the first study to find a high incidence of prepartum depression (e.g., Atkinson and Rickel, 1984; O'Hara et al. 1982); heretofore, this finding has been interpreted as a pregnancy-related artifact of the assessment device. This interpretation does not seem feasible in the present study because somatic items on the depression scale were not distorted in a depressive fashion during pregnancy.

Other findings of this study suggest that prepartum depression should be studied, not only as a disorder in its own right, but also as a precondition of postpartum depression. An examination of the data from individual subjects revealed that four out of seven women who were moderately to severely depressed postpartum experienced the same degree of depression during pregnancy. Furthermore, the positive correlation between prepartum and postpartum depression found in the analysis of group data suggests that postpartum depression is an elaboration, if not continuation, of a preexisting affective disturbance which originated during or before pregnancy.

The factors which predispose a woman to prepartum depression may not be the same as those which predispose her to postpartum depression. However, the close relationship between prepartum and postpartum depression levels suggests some continuity of affect between these two periods, so that factors which contribute to depression during pregnancy might continue to exert their effects during the postpartum period. To identify the woman at risk for prenatal or postpartum depression, predisposing factors should be studied at the beginning of pregnancy or before pregnancy in women who are trying to become pregnant. Investigating women before they become pregnant might reveal that prenatal and postpartum depression are continuations of a choronic depression in some women.

One strategy of this study was to approach the investigation of predisposing variables from the standpoint of Aaron Beck's cognitive theory of depression. On the whole, there was little support for either Beck's etiological account of depression or his characterization of the disorder. According to his etiological account, three classes of variables increase one's susceptibility to depression: (a) rigid, unattainable goals, (b) the death in childhood of a significant other, and (c) dysfunctional thinking. This study found no evidence that setting high goals increases one's vulnerability to depression. Furthermore, there was no relationship between postpartum depression and the time of life in which a significant death was experienced.

Susceptibility to depression did seem to differ according to the number of significant deaths the subject had experienced throughout her lifetime and the relationship of the deceased to the subject; however,

the association of these variables to depression was exactly opposite the prediction that Beck might make. Depression was low among women who had experienced many significant deaths. Furthermore, women who had lost a parent or other significant person were less depressed than women who had not suffered these losses. The death of a sibling did correspond to higher depression scores, as Beck might predict, but this relationship adds little credence to this hypothesis in light of the other findings.

The third etiological variable, dysfunctional thinking, is most important to the cognitive theory. According to Beck, dysfunctional cognitions are a necessary ingredient for the development and maintenance of depression. In the regression analysis, dysfunctional cognitions were a significant predictor of depression; however, much of their predictive power arose from their concurrent relationship to prepartum depression. In fact, this concurrent relationship was so much stronger than the predictive relationship that it seems more appropriate to consider dysfunctional cognitions a correlate rather than a cause of depression.

While dysfunctional cognitions appear to be symptomatic of depression, they clearly are not a necessary feature of the disorder, since many cases of ongoing depression did not exhibit a high level of distorted thinking. This observation casts doubt on Beck's conceptualization of depression as fundamentally a cognitive disorder.

Even though Beck's conceptualization of depression was not upheld by the results of this study, there were a considerable number of women who did exhibit dysfunctional thinking in conjunction with moderate to

severe depressive symptoms. The proportion of depressed women who exhibited a high level of dysfunctional thinking was 32% during pregnancy and 57% during the postpartum period. Since the criterion for high dysfunctional thinking was a DAS score greater than one standard deviation above the mean, the frequency of high dysfunctional thinking was 16% in the entire sample. As indicated above, the frequency of high dysfunctional thinking in depressed subjects was substantially greater than 16%. Therefore, dysfunctional thinking occurs much more frequently in depressed subjects than in normal ones. Although this analysis still does not permit an interpretation of dysfunctional cognitions as a causal or necessary condition of depression, it does perhaps imply that dysfunctional cognitions are often a symptom of depression.

The prognostic significance of dysfunctional cognitions for various treatments should be explored in future research. Perhaps the presence of dysfunctional cognitions in depression would indicate an amenability to cognitive therapy. Beck (Hollon & Beck, 1978) has claimed that cognitive therapy has a considerable success rate, but it is not clear that dysfunctional cognitions have actually been assessed in an objective fashion before treatment commences. It seems reasonable to propose that cognitive therapy would work best in cases of depression where maladaptive thinking is present. In fact, there is some preliminary evidence (McKnight, Nelson, Hayes, & Jarrett, in press) that the effectiveness of cognitive therapy is determined by the presence or absence of dysfunctional thinking.

In addition to examining Beck's theory of depression, this study investigated various social and psychological variables that seemed from previous research to be promising predictors of postpartum depression. The types of variables examined were related to the subject's demographic characteristics, her life situation, her psychiatric history, her reactions to particular hormonal conditions, and her prenatal thoughts about the baby. The only significant predictors out of all these prenatal variables were the subject's thoughts about her marriage and her thoughts about the baby. The risk of postpartum depression was increased among women who were dissatisfied with their marital situation and among women who (a) did not plan their pregnancy, (b) had doubts about having a child, and (c) did not plan to breast-feed the baby. The fact that these variables were no longer significant predictors in the summary analysis of prenatal variables suggested that thoughts about the marriage and thoughts about the baby could have been related to the level of prenatal depression, which remained in this analysis the most significant predictor of postpartum depression.

According to Beck, dysfunctional cognitions are the key factor in predicting whether a depressive episode will arise from a stressful life event, but social stress theorists claim that the event itself is the primary precipitant of depression (e.g., Brown & Harris, 1978; Dohrenwend & Dohrenwend, 1974; Weissman & Paykel, 1974). The variables that were related in this study to both prenatal and postnatal depression suggest that a social stress model might be an appropriate alternative to Beck's etiological account of depression. For example, pregnancy could constitute a stressful life event for women who have

negative or ambivalent feelings about having a child, just as it could for women who are unhappy with their marital situation. In addition, the events which led to dissatisfaction with the marital situation could have been stressful. During the postpartum period, a demanding baby could represent a stressful life event. Perhaps the stress induced by these situations would be sufficient to precipitate depression, regardless of the premorbid cognitive patterns.

The purpose of combining all of the significant prenatal predictors in one regression analysis was to determine how much the prediction of postpartum depression scores could be improved by assessing other variables in addition to prenatal depression levels. If the other variables could account for a significant amount of variability above and beyond that attributed to prenatal depression scores, then it might be useful to construct an instrument incorporating these variables. This instrument could then be administered prenatally along with the depression measure to identify women at risk for postpartum depression.

If the only prenatal measure used to predict postpartum depression were the Zung Depression Scale, 29% of the variability in postpartum depression could be predicted ($r^2 = (.519)^2 = .29$). Adding the Dysfunctional Attitudes Scale and questions about significant deaths to the prenatal assessment would increase the amount of predicted variability to approximately 39% (r square = .394). Although this amount of predicted variability would not have a great deal of practical utility for anticipating postpartum depression scores, it does represent a significant scientific contribution to the search for predictors of postpartum depression. These variables, along with those discovered in

other investigations, could lead to a practical and accurate instrument for assessing the risk of postpartum depression in pregnant women.

More information might have been gained from the present study by investigating other classes of predictor variables. There are several methodological improvements, however, that might have strengthened the information gained from the predictors actually used in this study. As mentioned earlier, it would have been desirable to conduct, later in the postpartum period, a second assessment of depression and its correlates. Also, it would have been desirable to sample a larger number of women, so that response frequencies on certain questionnaire items would be sufficiently large to include these items in a regression analysis. A third way in which this study could have been improved is to add behavioral measures (taken by the subject and others) to the self-report measures of depression and its correlates. Finally, the study might have been improved by including a control group of nonpregnant women who were matched to the present sample according to age, race, marital status, and income. By assessing depression and the other predictor variables at intervals equivalent to the pregnant group, it would have been possible to ascertain whether the risk of depression is actually increased by childbirth. Since there were only three cases of depression that actually began after childbirth, the incidence of depression that is uniquely postpartum seems to be 2.3%. This incidence of depression after childbirth might not be greater than the incidence of depression in other women over an equivalent period of time. If the control group exhibited new cases of depression with the same frequency as puerperal women, then the utility of labeling the

depression "postpartum" could be questioned. Assessing a control group might have also revealed some factors that predict depression in non-puerperal women, and these factors could have been compared to those which predict postpartum depression.

The most apparent drawback of this study is its correlational design. In a correlational design the "experimental" conditions are established in nature, but there is no manipulation of these conditions to determine the nature of their relationship to the dependent variable. Nevertheless, correlational studies do provide useful information for further investigations of a correlational or an experimental nature.

Whether a correlational or an experimental strategy should be employed in an etiological study is a matter of ethical as well as scientific consideration. In general, it is ethically and morally inappropriate to investigate the etiological significance of variables by experimentally introducing them to the subject. At times, however, it might be possible to test an etiological hypothesis experimentally by abolishing potentially causal factors that have been established in nature. For example, an experimental strategy for testing Beck's theory would be to treat dysfunctional cognitions during pregnancy in one group of nondepressed women who exhibit this type of thinking. Then the incidence of postpartum depression in this group could be compared to the incidence of postpartum depression in a group of dysfunctional thinkers who did not receive prenatal cognitive therapy. If Beck's theory were valid, the incidence of postpartum depression would be higher in the untreated group than in the treated group; and, in comparison to the general population of pregnant women, the incidence of

postpartum depression would be high in the untreated group and low in the treated group. Before conducting a study of this complexity, it would seem practical to establish through a correlational analysis that there is, in fact, a relationship between the variable in question and postpartum depression.

Although an experimental strategy could be used to test Beck's etiological hypotheses, it is often not practical or feasible to use an experimental strategy to investigate other types of variables. In some cases the variables are not manipulable. For example, life history variables, such as death of a significant other, can only be explored through correlational analyses. Other variables must be exposed and substantiated as potential causes of depression before they can be manipulated in an experimental fashion. To illustrate, this study and one other correlational study have suggested that marital problems are a potential contributor to postpartum depression. Further correlational analyses might be done to assess the likelihood that marital problems and not some related factors are contributing to postpartum depression. Then, having established that marital problems are a likely contributor, an experimental design might be used to assess the effects of prenatal marital therapy on postpartum depression.

Whether a correlational or an experimental design is used, the strategy for future research on the etiology of depression should be longitudinal investigations. As mentioned earlier, only one longitudinal study (Lewinsohn et al., 1981) has been conducted to investigate the etiology of depression among members of the general population. Because this strategy requires that a large number of subjects be

followed over a very long period of time, this type of longitudinal study might not be feasible or cost effective in terms of its outcomes. These drawbacks of a longitudinal procedure can be largely overcome, however, if high-risk populations are used to study the etiology of depression. This and other recent studies have initiated this strategy by investigating predictors of depression in postpartum women. However, it would be useful to study other populations that are at risk for depression as a consequence of some biochemical or life event such as menopause, reserpine treatment of hypertension, or retirement. If a variety of populations are used that make longitudinal studies more feasible, common themes could emerge which would help provide an answer to the general question of what causes depression.

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APPENDIX A

CONSENT FORM

Dear Mother-to-be,

I am a doctoral student in psychology at the University of North Carolina at Greensboro, and I am conducting a study on special concerns that women might have before and after childbirth. I am especially interested in discovering why some women get depressed after their baby is born. About 100 healthy, pregnant women in the Greensboro area will be in the study. If you agree to participate, you will be one of them. Your participation can help other women and professionals deal with problems that may occur after childbirth.

My study involves filling out some questionnaires before your baby is born and then filling out some questionnaires about six weeks after your baby is born. If you choose to participate, I will give the questionnaires to you at the doctor's office so that you can fill them out while you wait for your appointment. There are three questionnaires to fill out before the baby is born which should take about 30 minutes altogether to complete. If you do not finish while you are waiting for your appointment, you may either finish them after the appointment or during the time you are waiting for your next appointment in two weeks. There are only two questionnaires to fill out after the baby is born, and these can be done when you are visiting the obstetrician for the check-up that is normally done after the delivery. These two questionnaires should only take about 15 minutes to do.

As a participant, you will receive a written report of the study's results when the research is completed. The information that you provide will be strictly confidential. Furthermore, you will be free to withdraw at any time if you desire. If you choose not to participate, that is your privilege. Your relationship with your doctor will not be affected by whether you participate or not.

If you would like to participate in this research, please sign your name and fill in the five blanks on the following page. If you would like to receive a report of the study after it is completed, write your address in the address box at the bottom of the next page. Please feel free to ask me questions about the study.

Sincerely,

Margaret C. Salinger

I agree to participate in the study being conducted by Margaret Salinger, a doctoral student in psychology at the University of North Carolina at Greensboro. I understand that my participation will involve filling out questionnaires before and after my delivery. The investigator has offered to answer questions that I may have regarding the procedures of this study. I understand that I am free to terminate my participation at any time without penalty or prejudice. I am aware that further information about the conduct and review of human research at the University of North Carolina at Greensboro can be obtained by calling 379-5878, the Office for Sponsored Programs.

Name: _____
(first) (middle initial) (last)

Husband's name, if married: _____

Today's date: _____

Your obstetrician: _____

Your next appointment: _____
(date) (time)

Hospital where you plan to deliver: _____

Your due date: _____

As a participant in this research, I would like to receive a copy of the results of the study. My address is:

Street and number _____

City _____ Zip _____

APPENDIX B

PRENATAL QUESTIONNAIRE

PRENATAL QUESTIONNAIRE

Thank you very much for taking part in this research. The questions that will be asked in this survey deal with family, personal, gynecological, and pregnancy-related questions. I realize that some of the questions are personal in nature; however, these are the kinds of questions that are thought to be related to postpartum depression.

Please read each question carefully and check the answer that best fits you. If you have any comments that might explain your answers or make them clearer, feel free to write them beside the question. Please answer every question.

Again, let me stress that your answers are confidential and will be used for research purposes only.

The first group of questions deals with information about you and your occupation. Please read each question carefully and check the best answer for you.

1. Do you currently work outside the home?

_____Yes

_____No → If you are not currently working skip to Question-5.

If you are currently working:

2. How many hours per week do you usually work?

_____ 1-10 _____21-30 _____41-50

_____11-20 _____31-40 _____more than 50

3. In which of the following categories would you place your job?

_____Professional _____Laborer

_____Secretarial _____Service Worker

_____Manager _____Machine Operator

_____Skilled Craft _____Other (please specify)

_____

4. How satisfied are you with your job?

_____Very Satisfied _____Somewhat Dissatisfied

_____Somewhat Satisfied _____Very Dissatisfied

5. In which age category do you fall?

_____15-19 Years _____30-34 Years

_____20-24 Years _____35-39 Years

_____25-29 Years _____Over 39 Years

6. What is your race?

_____Black
_____White (Caucasian)
_____Hispanic
_____Oriental
_____American Indian
_____Other (please specify)
_____

7. What is the highest grade that you have completed?

_____No Formal Education
_____Some Grade School
_____Completed Grade School
_____Some High School
_____Completed High School
_____Trade or Vocational School
_____Some College
_____Completed College
_____Some Graduate Work
_____A Graduate Degree
_____Other (please specify)
_____

8. Which of the following categories best describes your total yearly income from all sources (including husband, if married)?

_____Less than $5,000
_____$5,000 to $9,999
_____$10,000 to $14,999
_____$15,000 to $19,999
_____$20,000 to $24,999
_____$25,000 to $29,999
_____$30,000 or more

The next group of questions deals with information about your physical (bodily) functioning. Please read each question carefully and check the best answer for you.

9. How would you describe your pregnancy, up to this point, in terms of physical problems such as nausea, fatigue, pains, or threatened miscarriage?

_____Experiencing Many Physical Problems
_____Experiencing Some Physical Problems
_____Experiencing Few Physical Problems
_____Experiencing No Physical Problems

10. How would you describe your pregnancy, up to this point, in terms of emotional reactions such as mood swings, nervousness, irritation, or depression?

_____Experiencing Many Emotional Reactions

_____Experiencing Some Emotional Reactions

_____Experiencing Few Emotional Reactions

_____Experiencing No Emotional Reactions

11. Have you ever had any miscarriages?

_____Yes

_____No → If you have not had any miscarriages skip to Question 13.

If you have had any miscarriages:

12. How many miscarriages have you had?

_____Number

13. Before this pregnancy, did your menstrual periods occur at about the same time each month, that is, within 3 days (late or early) of the usual time?

_____Yes

_____No

14. During past menstrual periods, did you ever experience cramps?

_____Yes

_____No → If you did not experience menstrual cramps skip to Question 16.

If you did experience menstrual cramps:

15. How would you describe your menstrual cramps?

_____Mild

_____Somewhat Painful

_____Painful

_____Extremely Painful

_____Other (please specify)

_____

16. During your menstrual periods how would you have described your mood (check all that apply to you)?

_____Very Tense (High Strung)

_____Irritable (Angry at Everyone)

_____Unhappy (Sad, Blue)

_____Mood Swings (Sometimes Happy, Sometimes Sad)

_____No Changes in Emotion

_____Other (please specify) _____

17. Have you ever received medication for thyroid problems?

_____Yes

_____No

18. Have you ever received medication for other hormonal problems?

_____Yes

_____No → If you have not received any medication for other hormonal problems skip to Question-20.

If you have received medication for other hormonal problems:

19. As accurately as possible, describe the kind of hormonal problems that you have.

_____

_____

_____

_____

_____

_____

_____

20. Have you ever used birth control pills?

_____Yes

_____No → If you have not used birth control pills skip to the instructions preceding Question-23.

If you have used birth control pills:

21. Do birth control pills affect your mood or cause your emotions to change?

_____To a Great Degree

_____Somewhat

_____Not at all → If birth control pills do not affect your mood, skip to the instructions preceding Question-23.

If birth control pills do affect your mood:

22. How would you describe your mood during the time that you took birth control pills (check all that apply to you)?

_____Very Tense (High Strung)

_____Irritable (Angry at Everyone)

_____Unhappy (Sad, Blue)

_____Mood Swings (Sometimes Happy, Sometimes Sad)

_____Other (please specify) _____

_____

The next few questions deal with psychological factors in your past or present. Please read each question carefully and check the answer that best applies to you.

23. Have you ever experienced the death of someone close to you?

_____Yes

_____No → If you have not experienced the death of someone close, skip to Question-26.

If you have experienced the death of someone close:

24. How old were you when the person(s) died?

_____Birth to 4 Years _____10-14 _____18-22

_____5-9 _____14-18 _____Over 22

25. What relation to you was the person(s) who died? (check all that apply)

_____Father _____Sister

_____Mother _____Other (please specify)

_____Brother _____

26. Do you feel that you set high standards for yourself in most areas of your life (personal, professional, or recreational)?

_____Never _____Most of the Time

_____Sometimes _____Always

27. Do you feel that you usually have an easy, moderately difficult, or difficult time reaching the goals you set for yourself?

_____Easy

_____Moderately Difficult

_____Difficult

28. In your opinion, have you ever had a serious emotional or psychological problem?

_____Yes

_____No

29. Have you ever been treated for an emotional or psychological problem?

_____Yes

_____No → If you have not been treated for an emotional or psychological problem, skip to the instructions preceding Question-34.

If you have been treated for an emotional or psychological problem:

30. Are you receiving treatment presently for an emotional or psychological problem?

_____Yes

_____No

31. What was the main problem(s) for which you have received treatment? (please check all that apply to the past and the present)

_____Nervousness

_____Depression

_____Schizophrenia

_____Phobia

_____Postpartum Depression

_____Physical Problems

_____Marital Problems

_____Other (please specify)

_____

32. From whom have you received treatment? (please check all that apply to both past and present)

_____Psychologist

_____Psychiatrist

_____Family Doctor

_____Social Worker

_____Obstetrician/Gynecologist

_____Other (please specify)

_____

33. What kind of treatment have you received? (please check all past and present treatments)

_____Counseling

_____Medication (please write the name(s) of the medication(s) you received: _____

_____)

_____Hospitalization

_____Other (please specify the form of treatment you received: _____)

The next group of questions deals with information about your family and your pregnancy. Please read each question carefully and check the best answer for you.

34. What is your marital status?

_____Married

_____Separated

_____Divorced

_____Single (Never Married)

_____Engaged to be Married

_____Other (please specify)

_____

35. How would you describe your living situation associated with that marital status?

_____Very Happy

_____A Little Happier Than Average

_____Just About Average

_____Not Too Happy

_____Unhappy

36. Do you have any children now?

_____Yes

_____No → If you do not have any children skip to Question-38.

If you do have children now:

37. In what month and year was your last child born?

Month Year

38. Was your current pregnancy planned?

_____Yes

_____No

39. Do you have doubts at this time about your desire to have a child?

_____Yes

_____No

40. If you have a preference about the sex of your child, what would it be?

_____Male

_____Female

_____No Preference

APPENDIX C

ZUNG SCALE

APPENDIX D

DYSFUNCTIONAL ATTITUDE SCALE

APPENDIX E

POSTPARTUM QUESTIONNAIRE

POSTPARTUM QUESTIONNAIRE

Please read each question carefully and check the answer that best fits you. If you have any comments that might explain your answers or make them clearer, feel free to write them beside the question. Please answer every question.
Remember that your answers are confidential and will be used for research purposes only. Thank you very much for taking part in this research.

1. Did you have a boy, a girl, twins, or more?

_____Boy

_____Girl

_____Twins (Please indicate sexes of the twins _____)

_____Triplets or more (Please indicate the number ____ and sexes _____ of the babies.)

2. Before your delivery, were you planning to breast feed?

_____Yes

_____No

3. Are you breast feeding now?

_____Yes

_____No

The following group of questions deals with your food intake, your appetite, and any changes in your weight that might have occurred recently. Please read each question carefully and check the best answer for you.

4. On the average, how much have you been eating during the past week?

_____A good deal more than I usually eat

_____Somewhat more than I usually eat

_____About the same as I usually eat

_____Somewhat less than I usually eat

_____A good deal less than I usually eat

5. Have you been trying to lose weight through exercise or diet during the past week?

_____Yes

_____No

6. How would you describe your appetite, or desire for food, during the past week?

_____Much larger appetite than usual

_____Somewhat larger appetite than usual

_____About the same appetite as usual

_____Somewhat smaller appetite than usual

_____Much smaller appetite than usual

7. What kind of change have you seen in your weight over the past week?

_____Weight has <u>increased</u> by 5 or more pounds

_____Weight has <u>increased</u> by 1 to 4 pounds

_____Weight has <u>not changed</u>

_____Weight has <u>decreased</u> by 1 to 4 pounds

_____Weight has <u>decreased</u> by 5 or more pounds

8. At this point, would you like to:

_____Gain weight

_____Remain the same

_____Lose weight

_____Don't care

The last group of questions deals with physical discomforts and changes in sleeping patterns that might occur after childbirth. Please read each question carefully and check the best answer for you.

9. How much breast soreness have you experienced during the past week?

_____No soreness _____Pretty much soreness

_____A little soreness _____A great deal of soreness

10. How much discomfort have you experienced from the episiotomy during the past week?

_____No discomfort _____Pretty much discomfort

_____A little discomfort _____A great deal of discomfort

11. How much abdominal (lower stomach) pain have you experienced during the past week?

_____No pain _____Pretty much pain

_____A little pain _____A great deal of pain

12. How much discomfort have you experienced from constipation during the past week?

_____No discomfort _____Pretty much discomfort

_____A little discomfort _____A great deal of discomfort

13. Do you feel that any of the physical discomforts mentioned above have gotten you down or made you irritable during the past week?

_____Yes

_____No → If the physical discomforts have not gotten you down or made you irritable, skip to Question 15.

If the physical discomforts have gotten you down or made you irritable:

14. Please indicate all physical discomforts that have gotten you down or made you irritable during the past week:

_____Breast soreness

_____Episiotomy

_____Abdominal (lower stomach) pain

_____Constipation

_____Other (please specify):_____

15. During the past week, what is the average time per night that you have been kept awake by the physical discomforts mentioned above?

_____None of the time

_____Less than 30 minutes per night

_____30 minutes to 1 hour per night

_____1 to 1½ hour per night

_____1½ to 2 hours per night

_____More than 2 hours per night

16. On the average, how often does your baby (or babies) awaken you at night?

_____times per night

17. On the average, what is the total amount of time you spend tending to your baby during the night?

_____0 to 1 hour per night _____3 to 4 hours per night

_____1½ to 2½ hours per night _____More than 4 hours per night

18. On the average, how many times per night do you awaken when the baby is not crying?

_____times per night

19. Once you've gone to bed at night, how much time are you awake when you are not tending to the baby?

_____0 to 30 minutes

_____30 minutes to 1 hour per night

_____1 to 1½ hour per night

_____1½ to 2 hours per night

_____2 to 2½ hours per night

_____2½ to 3 hours per night

_____More than 3 hours per night

20. On the average, how often do you awaken early in the morning when the baby is not crying and find it hard to get back to sleep?

_____Never

_____Once or twice a week

_____3 or 4 times a week

_____5 or 6 times a week

_____Every night

21. On the average, how much time do you spend sleeping or resting in bed during the daytime?

_____0 to 1 hour per day

_____1½ to 2½ hours per day

_____3 to 4 hours per day

_____More than 4 hours per day

22. During the past week, how much have the physical discomforts associated with childbirth interfered with your interest in sex?

_____Interfered a great deal

_____Interfered pretty much

_____Interfered somewhat

_____Interfered very little

_____Did not interfere at all

23. How much <u>interest</u> do you have in sex at this point?

_____None
_____Very little
_____Some
_____Pretty much
_____A great deal

24. How much do you expect the physical discomforts associated with childbirth to interfere with your <u>interest</u> in sex over the next few weeks?

_____Expect them to interfere a great deal
_____Expect them to interfere pretty much
_____Expect them to interfere somewhat
_____Expect them to interfere very little
_____Do not expect them to interfere at all

25. Please read the following statements and indicate whether or not each statement is true for you.

a) I have so little energy that it's hard to do the things I have to do. _____Yes _____No

b) I feel more nervous than usual. _____Yes _____No

c) My temper seems shorter than usual. _____Yes _____No

d) I find it hard to keep my mind on what I'm doing. _____Yes _____No

e) I have been feeling blue or depressed lately. _____Yes _____No

26. Did your mother ever experience postpartum depression (a true depression in the weeks or months after childbirth)?

_____Yes
_____No
_____Don't know

27. In your estimation, what is the average amount of time your new baby (or babies) spends crying in a 24-hour period?

_____hour(s) _____minutes

APPENDIX F

FIGURES

Figure 1:
Frequency polygon of prenatal depression (Zung SDS) scores

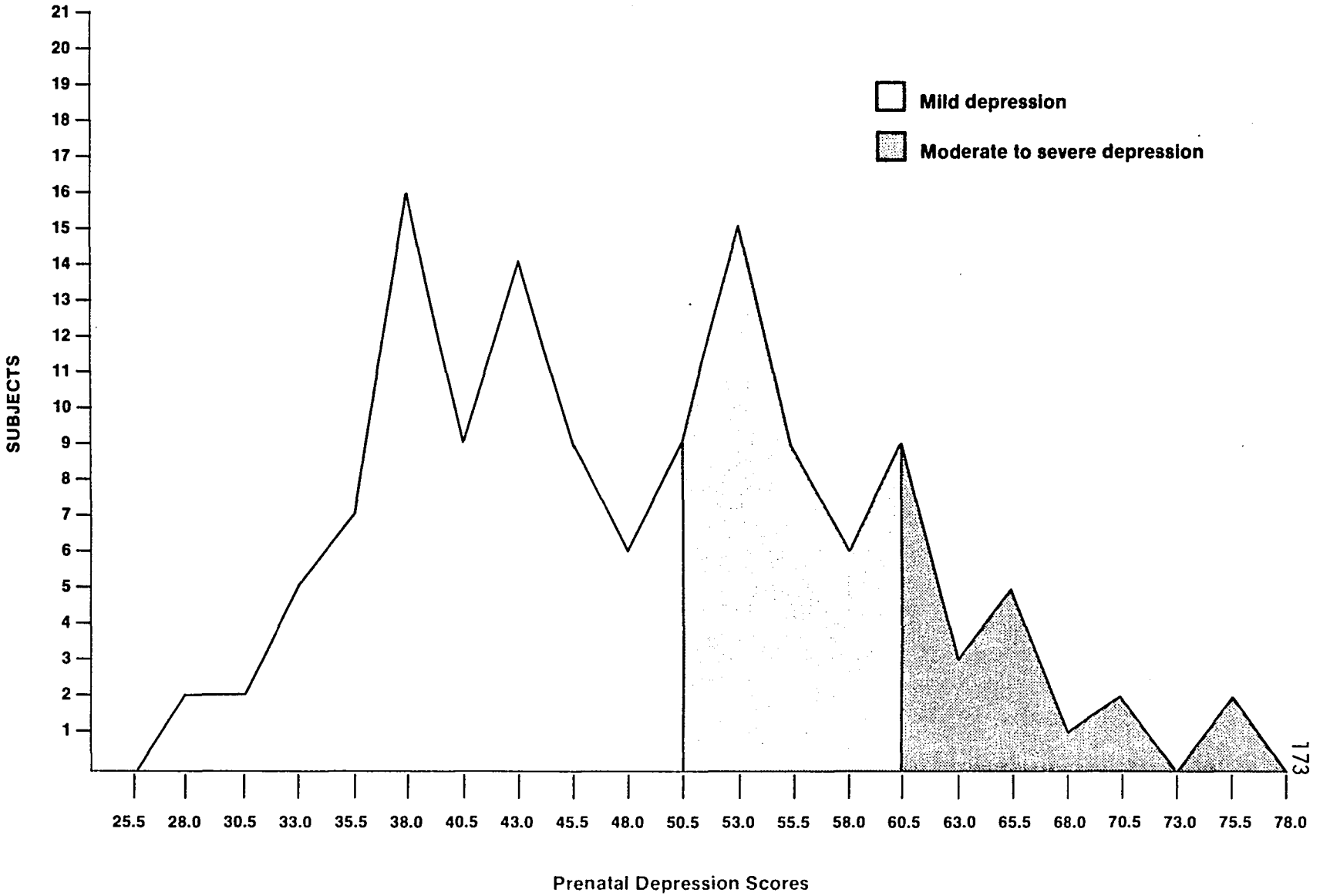
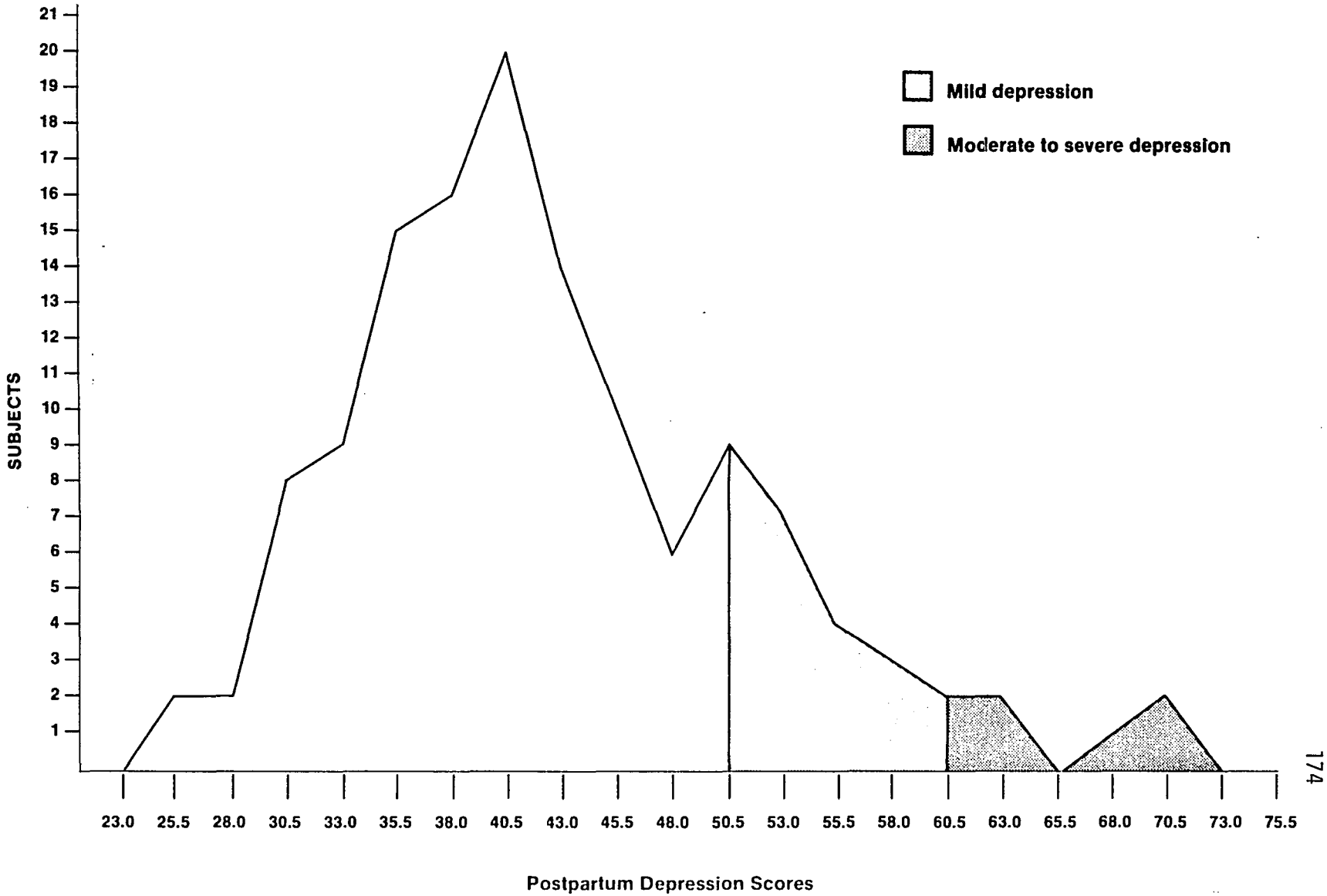


Figure 2:
Frequency polygon of postpartum depression (Zung SDS) scores



APPENDIX G

TABLES

Table G-1

Incidence of Postpartum Depression in Relation to Prepartum Depression[a]

		Postpartum	
		Depressed	Not Depressed
Prepartum	Depressed	4	18
	Not Depressed	3	107

[a]Only cases of moderate to severe depression are reported.

Table G-2

Prenatal Zung Depression Scale Items Ranked in Terms of Variability

Item	SD	M[a]
6 I still enjoy sex	1.105	2.409
4 I have trouble sleeping at night	1.071	2.356
2 Morning is when I feel the best	1.065	2.447
17 I feel that I am useful and needed	1.059	1.909
5 I eat as much as I used to	1.052	2.091
15 I am more irritable than usual	1.030	2.288
10 I get tired for no reason	1.020	2.432
11 My mind is as clear as it used to be	1.010	1.818
16 I find it easy to make decisions	1.005	2.189
20 I still enjoy the things I used to do	.976	1.909
13 I am restless and can't keep still	.970	2.076
12 I find it easy to do the things I used to	.931	2.864
18 My life is pretty full	.880	1.606
14 I feel hopeful about the future	.871	1.614
8 I have trouble with constipation	.869	1.674
9 My heart beats faster than usual	.844	1.886
3 I have crying spells or feel like it	.726	1.492
1 I feel downhearted and blue	.566	1.409
19 I feel that others would be better off if I were dead	.491	1.136
7 I notice that I am losing weight	.400	1.091

[a]The higher the value, the more depressive the response.

Table G-3

Postnatal Zung Depression Scale Items Ranked in Terms of Variability

Item	SD	M[a]
5 I eat as much as I used to	1.186	2.811
6 I still enjoy sex	1.146	2.000
12 I find it easy to do the things I used to	1.132	2.303
11 My mind is as clear as it used to be	1.127	1.932
7 I notice that I am losing weight	1.048	2.030
16 I find it easy to make decisions	1.029	2.053
13 I am restless and can't keep still	1.012	1.788
2 Morning is when I feel the best	.974	2.432
15 I am more irritable than usual	.905	1.773
14 I feel hopeful about the future	.903	1.538
20 I still enjoy the things I used to do	.897	1.606
10 I get tired for no reason	.795	1.538
17 I feel that I am useful and needed	.783	1.424
4 I have trouble sleeping at night	.774	1.439
8 I have trouble with constipation	.711	1.356
3 I have crying spells or feel like it	.649	1.371
18 My life is pretty full	.615	1.295
9 My heart beats faster than usual	.591	1.235
1 I feel downhearted and blue	.583	1.364
19 I feel that others would be better off if I were dead	.328	1.083

[a]The higher the value, the more depressive the response.

Table G-4

Frequency and Percentage of Responses to Demographic Questions

Variable		Frequency	Percentage	Cumulative Percentage
Pre Q5[a]	Age			
	15-19	14	10.6	10.6
	20-24	38	28.8	39.4
	25-29	52	39.4	78.8
	30-34	20	15.2	93.9
	35-39	6	4.5	98.5
	Over 39	2	1.5	100.0
Pre Q6	Race			
	Black	22	16.7	16.7
	White	107	81.1	97.1
	Hispanic	2	1.5	99.2
	Oriental	0	0.0	99.2
	American Indian	0	0.0	99.2
	Other	1	.8	100.0
Pre Q34	Marital Status			
	Married	118	89.4	89.4
	Separated	2	1.5	90.9
	Divorced	1	.8	91.7
	Single	10	7.6	99.2
	Engaged	1	.8	100.0
Pre Q1/2	Hours worked weekly			
	None	44	33.3	33.3
	1-10	2	1.5	34.8
	11-20	6	4.5	39.4
	21-30	5	3.8	43.2
	31-40	61	46.2	89.4
	41-50	10	7.6	97.0
	More than 50	4	3.0	100.0
Pre Q7	Education			
	None	8	6.1	6.1
	Some grade school	1	.8	6.8
	Completed grade school	2	1.5	8.3
	Some high school	15	11.4	19.7
	Completed high school	37	28.0	47.7
	Vocational school	13	9.8	57.6
	Some college	22	16.7	74.2
	Completed college	25	18.9	93.2
	Some graduate school	9	6.8	100.0
	Graduate degree	0	0.0	100.0
	Other	0	0.0	100.0

Variable		Frequency	Percentage	Cumulative Percentage
Pre Q8	Income			
	Less than $5,000	11	8.3	8.3
	$ 5,000-$ 9,999	15	11.4	19.7
	$10,000-$14,999	17	12.8	32.5
	$15,000-$19,999	14	10.6	43.1
	$20,000-$24,999	20	15.2	58.3
	$25,000-$29,999	18	13.6	71.9
	$30,000 or more	36	27.4	99.2
		(1 missing)	.8	100.0
Pre Q36	Children now?			
	Yes	55	41.7	41.7
	No	77	58.3	100.0
Pre Q3	Job Description[b]			
	Professional	34	25.8	25.8
	Secretarial	22	16.7	42.4
	Manager	2	1.5	43.9
	Skilled craftperson	1	.8	44.7
	Laborer	5	3.8	48.5
	Service worker	5	3.8	52.3
	Machine operator	10	7.6	59.8
	Other profession	9	6.8	66.7
	Not working	44	33.3	100.0

[a]The prefix Pre Q stands for "prenatal question." The number following this prefix indicates the specific item represented by that variable.

[b]Variable omitted from the regression equation due to restrictions on the acceptable number of categorical variables.

Table G-5

Multiple Regression of Demographic Variables on Postpartum Depression Scores

	r	Partial r	(Partial r)^2	Standardized β	t	p
Age	-.201	-.134	.018	-.169	-1.498	.14
Race	-.157	-.076	.006	-.090	- .870	.39
Marital status	-.176	-.075	.006	-.077	-.857	.39
Hours working weekly	-.014	.032	.001	.035	.351	.73
Education	-.001	.027	.000	.028	.306	.76
Income	-.125	.025	.001	.033	.279	.78
Children now?	-.093	-.023	.001	-.024	-.253	.80

$F(7,123) = 1.17$, $p = .38$

Multiple r = .24946

r squared = .06223

Table G-6

Frequency and Percentage of Responses to the Question Concerning Happiness with the Marital Situation

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q35 Happiness in marital situation			
Unhappy	1	.8	.8
Not too happy	3	2.3	3.0
Average	18	13.6	16.7
Happier than average	23	17.4	34.1
Very happy	87	65.9	100.0

Table G-7

Multiple Regression Analysis of Life Quality Variables on Postpartum Depression Scores

	r	Partial r	(Partial $r)^2$	Standardized β	t	p
Happiness in marital situation	-.216	-.188	.035	-.199	-2.145	.03
Children now?	-.093	-.101	.001	-.101	-1.133	.26
Marital status	-.176	-.081	.007	-.093	-.914	.36
Income	-.125	-.031	.001	-.036	-.343	.73
Hours working per week	-.014	.030	.001	.032	.337	.74

$F(5,125) = 1.96$, $p = .09$

Multiple r = .26987

r squared = .07283

Table G-8

Frequency and Percentage of Responses for the Prenatal Question Concerning the Birth of Subject's Last Child

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q37 When last child was born			
12-24 months	5	3.9	3.9
25-36 months	18	13.6	17.5
37-48 months	8	6.1	23.6
49-60 months	8	6.1	29.7
61-72 months	2	1.5	31.2
73-84 months	2	1.5	32.7
85-96 months	3	2.3	35.0
97-108 months	4	3.0	38.0
109-120 months	0	0.0	38.0
121-132 months	0	0.0	38.0
133-144 months	1	.8	38.8
No existing children	79 (2 missing)	59.8 (1.5)	98.6 (100.0)

Table G-9

Frequency and Percentage of Responses to Questions Concerning Hormonal Conditions

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q10 Emotional reactions this pregnancy			
None	11	8.3	8.3
Few	59	44.7	53.0
Some	46	34.8	87.9
Many	16	12.1	100.0
Pre Q14/15 Pain of menstrual cramps			
None	25	18.9	18.9
Mild	47	35.6	54.5
Somewhat painful	33	25.0	79.5
Painful	18	13.6	93.2
Extremely painful	9	6.8	100.0
Pre Q11/12 Number of miscarriages			
0	112	84.8	84.8
1	16	12.1	97.0
2	4	3.0	100.0
Pre Q16a Tense during periods			
Yes	11	8.3	8.3
No	121	91.7	100.0
Pre Q16b Irritable during periods			
Yes	40	30.3	30.3
No	92	69.7	100.0
Pre Q16c Unhappy during periods[a]			
Yes	7	5.3	5.3
No	125	94.7	100.0
Pre Q16d Mood swings during periods			
Yes	76	57.6	57.6
No	56	42.4	100.0
Pre Q16e No change in mood during periods			
Yes	23	17.4	17.4
No	109	82.6	100.0

Variable		Frequency	Percentage	Cumulative Percentage
Pre Q16	(total) Number of emotional reactions during periods			
	0	21	15.9	15.9
	1	93	70.4	86.3
	2	10	7.6	93.9
	3	7	5.3	99.2
	4	1	.8	100.0
Pre Q9	Physical problems this pregnancy			
	None	18	13.6	13.6
	Few	68	51.5	65.2
	Some	42	31.8	97.0
	Many	4	3.0	100.0
Pre Q13	Were periods regular?			
	Yes	104	78.7	78.7
	No	27	20.5	99.2
		(1 missing)	.8	100.0
Pre Q17	Medication for thyroid problem in the past?[a]			
	Yes	1	.8	.8
	No	131	99.2	100.0
Pre Q18	Medication for hormonal problem in the past?[a]			
	Yes	2	1.5	1.5
	No	129	97.7	99.2
		(1 missing)	.8	100.0
Pre Q20	Ever used birth control pills?[a]			
	Yes	109	82.6	82.6
	No	23	17.4	100.0
Pre Q21	Emotional changes with birth control pills? (n = 109)[b]			
	None	59	44.7	44.7
	Some	35	26.5	71.2
	A great deal	15	11.4	82.6
		(23 omitted)	17.4	100.0

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q22 Reactions to birth control pills (n = 50)[b]			
Very tense	7	5.3	5.3
Irritable	9	6.8	12.1
Unhappy	5	3.8	15.9
Mood swings	34	25.8	41.7
Other mood changes	4	3.0	44.7

[a]Variables omitted from the regression analysis due to low variability in responses.

[b]Variables omitted from the regression analysis due to inconsistency in number of subjects.

Table G-10

Multiple Regression of Hormonal Variables on Postpartum Depression Scores

Predictor Variable	*r*	Partial *r*	(Partial *r*)^2	Standardized β	*t*	*p*
Emotional reactions this pregnancy	.161	.133	.018	.141	1.478	.14
Pain of menstrual cramps	-.061	-.104	.011	-.105	-1.156	.25
Number of miscarriages	-.085	-.091	.008	-.090	-1.008	.32
Tense during menstrual periods	.115	.087	.008	.122	.966	.34
Irritable during menstrual periods	.119	.074	.005	.143	.815	.42
Mood swings during menstrual periods	-.014	.030	.001	.055	.325	.75
Number of emotional reactions during menstrual periods	.109	-.026	.001	-.062	-.292	.77
Physical problems this pregnancy	.028	-.015	.000	-.015	-.163	.87
Regular periods?	-.017	-.008	.000	-.008	-.094	.93

$F(9,121) = .86$, $p = .56$
Multiple $r = .24496$
r squared $= .06000$

Table G-11

Frequency and Percentage of Responses Concerning the Subject's Past and Present Psychological Condition

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q28 History of psychological problem			
Yes	15	11.4	11.4
No	117	88.6	100.0
Pre Q29 Treatment of psychological problem			
Yes	8	6.1	6.1
No	124	93.9	100.0
Prenatal DAS Scores			
61-85	25	17.4	17.4
86-110	43	32.6	50.0
111-135	52	39.4	89.4
136-160	11	8.3	97.7
161-185	2	1.5	99.2
186-210	1	.8	100.0
Prenatal Zung Self-Rating			
20-29	3	2.3	2.3
30-39	30	22.7	25.0
40-49	38	28.8	53.8
50-59	39	29.5	83.3
60-69	18	13.7	97.0
70-79	4	3.0	100.0
Pre Q30 Ongoing treatment of psychological problem[a]			
Yes	0	0.0	0.0
No	132	100.0	100.0
Pre Q31 Treatment recieved (n = 7) for:[a]			
Nervousness	1	.8	.8
Depression	5	3.8	4.6
Schizophrenia	0	0.0	4.6
Phobia	0	0.0	4.6
Postpartum depression	0	0.0	4.6
Physical problem	2	1.5	6.1
Marital problem	2	1.5	7.6
Other	1	.8	8.4

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q32 Treatment received (n = 7) from:[a]			
Psychologist	3	2.3	2.3
Psychiatrist	3	2.3	4.6
Family doctor	1	.8	5.4
Social worker	0	0.0	5.4
OB/GYN	0	0.0	5.4
Other	1	.8	6.2
Pre Q33 Type of treatment (n = 7)[a]			
Counseling	7	5.3	5.3
Medication	0	0.0	5.3
Hospitalization	2	1.5	6.8
Other	0	0.0	6.8

[a]Variables omitted from the regression analysis due to low variability in responses.

Table G-12

Multiple Regression of Psychological Variables on Postpartum Depression Scores

Predictor Variable	r	Partial r	(Partial r)^2	Standardized β	t	p
Prenatal Zung depression score	.531	.461	.213	.452	5.851	.000
Prenatal DAS score	.378	.256	.066	.234	2.987	.003
History of psychological problem	.021	.057	.003	.050	.644	.521
Treated for psychological problem	.006	-.035	.001	-.030	- .394	.694

$F(4,127) = 15.59$, $p < .00001$

Multiple r = .57392

r squared = .32938

Table G-13

Frequency and Percentage of Responses to Questions Pertaining to Beck's Theory

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q25a Father died			
Yes	15	11.4	11.4
No	117	88.6	100.0
Pre Q25b Mother died			
Yes	9	6.8	6.8
No	123	93.2	100.0
Pre Q25c Brother died			
Yes	5	3.8	3.8
No	127	96.2	100.0
Pre Q25d Sister died			
Yes	4	3.0	3.0
No	128	97.0	100.0
Pre Q25e Number of others who died			
0	67	50.8	50.8
1	56	42.4	93.2
2	7	5.3	98.5
3	1	.8	99.2
4	1	.8	100.0
Pre Q25(total) Number of deaths experienced			
0	40	30.3	30.3
1	77	58.3	88.6
2	12	9.1	97.7
3	2	1.5	99.2
4	0	.0	99.2
5	1	.8	100.0
Pre Q24a Age when first person died			
5-9 yrs.	7	5.3	5.3
10-14 yrs.	21	15.9	21.2
14-18 yrs.	16	12.1	33.3
18-22 yrs.	24	18.2	51.5
Over 22	24	18.2	69.7
(no 1st death reported)	(40)	(30.3)	(100.0)

Variable		Frequency	Percentage	Cumulative Percentage
Pre Q24b	Age when second person died			
	14-18 yrs.	5	3.8	3.8
	18-22 yrs.	4	3.0	6.8
	Over 22 yrs.	6	4.5	11.4
	(no 2nd death reported)	(117)	(88.6)	(100.0)
Pre Q26	Sets high standards			
	None of the time	2	1.5	1.5
	Sometimes	32	24.3	25.8
	Most of the time	76	57.5	83.2
	Always	21	16.0	99.2
		(1 missing)	.8	100.0
Pre Q27	Ease of reaching goals			
	Difficult	2	1.5	1.5
	Moderately difficult	80	60.6	62.1
	Easy	50	37.9	100.0
Prenatal	DAS socres			
	61-85	25	17.4	17.4
	86-110	43	32.6	50.0
	111-135	52	39.4	89.4
	136-160	11	8.3	97.7
	161-185	2	1.5	99.2
	186-210	1	.8	100.0

Table G-14

Multiple Regression Analysis of Beck's Predictor Variables on Postpartum Depression Scores

Variable	r	Partial r	(Partial r)^2	Standardized β	t	p
Death of a parent	-.047	.259	.067	.633	2.950	.004
Death of a sibling	.016	.271	.073	.402	3.095	.002
Death of others	-.014	.284	.081	1.109	3.247	.002
Childhood death	-.008	-.074	.005	- .160	- .813	.418
Adult death	-.067	-.084	.007	- .177	- .933	.353
Number of deaths experienced	-.088	-.265	.070	-1.078	-3.018	.003
Sets high standards	-.202	-.134	.018	- .121	-1.491	.138
Ease of reaching goals	-.203	-.166	.028	- .151	-1.848	.067
Prenatal DAS score	.381	.395	.156	.377	4.736	.000

$F(9,121) = 4.900$, $p < .00001$

Multiple $r = .51684$

r squared = .26712

Table G-15

DAS Scores Obtained During Prenatal and Postpartum Episodes of Moderate to Severe Depression

DAS Scores Obtained During Prenatal Depression (n = 22)[a]	DAS Scores Obtained During Postpartum Depression (n = 7)[b]
208 (high)	213 (high)
158 (high)	195 (high)
151 (high)	184 (high)
150 (high)	134 (high)
150 (high)	110 (average)
138 (high)	104 (average)
135 (high)	93 (average)
133 (average)	
130 (average)	
130 (average)	
122 (average)	
117 (average)	
116 (average)	
116 (average)	Mean = 107
115 (average)	Median = 107
112 (average)	Mode = 111
111 (average)	Standard deviations = 26
103 (average)	Range = 51-213
97 (average)	
97 (average)	
79 (low)	
69 (low)	
Mean = 109	
Median = 110	
Mode = 103	
Standard deviation = 24	
Range = 62-208	

[a] High DAS score $>$ 133 (n = 7)
Average DAS score = 85-133 (n = 13)
Low DAS score $<$ 85 (n = 2)

[b] High DAS score $>$ 133 (n = 4)
Average DAS score = 81-133 (n = 3)
Low DAS score $<$ 81 (n = 0)

Table G-16

Frequency and Percentage of Responses to Questions Concerning Baby and the Temporal Aspects of Baby's Arrival

Variable	Frequency	Percentage	Cumulative Percentage
Pre Q38 Pregnancy planned?			
Yes	70	53.0	53.0
No	61	46.2	99.2
	(1 missing)	.8	100.0
Post Q2 Intention to breast feed[a]			
Yes	82	62.1	62.1
No	50	37.9	100.0
Time since delivery of post-partum assessment			
Less than 28 days	2	1.5	1.5
28-34 days	22	16.7	18.2
35-41 days	38	28.8	47.0
42-48 days	49	37.1	84.1
49-55 days	12	9.1	93.2
56-62 days	4	3.0	96.2
63-69 days	3	2.3	98.5
Over 69 days	2	1.5	100.0
Early or late delivery			
Early			
30-39	2	1.5	1.5
20-29	4	3.0	4.5
10-19	25	19.0	23.5
0-9	33	25.0	48.5
Late			
1-10	37	28.0	76.5
11-20	27	20.5	97.0
21-30	4	3.0	100.0
Pre Q40/ Post Q1 Disagree (with gender preference)	35	26.5	26.5
Agree (with gender preference)	30	22.7	49.2
No preference (for specific gender)	67	50.8	100.0

Variable	Frequency	Percentage	Cumulative Percentage
Post Q27 Estimated time baby cries			
5-60 min.	52	39.4	39.4
65-120 min.	35	26.5	65.9
150-180 min.	20	15.2	81.1
205-240 min.	11	8.3	89.4
255-300 min.	7	5.3	94.7
360-600 min.	7	5.3	100.0
Pre Q39 Doubts about having a child[b]			
Yes	9	6.8	6.8
No	123	93.2	100.0

[a]The prefix Post Q stands for "postpartum question." The number following this prefix indicates the specific item represented by that variable.

[b]Variable omitted from the regression analysis due to low variability in responses.

Table G-17

Multiple Regression Analysis of Baby-Related Variables on Postpartum Depression Scores

Predictor Variable	r	Partial r	(Partial r)^2	Standardized β	t	p
Was pregnancy planned?	-.194	-.239	.057	-.244	-2.729	.007
Plans to breast feed	-.197	-.228	.052	-.227	-2.592	.011
Time since delivery of postpartum assessment	-.099	-.180	.032	-.183	-2.034	.044
Early or late delivery	.106	.100	.010	.098	1.111	.269
Estimated time baby cries	.027	.079	.624	.075	.873	.384
Agreement with gender preference	-.016	-.002	.000	-.002	- .024	.981
Disagreement with gender preference	.058	.065	.004	.066	.720	.473

$F(7,123) = 2.5439$, $p = .0186$

Multiple $r = .35562$

r squared = .12647

Table G-18

Prepartum and Postpartum Zung Depression Scores of Subjects who had Prenatal Doubts About Having the Child

Subject	Prepartum Depression Score[a]	Postpartum Depression Score[a]
1	66	56
2	66	50
3	63	70
4	60	60
5	57	41
6	56	48
7	53	38
8	43	39
9	39	30

[a]A score of 60 or greater on the Zung is indicative of moderate to severe depression.

Table G-19

Multiple Regression of Combined Prenatal Variables on Postpartum Depression Scores

Variable	r	Partial r	(Partial r)^2	Standardized β	t	p
Age	-.201	-.091	.008	-.091	- .972	.333
Race	-.181	-.125	.016	-.122	-1.332	.186
Income	-.148	.102	.010	.115	1.087	.279
Marital status	-.182	.010	.000	.010	.109	.913
Happiness in marital situation	-.225	.005	.000	.005	.056	.956
Was pregnancy planned?	-.193	-.078	.006	-.068	-.830	.408
Emotional reactions during pregnancy	.159	-.002	.000	-.002	-.020	.984
Emotional reactions during periods	.100	.058	.003	.050	.614	.541
Death of parent	-.047	.193	.037	.474	2.083	.039
Death of sibling	.017	.187	.035	.280	2.017	.046
Death of others	-.012	.197	.039	.798	2.125	.036
Number of deaths experienced	-.072	-.205	.042	-.857	-2.221	.028
Ease of reaching goals	-.206	-.127	.016	-.108	-1.356	.178
Sets high standards	-.187	-.075	.006	-.066	- .791	.431
Prenatal DAS score	.382	.292	.085	.266	3.233	.002
Prenatal Zung SDS score	.519	.315	.099	.357	3.515	.001

$F(16,112) = 4.55$, $p < .00001$

Multiple r = .62758

r squared = .39386

Table G-20

Frequency and Percentage of Responses to Postpartum Questions Represented in Factors

Variable	Factor Loading	Frequency	Percentage	Cumulative Percentage
Factor 1: Explained Sleeplessness				
Post Q16 Times awakened by baby per night	.83375			
0		18	13.6	13.6
1		62	47.0	60.6
2		41	31.1	91.7
3		10	7.6	99.2
5		1	.8	100.0
Post Q17 Time tending to baby in the night	.80431			
0-1 hr.		64	48.5	48.5
1½-2½ hrs.		51	38.6	87.1
3-4 hrs.		14	10.6	97.7
More than 4 hrs.		3	2.3	100.0
Post Q15 Time awake from physical discomforts per night	.55215			
None		111	84.1	84.1
< 30 min.		11	8.3	92.4
½-1 hr.		5	3.8	96.2
1-1½ hrs.		2	1.5	97.7
1½-2 hrs.		2	1.5	99.2
> 2 hrs.		1	.8	100.0
Post Q21 Sleeping during the day	.54099			
0-1 hr.		105	79.5	79.5
1½-2½ hrs.		19	14.4	93.9
3-4 hrs.		8	6.1	100.0

Variable		Factor Loading	Frequency	Percent-age	Cumulative Percentage
	Factor 2: Physical Discomforts During Past Week				
Post Q9	Breast soreness	.81115			
	None		91	68.9	68.9
	A little		30	22.7	91.7
	Pretty much		6	4.5	96.2
	Great deal		5	3.8	100.0
Post Q9/12	Total physical discomforts	.77600			
	0		39	29.5	29.5
	1		51	38.6	68.2
	2		31	23.5	91.7
	3		7	5.3	97.0
	4		4	3.0	100.0
Post Q11	Abdominal pain	.59784			
	None		96	72.7	72.7
	A little		34	25.8	98.5
	Pretty much		2	1.5	100.0
	Great deal		0	0.0	100.0
Post Q14(total)	Total physical discomforts affecting mood	.48960			
	Factor 3: Food Consumption				
Post Q6	Appetite during past week	.89018			
	Much smaller than usual		18	13.6	13.6
	Somewhat smaller than usual		40	30.3	43.9
	Same as usual		47	35.6	79.5
	Somewhat larger than usual		22	16.7	96.2
	Much larger than usual		5	3.8	100.0

Variable		Factor Loading	Frequency	Percentage	Cumulative Percentage
Post Q4	Amount eaten during past week	.84967			
	Good deal less than usual		22	16.7	16.7
	Somewhat less than usual		43	32.6	49.2
	Same as usual		44	33.3	82.6
	Somewhat more than usual		20	15.2	97.7
	Good deal more than usual		3	2.3	100.0
Post Q7	Change in weight during past week	.69767			
	Decreased 5 or more lbs.		14	10.6	10.6
	Decreased 1-4 lbs.		65	49.2	59.8
	No change		42	31.8	91.7
	Increased 1-4 lbs.		8	6.1	97.7
	Increased 5 or more lbs.		3	2.3	100.00
	Factor 4: Low Libido				
Post Q22	Physical discomforts interfered with libido past week	.81604			
	Not at all		55	42.0	42.0
	Very little		39	24.8	71.8
	Somewhat		21	16.0	87.8
	Pretty much		6	4.6	92.4
	Great deal		10	7.6	100.0
Post Q24	Physical discomforts will affect libido next week	.79329			
	None		59	44.7	44.7
	Very little		42	31.8	76.5
	Some		23	17.4	93.9
	Pretty much		7	5.3	99.2
	Great deal		1	.8	100.0
Post Q23	Libido now	-.52552			
	None		5	3.7	3.7
	Very little		18	13.7	17.4
	Some		32	24.2	41.7
	Pretty much		52	39.4	81.0
	Great deal		25	19.0	100.0

Variable	Factor Loading	Frequency	Percentage	Cumulative Percentage
Factor 5: Unexplained Sleeplessness				
Post Q18 No. of awakenings when baby is not crying	.80762			
0		56	42.4	42.4
1		23	17.4	59.8
2		22	16.7	76.5
3		18	13.6	90.2
4		9	6.8	97.0
5		3	2.3	99.2
6		1	.8	100.0
Post Q20 Early a.m. awakengins without baby crying	.70104			
Never		77	58.3	58.3
1 or 2 times weekly		38	28.8	87.1
3 or 4 times weekly		10	7.6	94.7
5 or 6 times weekly		3	2.3	97.0
Every night		3	2.3	99.2
		1	.8	100.0
Post Q19 Time awake at night (not tending to baby)	.62830			
0-30 min.		90	68.2	68.2
30 min.-1 hr.		22	16.7	84.8
1-1½ hrs.		13	9.8	94.7
1½-2 hrs.		2	1.5	96.2
2-2½ hrs.		3	2.3	98.5
More than 3 hrs.		2	1.5	100.0
Factor 6: Constipation				
Post Q12 Discomfort from constipation over past week	.79506			
None		89	67.4	67.4
A little		34	25.8	93.2
Pretty much		7	5.3	98.5
Great deal		2	1.5	100.0

Variable	Factor Loading	Frequency	Percentage	Cumulative Percentage
Factor 7: Delivery Questions				
Time since delivery of postpartum assessment	-.71388			
Less than 28 days		2	1.5	1.5
28-34 days		22	16.7	18.2
35-41 days		38	28.8	47.0
42-48 days		49	37.1	84.1
49-55 days		12	9.1	93.2
56-62 days		4	3.0	96.2
63-69 days		3	2.3	98.5
Over 69 days		2	1.5	100.0
Early or late delivery	.72540			
Early				
30-39		2	1.5	1.5
20-29		4	3.0	4.5
10-19		25	19.0	23.5
0-9		33	25.0	48.5
Late				
1-10		37	28.0	76.5
11-20		27	20.5	97.0
21-30		4	3.0	100.0
Factor 8: Depressive Symptoms				
Post Q25(total) Number of depressive symptoms checked	.66176			
Post Q23 Libido now	-.61417			
None		5	3.7	3.7
Very little		18	13.7	17.4
Some		32	24.2	41.7
Pretty much		52	39.4	81.0
Great deal		25	19.0	100.0
Post Q27 Estimated time baby cries	.47390			
5-60 min.		52	39.4	39.4
65-120 min.		35	26.5	65.9
150-180 min.		20	15.2	81.1
205-240 min.		11	8.3	89.4
255-300 min.		7	5.3	94.7
360-600 min.		7	5.3	100.0

Variable		Frequency	Percentage	Cumulative Percentage
	Variables not Included in the Factor Analysis			
Post Q26	Did mother have postpartum depression?			
	Yes	20	15.2	15.2
	No	25	18.9	34.1
	Con't know	87	65.9	100.0
Post Q2	Planning to breast feed before delivery?			
	Yes	82	62.1	62.1
	No	50	37.9	100.0
Post Q3	Breast feeding?			
	Yes	60	45.5	45.5
	No	72	54.5	100.0
Plans to breast feed				
	Not breast feeding	22	16.6	16.6
	Breast feeding	60	45.5	62.1
Plans not to breast feed				
	Not breast feeding	50	37.9	37.9
	Breast feeding	0	0.0	37.9
Postpartum DAS scores				
	Below 60	3	2.3	2.3
	61-85	25	18.9	21.2
	86-110	48	36.4	57.6
	111-135	42	31.8	89.4
	136-160	10	7.5	96.9
	161-185	2	1.5	98.5
	186-210	1	.8	99.2
	Above 210	1	.8	100.0
Post Q1	Delivered[a]			
	Boy	76	57.5	57.5
	Girl	55	41.7	99.2
	Twins	1	.8	100.0
Post Q5	Trying to lose weight now?[a]			
	Yes	60	45.5	45.5
	No	72	54.5	100.0

Variable		Frequency	Percent-age	Cumulative Percentage
Post Q8	Desired weight change[a]			
	Lose weight	109	82.6	82.6
	Remain the same	13	9.8	92.5
	Gain weight	6	4.5	97.0
	Don't care	4	3.0	100.0

[a]Variables omitted from both the factor analysis and the regression analysis.

Table G-21

Factor Analysis of Items from the Postpartum Questionnaire

	Factor	1	2	3	4
	Label	Explained Sleeplessness	Physical Discomforts	Food Consumption	Low Libido
	Eigenvalue	4.21570	2.55786	2.00476	1.65424
	% of Variance	18.3	11.1	8.7	7.2
Q16 Times baby awakens subject		.83375	.11526	.00589	-.05724
Q17 Time tending to baby at p.m.		.80431	.12476	-.13834	-.13546
Q15 Time awake from physical discomforts		.55235	.29471	.01589	.29961
Q21 Time in bed during day		.54009	-.12328	.05135	.30365
Q 9 Breast soreness		.07978	.81115	.04803	.01243
Q9-12 Total physical discomforts		.09815	.77600	-.10095	.13336
Q11 Abdominal discomfort		.18347	.59784	.16263	.01954
Q14 Total number of physical discomforts affecting mood		.37599	.48960	-.02786	.33902
Q 6 Appetite during past week		.05725	.09297	.89018	-.00388
Q 4 Amount eaten during past week		.02521	.10778	.84967	-.00149
Q 7 Weight change over past week		-.21097	-.13126	.69767	.17513
Q22 Physical discomforts affecting libido last week		-.07609	.08244	.04250	.81604
Q24 Physical discomforts affecting libido next week		.05283	.07545	.10626	.79329
Q10 Discomfort from episiotomy		.08359	.33981	-.27556	.37813
Q18 Times awake when baby is not crying		.01720	.00129	-.05452	.10578
Q20 Early a.m. awakenings without baby crying		-.10672	.18171	-.25169	-.01993
Q19 Awake when not tending to baby		.28749	.11461	.05938	-.03800
Q12 Discomfort from constipation		.05459	.24476	-.20943	-.00988
Early or late delivery		-.09122	-.09647	.12880	-.02161
Time of postpartum assessment		-.15336	-.15473	.02990	-.06393
Q25 Total number of depressive symptoms		.08205	.10366	.08071	.10766
Q23 Present libido		-.01045	.13303	-.05448	-.52552
Q27 Estimated time baby cries		.33729	.18438	-.04080	.02728

	Factor	5	6	7	8
	Label	Unexplained Sleeplessness	Constipation	Delivery Data	Depressive Symptoms
	Eigenvalue	1.42936	1.39647	1.18337	1.02461
	% of Variance	6.2	6.1	5.1	4.5
Q16 Times baby awakens		.01395	.10494	-.00071	.09044
Q17 Time tending to baby at p.m.		-.07710	-.03948	.05939	.17451
Q15 Time awake from physical discomforts		.20595	-.08546	.18637	.00951
Q21 Time in bed		.14364	.38881	-.15120	-.28401
Q 9 Breast soreness		-.00209	-.17092	.10549	.11630
Q9-12 Total physical discomforts		.12566	.48136	.08177	.09527
Q11 Abdominal discomfort		.19885	.23926	-.17594	-.01774
Q14 Total number of physical discomforts affecting mood		.03664	.20166	.04536	-.19464
Q 6 Appetite during past week		-.14104	-.02601	.08399	-.04039
Q 4 Amount eaten over past week		-.17194	-.19263	.07406	.00689
Q 7 Weight change over past week		.11010	.02691	-.07026	.12614
Q22 Physical discomforts affecting libido last week		.02423	.03557	.10238	.07879
Q24 Physical discomforts affecting libido next week		.06301	-.05994	-.11186	.06891
Q10 Discomfort from episiotomy		.15076	.22872	.20294	.11771
Q18 Awake when baby is not crying		.80762	.05751	.09292	-.01830
Q20 Early a.m. awakening without baby		.70104	-.17952	.09344	.01865
Q19 Awake when not tending to baby		.62830	.36524	-.16636	.16846
Q12 Discomfort from constipation		-.00824	.79506	.04959	.01501
Early or late delivery		.12359	.26877	.72540	.09307
Time of postpartum assessment		.01077	.17573	-.71388	.03653
Q25 Total number of depressive symptoms		.37006	.11859	.09213	.66176
Q23 Present libido		.27576	-.06034	-.11381	-.61417
Q27 Estimated time baby cries		-.05944	-.29793	-.19774	.47390

Table G-22

Multiple Regression Analysis of Postpartum Variables on Postpartum Depression Scores

Predictor Variable	r	Partial r	(Partial r)^2	Standardized β	t	p
Depressive symptoms factor	.487	.520	.270	.528	6.549	.000
Delivery questions factor	.142	.099	.010	.072	1.071	.286
Constipation factor	.171	.078	.006	.058	.846	.399
Unexplained sleeplessness factor	.337	.330	.109	.253	3.762	.000
Low libido factor	.143	.189	.036	.133	2.074	.040
Food consumption factor	-.181	-.198	.039	-.144	-2.173	.032
Physical discomfort factor	-.006	.107	.011	.077	1.158	.249
Explained sleeplessness factor	.064	.187	.035	.143	2.046	.043
Yes - mother had postpartum depression	.043	.030	.001	.027	.321	.749
No - mother did not have postpartum depression	-.164	-.024	.001	-.017	- .255	.799
Plans to breast-feed/not breast-feeding	.174	.127	.016	.103	1.382	.170
Plans not to breast-feed/not breast-feeding	.187	.145	.021	.124	1.580	.117
Baby's daily crying	.017	-.239	.057	-.239	-2.646	.009
Postpartum DAS score	.446	.278	.077	.215	3.112	.002

$F(14,116) = 10.24$, $p < .00001$

Multiple $r = .74347$

r squared = .55275