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Date May 26, 1978
A methodological investigation of maternal-infant bonding was undertaken with the purpose of developing instruments and measures for studying maternal attachment. The research was longitudinal, based upon the belief that the bond between a mother and her infant develops gradually, beginning before the infant's birth and continuing through the early postpartum period and on into infancy.

Existing research on maternal behaviour, which has grown out of the three fields of developmental psychology, ethology and pediatrics, was found to be limited in scope and lacking in adequate tools for measuring naturally occurring maternal-infant interactive behaviour. The present research was an attempt to extend and improve upon existing research by making a preliminary exploration of both the wide range of influences upon the maternal-infant bond and the equally wide range of manifestations of that bond, attitudinal as well as behavioural. The implicit model used as a basis for this research was a cumulative one, in which maternal behaviour is viewed as a response not only to concurrent events but to past events as well, and present behaviour is in turn thought to influence events yet to come.

The time span under study was the two-month period from the last month of pregnancy through the first month of the infant's life. Twenty-seven primiparous women were interviewed during their third trimester of pregnancy and questionnaires concerning prenatal attitudes were administered (Prenatal Questionnaire and Infant Temperament Prediction). Information about labour, delivery and the postpartum hospital stay was taken from hospital records after the birth. While in hospital, mothers filled out
the Hospital Diary, in which the amount of time spent with the infant each
day was recorded. At one month postpartum, questionnaires were again adminis­
tered (Postpartum Questionnaire and Infant Temperament Report), and a
naturalistic observation of mother-infant interactive behaviour was made in
the home (Behaviour Record). After the home visit the observer filled out
a set of eighteen Maternal Care Rating Scales developed by Ainsworth.

Of the seven instruments used in this study, six were developed
specifically for this research. The Prenatal Questionnaire administered in
the third trimester of pregnancy assessed maternal feelings toward the preg­
nancy, experiences in prenatal classes, support of the husband or partner,
preparation for labour and delivery, child care arrangements and prediction
of parent-infant attachment. The Postpartum Questionnaire, which was filled
out when the infant was one month old, was concerned with labour and delivery
experiences, support of husband or partner, self-confidence in caregiving
ability, caregiving routines and report of parent-infant attachment. The
Infant Temperament Prediction (administered in the prenatal period) was con­
cerned with the anticipation of infant behaviour in specific situations;
the Infant Temperament Report (at one month postpartum) was concerned with
maternal report of actual infant behaviour in those same situations. The
Behaviour Record was an observational system which employed fifteen-second
time intervals; twenty-eight maternal and seven infant behaviours were re­
corded for one hour. These individual behaviour categories were subsumed
under nine behavioural composites which were determined a priori. The
Maternal Care Rating Scales served as a molar assessment of maternal attitude;
emotional involvement and perception of infant capability.

Data gathered using these instruments provided evidence that both
change and continuity characterize the development of the maternal-infant
bond. Amid a general lack of correlation in maternal attitudes between the
prenatal and postpartum periods, some areas assessed showed evidence of continuity. Specifically, the prediction of parent-infant attachment in the prenatal period was found to be correlated not only with postpartum report of attachment but also with observed social-interactive, as opposed to simply caregiving, behaviour at one month postpartum. The lack of correlation between the Infant Temperament Prediction and Report provided additional support for the general evidence of change from the prenatal to the postpartum period. Neither the information taken from hospital records, i.e., length of labour, perinatal medication, type of delivery or infant outcome, nor the time spent with the infant in hospital during the postpartum hospital stay was found to be correlated with prenatal or postpartum attitudes or with observed maternal behaviour at one month postpartum.

It was concluded that evidence has been provided to support the notion that maternal-infant bonding should be studied longitudinally in order to trace the gradual development of that bond; in addition, evidence has been provided that the mother-infant bond should be studied using assessments of both attitudes and actual, observable maternal behaviour.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Methods</td>
<td>41</td>
</tr>
<tr>
<td>Results and Discussion</td>
<td>56</td>
</tr>
<tr>
<td>Conclusion</td>
<td>115</td>
</tr>
<tr>
<td>References</td>
<td>124</td>
</tr>
<tr>
<td>Tables</td>
<td>135</td>
</tr>
<tr>
<td>Appendix</td>
<td>167</td>
</tr>
</tbody>
</table>
TABLES

I. Prenatal Questionnaire: Demographic Variables .................. 135
II. Prenatal Questionnaire: Correlations Among Reported Physical and
Emotional Feelings. ........................................... 136
III. Prenatal Questionnaire: Reported Physical Problems. ............ 137
IV. Prenatal Questionnaire: Correlations Among Items Assessing Feelings
Toward the Pregnancy. ......................................... 138
V. Prenatal Questionnaire: Correlations Among Items Assessing Support
of Husband. ..................................................... 139
VI. Prenatal Questionnaire: Items Included in Factor Analysis. ..... 140
VII. Prenatal Questionnaire: Eigenvalues and Percent Variance Accounted
For in Ten Factor Solution. ..................................... 142
VIII. Prenatal Questionnaire: Factors and Rotated Factor Loadings. . 143
IX. Infant Temperament Prediction and Report: Chi-Square Tests on
Proportion of Subjects Responding in Each Category. ............... 145
X. Behaviour Record: Individual Behaviour Means, Standard Deviations,
Frequencies and Inter-Observer Agreement. ........................ 146
XI. Correlations Among the Maternal Composites. .................... 148
XII. Correlations Among Maternal Composites and Prenatal Questionnaire
Items. ............................................................ 150
XIII. Correlations Among Maternal Rating Scale Items. ............... 152
XIV. Correlations Between Maternal Rating Scales and Maternal
Composites ....................................................... 155
XV. Correlations Between Maternal Rating Scales and Infant Behaviour
and Infant Outcome .............................................. 157
XVI. Correlations Between Maternal Rating Scales and Some Prenatal
Questionnaire Items. ............................................. 158
XVII. Postpartum Questionnaire: Correlations Among Physical and
Emotional Feelings ............................................. 161
XVIII. Postpartum Questionnaire: Reported Physical Problems. .... 162
XIX. Postpartum Questionnaire: Correlations Among Parent-Infant
Attachment Items ............................................... 163
XX. Postpartum Questionnaire: Correlations Between Parent-Infant
Attachment Items and Other Postpartum Variables. ................. 164
TABLES (Cont'd)

XXI. Correlations Between Postpartum Questionnaire Items and Maternal Rating Scales. 165
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Finally, Amanda, Sweet Pea, the Muffin and Callie A.P.B., without whom I would still be on Saltspring Island. And of course, Delores, for hurling pleasure at despair.
The study of maternal behaviour affords an opportunity to investigate in detail the formation and maintenance of a unique affectional bond—the relationship of the mother to her infant. For nearly a decade developmental psychologists have been calling for re-focusing consideration toward the reciprocal, interactive nature of the parent-infant relationship (R.Q. Bell, 1968; 1974; Lewis & Rosenblum, 1974). This call has encouraged researchers to abandon the traditional unidirectional cause-effect model in which parental behaviour is studied mainly in order to assess its impact upon infant development, and has directed attention towards the infant as an active participant in the relationship (Goldberg, 1977).

It is ironic that one consequence of this recognition of the infant's social competence in shaping the mother-infant relationship has been a relative neglect of the other forces which influence the mother's behaviour. It is important to note that maternal behaviour is relational in its very nature; that is, "maternal" necessarily implies the existence of another person. Behaviour, attitudes and emotions can be termed maternal only when they are directed toward another person. Thus it is necessary to study maternal behaviour in a relational context. Current infant behaviour is of course an influence, and it is that influence which has received the major share of attention in attempts to disentangle the strands of the mother-infant relationship. As a result, other influences which are both intrinsic and extrinsic to the relationship have not been given adequate consideration. These other influences would include the mother's past history of interpersonal relationships; her cultural and subcultural expectations of the maternal role and maternal behaviour; psychological and physiological factors resulting from her pregnancy, labour and delivery, and the actual history of the mother-infant relationship beginning at the birth of the infant.
A relatively recent area of research designated as "maternal-infant bonding" (Klaus & Kennell, 1976) has involved attempts to deal with the impact of the mother-infant relationship upon the mother, and details of some aspects of maternal behaviour and mother-infant interaction have been studied. This research, which has received a great deal of attention in both the professional literature and the popular press has been focused on the early neonatal period, especially the first few hours after the infant's birth. One variable from this period which has received much emphasis is the occurrence of physical separation of mother and neonate shortly after the birth, either as a result of birth complications (such as prematurity or caesarian section, for example), or through routine hospital policy. Thus the focus of this research has been upon maternal behaviour patterns during the early post-partum period (e.g., Klaus, Jerauld, Kreger, McAlpine, Steffa & Kennell, 1972; Klaus, Kennell, Plumb & Zuehlke, 1970; Klaus & Kennell, 1970; Klaus, Trause & Kennell, 1975), and the influence of postpartum separation on the subsequent cognitive development of the child (Ringler, Jarvella, Navojosky & Klaus, 1975). In one study, the mother-infant pair was followed through the first five years of the child's life (Ringler, Trause & Klaus, 1976).

A few researchers have questioned the conclusions drawn by these investigators (e.g., Dunn, 1975; Lozoff, 1977) and one has asserted that "the emphasis on the immediate post-partum period may obscure the importance of prenatal influences and postnatal adaptations" (Lozoff in Klaus & Kennell, 1976, p. 85). The results of other studies provide support for the idea that maternal behaviour is strongly affected by prenatal attitudes (Hubert, 1974), and by early experiences with the infant (Robson & Moss, 1970).

The research described in this paper was designed as an initial attempt
to deal with the complexity of the early mother-infant relationship. The intrinsic complexity of this problem is reflected in the wide range of issues which must be considered when investigating questions in this area. The study of maternal behaviour and early mother-infant interaction has three logical entry points from three separate fields of study. (1) Developmental Psychologists have studied the attachment relationship between mother and infant, and although the traditional focus of that research has been the effects of the attachment relationship upon the socioemotional development of the infant, recent work has acknowledged the part played by maternal behaviour in establishing and maintaining that relationship (e.g., Ainsworth, 1973; Weinraub & Lewis, 1975). (2) Ethologists have contributed a large body of information concerning maternal behaviour of animals in both naturalistic and experimental situations which has helped to clarify some human maternal behaviour patterns. (3) Work by pediatricians interested in both neonatal behaviour and the genesis of parenting disorders such as child abuse has led to close scrutiny of modern obstetric and pediatric practices and their impact upon the emerging mother-infant relationship. The contributions of each of these fields to the study of maternal behaviour and the concept of maternal bonding will be outlined by reviewing the relevant literature in each area. Then an integration of these three areas will be made, and the present research, which focuses upon methodological considerations for the study of the maternal-infant affective bond, will be introduced.

I. Contributions of Developmental Psychology

The network of relationships between the infant and those in his or her environment forms the matrix through which the neonate develops into a fully functioning social being (Richards, 1974; Weinraub, Brooks & Lewis, 1975). Recognition of the importance of these relationships for later development,
both cognitive (S.M. Bell, 1970; Decarie, 1965; Escalona, 1953) and 
socio-emotional (Ainsworth, 1969; Yarrow & Pedersen, 1972), has led to 
increasingly detailed research into their nature. The main body of the work 
has grown out of maternal deprivation studies in which the traumatic 
separation of mothers and children during wartime or family crises was 
investigated. Conclusions were drawn about the nature of the mother-child 
relationship based on behaviour observed during and subsequent to these 
dramatic events (Robertson & Bowlby, 1952; Spitz, 1945). With the support of 
primate research (Harlow, 1961; Harlow & Harlow, 1962), researchers of human 
behaviour concluded that protracted separation from the mother, and thus the 
rupturing of the mother-child bond, had extensive detrimental effects upon 
the personality of the young child.

Leading directly from work on maternal deprivation, John Bowlby proposed 
a theory of attachment that would account for the affectional bond between 
mother and child (Bowlby, 1958). Based on ethology and evolutionary 
principles, it had as its hallmark proximity-seeking and 
proximity-maintaining behaviour on the part of the infant which would 
contribute to species survival. There has been a great deal of research on 
attachment in the twenty years since Bowlby formulated his theory and 
investigators have aligned themselves in various theoretical camps, basing 
their research on cognitive principles (e.g., Littenberg, Tulkin, & Kagan, 
1971), developmental theories of social relationships (e.g., Bernal, 1974; 
Weinraub, Brooks & Lewis, 1975), or taking a "mainstream" approach, that is, 
following Bowlby (e.g., Ainsworth, 1967; Schaffer & Emerson, 1964). Research 
in the area of attachment/mother-infant interaction has been characterized by 
a lack of consensus regarding measurement, and each research team has 
formulated specific sets of behaviours to use as measures of the attachment 
bond. Whatever the theoretical leanings of the large numbers of
developmental psychologists interested in attachment, all seem to agree that
the mother-infant relationship is characterized as a reciprocal, interactive
system embedded in time (Ainsworth, 1969; 1973; Lewis, 1972; Moss, 1967). What, exactly, does this mean, and what are the implications for empirical research?

Bowlby's early views on attachment concentrated on the
proximity-promoting behaviours of the infant (Bowlby, 1958), while neglecting somewhat the interactive components. Schaffer and Emerson (1964) also concentrated on the infant in their definition of attachment as "the tendency of the young to seek the proximity of certain other members of the species" (p.6). As empirical research began to yield clear-cut evidence of the influence of maternal behaviour on the attachment bond, the definition of the concept began to change, and both theoretical and operational definitions were modified by some researchers to include maternal behaviour. Thus, Ainsworth (1973) has defined attachment as "an affectional tie that one person forms to another person, binding them together in space and enduring over time" (p.1). Yarrow and Pedersen (1972) refer to attachment as "a relationship characterized by strong interdependence and intense affect", the development of which is "a reciprocal interactive process" (p. 302). Thus it is explicitly acknowledged that the attachment relationship involves two people who contribute affect and behaviour to the ongoing process and whose behaviour and affect are in turn influenced by the interaction within the relationship. The relationship, which endures over time, is continually altered as a function of the behavioural and affectional events occurring within the relationship. Present behavioural patterns (i.e., those observed in empirical research) are affected by earlier interactive patterns, and go on to affect subsequent patterns.
Time is very much an element of the mother-infant dyad. In nearly all of the attachment literature, however, "time" has been assumed to start at the birth of the infant when observable interaction begins. As it turns out many researchers do not begin observations of mother-infant pairs until well into the first quarter of the first year. Given that the interactive process is continually building on earlier events, the neglect of the first two months and the even more widespread ignoring of the prenatal and early neonatal period appears to have rather serious implications for the validity of attachment research. A further criticism which can be lodged against attachment theory as a full account of the mother-infant relationship is that the mother is seen merely as the object of the infant's behaviour. Maternal behaviour is not accorded an independent status; there is little attempt to explain or account for the patterns and antecedents of maternal behaviour, or to deal with the exigencies of the mother's life which affect her relationship and interaction with her infant. Although Bowlby has acknowledged the contribution of the mother as a blend of native endowment, history of interpersonal relations, and absorption of the values and practices of the culture (Bowlby, 1969), neither he nor his associates have dealt with these elements as if they were meaningful components of the attachment bond. A brief review of attachment theory will make clear what a limited part maternal behaviour is thought to play in the formation of the infant-mother attachment bond.

Attachment theory

The ethological approach to attachment as formulated by Bowlby (1958) reflected a growing interest of developmental psychology in behavioural systems for which the observable behaviour is an outward manifestation of inner organization, and for which the context of behaviour is not only the
external environment but also the internal environment—the neurophysiological state of the organism (Ainsworth, 1969). This approach grew out of advances in the biological sciences, especially ethology and genetics, and of recent formulations of control systems theory and computer models. The common interest of these diverse fields is the inner structure of the organism, with attention focused on the effect of environmental influences (both internal and external) on naturally endowed potential. According to the systems theory model, transformation and growth of the organism are due to organism-environment interaction. The essence of Bowlby's contributions is a theory of social relationships which combines this model with psychoanalytic theory, thus taking advantage of the current state of knowledge in psychology and in related fields such as ethology and biology.

The basis of Bowlby's position is that human attachment behaviour has biological foundations which can be best understood within the context of evolutionary theory. Accordingly, the most adaptive behaviour patterns are those that promote species survival. The relatively long period of infantile helplessness characteristic of the human species is a serious threat to that survival; an infant who cannot be quickly and easily retrieved by its mother endangers not only itself but also its mother who may, as a consequence, not live to produce replacement offspring. Recognizing the obvious point that the human species has survived in spite of its vulnerability, Bowlby hypothesized that the young of the species are endowed with a behavioural system which serves to promote the parental attention and caregiving behaviour needed to protect the infant through its extended immaturity. Attachment behaviour on the part of the infant would include vocalization, crying, smiling, looking, physically approaching the parent or initiating a
pick-up. The predicted outcome of this behavioural system is the close proximity of mother and infant, which is attained, according to Bowlby, through signals of the infant which call for maternal response, or, with the development of motor skills, through infant-initiated activity. Bowlby fails to deal directly with the obvious third choice — activity initiated independently by the mother. In fact, maternal behaviour is rarely considered to have independent origins, despite the many activities with which the mother must become involved in order to maintain her own and her infant's survival. The provision of food and shelter are the mother's job whether we are referring to the period of species evolution, or to the present time, and that job will often interfere with the mother's availability to her infant.

The mechanism responsible for the activation of the proximity-promoting system is posited by Bowlby as a complex system and of itself, the elements of which include the physical distance between mother and child, the internal state of the infant, and elements in the external environment, such as fear- or curiosity-evoking stimuli. Again, we see that the mother's internal state is not explicitly included among the activating conditions. One important reason why maternal behaviour is left out of this picture may be the intrinsic complexity of its motivation. Tracing the antecedents of a specific maternal behaviour in any given situation, and accounting for differences in that specific behaviour over both similar and dissimilar situations would require a taxonomy of maternal behaviour that was unavailable to Bowlby and that researchers today still lack. The topic of maternal behaviour has grown into a field of study itself, and Bowlby is not to be unduly faulted for concentrating only on infant behaviour and assuming some stability in maternal response systems. It does appear now, however,
that some attention must be paid to both individual differences and to systematic population differences (i.e., cultural, socioeconomic, etc.) in maternal behaviour if the construct of attachment, which ultimately involves two people, is to have continued meaning for researchers wishing to study the mother-infant system.

An issue which has been the topic of recurrent discussion in the attachment literature (e.g., Ainsworth, 1969; Ainsworth, Bell & Stayton, 1974; Bowlby, 1969; Lamb, 1974; Rosenthal, 1973; Sroufe & Waters, 1978) is the distinction between the internal organization of an affectional system and its outward, observable behaviour. Since similar issues will undoubtedly arise as the study of maternal behaviour continues, this topic is worth some attention here. An attachment has been studied as an unobservable which can be known or observed through the medium of attachment behaviour.

The distinction between attachment and attachment behaviour is sometimes obscured, and the energy with which the argument concerning it has been pursued may be some measure of its presumed centrality in attachment theory. The main point of concern to those interested in maternal behaviour is that the attachment itself is a tie or relationship; it is a separate entity from the inner organization of attachment behaviour systems which controls specific observable behaviour vis-a-vis specific attachment figures (c.f., Sroufe & Waters, 1978). Thus, while particular attachment behaviours may be heightened or attenuated in a specific situation, the attachment as a relationship to a person remains stable. For example, a child may be either strongly or weakly attached to its mother; the fact that s/he may cry and cling to the mother when a stranger approaches is not a direct measurement of the strength of the attachment itself; this outward behaviour is merely an indication that the system of attachment behaviours has been activated.
Alternatively, using an example of maternal behaviour, a mother may pick up her infant and hold it to her body if the pair are in some physically dangerous situation. Her basic feelings toward her child, that is to say, her attachment, is not changed by her behaviour, and cannot be measured by it; all that may be inferred is that her internal system of protective behaviour was activated by the situation. After observing this behaviour, we cannot tell how attached she is to her infant. Indeed, it would not be unusual to observe a stranger behaving identically toward the infant in the same situation, but we could not infer a deep-seated, emotional involvement with the infant from the stranger's behaviour; that is, we could not assess the attachment of the stranger to the infant by observing her/his behaviour in one particular situation.

It has been asserted that attachment is stable and enduring through time while attachment behaviours are variable in quality, exhibited intermittently and determined by the inner state of the organism and the external state of the environment (Ainsworth, 1973). It is because this distinction is made by attachment theorists that attachment is not considered to be an incremental construct, i.e., that more infant attachment behaviour indicates a stronger infant attachment. In fact, there may be evidence to the contrary: in some cases continual exhibition of heightened attachment behaviour on the part of an infant or young child has been regarded as an indication of a weak or insecure attachment (Ainsworth, 1969; 1973; Ainsworth, Bell & Stayton, 1974). The idea that maternal attachment and maternal attachment behaviour could be negatively related, or at least may not be positively related, has not been explored by researchers of maternal behaviour.

To return to the role of maternal behaviour in the theory of attachment, we find that Ainsworth (1969) has set the stage for acknowledging both
maternal and infant contributions to the establishment of their relationship by stating:

Genetic programming continues to bias the infant to behave in ways adapted to the original environment of evolutionary adaptedness, and similarly, under all the layers of individual learning and cultural acquisition, there is still a bias for mothers to behave reciprocally—-a bias which may have been more or less sharpened or blunted by learning in any individual mother. (p. 1000)

Although the biological predisposition on the part of the mother toward caregiving and protection has been made an intrinsic part of the attachment system, this has not been explicitly acknowledged in discussions of attachment. The role of the mother is often seen as a corollary to the infant's; the point here is that attachment behaviour on the part of both mother and infant are essential to the establishment of the attachment relationship. Bowlby characterized maternal behaviour as "reciprocal" to infant behaviour; thus maternal "retrieving" behaviour is deemed reciprocal to infant attachment behaviour in that both together have the biological function of protecting the infant from danger. However, Bowlby leaves the question of the mother's role in the system largely unexplored; his main focus is on the established attachment relationship between a young child and its mother (Ainsworth, 1969). The fact that maternal behaviour has not been traditionally explored for its contribution to the attachment relationship need not dissuade us from looking at attachment theory from the maternal point of view. From a biological and evolutionary standpoint, it makes sense that a system of maternal attachment might operate to keep the mother in proximity to her infant, to compel her to continue nurturing and nourishing the infant, to keep her aware of the infant's whereabouts when she is not in proximity and keep her attuned to the infant's signals. In the absence of a maternal predisposition to behave in ways that promote these outcomes, the
behavioural biases on the part of the infant posited by attachment theorists would be less than functional. Not only must the infant be able to cry for its mother to come if it is cold, hungry or frightened, but the mother must be able to listen for the infant's cry, distinguish it from other noises and from the cries of other infants, know where the distressed infant is and go to its aid without delay. The accomplishment of these tasks requires the coordination of complex auditory, visual and kinesthetic systems, the activation of these systems and the suppressing of impulses to respond to distracting stimuli. As we shall see in the following section, this coordination of maternal behaviour is accomplished by animal mothers and human mothers alike. But in the human mother, there is something more, something overreaching the mere organization of behavioural system, something which Yarrow & Pedersen (1972) have termed an "intense affect" which characterizes the mother's relationship to her infant and which serves to bind her to him and to orient both her behavioral and her affectional systems toward him. This intense affect is not transitory in nature, it is not momentary, it is not merely activated by an extreme situation such as the approach of danger. Rather, it may be thought of as a promise not only to nurture and care for the infant today, but to continue nurturing and caring for the developing infant for many years to come, through sleepless nights, through illness, through the "terrible twos", and on into childhood and beyond. It is a promise to behave with the same unconditional caring and love through good times and bad, for better or for worse, so to speak. Because a promise is by definition future-oriented, we should not require that specific maternal attachment behaviours measured today be correlated with those measured tomorrow, or with a qualitative measure of maternal attachment itself, if that attachment could be measured. What is required in
order to study maternal attachment is a way of measuring the strength of the maternal promise, and a model which fits specific maternal behaviours to that promise. One step toward devising that model would be an acknowledgement of the complexity of the maternal bond and of the range of attitudes and behaviour which must be dealt with in order to approach an adequate measure of the bond itself.

Let us leave this discussion now and explore the other areas of study which contribute information to the researchers of maternal behaviour, ethology and pediatrics. We will return to this discussion of the maternal promise with additional information and ideas from these two fields of study.

II. Contributions of Ethology

Ethological research has helped to focus attention upon four groups of variables which appear to be related to maternal caregiving and protective behaviour in animals: 1) infant visual, auditory and behavioural cues; 2) maternal behavioural systems and cues; 3) conditions of the birth and rearing situations; and 4) the role of hormones. These variables are well-interwoven, and even laboratory studies have not always been successful in separating their effects. The importance of ethological research in both field and laboratory has been the detailing of animal mothering behaviour which occurs in the absence of the kind of enduring affectional ties which can be called upon to explain maternal behaviour in humans.

Infant Cues

Animal species differ in the maturity of the young at birth, and patterns of maternal-infant relationships are adapted to the level of independence of the newborn: altricial species such as nest-builders and burrow-dwelling animals are found to have a long, intense period of maternal care for the immature newborn, with a short weaning period and abrupt natural
separation of mother and young; precocial species, such as herding and ground-living animals have a shorter initial period of intense care followed by an extended weaning period and gradual separation of mother and infant which ends in the transition of the young to the status of member of the herd or group. In either case, whereas much of the burden of maintaining the physical contact necessary to promote infant survival falls upon the mother, the infant is often equipped with a system to facilitate initial and continuing contact. In ducks and geese, the young are imprinted to their mother within the first thirty-six hours of life and are thus able to keep within the mother's nutritive and protective range (Hess 1958, 1972). In higher order animals such as the rhesus monkey, the infant is able to crawl from the birth canal to the mother's ventral surface immediately after birth, often with little or no assistance from the mother (Mitchell, 1972) and cling to the mother's fur in order to maintain contact with her nipple (Harlow, 1961). The newborn kangaroo, which is barely more than a fetus and completely unable to sustain itself independently is nevertheless able to crawl into its mother's pouch and attach itself to the nipple, where it remains for an extended period to complete its development.

Thus in many species, animal infants actively promote the mother-infant contact necessary for survival. There is some indication, however, that these independently-initiated behavioural patterns are important in eliciting complementary maternal caregiving activity and that the mother-infant system is dependent upon the behaviour contributed by both partners. For example, the contact-clinging reflex of the infant rhesus has been found to stimulate cradling and initiation of ventral contact (Harlow, Harlow, & Hansen, 1963; Seay, Alexander, and Harlow, 1964), and the absence of this contact-clinging by the infant results in the attenuation and eventual absence of maternal
caregiving behaviour (Harlow, Harlow, & Hansen, 1963).

Animal infants also exhibit cues which serve to elicit maternal behaviour. Jay (1963) cites visual cues such as coat color, quality of movement and size of infant, as well as the auditory cues of vocalization, to account for maternal responses in langurs. The mewing of her kittens brings the domestic cat to her young if she is within hearing range. Auditory and visual variables such as these are thought to be responsible for the intensity of maternal care for young infants, and the decrease in this care as the infant gets older and the cues, especially those of color, size and movement, change with maturity (DeVore, 1963; Jay, 1963). In laboratory studies maternal behaviour has been shown to be greatest toward newborns and to decrease as older test-infants are presented to mice (Noirot, 1964), hamsters (Noirot & Richards, 1966; Richards, 1966), and rats (Rosenblatt, 1965). Variables such as color, size and movement may be factors which elicit maternal behaviour in nulliparous females (Rosenblatt, 1967; 1969) and in male and female adults (DeVore, 1963; Jay, 1963). In some species, a constellation of infant cues must be present to foster maternal caregiving behaviour. Maier (1963) found that anesthetization of the hen's ventral surface caused the failure of appropriate maternal responses in spite of the visual and auditory cues provided by the presence of the chicks.

**Maternal behavioural systems and cues**

Field studies have shown that in some cases, maternal cues act as elicitors of infant attachment behaviours, just as infant cues serve to elicit maternal caregiving behaviours. In ducks, the mother alters her vocalization patterns when she moves away from the nest so that her ducklings are signalled to follow her (Hess, 1958; 1972). In higher-order mammals such as baboons and chimpanzees, visual, auditory and behavioural cues are
combined to bring infants into proximity to their mothers when the mother moves from a feeding spot or when danger threatens (De Vore, 1963).

**Conditions of birth and rearing situations**

The roles of partuition and the experiences surrounding birth in the development and maintenance of maternal behaviour have been studied in two ways: by observing animals that have undergone surgical delivery of their young, or by separating the mother from her young at different stages and for varying periods, and then observing maternal behaviour upon reunion. In rats, delivery by caesarian section was not found to affect the mother's response to her pups after her recovery from surgery (Rosenblatt, in Klaus & Kennell, 1976); however, rats delivering normally who had their pups removed immediately after birth did not respond to test-pups presented several weeks later, in contrast with rats allowed to keep their pups for as little as thirty minutes after birth, who then did respond to the later presentation of the test-pups (Bridges, 1975). Thus in rats it appears that contact with the young in the immediate postpartum period is important in eliciting and maintaining maternal behaviour. The concept of a critical period for maternal behaviour has been used to describe this situation, and the parameters of this critical period are hypothesized to differ across species. In biological research a critical period is one in which certain structures, physiological or behavioural, must develop in order for the organism or unit to become fully functioning. If events or conditions interfere with the development of these structures at the critical period, their ultimate failure to develop has impact upon the subsequent success of the organism. The concept of a critical period in the development of the mother-infant relationship has been adopted by some researchers who study human mothers and infants, although concept has been softened somewhat to a "sensitive period".
This will be discussed in more detail in a later section.

Ethological work has shown some additional factors which may interact with a critical period to create both inter- and intra-species differences in maternal behaviour. Sackett and Ruppenthal (1974) have shown that laboratory-reared monkeys delivered by caesarian section and separated from their infants for two hours refused to accept their young by the third day postpartum; whereas, feral-reared monkeys who underwent caesarian section and separation accepted their infants by the second day. The difference between laboratory and feral monkeys are explained as a function of rearing conditions of the mother herself, and the work of Harlow and Harlow (1966) showing that motherless monkeys fail to exhibit maternal behaviour to their own offspring supports this explanation. However, the actual mechanisms responsible for the failure have not been clearly delineated.

The mere separation of mother and young after normal delivery has been shown to affect later maternal behaviour and the degree of effect depends upon the timing and length of separation. In rats, separation of a few days beginning immediately after birth results in attenuation of nursing, retrieving and nest building behaviours (Rosenblatt & Lehrman, 1963; Rosenblatt, 1969). In goats, separation of one to three hours immediately after birth was followed by maternal rejection upon reunion, whereas the same amount of separation but with five minutes of contact after birth was followed by acceptance of the young upon reunion (Klopfer, 1971). Collias (1956), also working with goats, showed that separation of goat and kid for less than one hour beginning shortly after birth was followed by acceptance of the young by the mother, whereas separation of more than one hour was followed by rejection. In monkeys, Sackett and his colleagues have found several variables which appear to affect a female's attraction toward infants (Sackett & Ruppenthal, 1974). Normally, nulliparous females are attracted to
test-neonates. Monkey mothers separated from their infants for one to twenty-four hours after birth were found to prefer contact with neonates over contact with adults; those separated longer fail to show a preference for newborns. Normal mothers who rear their own infants and are separated from them prefer their own infants to other infants or to adults; those who have reared several infants serially show no preference for their biological offspring over other infants the same age. Motherless mothers reared in laboratories, in contrast to feral-reared mothers, show no attraction to neonates, and indeed are generally aberrant in their behaviour toward neonates even after attaining the multiparous status which would cause a normally-reared mother to be highly attracted to newborns. One very interesting finding from this series of experiments by Sackett & Ruppenthal is that females who rear their infants in confined conditions which do not allow the mother to interact with animals other than her own infant show much lower levels of attractions toward infants than do mothers who have had access to other animals and opportunity to interact with them during the rearing period. One cannot help but think of the human mother, isolated with her infant in her house or apartment, who longs for adult company to help her get through the day.

Thus we find that maternal parity, the rearing conditions of the mother herself, loss of contact with the infant and maternal social environment have all been shown to affect a monkey mother's maternal behaviour. Adoption studies, in which a female is introduced to young not her own, have been undertaken in an attempt to explore variables relating to a kind of threshold of maternal behaviour. In laboratory rats, a female which has been lactating for one day after the delivery of her own young is more likely to successfully adopt alien pups (that is, to behave in a manner that promotes
the survival of the adopted young) than is a female which is also lactating but is ten days postpartum (Grota, 1968). The elapsed time from parturition, then, appears to affect the success of the adoption. In domestic cats, the size of the litter and time of introduction to the adoptive mother (whose own kittens have been removed at birth) influences adoptive behaviour: a single kitten was successfully adopted up until fifteen days after the birth and immediate removal of the mother's own kittens; a litter of three was successfully adopted if introduced before the fifteenth day, but attacked and avoided if introduced after the fifteenth day (Schneirla, Rosenblatt & Tobach, 1963). In goats, alien young are normally butted away, but a goat can be made to adopt a kid if mother and kid are isolated from the herd and the mother is prevented from butting (Hersher, Richmond & Moore, 1963).

There is evidence that the behaviour of the young is also a variable in the success of the adoption: cats will not adopt a kitten which shows eccentric behaviour (Schneirla, Rosenblatt & Tobach, 1963), even under optimal conditions; rhesus monkeys have been observed to abandon attempts to adopt an infant who refused contact or a kitten who was unable to cling to the adopting mother (Harlow, Harlow & Hansen, 1963).

The role of hormones

The mechanisms underlying maternal behaviour have been traditionally assigned to hormonal condition, and hormonal changes before, during and after parturition have been shown to affect a female's exhibition of caregiving behaviour toward newborns. Female hamsters and rats show increasing caregiving behaviour when presented with test-newborns at three stages: non-pregnant females show less caregiving behaviour than pregnant females, who show less than lactating females; this trend is reversed if the pregnancy is terminated (Richards, 1966; Rosenblatt, 1969). Virgin rats and mice
injected with blood plasma from newly delivered females exhibit maternal behaviour toward test-infants (Richards, 1966; Terkel & Rosenblatt, 1968). The fact that primates who have just given birth prefer to view newborns rather than adults has been attributed to hormonal factors by Harlow and his associates; this preference has been shown to decrease if the new mother is separated from her young (Cross and Harlow, 1963). Thus far, however, primatologists have not distinguished the effects of hormones from those of separation, so the conclusion that hormones are involved is only reasonable speculation. Cross-transfusion research, in which the blood of virgin, pregnant and newly delivered female rats is mixed, shows that substances in the blood during a limited time around partuition induces maternal behaviour toward test-neonates (Terkel & Rosenblatt, 1972). It appears that a rise in estradiol, a hormonal substance secreted just before parturition, accompanies prepartum nest-building and retrieving behaviour and may be responsible for the onset of maternal behaviour in rats (Rosenblatt & Seigel, 1975). It should be noted that a rise in estradiol in human females shortly before parturition has been found by Turnbull and his colleagues (Turnbull, Patten, Flint, Keirse, Jeremy & Anderson, 1974).

The interaction of hormonal factors and the presence of the young appears to affect postpartum maternal behaviour and it has been argued that the mechanisms responsible for human maternal behaviour shift from internal (i.e., hormonal) to external ones (Klaus & Kennell, 1976). Whether or not this transition creates in the human mother a sensitization to infant behavioural cues, as Klaus and Kennell appear to be arguing, is still to be determined.

Let us turn to the literature contributed by medical researchers in the field of pediatrics which addresses some of the same issues as the
ethological literature, namely, species-specific maternal behaviour, infant and maternal cues, the role of parturition and birth experiences, and hormonal influences.

III. Contributions of Pediatrics

Human maternal behaviour is a complex system of attitudes, affect and actions which arises from an equally complex set of antecedents, as does any human behaviour system. The mother's history of interpersonal relations with her own parents, her husband, her children and others give rise to a characteristic style of interaction as well as to attitudes and expectations about the quality and content of personal relationships (Klaus & Kennell, 1970). In addition, the practices and values of her social and cultural milieu contribute a great deal to the specific attitudes and expectations she has toward her new infant. In the past twenty years especially, the "cult of Child Psychology" (Newson & Newson, 1974) offers an unending stream of information and advice about children and childrearing which may be consistent with or in conflict with the values the mother already holds. The mother's behaviour toward her newborn child is also affected by her attitudes toward and expectations of pregnancy and childbirth, as well as whether the pregnancy was desired (Hubert, 1974). Her experiences with previous pregnancies, births and childrearing problems will undoubtedly color her attitudes toward a new infant, and the exigencies of the needs and activities of older children will have their effect upon her interaction with her newest child (Lewis, 1976). In addition, experiences during her present pregnancy, especially threat of miscarriage or other medical problems that might result in loss of the baby, have been shown to affect the mother's behaviour toward the infant once it is born (Klaus & Kennell, 1970). Prematurity itself has been treated as an emotional crisis wherein the anticipatory grief
experienced by the mother may interfere with the establishment of her relationship to her infant (Kaplan & Mason, 1960). Conversely, threat of loss of the infant might heighten the mother's attachment to him once he is born.

Two factors which may be crucial in the development of the mother-infant relationship especially in first pregnancies are the interaction of the mother's knowledge and expectations of neonatal behaviour with the infant's actual behaviour (Hubert, 1974), and the events of the early post-partum days, i.e., the way in which hospital practices constrain the mother-infant relationship (Klaus & Kennell, 1970). Most of the research on the maternal side of the mother-infant attachment relationship has been done by neonatologists and psychologists concerned with the effects of separating newborn infants from their mothers, primarily in the case of the premature infant. This attention upon the effects of separation was stimulated by the results of correlational studies in which samples of premature infants, who were cared for in the intensive-care nursery and thus separated from their mothers for long periods, were found later to have disproportionately high rates of child abuse or battering (Elmer & Gregg, 1967; Klein & Stern, 1971; Oliver, Cox, Taylor & Baldwin, 1974; Skinner & Castle, 1969) and failure to thrive in the absence of organic disease (Ambuel & Harris, 1963; Evans, Reinhart & Succop, 1972; Shaheen, Alexander, Truskowsky & Barbero, 1968).

The discovery of these dramatic correlates of early maternal-infant separation led researchers who were interested in "mothering disorders" (Klaus & Kennell, 1976; Rose, Boggs, Alderstein, 1960) to attempt to understand the mechanisms of what was then termed maternal attachment (Robson & Moss, 1970), and what has come to be called maternal-infant bonding (Klaus & Kennell, 1976). Thus, the major focus of pediatrics research has been the
experiences during the immediate postpartum period, and the later correlates of early separation in hospital. Very little attention has devoted to the mother's attitudes and expectations; rarely have research projects spanned the prenatal through the early infancy period to examine the interrelationships among prenatal, perinatal and postnatal variables. Let us examine the issue of early separation versus early contact as presented in studies of rooming-in, and studies of the relationship between postpartum separation or contact and later maternal functioning.

**Rooming-in**

In the late 1800's when women began routinely to give birth in hospital, rooming-in (allowing the infant to stay in the mother's room) was standard procedure and the mother's participation in the care of even the premature infant was encouraged. When infant morbidity and mortality rates began to rise due to epidemic viral infections and inadequate equipment, neonates were isolated in separate wards and the handling of infants was reduced to a minimum. Eventually the mother was completely barred from the hospital nursery, and the separation of mothers and infants became the standard procedure. Klaus & Kennell (1970) note that in most cultures except for Western societies, the mother and newborn infant are secluded together for several days following birth. In sharp contrast, all mothers and newborns in Western hospitals are separated from one another to a greater or lesser degree. Full-term infants are routinely taken from their mothers after birth and placed in a nursery for the duration of the hospital stay; they are periodically brought to their mothers for short feeding sessions and then returned to the nursery.

In hospitals which have retained or re-instituted the practice of rooming-in, researchers have had the opportunity to compare rooming-in
mothers with mothers who experienced the more routine separation from their infants. Greenberg, Rosenberg & Lind (1973) compared one hundred primiparous mothers assigned randomly to rooming-in or conventional hospital arrangements in Stockholm. The rooming-in mothers had the opportunity to interact with their infants for eight hours a day whereas in the conventional group the babies were brought to their mothers for twenty-minute feeding sessions six to eight times a day. The results of questionnaires administered to the mothers revealed that rooming-in mothers judged themselves to be more self-confident and competent in the care of their infants and more able to understand the meaning of their infants' cries than did mothers in the conventional group. Rooming-in mothers also reported feeling less uneasy hearing their own infants cry. The rooming-in mothers were described to have "developed maternal feelings faster than the conventional mothers" by the authors (p. 385), but they did not outline the criteria used to make this judgment. There were no differences between the groups in their self-reports of how much they thought the infant would restrict their normal activities, how great a responsibility they thought the infant would be, how many future children they planned to have, or how anxious they felt about the hospital care of the infant. No differences were found in how tired the mothers felt after delivery, how much sleeping medication they received, the presence of the father in the labour room or the incidence of breast-feeding problems. The rather unique arrangements in this study may have affected the results, however. Because the rooming-in mothers were in ward-type accommodations, sharing a room with three other mothers and their infants, those mothers benefitted from the mutual support of the other mothers and gained knowledge of individual differences in neonatal behaviour, which may have affected their attitudes and rate of adjustment. It is difficult to separate out the
effects of rooming-in from the effects of this "therapeutic community." No evaluation of actual maternal behaviour was made in this study, and no follow-up of the subjects has been reported. Despite these inadequacies, however, the results of this study confirm the findings of earlier studies comparing rooming-in with conventional arrangements. Jackson and her colleagues found that rooming-in mothers acquired greater competence and confidence in handling their infants and had better understanding of the infant's behaviour (Jackson, Olmstead, Foord, Thomas & Hyder, 1948). Mothers who have little contact with their newborns may feel tense and unfamiliar with their infants while still in hospital and after returning home; maternal distress and anxiety concerning unexpected infant behaviour or behavioural patterns may affect the development of a close relationship between mother and child. Indeed, maternal anxiety has been shown to be related to difficulties in breast-feeding (Olmstead, Svigbergson & Kleeman, 1949) and to later behavioural disorders in the child (Shea, Klatskin & Jackson, 1952). Infant crying upon returning home from hospital has been judged to be a major problem in the adjustment of the mother to motherhood and her new baby (Lind, in Greenberg, Rosenberg, & Lind, 1973); the fact that rooming-in mothers in the Greenberg study felt less uneasy hearing their infants cry, felt that they could understand the meaning of the cry and felt that they knew what to expect in the way of newborn behaviour points to an easier adjustment and a more relaxed, less anxiety-laden relationship between mother and infant. Some researchers have predicted a lower incidence of postpartum emotional problems for rooming-in mothers (Gordon, Kapostins & Gordon, 1965); however this prediction has not been empirically tested. Recently, Davidson (1978) has shown that maternal self-report of anxiety and depression at one month postpartum was reduced by the intervention of a nurse who visited the mother
at home fourteen days after the birth to "introduce" the mother to her new infant by demonstrating and explaining infant behaviour and behavioural patterns.

**Separation versus contact**

In contrast with full-term, healthy infants who are usually taken from the delivery suite to the nursery and brought out to their mothers for feeding, prematurely born infants or infants who experience birth difficulties or are born with problems are taken from the delivery room to the intensive care nursery where they are kept in incubators or isolettes until they reach an appropriate weight and condition. Only then are they placed in the regular nursery and reunited with their mothers for feeding. In the case of very premature or sick infants, the mother is usually discharged from hospital after a few days but the infant may be kept in hospital for a long time, resulting in separations which may last up to twelve weeks. In these cases, mothers may or may not visit their infants during this protracted period of separation. The results of the ethological research which has just been reviewed has encouraged some hospitals to acknowledge the possible negative effects of mother-infant separation and to make arrangements for an increase in contact between mothers and their premature infants. Such changes in hospital policies have afforded an opportunity for researchers to study differences in maternal behaviour that may result from the degree of separation experienced in the various arrangements. Results of this research have been used to support theoretical speculations about the nature and antecedents of the maternal attachment bond.

Researchers at the Stanford University Medical School modified hospital policy regarding premature infants in order to study the effects of the
routine separation of the mother and infant (Barnett, Leiderman, Grobstein, & Klaus, 1970). Mothers were allowed to enter the premature nursery and have tactile contact with the infant through the portholes of the baby's isolette. Later the mother was permitted to feed the baby. Mothers were interviewed during the time their infants were in the premature unit and after discharge. On the basis of animal research (e.g., Harlow, Harlow, & Hansen, 1963; Maier, 1963), it was hypothesized that mothers deprived of tactile and caretaking contact with their infants would be less responsive than mothers who were allowed to handle their infants, and that further, a mother who is unattached to her infant because of her separation from him shortly after birth may, in turn, deprive the infant of adequate stimulation when she assumes responsibility for his care. The preliminary report of this study noted that mothers who were allowed to interact with their infants were different in three ways from mothers who suffered interactional deprivation: contact mothers exhibited greater commitment to the infant, greater self-confidence in the ability to be a mother, and a higher level of stimulation and skill in caretaking behaviour.

In a related study, (Leifer, Leiderman, Barnett, & Williams, 1972), mothers of premature infants were randomly assigned to a contact group or a non-contact group, and both groups were compared with a group of full-term mothers. As in the previous study, contact mothers had access to the premature nursery and could touch the infants through the portholes of the isolette. Non-contact mothers were permitted to view their infants through a glass wall but could not touch them, talk to them, or hear them. Full-term mothers had normal arrangements, i.e., their infants stayed in the nursery except for feeding, but they had full sensory contact when the infants were brought to them. Thus, although mothers in all three groups were separated
from their infants at parturition and continued to experience partial separation throughout the hospital stay, the mothers differed in the modes of contact available to them, the length of time that full or partial separation persisted, the age and maturity of the infant and the physiological and hormonal status of the mother when full contact was restored (at discharge). Discharge was at three days for full-term infants and at the attainment of a weight of 2500 grams for prematures. Behavioural observations were made prior to, one week, and four weeks after hospital discharge, and time-sampled data were gathered while the mother engaged in normal caretaking activities and interaction. The only consistent finding was that full-term mothers were observed to exhibit more ventral contact and more smiling to their infants than mothers in either the separated or contact groups. The lack of difference found between separated and contact groups was attributed by the authors to the minimal differences in contact opportunity experienced by these mothers; i.e., even the contact mothers could not hold their infants or have full bodily contact with them. It was also noted that the amount of accumulated exposure between contact mothers and their infants over the separation period was relatively low since the frequency of these mothers' visits to hospital once they themselves were discharged was low. On rough estimate, the contact mothers chose or were able to visit their infants only about once every six days. This in itself may be some indication that the strength of their attachment to their infants had attenuated despite extra contact, although this view is tempered somewhat by the fact that no differences were found when the two premature groups (contact and no-contact) were combined and compared with the full-term groups after one month of full contact. The authors note, however, that other maternal behaviour points strongly to differences that were simply not picked up in the observations.
Five of the twenty-two mothers in the separated group had their marriages end in divorce, and two of these mothers chose to relinquish custody of their infants. Although the number of cases is small, as the authors point out, this is a remarkable departure from what is considered to be normal maternal and marital behaviour, and suggests that the premature birth of an infant and/or the fact of mother-infant separation may very seriously disrupt normal family patterns, as well as affecting the mother-infant relationship itself.

In a study specifically concerned with developmental patterns of maternal attachment, Robson & Moss (1970) followed 54 primiparous women and their infants through the first several months of the infants' lives. In the report of this study the authors define maternal attachment as "the extent to which a mother feels that her infant occupies an essential position in her life" (p. 977). The data reported are from an interview with the mother when the infant was approximately 3 1/2 months of age, in which (among other things) three questions about the "onset, course and determinants" of the mother's feelings toward her infant were asked. The questions were: When did the mother first experience positive feelings and love toward her baby? When did the baby first become a person to the mother? When did the baby first seem to recognize the mother? Unfortunately these data are mainly retrospective (cf. Yarrow, Campbell & Burton, 1970), that is, they describe subjects' memories of experiences during labour, delivery, the hospital stay and initial establishment of home care. Robson and Moss (1970) extrapolated a pattern of maternal attachment from their subjects' responses which begins with feelings of estrangement during the hospital stay (the authors state that the 24% of this sample who had rooming-in were no different from the remainder of the sample); "impersonal feelings of affection" toward the infant were felt during the first four to six weeks, and feelings that the
infant was a unique person who was seen as responding differentially to his own mother were experienced by the end of two months. This was found to correspond to subjects' reports of responsive smiling, eye contact and visual following on the part of their infants. Robson and Moss concluded that "the release of human maternal feelings seems to depend heavily upon the infant's capacity to exhibit behaviours that characterize adult forms of social communication" (p. 984). These data and conclusions concerning the development of maternal attachment are of value, but the main faults of this work remain: the data were gathered retrospectively, and no actual observations of maternal behaviour were included.

A series of studies at Case Western Reserve Medical Center (Kennell, Jerauld, Wolfe, Chester, Kreger, McAlpine, Steffa & Klaus, 1974; Klaus & Kennell, 1970; Klaus, Kennell, Plumb & Zuehlke, 1970; Klaus, Jerauld, Kreger, McAlpine, Steffa & Kennell, 1972) were designed to test the notion that there is a sensitive period immediately after birth during which the mother's ability to become attached to her infant is optimal. This research is based upon ethologists' demonstration of critical periods for attachment in mammals (discussed in the previous section). Fourteen primiparous mothers comprised an experimental group ("extended-contact"), who were given their infants for one hour within the first three hours after birth, and for five extra hours per day for each of the three days of the hospital stay. The fourteen primiparous mothers in the control group experienced routine separation after birth and twenty-minute feeding sessions every four hours for the three-day hospital stay. Dependent measures for this research consisted of: 1) responses to two questions asked during an interview at one month postpartum which were concerned with maternal response to infant crying and maternal reaction to being away from the infant (i.e., leaving the infant with another
person while the mother went out); 2) observed maternal behaviour during a physical examination of the infant at one month; and 3) observed maternal caretaking behaviour during a feeding (Klaus, Jerauld, Kreger, McAlpine, Steffa & Kennell, 1972). The authors found differences between the contact and control group in the interview data (control mothers tended to let their infants cry and reported feeling "good" while out without the infant more than did contact mothers who tended to pick the infant up if he cried, and who tended not to want to go out without their infant); in the observations during the physical examination (contact mothers tended to stand near the infant and attempt to comfort him if he cried more often than did control mothers); and in the observed feeding (out of twenty-five behaviours coded, two—en face position and fondling the baby—discriminated between the two groups).

When the infants were one year of age, the two groups of mothers answered differently to an interview question concerning how they felt when they returned to work or school (only six of the contact mothers and seven of the control mothers had returned to their previous activities). Again more contact mothers soothed their infants during a physical examination when the infant was one year old. No differences were found in mother-infant interaction, interviews, or a free-play situation (Kennell, Jerauld, Wolfe, Chesler, Kreger, McAlpine; Steffa & Klaus, 1974).

On the basis of these findings Klaus and Kennell have hypothesized that the period immediately after birth is a sensitive period in the human mother "which is the optimal time for an affectional bond to develop between the mother and her infant" (Kennell, Trause & Klaus 1975, p. 94). However, the evidence for this notion appears to be somewhat inadequate, both in terms of sampling and measurement. The sample was small (n=28), nearly uni-racial (26
black, 2 white women), and consisted of very young (mean age = 18.4 years), mostly unmarried mothers, all of whom bottle-fed their infants. Although data regarding social status are not reported (except to say that it was comparable for both groups), young, unmarried black women in an urban area in the U.S. are likely to be of low education and low income. Any general conclusions drawn from such a restricted sample ought to be called into question. An equally serious criticism of these studies can be made concerning the face validity of the outcome measures; they appear insufficient both in quality and quantity. No observation or interviews were done in hospital during the postpartum period; coded observations from a filmed feeding yielded either very few differences between the samples (at one month) or no differences (at one year); other naturalistic observation of mother-infant interaction were either omitted (at one month) or showed no differences (at one year). The conclusions of these authors are based upon answers to three interview questions (two at one month and one at one year) and the behaviour of young, single, black women in the presence of older, high-status, white physicians who were conducting a physical examination of their infants. The results obtained must surely reflect the ecology of the situation in which the data were gathered (c.f. Bronfenbrenner, 1977); whether they also reflect actual differences due to postpartum experiences is not at all clear.

The separation/contact research is not only weak in methodology and sampling, but is incomplete theoretically. It is not surprising that contact between mother and infant after birth increases maternal familiarity with infant behaviour; nothing more could be expected. The question which remains unanswered is: how does this increased familiarity interact with previous knowledge and experience or the lack of it, and exactly what differences in
maternal-infant interaction result. One element which would lend a great deal of weight to the findings concerning the effects of separation but which has not been assessed by any of these researchers is that of maternal expectations of infant behaviour. It makes sense that mothers who have the most unrealistic expectations of infant behaviour, either over- or under-estimates of their capabilities and capacities, would be the most affected by separation in hospital and the resultant lack of opportunity to become familiar with what a newborn is really like and what can be realistically expected in the way of behaviour. An unquestioned assumption of most researchers in the field of maternal behaviour is that experience with infants is isomorphic with parity—that is, primiparas are assumed to be naive with regard to infant behaviour, and multiparas are assumed to be universally knowledgeable about it. Common sense alone would call this assumption into question, but it has never been empirically tested. To be sure, many women, especially Western women brought up in small families and living alone with their husbands before the birth of their child, may arrive home from hospital with little idea of how to care for their infants. But not all new mothers lack experience with infants; they may have helped to care for siblings or for the infants of neighbours or relatives, or they may have learned how to care for infants in a child-care related job. Women bring varying degrees of experience to their role as mother, but the amount of experience and its impact upon their actual mothering behaviour with their own infant has never been assessed.

Another factor not explored by researchers is the integration of the newborn into the family. Little normative data concerning this integration exists; existing work is largely concerned with the mother's response to her newborn immediately after delivery. Newton and Newton (1962) found that the
most frequent initial maternal response to the newborn was "smiles a little" (as opposed to "greatly pleased", "indifferent", or "disgusted"). However, no relationship was drawn between this initial reaction and either later maternal behaviour or infant outcome. Rising (1974) discusses the first hour after birth in terms of a "fourth stage of labour: family integration."

Spontaneous parental response to the infant after the birth is seen by Rising as an indicator of later adjustment. A systematic method for recording these responses, both verbal (such as calling the baby by name, or voicing disappointment over the baby's sex) and non-verbal (kissing or reaching for the baby, turning away from baby, husband, or attendants) was offered, but neither normative nor follow-up data were presented. In another study, (Gray, 1977) initial maternal response to the newborn was used as an indicator of risk for later child abuse, but again no data relating initial response to later maternal behaviour were offered.

It has been suggested by Barnett and his colleagues (Barnett, Leiderman, Grobstein & Klaus, 1970) that the late entrance of the premature infant into the family, where mother and infant were not regarded as a unit, could affect the normal development of the mother-infant relationship; this suggestion, however, was not followed up by either Barnett and his associates or by other researchers.

The point being made here is that the real issue of family integration, that is, the long-term integration of the infant into the family, has not been treated anywhere in the literature. No where has it been acknowledged that true family integration, which includes not only the acceptance of the infant by the parents, but the acceptance of parental roles and responsibilities, begins when the baby is planned or when the woman learns that she is pregnant, and continues throughout pregnancy, parturition, the
postpartum stay in hospital and the transition to home care. There has been no work on the normative course of this long-term integration. There is a need to explore the implications that early experiences and attitudes have for the constantly adjusting process of family integration.

IV. Critique and Introduction to the Present Research

Three areas of research which contribute information to the field of maternal behaviour have been reviewed. Developmental psychologists have provided theories of human attachment relationships which, it has been argued, must be augmented by a focus on the uniquely adult aspects of a mother's ability to project into the future and see her relationship to her infant as one that grows and changes. Ethologists have shown how both maternal and infant cues and behavioural systems interact with birth and rearing conditions and with hormonal factors to produce species-specific maternal-infant patterns in animals. Medical researchers have explored the effects of mother-infant contact upon the ways in which human mothers relate to their infants.

There are three ways in which current research on maternal behaviour is seriously flawed; these deficiencies are reflected in the unclear results of the major research projects to date, in the uncertainty with which these results have been interpreted, and in the general failure of the investigators in the field to integrate and build upon ongoing research. These flaws are: 1) the absence of a sound theoretical model of maternal behaviour; 2) the dearth of tested methodological tools with which to study the problem; and 3) the lack of a comprehensive but specific definition of maternal attachment or maternal bonding. Perhaps because those working on the issue of bonding have been for the most part medical researchers and the
problem has therefore come to be seen in light of hospital management techniques, there has been little attempt to ground the research in a theoretical perspective that would account for maternal behaviour in the context of the influences upon it, the consequences of maternal behaviour in terms of family development and the broad network of the mother's interpersonal relationships, and the reciprocally interactive nature of the mother-infant relationship itself.

Due perhaps to the links hypothesized between "bonding" and child abuse (Klaus & Kennell, 1976), and due to the focus of alarmed attention upon the growing rate of child abuse reports, there appears to have been a bandwagon effect in which researchers have seized upon the tools nearest to hand and applied them to the problem with great haste and fervour. The result has been the use of research methodology that has been examined neither for its specificity to the problem of maternal behaviour, nor more importantly, for the direct influence that methodology has upon the kinds of results obtained.

The combined effect of weak theory with weak methodology brings the field to the following example of impasse. Leifer and her colleagues, in discussing the ambiguous results of their research, state that differences between the contact-, separated- and full term- mothers are expected to disappear with time as the women return to non-pregnant status and "experience the pleasures associated with infant care" (Leifer, Leiderman, Barnett & Williams, 1972, p. 127). To say that this conclusion is counter-intuitive is to badly understate the situation. For the new mother, isolated from emotional support, bewildered by the constant and conflicting advice from relatives, friends, health care professionals and books, and exhausted from both the physical shock of parturition and the unending demands of a newborn infant, the "pleasures associated with infant care" are few and far between. Much more important, however, than these researchers'
ignorance of the realities of modern motherhood, is the fact that this conclusion could be drawn only in the absence of an adequate theoretical model. If, for example, one views the mother-infant relationship within an interactional model in which the effects of behaviour and experience are cumulative, and indeed, the proponents of bonding appear to be telling us that the lack of opportunity for early mother-infant contact has serious implications for the later development of both mother and infant, then differences between groups of mothers should increase, not decrease, with time. There are four possible reasons that the Stanford group failed to find differences between their groups: first, there may actually be no differences between these three groups; second, the behaviours they chose to observe may simply have been the wrong ones, and indeed, no theoretical basis is given for their choice; third, the choice of molecular over molar behaviours may have been wrong, and the evidence of the marital and family problems seems to indicate that this might be the case; and fourth, the observations reported may have been done in the wrong context, or at the wrong time, or may not have extended far enough in time into the mother-infant relationship. In this and other studies, the possible effects of early experience may have been obscured because the tools used were inadequate or inappropriate, and therefore the selection of variables or of data-collection points may have been misguided. R.Q. Bell (1968, 1971) and Moss (1965) have made this point with regard to the study of infant behaviour, and the insight is of course no less applicable to the study of maternal behaviour.

The lack of a specific definition of bonding or maternal attachment has added to the confusion and compounded the theoretical and methodological problems. Klaus and Kennell, in their book *Maternal-Infant Bonding*, (1976) neither clearly differentiate the term "bond" from the term "attachment", nor
do they indicate that they are using both terms to refer to one and the same phenomenon. They define attachment as a "unique relationship between two people that is specific and endures through time" (p. 2), after Ainsworth and Bowlby, and spend a short paragraph outlining the issue of attachment versus attachment behaviours, but they do not deal with it as either a theoretical or operational problem. The definition of maternal attachment given by Robson and Moss (1970) - "the extent to which a mother feels that her infant occupies a central position is her life" (p. 979) also fails to specify elements which could form the basis of an operational definition.

Leifer and her colleagues speak of "maternal attachment" and define it as "the degree to which a mother is attentive to and maintains physical contact with her infant" (Leifer, Leiderman, Barnett, & Williams, 1972, p. 117). The central problem with this definition is that it is over-inclusive—it fails to specify behaviours or behaviour patterns exclusive to a mother with her own infant. An infant-care worker or a baby-sitter is expected to be and indeed would be observed to be attentive to and in physical contact with any infant in his or her charge. An additional problem is that the term "attachment" evokes the ethological concept of species-survival mechanisms, and has been used for several decades to denote infant behaviour and behavioural systems by Bowlby (1969), Ainsworth (1969; 1973), and others who have defined the field which is called "attachment". It might be best to consign the term "attachment" to the use of infant attachment researchers, and use another term to refer to the emotional tie of a mother to her infant. If the term "bond" is used for this purpose, it should be defined in a way in which the component of relationship-building and maintenance that is uniquely adult is emphasized, the component referred to in an earlier section in the discussion of the "maternal promise". Let us
refer to this component as commitment. If conceived of in terms of commitment, we can see that this component is at once both cognitive, in terms of making an intentional choice to become involved with another, and emotional in terms of the strong pull toward another that some developmental psychologists have recently had the courage to call love (Ainsworth, 1973). It is commitment which distinguishes the adult relationship, whether to another adult or to an infant or child, from the relationship of the child to his parent, which is, at least to begin with, driven by need. It is commitment that makes a relationship "endure through time" (Klaus and Kennell 1976, p. 2) and bridge physical separation over great distances. Commitment can be seen as a general construct in human relationships (cf. Rubin, 1973) and it is this generality that makes it useful in attempting to describe the maternal side of the mother-infant relationship. It is important to recognize that this relationship is one of many in the mother's life, and it should be possible to describe it using the same parameters which describe her other relationships. The commitment that motivates a mother to put the needs of her infant over her own is no different from that which motivates anyone to put the needs of another over their own—it is not unique to the mother-infant situation. Human relationships are built upon a foundation of commitment, and disintegrate with the breakdown of that commitment; the behaviour generated by the commitment will change with time and circumstance, but as long as the commitment is still there, the bond remains.

Let us use the term "bond" now to refer to the commitment a mother makes to her infant, one that may have begun in hopes and expectations many years before the birth of the infant, or one that may have been constructed only after the discovery of an unexpected pregnancy and subsequent decision to bear the child, or one that has never been made, and whose lack is reflected in neglectful, or perhaps abusive parental behaviour.
The purpose of this research was to extend and improve upon existing research by making a preliminary exploration of both the wide range of influences upon the maternal bond and the equally wide range of manifestations of that bond, attitudinal as well as behavioural. This research was based upon a cumulative model of maternal behaviour in which behaviour at any given point is influenced by past events and in turn influences events yet to come. The research design was necessarily longitudinal and specifically dealt with the two-month period from the last month of pregnancy through the first month of the infants' life. The main effort was the testing of measures to be used in assessing the influences upon the manifestations of the maternal bond, to validate them, relate them to one another and to discover how to extend them to cover a wider time span and to deal with a greater complexity of detail. Thus the following chapter on methods will contain the usual description of subject procedures, and also a section on the development of the instruments and measures used. The chapter on Results will deal with estimates of reliability and validity of the measures as well as analysis of the data collected using them.

In this research, twenty-seven primiparous women were interviewed during their third trimester of pregnancy and questionnaires regarding prenatal attitudes were administered at that time. Information about labour, delivery, and the postpartum hospital stay was subsequently taken from hospital records. At one month postpartum, questionnaires were again administered, and a naturalistic observation of maternal-infant interaction was made in the home.
METHODS

Methods I: Subjects and Procedures

Subjects. Subjects for this study were two groups of primiparous women and their infants. The two groups differed in method of recruitment, researcher contact and extent of involvement.

Core group. The core group consisted of twenty-seven women who gave birth at St. Pauls' Hospital in Vancouver between April and September 1977. They were recruited during prenatal tours of the hospital obstetric facilities which are conducted weekly by the head nurse of the maternity unit. The tour includes visits to the labour/delivery suite, the intensive care nursery and the maternity unit/regular nursery. Hospital procedures are explained and questions answered. At the end of each tour, the head nurse introduced the researcher to those on the tour. The researcher verbally explained the research project, provided a written explanation (Appendix L), and asked those women who were having their first baby to leave their names and telephone numbers so they could be contacted individually. Twenty-one tours were attended by the researcher; 104 women were present and of those 75 signed up to be contacted (72%). A mean of five women attended each tour (range: 1-9) and a mean of three signed up at each tour (range: 1-6); the mean rate of sign-up on any given tour was 74% (range 17-100%). Within one week of each tour, the researcher contacted each potential subject by telephone, answered questions about the project, again explained the extent of involvement, and ascertained whether the woman would be willing to participate. Core group subjects were told that they would be involved in prenatal and postpartum visits, and that information would be taken from their hospital charts. Of the 68 women who could be reached by telephone, 55 agreed to participate (80%). Of those 55 subjects, 27 completed the study. Of the 28 women who
agreed to participate but did not complete the study, six gave birth before a prenatal visit could be arranged, three dropped out due to medical problems, seven were seen for the prenatal visit but were unable to arrange for a post-partum visit, four had not given birth by the end of the study, and eight were not included due to miscellaneous reasons (moving out of the area, giving birth at another hospital, not speaking enough English to complete the questionnaires, etc.).

The 27 women who made up the core group were all married and spoke English without difficulty. Their mean age was 26.9 years (range: 20-37 years); the mean age for husbands was 29.6 (range 23-42 years). These couples had lived in common residence (either legally married or cohabiting) a mean of three years, nine months (range: 9 months to 8 years) before having their first baby. (No woman was included who had previously carried a pregnancy to term.) Mean number of years of education for wives was 13.6 (range 10-20 years); for husbands, 13.9 (10-18 years). The mean occupation according to the Hollingshead code (Hollingshead, 1956) was 4.4 for wives and 4.7 for husbands (range: 2-6 and 1-7 respectively). Examples of occupations rated as 4 are computer-operator, typist, bank teller, etc. Three of the wives listed their occupation as housewife.

Questionnaire group. The second group of subjects consisted of 107 women who attended prenatal classes given by the Vancouver Childbirth Association. Prenatal questionnaires (Appendix A) were given out by the prenatal class teacher to those women who were expecting their first baby. A letter from the researcher (Appendix T) explaining the study and inviting participation was attached to each questionnaire. The complete questionnaires were returned by the subjects to the prenatal class teacher, who returned them to the researcher by mail. The mean age of the women in this group was 27.2 (range: 19 to 38); for their husbands or partners, 30.2 (range: 23 to
The mean length of common residence for those who gave the information (83%) was three years, seven months (range: 11 months to 8.5 years). Mean number of years of education for the women was 13.7 (range: 10 to 20), and for their partners was 14.5 (range: 10 to 20). Average occupation using the Hollingshead scale was 4.3 for the women (range: 2 to 7) and 4.8 for their partners (range: 1 to 7). No significant differences were found between the core group and the questionnaire group in age, education, occupation or length of common residence (see Table 1).

Subject procedures - Core group.

Prenatal visit. Subjects in the core group, having been initially contacted by telephone, were scheduled for prenatal interviews in their homes. Interviews were optimally scheduled one month before the subject's estimated due date, but for some subjects this was not possible, as their due dates were already less than one month away at the time of first contact. The wide range of time between prenatal interview and actual birth date (mean = 22 days; range: 2 to 52 days) reflects this fact, as well as the fact that estimated due dates were quite inaccurate: of the 27 subjects, only one gave birth on her due date. There was a mean of 12 days' variation between due date and birth date; 18 subjects delivered after their due dates (mean = 13 days; range: 2 to 28 days) and 8 subjects delivered before their due dates (mean = 11 days; range: 1 to 30 days).

One week before the scheduled appointment for the prenatal interview, the researcher sent a package of prenatal materials to the subjects, consisting of a letter from the researcher (Appendix N), the Prenatal Questionnaire (Appendix A), the Infant Temperament Prediction (Appendix B), and a set of consent forms to be signed by the woman and her husband or partner (Appendix M). The questionnaires were filled out by the subjects before the interview,
and were used as the basis of discussion with the subject during the prenatal visit. In some cases, when the package did not reach the subject before the interview, the completed forms were returned to the researcher by mail. The prenatal visit served to establish rapport with the subject and to clarify items on the Prenatal Questionnaire if necessary.

**Hospital.** The researcher visited the hospital twice weekly in order to keep in contact with mothers once they entered the hospital, and to gather information concerning labour, delivery and the postpartum period from the hospital charts (Chart Variables, Appendix J). The researcher usually had a brief visit with the mother, but no information was gathered from her during her hospital stay. In some cases, there was no visit during the hospital stay, if the mother was unavailable during the researcher's visit to the maternity unit (i.e., the subject was bathing, doing exercises, etc. or had been discharged before the researcher's regularly scheduled trip to the hospital).

**Postpartum visit.** One week prior to the infant's one month birthday the mother was again contacted by telephone and an appointment was made for the researcher to visit the home and observe mother and infant during a time when the infant would be awake for at least one hour and a feeding would occur. Postpartum materials sent to the mother by mail before this visit consisted of a letter outlining the purpose of the visit (Appendix O), a Postpartum Questionnaire (Appendix Q) and an Infant Temperament Report (Appendix C). Again, if the materials did not reach the subject in time, they were returned to the researcher by mail. The postpartum visit took place an average of 32 days after the birth of the infant; however, there was again a wide range (26 to 44 days), since visits were scheduled at the subject's convenience and personal situation (i.e., they were scheduled around visits from relatives, holidays, appointments with the doctor, etc.).
The researcher called the mother on the morning of the visit to confirm the appointment. When the researcher arrived at the home, she talked to the mother to put her at ease before beginning the observation. If the infant was still asleep when the researcher arrived, the questionnaires were discussed until the baby awakened. If the infant was awake, the researcher began a one-hour observation after briefly chatting with the mother, and discussed the questionnaires after the observation period ended. The mother was told that the focus of attention during the one-hour observation would be on the infant and that the mother should continue with her normal routine as much as possible and refrain from interacting with the researcher until the end of the observation period. Normally, activities carried on during the observation period consisted of a feeding, diaper-changing and some non-caregiving interaction. In some cases the infant was also bathed during the observation period. (See Appendices F and G for observation tools.) If the infant fell asleep before the end of the observation, the researcher resumed the interview with the mother and waited until the infant awakened. If the mother judged that the infant would not re-awaken within a reasonable amount of time, arrangements were made for the researcher to return to finish the observation. This was necessary for 4 of the 27 subjects. After the postpartum visit the researcher filled out the Maternal Rating Scales (Appendices H and I) for the mother, and made notes about the visit.

Subject procedures – Questionnaire group.

There was no contact between the researcher and the subjects in the questionnaire group. Prenatal Questionnaires (Appendix A) were filled out anonymously by the subjects and were returned to the researcher by the prenatal class teacher as explained above.
Methods II: Development of Instruments

Seven questionnaire or observation instruments were used in this research project, of which six were developed specifically for this longitudinal study. They were designed to assess: (1) prenatal experiences, attitudes, expectations and preparation for birth, infant care and various aspects of the soon-to-be-assumed parental role (Prenatal Questionnaire, Appendix A); (2) parental expectations for, and report of, infant temperament (Infant Temperament Prediction, Appendix B; Infant Temperament Report, Appendix C); (3) time spent in hospital with the newborn infant (Hospital Diary, Appendices D and E); (4) mother-infant interactive behaviour observed in the naturalistic setting of the home (Behaviour Record, Appendices F and G); (5) postpartum experiences with the new infant, and aspects of infant care and adjustment to the parental role (Postpartum Questionnaire, Appendix Q). In addition, a rating scale of maternal care variables developed by Ainsworth (1977) was used by the postpartum observer (Maternal Rating Scales, Appendices H and I) and information regarding the course of labour and delivery, perinatal medication, infant outcome and postpartum medication was taken from the subject's hospital chart (Chart Variables, Appendix J). The development and use of each instrument will be discussed separately and in some detail, since a major purpose of this research was the development of instruments for assessing the development of mother-infant bonding.

A. Prenatal Questionnaire (Appendix A)

The items of the Prenatal Questionnaire were designed to gather demographic information and to assess eight areas of concern thought to be related to subsequent maternal behaviour and adjustment to the parental role. Originally the questionnaire was planned to be open-ended, allowing subjects to fill in
their own responses to each item. In order to facilitate data analysis, however, the format was changed to five-point, Likert-type scaling on the items for which it was appropriate. Most of the other items were designed with a limited number of possible answers, of which the subject was to choose only one, but a few of the items were necessarily open-ended. The questionnaire was pilot-tested on four subjects who were then asked to discuss the questionnaire and their responses with the investigator. On the basis of this information the questionnaire was revised to its present form. The eight sub-scales and the items related to each are included in Appendix K. The sub-scales are: (a) mother's feelings toward pregnancy, which includes both emotional and physical aspects (7 items); (b) mother's perceptions of the support of husband/partner, including whether husband/partner attended prenatal classes, his feelings toward the pregnancy and the mother's anticipation of his involvement in child care (10 items); (c) mother's experience in prenatal classes, including topics covered and satisfaction with the classes (7 items); (d) mother's preparation for labour and delivery, including plans for having a partner during labour and delivery and the use of perinatal medication (8 items); (e) mother's confidence in caregiving ability (4 items); (f) mother's expectation of the role of the infant in her life, including her plans to return to work, her plans for having help at home after the birth (11 items); (g) mother's arrangements for child care, including arrangement of a room, clothing, etc., for the baby, plans for feeding, and knowledge about infant care from books (4 items); and (h) mother's involvement with and prediction of attachment to the infant, including her wishes to keep the baby in her hospital room after the birth, and her estimation of when she and her infant would develop strong feelings for one another (6 items).

A factor analysis of the results of the Prenatal Questionnaire was
planned to empirically verify the existence of sub-scales and the relationship of each items to the sub-scales.

B. Infant Temperament Prediction (ITP) and Report (ITR) (Appendices B and C)

Because no temperament scales intended for use with one-month old infants were available, one was developed for this study. Rothbart and her colleagues have recently developed a temperament scale for 3 to 12 month old infants (Rothbart, Furby, Kelly and Hamilton, 1977), but it was not available even for adaptation to the one-month level at the beginning of this research project. The temperament scale developed by Carey (1976), which is based on the work by Thomas, Chess and Birch (1968) and is also geared to older infants, was used to guide the selection of items suitable for a younger sample.

The rationale behind the temperament scales was not to obtain an independent measure of the infant's temperament, but to have a measure of the infant's temperament as it was perceived by the parent. Thus, what was being measured was whether the mother thought her baby was easy to manage or was difficult to handle. It was also thought that the parent's anticipation of the infant's temperament or disposition before the infant was born, and the match or mismatch of this expectation to the infant's "actual" temperament (as perceived by the parent), would be an important variable in the mother's adjustment to her new baby and to the course of their relationship. The Infant Temperament Prediction and the Infant Temperament Report each consist of 15 items which describe a situation, such as "When I put my baby to bed, s/he...", "When I show my baby a new toy, s/he...", etc. The situations are caregiving ones (feeding, sleeping, bathing), interactive ones, such as response to toys or to people, and general temperament questions regarding physical activity and mood. Each item is followed by three possible responses. The responses reflect a three-point scale of infant functioning,
similar to that employed by Carey -- easy baby, medium baby, difficult baby. For the ITP, mothers were asked to consider their own and their husband's temperament, and to predict their infant's behaviour in the 15 situations; for the ITR, they were asked to report their infant's response in the 15 situations.

Each item was given a score of 1 (easy baby), 2 (medium baby), or 3 (difficult baby), and three overall scores were computed for each subject -- ITP sum score, ITR sum score, and ITP-ITR difference score.

C. Hospital Diary (Appendices D and E)

The Hospital Diary was used to assess the amount of mother-infant contact in hospital. It was developed as an attempt to verify the hypothesis put forth by medical researchers that the amount of mother-infant contact immediately after birth (Kennell, Jerauld, Wolfe, Chester, Kreger, McAlpine, Steffa & Klaus, 1974; Klaus, Jerauld, Kreger, McAlpine, Steffa, & Kennel; Klaus & Kennell, 1976; Ringler, Kennell, Jarvella, Navojosky & Klaus, 1975), and during the hospital stay (Leifer, Leiderman, Barnett & Williams, 1972) is an important variable which affects the course of maternal-infant bonding. The diary was designed with two sections: the first concerns contact with the infant right after birth and throughout the first 12 hours and is a series of questions concerning that period; the second concerns daily contact, i.e., the amount of time the infant stayed in the mother's room during each day of the hospital stay. In addition, some assessment of the daily activities of mother and infant was attempted (such as feeding, changing diaper, holding, arrival of father, nurse, etc.). The daily diary consisted of a grid of hours-by-activities, and subjects were asked to fill in the squares for the appropriate times and events.
D. Behaviour Record (Appendices F and G)

The Behaviour Record is an observational tool developed for recording mother-infant interactive behaviour in a naturalistic setting. Originally it was an open-ended, continuous recording system with pre-coded categories based upon the work of Clarke-Stewart (1973). In this system, a running record of maternal and infant behaviour is written by an observer into a stenographer's notebook with the pages divided lengthwise, one side for mother's behaviours, one side for infant's behaviours. Simultaneous behaviour is recorded on the same line and non-simultaneous behaviour is recorded on alternating lines. Time intervals are marked with a horizontal line across the page. This system was attempted and abandoned for four reasons. The most serious problem was that the system relies upon the observer's memory of the pre-coded categories, and it was found that it was possible to temporarily forget one or more categories in a given observation, thereby accidentally but systematically reducing the number of categories recorded and making it impossible to compare observations across subjects. It was felt that the Clarke-Stewart method would be workable if the observer were doing many observations over a short period of time, since repetition of the task would help retention of the categories in the observer's memory. As this was not the case in this research project, the system was found to be unsuitable. Second, the writing out of each behaviour observed, even in a coded form, was found to be very time-consuming, and thus a fairly large proportion of the behaviour exhibited by the mother and infant was missed while the observer was engaged in writing down the previous behaviours. Third, inter-observer agreement could not be obtained even after prolonged training, possibly as a result of the two problems mentioned above. Fourth, the task of accurately transcribing the raw data once it had been collected was extremely time-consuming, and reliability was difficult to achieve.
The recording system developed for this project was a time-sampling system based upon previous work of the present author (Lee-Painter & Lewis, 1975; Lewis & Lee-Painter, 1974). In the present system, the selected behavioural categories were printed on special observation sheets, and maternal and infant behaviours were merely checked off by the observer as they occurred. This was found to save time and preserve accuracy, as a trained observer needed very little time to locate and check off the behaviour as it happened and could be ready to record the next behaviour when it occurred. The time-base chosen for recording was fifteen-second intervals. This interval was chosen to be large enough for the observer to observe and record a number of behaviours, but small enough so that only a limited number of behaviours would occur within one time-frame. Thus both the rate and variation of behaviour for any individual mother-infant pair could be accurately recorded. The observation sheets (Appendix F) were printed to have 8 time-frames or the equivalent of two minutes of observational time per page. A small timer calibrated to fifteen-second intervals was used to time the intervals. The total observation time for each mother-infant pair was one hour, i.e., the observation period continued until the observer had collected data on 30 two-minute pages.

Using this system a given behaviour can be recorded as having occurred or having not occurred during any given fifteen-second period. Behaviour is recorded only once during a period, no matter how many times it actually occurred during that time-frame. Contingent maternal behaviour is recorded in a special section of each time-frame. The main element lost in this recording system is the indication of continuous behaviour. It is not possible to extract from the raw data whether a behaviour recorded in two consecutive time-frames was going on continuously for 30 seconds, or whether it occurred once during each of two consecutive fifteen-second recording periods with a
pause between the two occurrences.

Behavioural categories were chosen in a way that, it was hoped, would eliminate the problem of recording either molar or molecular behaviour, but not both, as had been the case in previous research. Global categories were chosen to reflect several possible dimensions of maternal bonding or adjustment, and individual behaviours were grouped under these global behavioural categories. As the focus of the research was the mother, more maternal behaviours than infant behaviours were observed and recorded. The five global categories of maternal behaviour included 28 individual behaviours, and the two categories of infant behaviour included 7 individual behaviours. Infant behaviours were chosen as an abbreviated catalogue of the one-month behavioural repertoire; they give an overall measure of infant activity, and also serve as anchors for maternal responsive behaviour. Infant behaviours chosen were focus attention, vocalization, grunt, gross motor movement, cry-fuss, smile and miscellaneous (yawn, burp, etc.).

Maternal behaviours were chosen to reflect qualitative differences among the global categories, to differentiate time spent in caregiving tasks from that in non-caregiving interactive behaviour, and to evaluate various behaviours used in previous research. A list of behaviours and definitions is included in Appendix G. The global categories and their subsumed behaviours were:

I. Physical contact:
   close physical contact (in arms or on shoulder)
   loose contact
   infant held in mother's lap
   infant held securely away from mother's body

II. Social engagement:

   Visual engagement: mother holds her face so that her eyes and her infant's eyes are in the same plane ("en face")
   eye to eye contact
Vocal engagement:  
- mother vocalizes to infant
- mother requests responsive smile or vocalization

Tactile engagement:  
- mother touches infant with fingers
- mother pats or strokes infant with palm of hand

Play engagement:  
- mother smiles at infant
- mother plays with infant with or without object
- mother makes a "play face" or exaggerated face at infant

III. Provide stimulation:  
- visual stimulation
- auditory stimulation
- tactile stimulation
- vestibular stimulation

IV. Affection:  
- mother kisses infant
- mother uses infant's name
- mother uses a nickname

V. Caregiving:  
- mother feeding infant (breast or bottle)
- mother begins feeding
- mother interrupts feed
- mother changes infant's clothing, diaper or gives bath
- mother adjusts infant's position, clothing, etc.

VI. Contingent response:  
- all maternal behaviour which is recorded as being contingently responsive to an infant's behaviour

E. Postpartum Questionnaire (Appendix Q)

The Postpartum Questionnaire was designed to gather information about seven areas of concern in the postpartum period; as in the Prenatal Questionnaire, most of the items were in the form of five-point Likert type scales. The areas assessed were: (a) postpartum physical condition of mother and infant; (b) mother's experiences in hospital during labour, delivery and postpartum stay; (c) mother's perception of support of husband during labour and delivery and infant care; (d) mother's self-confidence in caregiving; (e) mother's caregiving routines; (f) mother's report of her relationship with
her infant; and (g) mother's perception of the role of the infant in her life. Several of these sub-scales are related to sub-scales on the Prenatal Questionnaire and were included both for the information they would yield about the postpartum experience and to determine whether there is continuity between the prenatal and postpartum periods with regard to topics such as perception of husband's support, confidence in caregiving, perception of the mother-infant relationship and the role played by the infant in the mother's life.

F. Maternal Rating Scales (Appendices H and I)

A set of 18 subjective rating scales which were developed by Ainsworth (1977) for use during the first quarter of the infant's first year were included in order to have a molar assessment of maternal attitude, emotional involvement and maternal perception of infant capabilities. They are in the form of nine-point Likert-type scales, and are filled out by the observer after the one-month postpartum visit, with the assistance of a manual provided by Ainsworth (Appendix I) which describes in detail five anchor points for each scale. The 18 rating scales fall into seven general areas: A. General attitude of the mother toward her infant and toward her own role as mother: (a) mother's perception of infant, (2) mother's delight expressed toward infant, (3) mother's acceptance of infant and the demands of infant care, (4) mother's ability to provide information about the infant; B. Feeding: (1) mother's synchronization of feeding times with infant's own rhythms, (2) whether mother or infant determines the amount of food given and the end of a feeding session, (3) mother's synchronization of rate of feeding to infant's own pace; C. Availability and Interaction: (1) mother's physical and psychological availability to infant, (2) amount of interaction offered to infant by mother, (3) appropriateness of mother's interactions with
infant; D. Physical contact: (1) amount of physical contact between mother and infant, (2) quality of mother's physical contact with infant; E. Mother's effectiveness of and latency to respond to infant's crying; F. Social contact: (1) amount of visual contact with mother and environment, (2) amount of auditory and vocal contact with mother and environment, (3) frequency of play interaction provided by mother; G. Facilitation of sensorimotor development: (1) stimulus potential of the physical environment, (2) mother's encouragement of sensorimotor achievement.

In addition to providing a measure of maternal functioning, these scales were included to lend validity to the observational measurement of similar behaviour and behavioural patterns (e.g. amount of play, amount of visual or vocal contact, or amount of stimulation provided).

G. Chart Variables (Appendix J)

Information was taken from the subjects' hospital charts in order to determine whether there is a relationship between maternal behaviour at one-month postpartum and such variables as length of labour, type of delivery, perinatal medication and infant outcome. The variables used were: length of labour, stimulation of labour, type of delivery (vaginal or caesarian section), mechanical intervention such as use of forceps or artificial rupture of the membranes, medical intervention such as use of analgesia or anesthesia, infant's gestational age, infant's birthweight, Agpar scores at one and five minutes, infant outcome (whether the infant went to the regular or intensive care nursery following delivery), and post-delivery medication for mother or infant.
RESULTS AND DISCUSSION

The results obtained for each of the various instruments used, and the relationships among the variables assessed with those instruments were both of interest. As the main purpose of the research was the evaluation of methods rather than hypothesis testing, each instrument will be treated in turn. For each instrument the results will be described and used as a guide for making an assessment of that instrument; this will be followed by a discussion of the strengths and weaknesses of that instrument and recommendations for changes for future use. Unless otherwise noted, the results are for the Core group of subjects (n = 27) on which all instruments were tested.

A. Prenatal Questionnaire (Appendix A)

(Note: Specific items on the Prenatal Questionnaire will be referred to by a shorthand system indicating the appendix letter and item number. For example, question 10 in the Prenatal Questionnaire will be referred to as A:10.

All scales used were five-point, Likert-type scales. When two points are mentioned, the first is rated 1, and the second is rated 5; when three points are mentioned, the first is rated 1, the second (midpoint) is rated 3, and the third is rated 5.)

The Prenatal Questionnaire was constructed on the basis of eight areas of interest which were assumed to be related to both perinatal and postpartum variables, and to be themselves interrelated.

1. Feelings toward pregnancy were evaluated using three groups of items.

   (a) The emotional and physical accompaniments of pregnancy (A:1) were assessed by having subjects rate their overall feelings on 7 five-point scales which had the following pairs of anchor points: "very energetic"-"very tired"; "very relaxed"-"very anxious"; "very comfortable"-"quite uncomfortable";
"content"-"impatient"; "elated"-"depressed"; "very happy"-"very unhappy"; and "curious"-"bored". The midpoints for all scales were labelled "normal for me". For the first five scales, subjects actually used all five points to describe themselves; for the last two scales, subjects used only the first three and the first four points, respectively. Subjects rated themselves as normally relaxed ($\bar{X}=2.7$), comfortable ($\bar{X}=2.8$), content ($\bar{X}=2.5$) and elated ($\bar{X}=2.7$); fairly tired ($\bar{X}=3.4$); quite happy ($\bar{X}=1.9$) and fairly curious ($\bar{X}=2.2$). Correlations among responses to these items are shown in Table 2. Report of feeling content was positively related to report of feeling relaxed, happy and comfortable ($r=.52$, $p<.01$; $r=.43$, $p<.05$; $r=.49$, $p<.01$ respectively) and report of feeling elated was positively related to feeling energetic, happy and content ($r=.43$, $p<.05$; $r=.51$, $p<.01$; $r=.42$, $p<.05$ respectively).

There are at least four possible explanations for the tendency to self-report as "normal for me" on these scales. (1) This response may accurately reflect the subject's feelings. (2) This response may reflect a wish to be seen as "normal" and without special problems (i.e., "normal" is the socially desirable response). (3) This response may reflect a wish to be normal, and the hope that a normal pregnancy will result in a normal baby. Or, (4) this response may be an artifact of scale construction, reflecting a natural tendency of subjects to rate themselves in the middle of a scale. Notes made by the investigator following the prenatal interview indicated that many women expressed boredom with their pregnant condition, and impatience to give birth. Yet they did not rate themselves as even moderately impatient or bored on these scales. The Questionnaire group ($n=110$ additional subjects) showed the same tendency to report "normal for me" on these scales. Whereas Core subjects used only three and four scale points to describe themselves on two of the three scales ("very happy"-"very unhappy"; "curious"-"bored"),
Questionnaire subjects used all five points on all scales, although only two of these subjects rated themselves as very unhappy (i.e., used the last point on the scale), nine rated themselves as unhappy (i.e., used the second to last point), and only five rated themselves as bored (used the last point on that scale). The data available do not give adequate information to decide what may be causing the tendency to report "normal for me" on these scales. (It is perhaps worth noting that in his revised temperament scale Carey avoided the problem of midpoints by using 6-point scales (Carey, 1978).)

(b) Physical problems during pregnancy were recorded using a checklist (A:2) and a total score and a scaled score based upon the seriousness of the problem(s) were derived. The problems reported and number of subjects reporting each problem are shown in Table 3. The number of problems reported by any one subject ranged from 0 to 6, with the mean greater than 2 ($X=2.4$). Seriousness of problems were scaled as follows after consulting with a health care worker (Davidson, 1977b): score = 1 for mild problems only (insomnia, fatigue, fluid retention); score = 2 for mild and/or one moderate problem (morning sickness, anxiety, varicose veins, back or leg problems); score = 3 for mild and/or two moderate problems; score = 4 for mild and/or three or four moderate problems; score = 5 for one or more serious problems (high blood pressure, bleeding, diabetes, toxemia, kidney problems). The obtained scaled scores ranged from 1 to 5, with the mean at 2.4.

(c) The third set of prenatal questionnaire items concerned with feelings toward pregnancy involved assessment of changes in feelings toward pregnancy (A:18-20, 26). Three five-point rating scales ("very happy"-"very unhappy" with "mixed feelings" as midpoint label) were used to describe feelings at first (upon learning of pregnancy), later (when the subject became used to the idea) and now last trimester). Subjects also described whether the pregnancy was planned ("definitely planned"-"completely unexpected"), and
whether the pregnancy had caused a change in the subject's life style ("a great deal" - "not at all"). Significant correlations among these items are shown in Table 4.

Subjects rated themselves as moderately happy upon learning of their pregnancy ($\bar{X}=1.96$), and very happy both when they became used to the idea ($\bar{X}=1.3$), and during the last trimester ($\bar{X}=1.2$). Subjects only used the first three points of these three scales to describe their feelings toward pregnancy. The modal report was that the pregnancy was definitely planned, although 4 of the 27 subjects reported that it was "completely unexpected", and 3 others reported that it was somewhat unexpected. Subjects reported moderate changes in their life style as a result of the pregnancy ($\bar{X}=2.7$). The tendency toward "happy" ratings was confirmed by the Questionnaire group, as was the distribution of planning, although more unexpected pregnancies were reported: 23 out of 110 reported that the pregnancy was "completely unexpected". Greater changes in life style were also reported by the Questionnaire group: 32% used the last two points on the scale (indicating the greatest amount of change) to describe the change in their lives, compared to only 18% of the Core group.

It is curious that, whereas over one-quarter of the Core subjects reported that the discovery of the pregnancy was unexpected, not one rated herself as very unhappy or moderately unhappy upon learning of this. Although the socially desirable "very happy" was expected as the report of present feelings, the items regarding feelings at first and later were deliberately included in order to learn about subjects' initial reactions. Three possible explanations for this situation come to mind. The sample might have been biased, i.e., only women happy with their pregnancy volunteered to take part in this study. Or, perhaps women who discover an unwanted first pregnancy may choose to have an abortion, thereby reducing the number of unhappy primiparous women
who might have been potential subjects. A third possible explanation is dissonance reduction, i.e., by the end of their pregnancy, even women who were unhappy at first have reconstructed their initial feelings to be more compatible with the unalterable fact that they are soon going to have a baby. There is some support for this explanation in the prenatal interview data: one subject who said in the interview that she had been distressed to find herself pregnant only a month after her marriage rated herself on the questionnaire as only having "mixed feelings" when she first learned of her pregnancy.

The fact that five percent of the Questionnaire group reported themselves to have been "very unhappy" at first but none described themselves as "very unhappy" later, or in the third trimester, may be seen as lending support for the explanation that sample bias may be affecting the data. That is, the fact that a greater number of Questionnaire group subjects did report feeling "very unhappy" at first may indicate that the two samples were drawn from different populations. However, the lack of group differences in responses to nearly every other item in the Prenatal Questionnaire argues for another explanation. Social desirability may have contaminated the data from the Core group. That is, Questionnaire subjects may have felt free to report their true feelings because their participation was completely anonymous; however, Core subjects filled out their questionnaires knowing that a researcher who would be coming to visit them would be likely to look at their responses and perhaps inquire about them. Thus they might have been more likely to give socially desirable responses to questions concerning their feelings about their pregnancy.

2. The second of the eight areas of interest explored by the Prenatal Questionnaire was the support of the husband as perceived and reported by the subjects. It was the subject's perception of support available, rather than
the actual support offered or reported by the husband, which was under study. Four sets of items were used to assess this perceived support: the husband's attendance in prenatal classes, his plans to be present at the birth, his feelings toward pregnancy, and his intention to become involved with infant care.

(a) **Prenatal class attendance** (A:9-10). At least one prenatal class was attended by all but one husband (whose wife, a professor of physiology, also did not attend any classes), and although husbands generally attended fewer classes than wives, half of them attended all classes given in the course in which the couple had enrolled.

(b) **Husband's feelings toward the pregnancy** (A:23-25) were measured in the same way as for wives, i.e., three five-point scales for at first, later, and now (third trimester), anchored as "very happy"-"mixed feelings"-"very unhappy". Wives perceived their husbands' feelings as more positive than their own at first ($\bar{X}=1.8$) and as similar to their own later ($\bar{X}=1.3$) and now ($\bar{X}=1.3$). Again only the first three points of these scales were used. Correlations among items measuring wives' and husbands' feelings were all greater than .53 ($p<.01$), and having planned the pregnancy was related to wives' perceptions of positive feelings for their husbands as well as for themselves (all $r$'s greater than .44, $p<.05$; see Table 4).

(c) Almost all husbands were planning to attend labour ($n=26$) and delivery ($n=24$) (A:34-36). On a five-point scale ("quite enthusiastic"-"willing"-"not very enthusiastic") 14 wives reported their husbands to be quite enthusiastic about attending the birth, six were reported as enthusiastic, five as willing and one as unenthusiastic. Husbands' involvement with the birth and enthusiasm for doing so were related to the number of classes husbands had attended (lowest $r=.43$, $p<.05$; see Table 5).

(d) Most husbands ($n=24$) were perceived as being **interested in becoming**
involved with infant care (A:40-41). Wives judged their husbands' preparation for this task on a five-point scale ("very well-prepared"-"very unprepared"): one was reported to be very well-prepared, nine were reported as prepared, fifteen as somewhat prepared (midpoint of scale), one as unprepared and one as very unprepared. Husbands' interest in infant care and judged preparation were correlated with the number of classes attended by wives (lowest $r=.52$, $p<.01$; see Table 5), but not to the number of classes attended by husbands, which makes sense if we recall that it is the wives' perceptions which are being measured.

In future research, information concerning husbands' feelings, attitudes, and behaviour should be obtained directly from them rather than only from their wives. For one thing, there appears to be an emphasis in the local prenatal classes upon involvement of the husband or partner, and several subjects and their husbands expressed surprise (and perhaps offence) at the fact that this research project did not directly involve the husband in either questionnaires or interviews. As social norms have changed with regard to male and female roles, expectations about the role and activities of fathers have also changed, and these changes should be reflected in research. Aside from this, the problem of receiving only socially desirable information is compounded by the fact that wives may feel it is socially desirable for their husbands to have the same feelings and attitudes as they have. In addition, wives may be invested in seeing their husbands' attitudes and feelings as similar to their own. A separate instrument constructed and tested for husbands to use would be useful in this kind of research, both as a measure of actual support available and as a measure of possible discrepancy between wives' perceptions and husbands' actual attitudes, feelings and intentions. In any case, the items included in the Prenatal Questionnaire do serve as a measure of the extent to which wives perceive their husbands as supportive.
3. **Subjects' experience in prenatal classes** was the third area of interest in the Prenatal Questionnaire. This was measured in terms of number of classes attended, satisfaction with classes and topics covered, report of how much was learned and how many recommended books were read (A:6-14). All but one subject attended prenatal classes, and eighteen out of the twenty-six went to all the classes offered in the course they took. As subjects reported it, the topics covered in the classes, e.g., physiology, exercises, information about newborns, information about child care, and nutrition, were fairly uniform. Seven subjects listed at least one topic they felt should have been covered which was left uncovered. Some of these were birth control, infant development, marital adjustment, difficult deliveries, caesarian section and birth problems. The topic most often mentioned as inadequately covered was child and/or infant care. Fourteen subjects reported they were very pleased with the classes, three were pleased, five were less than pleased, two were disappointed and one was very disappointed. Ratings of how much they had learned ("learned a lot"-"learned very little") were identical to expressed satisfaction for 20 subjects, and varied by only one point for the remaining six. Eighteen subjects reported having read at least one book suggested in the classes (a list of the books read is included in Appendix R). It is noteworthy that subjects reported being generally quite pleased with their classes prior to the birth of their infants, but notes from the postpartum interviews conducted later uniformly indicated that these mothers felt very unprepared for infant care, and felt that the classes should have given more information about taking care of the infant once s/he was born. One subject complained, "They acted as if THE BIRTH was the end, rather than the beginning!" Despite this hindsight perspective, the questions in the prenatal questionnaire appear to have been adequate for assessing subjects' experience in the classes and their satisfaction with them in the last trimester of
pregnancy.

4. Subjects' preparation for labour and delivery was the fourth area of interest in the prenatal Questionnaire, and was measured by three sets of items.

(a) Subjects were asked to rate their expectations of labour and delivery on a five-point scale ("easy"-"difficult") (A:30). Eleven subjects reported expecting their labour and delivery to be easy or fairly easy, twelve as neither easy nor difficult, and four as fairly difficult or difficult. In the future, questions regarding specific concerns about the birth should be included for a more complete picture of these kinds of expectations.

(b) Responses to three items concerning the use of drugs during labour and delivery, and requests for special hospital arrangements (A:31-33) showed that twenty-two subjects had discussed the use of drugs with their physicians and nine felt they would leave the decision up to their doctor. Leaving this decision to the doctor was found to be negatively correlated with satisfaction about and amount learned in prenatal classes ($r=-.88$, $p .01$, and $r=-.66$, $p .05$, respectively). Eighteen subjects planned to use no drugs during the birth or to use drugs only if necessary, and four reported that they would probably or definitely use drugs during labour and delivery. No questions were asked concerning the subject's information about the effect of perinatal medication on the infant or on the mother. This was not listed by subjects as a topic covered by prenatal classes, nor was it listed as a topic subjects felt should have been covered. Future questionnaires should include items on this topic as an additional indication of the thoroughness with which subjects prepare themselves for the birth experience.

(c) Twenty-six subjects planned to have a partner with them during labour and twenty-four planned for a partner during delivery; all indicated that their husband would be their partner (A:34-35).
Although the items used to assess preparation for birth showed low response variation (standard deviations ranged from .13 to .89), notes from prenatal interviews indicated that during the last trimester, most subjects were looking forward optimistically to the birth both as an end to the waiting period of pregnancy and as an opportunity to see whether the information they had learned in their classes would be useful. In postpartum interviews, most subjects expressed the view that they had been very unprepared for their labour and delivery experiences and had greatly underestimated both the prolonged effort required and the intensity of the pain involved. They indicated that the focus of the prenatal classes was on the "ease" of childbirth and that the more unpleasant aspects were dealt with only briefly. An alternative explanation of the discrepancy between prenatal and postnatal reported satisfaction with prenatal classes may be that subjects selectively attended to the information given in the classes, and chose to listen to, or remember, only the information which confirmed their expectations. Playing down the difficult aspects of the birth experience appears to be a technique on the part of prenatal class curricula for avoiding the creation of a negative self-fulfilling prophecy wherein fear and fear-related physical tension lead to greater pain and suffering and in some cases, prolonged labour and difficult delivery. However, subjects seemed to feel in retrospect that this "slanting" of the classes contributed to unrealistic expectations of childbirth and possibly to a feeling of failure for those women who were unable to continue without drugs to combat the pain and exhaustion. In any case, the questions on the prenatal questionnaire regarding preparation for the birth experience, like the questions concerning prenatal classes, appear to be adequate for assessing last-trimester attitudes and expectations and are useful for comparison with actual experiences in longitudinal research.
5. Subject's confidence in their caregiving ability (A:39) was assessed on a five-point scale ("very well-prepared"-"very unprepared"). Eleven subjects felt they were very well-prepared, nine felt they were prepared, and six felt they were only somewhat prepared. It is interesting that only the first three points of this scale were used by subjects to describe themselves, indicating that they felt generally confident. However, as was noted earlier, in subsequent postpartum interviews mothers described themselves as feeling quite unprepared for caregiving responsibilities. On another scale ("a lot of experience"-"no experience"), seven subjects indicated they had a great deal of experience with young children or infants, eight reported some experience, six reported only a moderate amount, two little and two none (A:57).

(b) Subjects were asked about their ability to understand and respond to signals their infant might use to communicate his or her needs (A:47). In a free-response format, fourteen subjects indicated they thought their baby would communicate by crying and/or fussing only, seven suggested crying and other signals such as facial expressions or noises, and two mentioned only ways other than crying. Four prospective mothers felt they would be unable to understand their infant's signals. Responses to an item concerning subjects' anticipated ability to calm a crying baby (A:48) showed that eight indicated they would do so by picking up or holding the baby, thirteen said they would cuddle or give affection to the baby, and three gave abstract responses, such as "make the baby more secure". Three subjects felt they would not know how to be effective in quieting a crying infant; two of these women had also felt they would be unable to understand their infant's signals.

6. The projected role of the infant in the mother's life was the sixth area of interest investigated by the Prenatal Questionnaire. It was assessed by four sets of items concerning the subjects' jobs and plans to return to work, anticipation of needing help at home after returning from hospital, projected
image of the infant, and anticipated changes in the mother's life caused by
the infant's existence.

(a) Work/school plans (A:15-17). Four subjects were still working or
going to school when interviewed prenatally, twenty had previously worked or
gone to school but had stopped at some point during their pregnancy, and three
had not worked or gone to school prior to the pregnancy. All who were still
working or going to school (A:4) reported that they planned to return; of
the twenty who had already stopped work or school, twelve planned to return.
Ten of these and all of those still working planned to return to work or
school within the first nine months of their infants' lives. A correlation
of -.49 (p<.01) between wives' Hollingshead occupation scores and the infant's
age when subjects planned to return to work (A:17), indicated that those
women who planned to return to work soon after the infant's birth had jobs of
higher status. Higher status jobs may be related to a stronger commitment to
the job or to career goals, which could account for these women's desires to
return to their work as soon as possible. Unfortunately, no questions were
included which covered child-care arrangements so no assessment of the extent
and adequacy of the mother's plans could be made.

(b) Anticipation of needing help at home (A:42-44). Subjects generally
felt they would need help at home (only seven felt they would need no help at
all), but although twenty thought help would be required, only fifteen had
even discussed arrangements for help. These fifteen subjects mainly anticipated
a visit from a mother or mother-in-law for a short period of time. Although
all who had arranged help indicated they were "very pleased" or "pleased"
with the arrangements, at least one subject confided at the interview that
she was not looking forward to her mother-in-law's visit at all, and had the
feeling that her mother-in-law would want to look after the baby and leave
the cooking and housecleaning to her. Material from postpartum interviews
indicates that the question of needing help after the baby arrived is another case of foresight versus hindsight: at one month postpartum, most women said they had failed to anticipate how tired they would be, how unable they would be to do anything but look after the baby, and how much they could have used help or were grateful for the help they did have during the first few weeks.

(c) Subjects' image of their expected infant was assessed by three items. On a five-point scale indicating sex preference ("really want a boy"-"no preference"-"really want a girl") (A:27-28), twenty expressed no preference and of these, thirteen reported their husbands also had no preference. Not one subject expressed "really wanting" a girl, and only two "preferred" a girl. Five subjects "really wanted" a boy. Hoffman (1977) reports a similar pattern of preference for males among prospective parents in the United States. Twenty-one of the couples in the present study had already chosen names for their infant.

Twelve subjects reported having a quite clear picture of what it would be like to have a baby ("quite clear"-"somewhat hazy"-"quite unclear") (A:46). Fourteen reported a clear or somewhat hazy picture, and one felt she had a quite unclear picture. Having a clear picture of what it would be like to have an infant was found to be positively correlated with the number of prenatal classes attended by wives and husbands (lowest r = .41, p < .05), and the extent of preparation for infant care for both parents (lowest r = .42, p < .05).

(d) Anticipation of life changes and restrictions due to infant (A:59, 62). Subjects rated the extent to which they anticipated that the baby would restrict their lives on five-point scales ("a great deal"-"not at all") (A:59). With regard to school or work restriction, seven reported anticipating at least some restriction and eight reported anticipating little or no restriction; with regard to their social lives, five reported anticipating
a great deal of restriction, fifteen at least some restriction and seven little or no restriction. The correlation between anticipation of work restriction and a social restriction was not significant. When asked about the extent to which they anticipated changes in their marital relationship due to the baby (A:62), three anticipated a great deal of change, nine anticipated at least some change and fifteen anticipated little or no change. Of those who did anticipate some change, six anticipated positive change, such as being brought closer together, seven anticipated negative change, such as having less time for each other, and four anticipated mixed change.

7. **Arrangements for child care** was the seventh area of interest explored by the Prenatal Questionnaire, and was assessed by items asking about plans and arrangements for the new baby and about the number of books read. Eighteen subjects planned to breast-feed, two planned to bottle-feed and seven planned to use both breast- and bottle-feeding (A:45-46). All those who planned to mix breast- and bottle-feeding were also planning to return to work or school. At the time of the prenatal interview, twenty-two had already arranged a room or space for the baby, twenty-four had clothing ready for the baby, twenty-one had furniture for the baby and fourteen had acquired toys for the baby (A:52). Twenty-three had read at least one book and ten of the twenty-three had read at least five books in preparation for the new baby (A:54). These questions would seem adequate to assess some aspects of prenatal preparation. Again, the question of how well-prepared a subject actually was to deal with the problems that arose in learning to care for her infant were largely unanticipated at the time of the prenatal interview, and the adequacy or inadequacy of preparation, which was rarely a matter of having the proper equipment, became evident only later.

8. **Subjects' prenatal involvement with and prediction of parent-infant attachment** was the eighth area explored by the Prenatal Questionnaire, using
two sets of items.

(a) Plans for mother-infant contact in hospital. On a five-point scale ("very much"-"undecided"-"probably not"), twenty-one subjects indicated that they wanted to have their infant with them right after the birth, four were undecided, and two felt they would not want to have the baby with them. \( (A:38) \). On another scale ("as much as possible"-"about half the time"-"only for feedings"), eighteen subjects indicated their wish to have their infant stay in their hospital room a great deal of the time, eight wanted the infant with them only some of the time, and one wanted the infant with her only for feeding (\( A:37 \)). The wish to have the infant stay in the mother's hospital room was positively correlated with having a clear picture of the infant (\( A:46 \) \( r = .63, p < .01 \)).

(b) Subjects were asked to predict the course of their relationship with their infant by stating when they thought mother-infant and father-infant relationships would develop (\( A:49-51 \)). Twenty reported they had already developed a strong feeling for their infant, two predicted they would do so at birth, four said they would within two weeks after birth, and one by a month after birth. In contrast, three felt their baby had already developed strong feelings for them, twelve thought those feelings would develop during the first two weeks of the infant's life, five thought they would develop during the first month, four by three months and two not until six months or later; one was unable to predict when her infant would develop a strong feeling for her. Seven subjects felt the baby would develop a strong feeling for its father during the first two weeks of life, nine by a month, four by three months, three by six months and two later than six months; two were unable to predict. Only nine subjects predicted that mother and infant would develop strong feelings for one another at the same time; all the others thought the baby would come to feel close to them later. Eight felt the relationship would
be in balance in terms of mutual feelings by two weeks postpartum, but four thought the process would take a month, three thought it would take three months and two thought six months. Thirteen subjects felt their infant would develop strong feelings for mother and father at about the same time, and all others thought the baby's feelings for the mother would come first. Subjects' prediction of the infant's early attachment to mother and father was correlated with having a clear picture of the infant (lowest $r=.45, p<.05$), with a low scaled score for physical problems experienced during pregnancy ($r=.45, p<.05$) and with a greater number of prenatal classes attended by mother and father (lowest $r=.49, p<.05$). Mother's prediction of early attachment to the infant was positively correlated with her feelings of self-confidence in her preparation for infant care ($r=.41, p<.01$).

The fact that many mothers do not feel their infants will reciprocate their strong feelings soon after birth may be helpful in predicting later difficulties in adjustment.

B. Factor Analysis of Prenatal Questionnaire

Using all available subjects ($n=137$: 27 from the Core group plus 110 from the Questionnaire group), forty items from the Prenatal Questionnaire which had the greatest variance were included in a factor analysis (see Table 6). A minimum residual solution was computed for the correlation matrix with squared multiple correlations as original communality estimates on the diagonal (original and final, iterated communalities are provided in Table 6). The number of factors was determined on the basis of the number of eigenvalues of the decomposed correlation matrix which were greater than 1 (Table 7), and was confirmed by a scree plot. The matrix of residuals using this solution showed no values greater than .18. Ten factors were taken out and a Varimax rotation was performed, resulting in an orthogonal solution. The proportion
of the variance accounte for by each factor is provided in Table 7. The rotated factors and the variables loading on each factor are presented in Table 8.

Although ten factors is a large number to take out of a correlation matrix consisting of forty variables, there is actually no theoretical reason to expect any particular number of factors from these data. As shown in Table 6, Factor I, "Initial Reactions to Pregnancy", accounts for both wives' and husbands' feelings upon learning of the pregnancy and whether the pregnancy was planned. Factor II, "Husband", accounts for the subject's perceptions of her husband's subsequent feelings regarding the pregnancy and his preparation for and intention to become involved in infant care. The mother's wish to keep her infant in her hospital room after the birth, which loads on this factor, may indicate a general positive feeling toward the infant and a wish to be involved with him or her which is in part based upon the support she feels she has and will have from her husband.

Factor III, "Present Feelings", accounts for the subject's later feelings toward the pregnancy, her prenatal feeling of attachment to her infant and her curiosity to actually see her baby. Factor IV, "Physical Feelings", accounts for the physical problems experienced during pregnancy, the accompanying emotional feelings of being content, relaxed and comfortable associated with fewer problems, and the relationship of these to projected expectations of labour and delivery. The age of the mother loads negatively on this factor, indicating either an older woman with fewer physical problems and more positive emotional feelings, or a younger woman with a greater number of problems and more negative feelings. Possibly the presence of the variable, number of books read, can provide an explanation for this seemingly counter-intuitive combination of variables (maternal age and physical problems). It may be that older women, who have augmented their greater general experience with
information from books they have read, have tended to downplay their physical problems, believing them to be a normal accompaniment to pregnancy. Such women might be less likely to even report these problems, and would feel emotionally positive about the pregnancy in spite of difficulties. The younger woman with less experience and also less information from books (having actually read fewer books), might not have realized that various physical problems are quite normal during pregnancy, and therefore these problems would tend to assume a greater importance in her assessment of her pregnancy: she might be more likely to report a given problem, and these problems might be more likely to influence her emotional feelings as well. Alternatively, older women may have taken better prenatal care of themselves because of advice and information gained from the books they read, and might actually have had fewer problems during their pregnancy.

Factor V, "Experience in Prenatal Class", accounts for subjects' feelings about the prenatal classes they attended, in terms of the amount they felt they had learned and their general satisfaction with the classes. Factor VI, "Family Attachment", accounts for predicted infant attachment to mother and to father, and the mother's anticipation of her husband's support during labour and delivery. This factor appears to indicate a general expectation of family members' attachment and closeness to one another. Factor VII, "Expectations of Child Care", relates maternal education level to having a clear picture of what it would be like to have an infant, to experience with young infants, to anticipation of needing help and to self-confidence in ability to care for an infant. In this factor, a lower level of education is related to what might be called a naive picture of the approaching situation: the assertion of having a clear picture of what it will be like to care for an infant in spite of having little experience with young infants, a denial of the need for help at home after the birth, and perhaps an over-confident assessment of
caregiving ability. The more highly educated woman, then, has a less clear picture, perhaps because of more experience with infants and some knowledge of their variability; this experience possibly resulted in an expressed need for help and a less confident assessment of caregiving ability.

Factor VIII, "Work Plans", accounts only for plans to return to work or school after the birth of the infant. Factor IX, "Anticipation of the Future", accounts for the anticipated restriction of future work and social life with the arrival of the infant, accompanied by anticipated changes in the marital relationship also due to the infant's arrival, in spite of energetic feelings at present and few changes in life style caused by the pregnancy. Factor X, "Living with Baby", accounts for the wish to have the infant stay in the mother's hospital room, a lack of concern about spoiling the baby, maternal confidence that the baby will be able to communicate with her, and the number of books read which were suggested by prenatal classes.

Although the factor analysis of the Prenatal Questionnaire did confirm the notion that there were separate aspects of prenatal attitudes and expectations, it did not confirm the intuitive grouping of items hypothesized a priori to reflect those attitudes and expectations. It is possible that, since the number of variables entering the factor analysis was restricted because of the number of subjects available, a true picture of the Prenatal Questionnaire was not obtained. In any case, it would appear that the use of a factor analytic technique did not contribute much additional information to that obtained from correlational analysis of the questionnaire alone.

C. Infant Temperament Prediction and Report (Appendices B and C)

The Infant Temperament Prediction was developed to be a measure of the mother's prenatal expectation of infant behaviour and consists of prediction on fifteen items concerned with infant response to specific situations,
activities and events. The Temperament Report, which consists of the same fifteen items, is a measure of the infant's temperament as perceived by the mother at one month postpartum. Because there are no established temperament instruments for use with very young infants with which the ITP and ITR could be compared, the coefficient alpha (Cronbach, 1974) was used to assess the internal consistency of the instruments, that is, as an indication of how well any given item was related to the total instrument.

Coefficient alpha for the ITP was .55, for the ITR, .05, indicating that internal consistency, while somewhat higher for the Prediction than for the Report, was generally low for both. This is interpreted to mean that the items making up the instruments are reflecting more than one underlying factor and that both predicted and perceived temperament are multi- rather than uni-factorial.

The results of the ITP showed low between-subject response variation: for ten of the fifteen items, half or more than half the subjects chose the same response; for the remaining five items the responses were fairly evenly split between two of the alternatives with very few or no subjects choosing the third (Chi-squares are reported in Table 9). Prenatal subjects generally predicted a baby who would be fairly easy to care for, who would adapt to a convenient schedule of sleeping, waking and feeding (B:1-3) who would give clear signals as to his/her needs (B:5-6), who would enjoy caregiving activities such as changing and bathing (B:7-8), be active and alert to the stimulation provided by objects and people (B:9-10),12,14), but be self-regulating (B:4) and generally guided by his/her own mood (B:11,13,15). During the prenatal interviews many subjects laughingly indicated that they had filled out the ITP to describe the baby they "hoped for", and it would appear that the internal consistency of this instrument (i.e., alpha=.55) is a reflection of this general optimism which seems to be shared by expectant parents. The
fact that some of the characteristics the parents want or expect in an infant are incompatible with one another, e.g., to adapt to a schedule but to regulate his or her own behaviour, does not deter them from hoping for the "best of all possible worlds."

The extremely low alpha associated with the ITR appears to reflect the multi-factor character of infant temperament as perceived by parents. Thirteen out of fifteen items had one alternative chosen significantly more often than the other two alternatives (Chi-squares provided in Table 7). For seven of the items the middle alternative was chosen, for four items the alternative indicating the "easy" infant was chosen more often and for only two, the alternative indicating the "difficult" infant was chosen more often. The fact that only a chance number of intercorrelations for this instrument were significant lends support to the notion that infant temperament is perceived and reported by parents to have many facets.

All cross-correlations between the same items as predicted and as reported were non-significant. This would indicate that parents were unable to accurately predict their infant's temperament or response to various situations. It is reasonable that this should be the case, as most parents expecting their first child would have very little idea of what living with an infant would be like. However, it will be recalled that 70% of these subjects felt they had a "quite clear" or "clear" picture of what it would be like to have a new baby (Prenatal Questionnaire A:56). The results of the ITP show that they do indeed have a clear picture, but it is very idealized, and not borne out in reality.

D. Chart Variables (Appendix J)

Information gathered from hospital charts gave a profile of labour and delivery experiences and infant outcome. Descriptive statistics will be
included here, and correlations with other variables will be discussed in later sections. For some variables, chart information was available for only twenty-six of the twenty-seven subjects.

The average length of labour was twelve hours, seven minutes, resulting in twenty-two vaginal deliveries and five caesarian sections, a proportion which reflects the current rate of caesarian section in local hospitals (Kayce, 1978). Five subjects had stimulated labour, four by an artificial rupture of the membranes, and two by injection with pitocin. Thirteen of the twenty-two vaginal deliveries involved the use of forceps. Seventeen subjects had analgesia administered to them, and for twenty-three, some type of anesthesia was used: eight had local anesthesia (mostly for episiotomy repair), eight had regional anesthesia (e.g., epidural) and seven had a general anesthetic (the five caesarian sections and two other subjects). Thirteen males and fourteen females were born; seventeen of the infants went to the regular nursery on the maternity floor, and ten went to the Intensive Care Nursery (the five caesarian sections and five others). Apgar scores at one minute ranged from 4 to 9; the mean score was 7.5. Twelve infants had scores of 7 or less, fourteen had scores of 8 or 9. Apgar scores at five minutes were 8 (n=4, 9 (n=16) and 10 (n=6); the mean score was 9.1. Infants taken to the Intensive Care Nursery were kept there an average of 30.5 hours (range: 12-72 hours). The average hospital stay was 5.7 days (range: 4-7). All mothers went home with their infants; one mother had a post-partum hemorrhage after returning home which resulted in her subsequent hospitalization and separation from her infant for several days.
E. Hospital Diary (Appendices D and E)

The hospital diary as used to assess the amount of contact mothers had with their infants immediately following delivery and during the hospital stay. Descriptive statistics will be included here; correlations with other variables will be discussed in later sections. Diary information was obtained from nineteen subjects but because not all subjects provided complete information, for certain variables diary data are available for fewer than nineteen subjects.

Thirteen of the subjects held their infants right after birth and five breast-fed on the caseroom table. Mothers reported spending an average of fourteen minutes with their infants immediately following delivery (range: 2-45 minutes) and they waited an average of 7.4 hours until they next saw their infants (range: 2-24 hours), when they spent an average of 38 minutes with him or her (range: 3 minutes to 2.5 hours). In all, mothers estimated spending an average of two hours with their infants during the first twelve hours of the infant's life (range: 1-6 hours). On the first four days of the hospital stay, mothers reported spending an average of 5.1, 7.9, 9.1 and 7.4 hours respectively with their infants during the day and evening (ranges: 1-12, 2-13, 3-13, 3-13 hours respectively). In addition, twelve mothers spent at least part of the first night with their infants, eleven spent at least part of the second night, and twelve spent at least part of the third night with their infants.

The information from the Diary was useful but several subjects were unable to fill it out. Some had difficulty understanding how to use it, and some felt it was too time-consuming. Based on the information received from subjects, a revised diary form was developed. It is included in Appendix P and seems to have gained better acceptance in a related research project.

It was found that Chart variables and Diary items were generally
unrelated to one another; however, longer labour and use of drugs during labour and delivery were related to a longer hospital stay \((r = .97\) and \(r = .92\) respectively, \(p < .01\)), as would be expected. It was also found that longer labour was related to a greater amount of time spent with the infant after birth \((r = .71, p < .01)\). This may be because the newborn is generally given to the mother to hold while she is in the recovery room, and as the recovery period might be longer for a longer labour, the mother who had experienced a longer labour would have a longer time to be with her infant after the birth.

F. Behaviour Record (Appendices F and G)

The Behaviour record was developed in order to have a direct, observational record of mother-infant interaction which could be related to prenatal and perinatal variables. Both maternal and infant behaviour were recorded, but the emphasis was on maternal behaviour. A report on interobserver agreement is followed by a discussion of the problems encountered using this recording system.

**Interobserver agreement.** Observers were trained in two ways: using videotapes made during home visits, and using actual home visits. Videotapes were made to show a mother and a one-month old infant during feeding, caregiving and play activities, and were similar in content to the home-visit sessions which were used for both training and actual data collection. The second observer was the same throughout training and reliability sessions.

Rate of interobserver agreement was calculated by the function: number of agreements/(number of agreements + number of disagreements). Four one-half hour tape sessions and two one-hour live sessions were used to calculate agreement; the highest rate of agreement is reported here. Agreement over all behaviour categories for any given observation session ranged from .63 to .77; agreement in individual categories ranged from .50 to
to 1.00. For 26 out of 41 categories, agreement was greater than .75, and for an additional eight categories it was greater than .60. A list of behaviour categories and rate of agreement for each is provided in Table 10. The difficulty with which agreement was achieved was in part due to some behaviour categories which proved to have low frequency across all observation sessions. In six out of the seven categories for which observers failed to reach even .60 agreement, the mean frequency over all twenty-seven subject-observations was 10.3 or less; that is, these behaviours were observed to occur during an average of only 10 out of 240 fifteen-second periods. In any given observation session, they were likely to not occur at all. The problem of low frequency for interobserver agreement is as follows: if, for example, "nickname" (which had a mean frequency of 3.0) occurred twice in a given observation session and each observer recorded it once and missed it once, their rate of overall agreement would be 1.00 if they recorded the same occurrence and zero if they each recorded a different occurrence. In contrast, for a high-frequency behaviour such as "vocalize", which had a mean frequency of 110, if each observer missed one vocalization, the rate of agreement would still be very high, i.e., 100/110, or .98. Thus the inclusion of low-frequency behaviours in this recording system brought the overall rate of interobserver agreement down; by removing the low-frequency behaviours (those with a mean observed frequency less than 12 out of 240 fifteen-second periods), overall agreement rises to .85.

A related issue in evaluating this system is the inclusion of behaviours which were difficult to observe accurately. For example, it was difficult for the observer to see whether mother and infant were in eye-to-eye contact while still attempting to remain unobtrusive and non-interfering. If the observer was in a position to see the infant's eyes, it was often impossible to simultaneously watch the mother's eyes. In some cases, even when both
mother and infant could be closely watched, it was not possible to be completely certain that their eyes were indeed fixed upon one another. In one pair, for example, the infant appeared to be making eye contact with his mother; however, after the observation period ended and the observer was interacting with the infant, she (the observer) found that the infant averted his gaze from her eyes while still looking at her face. Thus it was unclear whether the mother-infant pair had actually been in eye contact when they were observed, or whether the infant had averted his gaze when looking at his mother as he had done while looking at the observer. There is no way of knowing what the case actually was for this infant, or for any other infant, short of asking the mother if her infant was looking directly at her.

Fortunately most behaviour categories were not found to be so elusive: postural or positional behaviours such as close or loose contact, en face position or looking could be readily observed and recorded, and verbal behaviours were simple to observe and record. Behaviours involving facial expressions, however, such as "smile" or "play-face", were at times difficult to observe if the mother's hair fell across her face as she looked down at her infant, which sometimes happened.

The category "secures", which is defined as maternal behaviour designed to prevent the infant from falling out of an infant seat or rolling off a change table, etc., was found to have more meaning if it was observed not to occur than if it did occur. Because most mothers automatically place their infant in a secure position, a mother who fails to do so is giving a great deal of information about her ability or willingness to attend to her child's safety. This was observed in only one mother, who left her infant in a dangerous position three times during the one-hour observation period. In effect, this behaviour category is more useful as a nominal category than as one for which actual frequency has much meaning. A mother who leaves her
infant in danger may merely be in need of intervention or assistance to help her realize what she is doing, or the situation may be more serious, and she may be "at risk" for child abuse or neglect. In any case, this behaviour category was a low-frequency one, and the amount of information it can contribute is limited if the data are analyzed only in terms of frequency.

The mean frequencies of occurrence for each behaviour category, along with the number of subjects for whom the behaviour was recorded at least once are shown in Table 8. Several behaviour categories may be more useful if used as nominal variables than if treated as interval data. The low-frequency behaviours discussed earlier can be meaningful clues to the nature of the mother-infant relationship because of, rather than in spite of, their low frequency. The frequency of commonly observed behaviours tells us little about the quality of an individual relationship; for example, since mothers generally hold their infants in a close-contact position during feeding, knowing that a mother held her infant in this position for a great deal of the observation period may be more of an indication that a feeding session was observed than that the mother had feelings of warmth and closeness for her infant. On the other hand, a mother who "requests a response" from her infant by attempting to elicit a smile or a vocalization is giving an indication that she knows enough about infant capabilities to try to get her baby to respond, and that she cares enough about her relationship with her infant to spend her time and energy making their interaction more meaningful for both of them. Her attachment or commitment is perhaps best measured in this way, rather than as a function of the gross amount of behaviour she exhibits. There are other behaviours which could be seen similarly -- play and play-face, providing visual and auditory stimulation, and perhaps calling the infant by name or nickname. Further discussion of this issue, and of specific elements of research design and instruments used in this study and
the effects of these upon the validity of the information gathered follows in a later section.

G. Maternal Behaviour Composites (Appendix S)

Another approach to the issue underlying the previous discussion — that of quality versus quantity — was taken. Since examination of individual behaviour frequencies did not appear to provide enough information about patterns of maternal behaviour, a more molar level of analysis, wherein individual behaviours were grouped together to form behavioural composites, was used. The Maternal Composites were determined a priori, and were the organizing principle for generating the individual behaviour categories to be observed. In practice, they were derived by simply summing across specific individual behaviour categories. The rationale was to sum across categories which served the same function, thereby accounting for individual differences in maternal style. Thus, for example, a mother who shows her infant a toy is not different from a mother who shakes a rattle for her infant if both activities are seen as providing stimulation for the infant. Rather than differentiate these two mothers by the actual method used to stimulate their infants (visual versus auditory), they would both be scored as providing one (or more) fifteen-second period worth of stimulation.

The eight Maternal Composites are listed and defined in Appendix S, and the correlations among these eight groups of behaviours are shown in Table 11. On this level of analysis, patterns began to emerge. Three of the Social Engagement categories (Visual, Vocal and Play Engagement) and Contingent Response were significantly intercorrelated (lowest $r=.44$, $p<.05$; mean $r=.58$, $p<.01$) and were correlated with Providing Stimulation (lowest $r=.30$, $p<.05$, mean $r=.45$, $p<.05$), and Giving Affection (lowest $r=.36$, $p<.10$; mean $r=.44$, $p<.05$). The fourth Social Engagement category, Tactile Engagement,
was unrelated to the others, probably because one of its subsumed behaviour categories was defined to include rhythmic patting, which was generally observed as part of feeding and burping rather than social interaction. Physical Contact and Caregiving were marginally intercorrelated ($r = .36$, $p < .10$), but were only sparsely related to the other behaviour groups: the correlation between Physical Contact and Tactile Engagement ($r = .50$, $p < .01$) probably reflects the fact that holding and patting are both part of the feeding situation. Time spent Caregiving was negatively related to time spent in Visual Engagement ($r = -.41$, $p < .05$). Thus there is evidence for separate constellations of maternal behaviour which do not appear to be related -- contact and caregiving versus interaction, stimulation and affection. The use of these behavioural composites seems to be a more meaningful way to look at the observational data on its own. Let us see how they relate to prenatal and perinatal variables as well as to other postpartum variables.

H. Maternal Composites -- correlation with other variables

(a) Maternal Composites -- Prenatal Questionnaire

The number of significant correlations between Maternal Composites and Prenatal Questionnaire item responses exceeded the chance level, and some patterns appeared. The correlations are provided in Table 12. (It should be noted that some correlations reported in the Table are negative because the scales used in the Prenatal Questionnaire are constructed so that a score of 1 indicates the most positive response. Therefore, if a positive response to a prenatal question is positively related to a high Maternal Composite score, the correlation will be negative. Because this is confusing, the correlations have been reflected (i.e., the sign has been changed) where necessary in both the tables and the text.) More time spent in Physical Contact with the infant at one month was related to the mother's wish during the last trimester
of pregnancy to have her infant in her hospital room after the birth
($r = .43, p < .05$); to her prediction that she would calm a crying infant by
picking him up rather than by giving affection ($r = .43, p < .05$); to having
an unclear picture of what it would be like to have a new baby ($r = .43,$
$p < .05$); and to predicting a positive change in her relationship with her
husband ($r = .50, p < .05$). Thus a mother who spends time in physical contact
with her infant is one who wished prenatally to have contact with her infant,
and whose prediction of her own behaviour showed a limited repertoire of
responses to the infant, perhaps due to the fact that she did not have a
clear picture of life with a new baby. This unclear picture may also be
responsible for her failure to consider that the necessary time spent
caring for a new infant would probably take away from time which husband and
wife usually spent together.

More time spent in overall Social Engagement was correlated with the
retrospective report of a positive initial feeling about the pregnancy
($r = .39, p < .05$) and the prediction of being well-prepared for caregiving tasks
($r = .40, p < .05$). More time spent in Vocal Engagement was related to reporting
initial positive feelings toward pregnancy ($r = .37, p < .10$); feeling well-
prepared to care for the infant ($r = .45, p < .05$); anticipation of needing help
at home after the birth ($r = .36, p < .10$); and prediction of infant's early
attachment to mother ($r = .38, p < .05$) and father ($r = .43, p < .05$). More time spent
in Tactile Engagement was related to maternal prediction of calming a crying
baby by picking him/her up ($r = .40, p < .05$). Thus prediction of using tactile
stimulation (i.e., picking baby up) was related to actual observed tactile
behaviour. Time spent in Play Engagement was related to a prenatal lack of
concern for spoiling the infant ($r = .44, p < .05$) and prediction of negative
changes in the marital relationship as a result of having a baby ($r = .41,$
$p < .05$). Here we see that the prenatal belief that the infant cannot be
spoiled by maternal attention is related to the postpartum observation of the mother giving her infant attention. Similarly, the belief that time spent with the infant might take time away from the mother's relationship with her husband was related to actually spending time interacting with the infant. More time spent in Giving Affection was related to prenatal prediction of confidence in caregiving ($r = .46, p < .05$), anticipation of being able to understand non-crying signals from the infant ($r = .44, p < .05$), and prediction of early attachment of baby to mother ($r = .46, p < .05$). Thus the anticipation of a close and understanding relationship between mother and baby was related to observed maternal affectionate behaviour. Contingent Response was correlated with prediction of early infant-mother and infant-father attachment ($r = .49, p < .05; r = .50, p < .01$), and marginally correlated with predicted mother-infant attachment ($r = .36, p < .10$).

Time spent in Caregiving at one month was correlated with prenatal prediction of infant-mother attachment ($r = .38, p < .05$). More time spent Providing Stimulation for the infant at one month was related to positive feelings upon first learning of the pregnancy ($r = .49, p < .01$).

In summary, there appears to be a constellation of behaviours and attitudes which bridge the prenatal-to-postpartum period. We have seen that observation of the mother engaging in responsive, social stimulation and affectionate behaviour in the postpartum period is related to positive feelings about pregnancy during the prenatal period, to anticipation of dealing with caregiving and infant signals with confidence, to being unconcerned that picking up or playing with the infant might spoil him or her, to anticipation of needing help at home after the birth, to a feeling that close ties between mother, infant and father would be established early, and to an awareness that time spent caring for the infant might detract from the marital relationship. In other words, we see that a group of prenatal attitudes reflecting a
sensitive, confident, realistic expectant mother is related to sensitive, interactive behaviour as observed at one month postpartum. Thus there does appear to be a relationship between prenatal attitudes and postnatal behaviour when maternal behaviour is taken at a molar level, wherein various individual behaviours are grouped together to form composites which can then reflect the function rather than the actual form of various molecular behaviours.

(b) **Maternal Composites -- Chart Variables and Diary**

The number of significant correlations between Maternal Composites and Chart Variables or Diary items was below chance level; there seems to be no systematic relationship between these perinatal variables and the Maternal Composites.

(c) **Maternal Composites -- Infant Behaviours**

Similarly the number of correlations between infant behaviours and maternal composites was below chance level, and while it would be foolish to conclude that there is no relationship between maternal and infant behaviour, perhaps it is the case that we have not measured infant behaviour in enough detail to capture the nature of the relationship.

I. **Maternal Care Rating Scales** (Appendices H and I)

Let us now turn to a different procedure which may be another useful way to assess quality of maternal behaviour as distinct from quantity. Following the one-month postpartum home visit, the observer filled out a set of eighteen scales developed by Mary Ainsworth (1977) upon which overall maternal behaviour was rated. These scales are concerned with the mother's general attitude, her synchronization of caregiving with her infant's needs and rhythms, her availability to, interaction with, and physical and social contact with her infant, the effectiveness of her response to her infant's cries, and her encouragement of the infant's sensorimotor achievement. High
ratings on these scales indicate sensitivity, warmth, affection, and effectiveness of care. Analyses involving the scales revealed that they were all highly intercorrelated (Table 13), and were highly correlated with many of the Maternal Composites (Table 14). They were also found to be correlated with some Infant Behaviours and infant outcome after delivery (Table 15), and with some items from the Prenatal Questionnaire (Table 16). The Maternal Ratings were found to be unrelated to the Diary items.

(a) **Maternal Ratings — Maternal Composites** (Table 14)

The ratings for **Maternal Attitude** (maternal perception of the infant, delight expressed in the infant, acceptance of the infant, and ability to give information about the infant) were correlated with observed Visual Engagement \( (r = .43, p < .05; r = .33, p < .10; r = .48, p < .05; r = .33, p < .10) \), Vocal Engagement \( (r = .54, p < .10; r = .45, p < .05; r = .53, p < .01; r = .42; p < .05) \), Play Engagement \( (r = .61, .53, .62, .51; p < .01 for all) \), Social Engagement \( (r = .65, .53, .62, .51, p < .01 for all) \), Giving Affection \( (r = .38, p < .05; r = .33, p < .10; r = .41, p < .05; r = .34, p < .10) \), Contingent Response \( (r = .57, .50, .56, .55, p < .01 for all) \), and Providing Stimulation \( (r = .33, p < .10; r = .54, p < .01; r = .41, p < .05 for delight, acceptance and information respectively) \). Only the ratings for Maternal Perception were significantly correlated with observed Physical Contact \( (r = .47, p < .05) \), and Tactile Engagement \( (r = .41, p < .05) \).

Maternal ratings for **Availability** (availability of mother for infant, amount and appropriateness of interaction provided) were correlated with observed Visual Engagement \( (r = .53, p < .01; r = .62, p < .01; r = .46, p < .05) \), Vocal Engagement \( (r = .49, .79, .69, p < .01 for all) \), Play Engagement \( (r = .60, .71, .71, p < .01 for all) \), Social Engagement \( (r = .60, .79, .67, p < .01 for all) \), Providing Stimulation \( (r = .37, p < .10; r = .54, .51, p < .01 for both) \), Giving Affection \( (r = .41, p < .05; r = .55, p < .01; r = .41, p < .05) \), and Contingent Response \( (r = .60, .69, .56, p < .01 for all) \). Maternal ratings for **Contact** (amount of
physical contact, quality of physical contact) were correlated with observed Physical Contact ($r = .68, p < .01; r = .41, p < .05$), Vocal Engagement ($r = .41, .47, p < .05$ for both), Social Engagement ($r = .52, .48; p < .01$ for both), Providing Stimulation ($r = .39, .40; p < .05$ for both), and Contingent Response ($r = .41, .45; p < .05$ for both). In addition, ratings of amount (but not quality) of physical contact were correlated with observed Visual Engagement ($r = .34, p < .10$) and Tactile Engagement ($r = .47, p < .05$). Ratings of quality of physical contact (but not quantity) were related to observed Play Engagement ($r = .41, p < .05$).

Maternal ratings for Interaction (amount of visual contact, amount of auditory contact and frequency of play interaction) were correlated with observed Visual Engagement ($r = .39, p < .05; r = .57, .60; p < .01$ for both), Vocal Engagement ($r = .46, p < .05; r = .66, .78, p < .01$ for both), Play Engagement ($r = .50, .55, .74, p < .01$ for all), Social Engagement ($r = .51, .67, .78, p < .01$ for all), Giving Affection ($r = .39, .46, p < .05; r = .58, p < .01$), and Contingent Response ($r = .47, p < .05; r = .55, .64, p < .01$ for both). In addition, the rating for amount of visual contact was correlated with observed Physical Contact ($r = .53, p < .01$). The rating for amount of auditory contact and frequency of play interaction were correlated with observed Providing Stimulation ($r = .39, p < .05; r = .51, p < .01$). Maternal ratings of Facilitation of Development (stimulus potential of the environment and encouragement of sensorimotor achievement) were correlated with observed Vocal Engagement ($r = .48, p < .05; r = .62, p < .01$), Play Engagement ($r = .55, .79, p < .01$ for both), Social Engagement ($r = .51, .71, p < .01$ for both), Providing Stimulation ($r = .55, .50, p < .01$ for both), and Contingent Response ($r = .47, p < .05; r = .51, p < .01$). In addition, encouragement of sensorimotor achievement was correlated with observed Visual Engagement ($r = .55, p < .01$) and Affection ($r = .43, p < .05$).

The ratings of Effectiveness of Response to Infant Crying were significantly correlated with observed Physical Contact ($r = .61, p < .01$), Visual
Engagement \((r=.39, p<.05)\), Vocal Engagement \((r=.49, p<.01)\), Social Engagement \((r=.56, p<.01)\), and Play Engagement \((r=.41, p<.05)\), and marginally correlated with Tactile Engagement \((r=.34, p<.10)\), Giving Affection \((r=.34, p<.10)\), and Contingent Response \((r=.37, p<.10)\). Ratings for Feeding (synchrony of feeding intervention, amount and rate of feeding) were largely unrelated to the Maternal Composites, except that the rating for feeding was correlated with observed Vocal Engagement \((r=.43, p<.05)\), Providing Stimulation \((r=.34, p<.10)\), and Contingent Response \((r=.42, p<.05)\). The rating for amount of food was marginally correlated with observed Play Engagement \((r=.35, p<.10)\), the rating for synchrony of feeding intervention was correlated with observed Play Engagement \((r=.36, p<.10)\), Providing Stimulation \((r=.47, p<.05)\), and Contingent Response \((r=.37, p<.10)\).

It is noteworthy that no Maternal Care Ratings were significantly correlated with the observed Maternal Composite, Caregiving. This may be seen as lending support to the notion for which previous data have given evidence that there is a constellation of maternal interactive behaviour which is separate from a constellation of maternal caregiving behaviour. Similarly, the Maternal Ratings for feeding behaviour were largely unrelated to both the other Maternal Ratings (see Table 13), and the Maternal Composites (see Table 14).

The extent to which the Maternal Ratings and the Maternal Composites were found correlated was undoubtedly influenced in part by the fact that they were not completely independent measures, i.e., the observer, after recording the behaviour which makes up the Maternal Composite scores, filled out the Maternal Rating Scales. Perceptions about certain aspects of behaviour rated on the scales came in part from the direct observation of the mother's behaviour during the one-hour observation; for other scales, e.g., General Attitude and Facilitation of Development, information from the interview.
and/or the observer's perception of the situation were the major sources of information used to fill out the scales. It is perhaps worth noting that the Maternal Ratings can only be made on the basis of observation, and were developed to be used in conjunction with systematic observational methods. Also, despite the interdependent nature of the scales and the observational data, they need not have turned out to be so highly and extensively correlated. That they are correlated lends validity to both: clinical judgments, "subjective" as they are, were found to be supported by more objectively documented observations of actual behaviour. From the point of view of this research project, which is concerned with the development and validation of instruments for studying maternal behaviour, it is especially encouraging that the observational system developed expressly for this project was shown to be related to an instrument developed independently by another researcher to measure quality of maternal behaviour.

(b) Maternal Ratings -- Infant Behaviour (Table 15)

Maternal Ratings were found to be related to some infant behaviours. The amount of time the infant was observed to be focusing attention upon the mother was found to be positively correlated with maternal ratings for amount of interaction ($r=.45$, $p<.05$), appropriateness of interaction ($r=.39$, $p<.10$), visual contact ($r=.42$, $p<.05$), auditory contact ($r=.33$, $p<.10$), frequency of play interaction ($r=.40$, $p<.05$) and encouragement of sensorimotor achievement ($r=.43$, $p<.05$). The amount of time the infant was observed to spend focusing on objects was negatively correlated with maternal ratings for perception of the infant ($r=-.39$, $p<.05$), expressed delight in the infant ($r=-.42$, $p<.05$), availability of mother to the infant ($r=-.35$, $p<.10$), amount and quality of physical contact ($r=-.45$, $-38$, $p<.05$), maternal response to crying ($r=-.61$, $p<.01$) and amount of auditory contact ($r=-.54$, $p<.01$). Thus, to the extent that the infant attended to his or her mother, the mother responded by
providing interaction and interpersonal stimulation for the infant; whereas, to the extent that the infant attended to objects, the mother was seen to be less interactive, i.e., she was less available to the infant, she provided less physical contact and was less effective in responding to the infant's cry. No causal inferences are made about the direction of the effects, of course. Indeed, a hypothesis congruent with a fully interactional model in which both mother and infant contribute to and are affected by behaviour within the system is proposed: the driving force behind the relationship is a spiral of interaction, in which specific kinds of behaviour initiated by one member of the dyad are responded to by the other in a manner which reinforces the original behaviour, thereby setting a pattern of interaction. To take an extreme example, a mother who observes her infant looking at objects but who cannot seem to get him to focus upon her may conclude that he prefers to look at objects rather than at people, and may interact less with him. The infant's opportunities for visual stimulation are thus reduced, and he is left with little to attend to except objects. He then continues to look at objects all the more intently, thereby reinforcing the mother's erroneous conclusion that he prefers them to her. She may then withdraw even more from him, reducing his potential field again, and she may also begin to respond less to other kinds of infant signals such as crying. It is easy to see that this kind of downward spiral which Goldberg (1977) has recently discussed, could continue until a serious state of affairs between mother and infant set in.

(c) Maternal Ratings -- Infant Outcome (Table 15)

One of the Chart Variables, "infant outcome" (whether the infant went to the regular nursery or to the intensive care nursery after birth) was strongly correlated with the Maternal Ratings, although other chart variables were not found to be highly correlated with the Maternal Ratings. The infant being sent
to the intensive care nursery after birth was correlated with ratings at one month of maternal perception of the infant ($r = .44, p < .05$), delight expressed in the infant ($r = .51, p < .01$), acceptance of the infant ($r = .41, p < .05$), ability to give information about the infant ($r = .44, p < .05$), amount of food offered ($r = .51, p < .01$), appropriateness of interaction ($r = .43, p < .05$), and amount of physical and visual contact ($r = .42, .43, p < .05$). Thus to the extent that the infant was separated from his or her mother after birth, mothers were rated as having a more positive attitude, and as offering more food, contact and interaction at one month postpartum. Possibly the concern engendered by the fact that these infants were in Intensive Care caused their mothers to become concerned about their physical condition and to be more devoted to their care even after being at home for one month. Klaus and Kennell (1976) have found that a mother's distress which is related to being separated from her sick infant tends to extend throughout the early months of the infant's life, long after the infant returns to a healthy condition. In the present study, however, there were no significant correlations found between length of perinatal separation and any of the Maternal Care Ratings, contrary to what would be expected on the basis of other aspects of Klaus and Kennell's work.

(d) Maternal Ratings -- Prenatal Questionnaire (Table 16)

Maternal Ratings made by the observer at one month postpartum were significantly correlated with several items on the Prenatal Questionnaire (Appendix A). (Again it should be noted that the sign of the correlations has been reflected in the text and tables to avoid confusion.)

It is interesting that the best prenatal predictor of the Maternal Ratings at one month postpartum was the mother-to-be's own prediction of mother-infant attachment (A:49); this item was correlated with all four sub-scales of rated Maternal Attitude (lowest $r = .52, p < .01$; mean $r = .54$), all three sub-scales of rated Availability (lowest $r = .42, p < .05$; mean $r = .44$), both
subscales of rated **Contact** ($r=.47$, $p<.05$ for both subscales), rated **Effectiveness of Response to Crying** ($r=.51$, $p<.01$), and with all three subscales of rated **Interaction** (lowest $r=.34$, $p<.10$; mean $r=.45$, $p<.05$).

Prenatal maternal prediction of mother-infant attachment was also correlated with amount and rate of feeding at one month ($r=.39$, and .42, respectively, $p<.05$ for both) and with encouragement of sensorimotor achievement ($r=.49$, $p<.01$).

Prenatal prediction of confidence in caregiving ability ($A:39$) was another Prenatal Questionnaire which predicted well to the Maternal Ratings at one month postpartum. Responses to this item were significantly correlated with three of the rated **Attitude** subscales ($r=.56$, $p<.01$ for maternal perception of the infant; $r=.39$, $p<.05$ for delight expressed in the infant; $r=.44$, $p<.05$ for acceptance of the infant), with all three subscales of rated **Availability** (lowest $r=.38$, $p<.05$; mean $r=.45$), with both subscales of rated **Contact** (lowest $r=.35$, $p<.05$; mean $r=.44$), with **Effectiveness of Response to Crying** ($r=.43$, $p<.05$), and with the subscales auditory contact ($r=.46$, $p<.05$), frequency of play interaction ($r=.33$, $p<.10$), encouragement of sensorimotor achievement ($r=.39$, $p<.01$) and rate of feeding ($r=.41$, $p<.05$).

A third significant predictor was prenatal ability to picture what it would be like to have a new infant ($A:56$). This item was significantly correlated with all four subscales of **Attitude** (lowest $r=.35$, $p<.10$; mean $r=.38$, $p<.05$), both subscales of **Contact** ($r=.53$, .50, $p<.01$ for both), **Effectiveness of Response to Crying** ($r=.48$, $p<.05$), both subscales of **Facilitation of Development** ($r=.49$, .47, $p<.01$ for both) and with the subscales for rated amount of visual contact ($r=.55$, $p<.01$), frequency of play interaction ($r=.33$, $p<.01$) and amount of food offered ($r=.40$, $p<.05$).

A fourth predictor of the maternal ratings at one month was a prenatal lack of concern for spoiling the infant ($A:60$); this item was related to
three of the rated **Attitude** subscales ($r=.41, p<.05$ for maternal perception of infant; $r=.40, p<.05$ for acceptance of the infant; $r=.48, p<.05$ for ability to give information about the infant), two of the subscales for **Feeding** ($r=.51, p<.01$ for synchrony of feeding intervention; $r=.49, p<.01$ for amount of food offered), all three subscales for **Availability** (lowest $r=.39, p<.05$, mean $r=.46$), and with the subscales for rated quality of physical contact ($r=.33, p<.10$), frequency of play interaction ($r=.40, p<.05$) and encouragement of sensorimotor achievement ($r=.42, p<.05$).

There were other items from the Prenatal Questionnaire which were significantly correlated with the Maternal Rating Scales (see Table 16), but these four appear to show the most consistent patterns of relationship. It is quite interesting that these four items are all concerned with prediction of the future relationship with the infant — that is, having a clear picture of the infant, anticipating mother-infant attachment, having self-confidence in the ability to care for the infant, and being unconcerned that the infant would become spoiled. The fact that these are all correlated with high ratings on the Maternal Ratings scales can be seen as more evidence that prenatal attitude toward the infant is related to postpartum behaviour with the baby. Thus these findings support the notion that a mother's attachment to her baby begins to develop before the birth and should be studied longitudinally.

**J. Postpartum Questionnaire** (Appendix Q)

(Notes: Specific items on the postpartum questionnaire will be referred to with the shorthand system of appendix letter and item number. Thus question 2 on the postpartum questionnaire would be referred to as Q:2.

All scales used were five-point, Likert-type scales. When referring to a specific scale, two or three anchor points will be given. When two points
are mentioned, the first is rated 1 and the second is rated 5; when three points are mentioned, the first is rated 1, and second is rated 3 (midpoint), and the third is rated 5.)

The postpartum questionnaire was constructed on the basis of six areas of interest which were assumed to be related to prenatal, perinatal and other postpartum variables. Some items from the prenatal questionnaire were repeated in the postpartum questionnaire in order to assess changes of attitudes and feelings from the prenatal to the postpartum period.

1. **Physical condition** was assessed by two sets of items.

   (a) **Physical and emotional feelings** at one month postpartum (Q:1) were assessed by having subjects rate their overall feelings on seven five-point scales having the following pairs of anchor points: "very energetic"-"very tired"; "very relaxed"-"very anxious"; "very comfortable"-"very uncomfortable"; "elated"-"depressed"; "very happy"-"very unhappy"; "content"-"impatient"; "curious"-"bored". The midpoints for all scales were labelled "normal for me". Subjects actually used all five points to describe themselves on the first four scales; for the next two, they used the first four points only, and for the last scale they used only the first three points to describe themselves.

   At one month postpartum subjects rated themselves as somewhat tired ($X=3.3$), "normally" relaxed ($X=2.9$), fairly comfortable ($X=2.4$), just somewhat more elated than normal ($X=2.6$), quite happy ($X=1.7$), quite content ($X=1.8$) and fairly curious ($X=2.6$). As can be seen in Table 17, reporting feeling relaxed was correlated with reporting feeling comfortable and curious ($r=.37$, $p<.10$; $r=.45$, $p<.05$); reporting feeling happy was correlated with reporting feeling comfortable and curious ($r=.48$, .44 respectively, $p<.05$); and reporting feeling comfortable was related to reporting content and elated ($r=.48$, $p<.05$; $r=.59$, $p<.01$). Again, as with the prenatal questionnaire, there was a tendency to self-report as "normal for me" on most of the scales.
Physical problems during the postpartum period were assessed using a checklist (Q:2), and a total number of problems for each subject was derived. Subjects reported having zero to six problems, with the mean greater than two \( (\bar{X}=2.4) \). Subjects' reports of physical problems were distributed as shown in Table 18. Because the infant's health is as much a factor in maternal postpartum adjustment as is the mother's own health, another checklist inquired about the infant's physical problems (Q:3). Mothers reported a range of zero to four infant problems in the first month after birth, with the mean greater than one \( (\bar{X}=1.4) \). The distribution of specific infant problems is provided in Table 18.

Only two subjects had neither seen nor spoken to their physician concerning infant or maternal problems (Q:4). The number of maternal problems reported was significantly correlated with reported feelings of curiosity but not with other overall feelings (Q:1); women reporting a greater number of physical problems tended to report feeling more curious rather than more bored \( (r=.52, p<.01) \). A greater number of reported infant problems was significantly correlated with maternal feelings of happiness \( (r= -.39, p<.05) \) and curiosity \( (r= -.48, p<.05) \) but not with overall feelings. It should be recalled that the scales of curiosity and happiness (Q:1) showed the lowest range of response variation of all seven scales assessing postpartum feelings; perhaps the counter-intuitive nature of these correlations (i.e., that a greater number of both infant and maternal problems is related to more positive feelings) may be explained by the small variation of response to these two scales.

2. Hospital experiences were assessed using two sets of items.

(a) Subjects were asked to rate their labour and delivery (Q:8,9) using five point scales ("easy"-"medium"-"difficult"). Subjects used all five points to describe their experiences, and tended to rate their labour as
being more difficult than their delivery ($\overline{X}=3.6$ and 2.4, respectively).

Ratings of labour and delivery were only marginally, but negatively, intercorrelated ($r=-.38$, $p<.10$). Of 26 subjects reporting on their labour, one rated it as easy, four as fairly easy, six as medium, eight as fairly difficult and seven as difficult. Of 24 reporting on their delivery, nine rated it as easy, five as fairly easy, five as medium, one as fairly difficult and four as difficult. Three subjects who had caesarian sections did not report on their deliveries as they had had general anesthesia and felt they were unable to rate their delivery as either easy or difficult. Ratings of labour and delivery were found to be largely uncorrelated with other Postpartum Questionnaire items; they were, however, positively correlated with the number of infant physical problems reported ($r=.66$, $p<.01$ for labour; $r=.47$, $p<.05$ for delivery) such that a greater number of infant problems reported was associated with report of more difficult labour and delivery. These correlations could be interpreted to mean that a more difficult birth experience contributed to more physical problems for these newborns, or that mothers who were experiencing difficulties at home due to their infants' illness retrospectively reported that their birth experiences were also difficult.

(b) Subjects were asked to rate their feelings about hospital experiences for the time they were in the caseroom (Q:10) and for the time they stayed on the maternity unit (Q:11). Scales were anchored as "very happy"-"neutral"-"very unhappy". Subjects reported being quite positive in their feelings about their stay on the maternity unit and their experiences in the caseroom ($\overline{X}=2.03$ and 1.93 respectively). Thirteen subjects reported being very happy in the caseroom, three indicated that they were fairly happy, either were neutral and three were fairly unhappy. No-one reported being very unhappy. Twelve women reported being very happy on the maternity unit, eight were
fairly happy, five were neutral, one was fairly unhappy and one was very unhappy. These ratings were not significantly correlated with other Postpartum Questionnaire items. All but one subject described at least one pleasing experience while on the maternity unit, and 19 out of 27 also described at least one displeasing experience (Q:12, 13). All subjects had had a partner with them during labour (Q:14) and 22 had had a partner during delivery (Q:16); in each case the partner was the husband.

3. **Perceived support of husband** was assessed using two sets of items.

   (a) Subjects reported on how having a partner during labour and delivery had worked out (Q:15,17) ("better than I expected"-"all right"-"not very well at all"). The mean ratings were positive, and were similar for labour and delivery (\(\bar{x}=1.2\) and 1.3 respectively). Twenty-three subjects thought having a partner during labour was better than expected, two thought it had worked out quite well, and two felt it had been all right. For delivery, 19 subjects indicated that having a partner had been better than expected, and three reported it had been all right. Report of satisfaction with partner during labour was significantly correlated with report for delivery (\(r=.46, p<.05\)).

   (b) Subjects were asked if their husbands were participating in caring for the infant (Q:19). The five-point scale was labelled "a great deal"-"somewhat"-"not at all". Fourteen reported that their husband cared for the infant a great deal, six reported that the husband participated a fair amount (rated as 2), and seven reported that the husband helped somewhat. No subject indicated that her husband participated very little or not at all. Eight husbands were reported to be very confident (Q:20) ("very confident"-"mixed feelings"-"very unsure") about their ability to care for the infant, eleven as somewhat confident, seven as having mixed feelings about confidence in caregiving, and one as being somewhat unsure. No husband was judged to be very unsure. Maternal reports of feeling happy, comfortable, content, elated
and curious were positively related to the extent to which husbands participated in infant care (respectively, $r = .65, p < .01; r = .44, .42, .43, p < .05; r = .37, p < .10$).

4. The subject's own confidence in caregiving and actual caregiving behaviour was assessed by three sets of items.

(a) Subjects rated their self-confidence in their ability to care for their infant (Q:18) on a five-point scale ("very confident"-"mixed feelings"-"very unsure"). They described themselves as feeling quite confident; the mean rating was 1.6. Fifteen indicated that they were very confident, eight were somewhat confident and four had mixed feelings. No subject reported herself as unsure or very unsure of her caregiving ability at one month postpartum. Self-confidence was positively related to reporting feeling relaxed ($r = .61, p < .01$) and negatively related to feeling curious ($r = -.61, p < .01$); it was unrelated to other reported feelings. The reported self-confidence of mothers was positively correlated with their perception of their husbands' confidence in caring for the infant ($r = .51, p < .01$). Self-confidence in caregiving was not significantly correlated with other postpartum Questionnaire items.

Seventeen mothers had had someone to assist them during their first month at home (Q:21). Of these, ten indicated that the help they received had been very helpful, five as quite helpful and two as somewhat helpful (Q:22).

(b) Subjects were asked about their method, schedule and success in feeding their infants (Q:23-28). At one month postpartum, nineteen subjects were breastfeeding, four were feeding with a bottle and four used both breast and bottle (Q:23). Thirteen reported that feeding was progressing very smoothly, eight reported that it was going smoothly, four described it as medium, one reported having some problems and one reported having a lot of problems (Q:27). Reporting that feeding was progressing well was positively
correlated with estimates of self-confidence in caring for the infant \( (r = .45, p < .05) \), marginally correlated with feeling relaxed \( (r = .36, p < .10) \), and was found to be unrelated to other Postpartum Questionnaire items. Correlations between feeding progress and self-confidence confirmed the impressions from postpartum interviews that feeding problems or the lack of them dominated the mother's perception of her own adjustment to her new infant.

Of the twenty-three mothers who were nursing their babies at one month, eight intended to continue 2-3 more months, three intended to continue 4-5 more months, five planned to go on for 6-7 more months, four expected to continue 8-10 more months and three indicated that they would see how it was working out before deciding (Q:28).

(c) **Mother-infant communication** was assessed using four items. On a five-point scale ("very well"-"not very well at all") subjects rated how well they felt they were able to tell what their infant needed or wanted (Q:34). The mean rating was 2.2, indicating that at one month postpartum, mothers felt they could tell fairly well what their infants were signalling. Six mothers reported that they could tell very well, thirteen reported being able to tell fairly well, six felt they were able to tell somewhat, one felt she had some difficult and one felt she had a quite difficult time telling what her infant needed or wanted. Mothers' estimation of their ability to tell what their infants' signals meant was positively correlated with estimation of feeding progress \( (r = .66, p < .01) \), again indicating that the details of the relationship between mother and infant appear to revolve around progress or problems in feeding. When mothers were asked what signals their infant used to communicate with them (Q:35), 11 mentioned crying only, 12 mentioned crying and other non-crying signals (such as facial expressions), and 4 mentioned both crying and other signals.

Subjects were asked what their responses would be if their infant were
crying and they were sure that he/she was not hungry or wet; they were asked to check off as many responses as would apply using a precoded checklist (Q:36). Twenty-three mothers reported that they would pick up or rock the infant, and twenty-two would pat or talk to the infant. Only sixteen said they would play music, fourteen would give the infant a pacifier, eight would let the baby cry it out, six would feed the baby and three would give the baby a toy. The number of different responses to infant crying ranged from one to ten; the mean number of responses per subject was greater than five. The number of responses was correlated with the mother's indication of the way their infants signalled their needs ($r = .42 p < .05$), such that a higher number of responses was associated with mother's report that the infant tended to use non-crying signals to communicate with her. This appears to indicate that a mother's ability to vary her repertoire of responses to her infant is related to the infant's own ability to vary his or her signals or to the mother's ability to perceive various types of signals. Again, the direction of influence is not known.

When asked if they found it difficult to quiet the baby once he/she was crying or fussing (Q:37) ("very easy"-"very difficult"), the mothers indicated that they found it fairly difficult: the mean score was 2.6. Four mothers found it very easy, seven found it easy, eleven found it somewhat difficult, three found it quite difficult and one felt it was very difficult to quiet her crying infant.

5. Subjects' own assessment of parent-infant attachment was measured using five items.

(a) On four five-point scales, mothers were asked to estimate how close they and their husbands felt to their infant (Q:29,30) ("very close"-"still seem like a stranger"), and how close they thought their infant felt to his/her parents (Q:31, 32) ("very close"-"not at all close yet"). The mean
responses for mother-infant and father-infant attachment were the same: $\bar{X}=1.3$ for both, indicating that mothers felt quite close to their infants at one month postpartum, and judged that their husbands felt the same. For infant-mother and infant-father attachment, however, mothers estimated that their infants felt somewhat closer to themselves ($\bar{X}=1.8$) than to their husbands ($\bar{X}=2.1$).

(b) On a five-point scale ("right away"-"still don't feel that way") subjects rated how soon they began to feel that the baby was really theirs (Q:33). The mean response ($\bar{X}=1.9$) indicated that mothers felt their infant was really theirs quite soon; sixteen mothers felt so right away, two felt that way fairly soon, seven felt that way after some time, one felt that it took a long time and one reported that she still didn't feel her baby was really hers.

Mothers' assessments of parent-infant attachment (Q:29-33) were significantly intercorrelated and correlated with other Postpartum Questionnaire items (see Tables 19 and 20). A mother's assessment of her attachment to her infant and her infant's attachment to herself were highly correlated ($r=.71$, $p<.01$) and both were related to the mother's feeling that the infant was hers very soon ($r=.54$, $p<.01$ for mother-infant attachment; $r=.53$, $p<.01$ for infant-mother attachment); the mother's estimates of father-infant and infant-father attachment were also positively correlated ($r=.43$, $p<.05$). Maternal estimation of infant-father attachment was correlated with the extent to which fathers were seen to participate in infant care ($r=.44$, $p<.05$). It is quite interesting that whereas the mother's assessment of her own attachment to the infant was not significantly correlated with her assessment of her husband's attachment to the infant, her estimates of the infant's attachment to herself and to her husband were highly correlated ($r=.57$, $p<.01$). This pattern of correlation makes it appear that whereas mothers do differentiate
their relationship with their infant from that of their husbands (perhaps because they feel the amount of time they spend caring for the infant makes their relationship to him or her special), they do not perceive the infant as being able to differentiate between his or her two parents.

An interesting pattern emerges from the correlations between these attachment items and other Postpartum Questionnaire items. A mother's estimate of the ease with which she felt able to read her infant's signals was highly related to mother-infant attachment and perceived infant-mother attachment ($r=.70$ and $.48$, respectively, $p<.01$ for both), and to her feeling that the infant was hers right away ($r=.40$, $p<.05$); similarly, her report of being easily able to quiet her crying infant is correlated with mother-infant ($r=.37$, $p<.10$) and infant-mother attachment ($r=.45$, $p<.05$) and with maternal feeling that the baby was hers soon ($r=.43$, $p<.05$). However, the mother's estimate of father-infant and infant-father attachment was not significantly related to these variables, but rather to her reports of the number of her own physical problems and the infant's physical problems ($r=-.46$, $p>.05$ for number of maternal problems and infant-father attachment; $r=-.52$, $p>.01$ for the number of infant problems and both father-infant and infant-father attachment). (It should be noted that the sign of these correlations is negative because a larger number of physical problems is related to an estimate of close attachment, which is scored as a low number on a five-point scale.) This pattern of correlation may be indicative of one way in which a new mother is able to deal with the fact that caring for a new infant, despite the many rewards, definitely has unpleasant aspects, in terms of both her own physical condition and infant problems which may contribute an extra burden to his or her care. It could be hypothesized that the mother does not allow her negative feelings regarding these problems to interfere with her own relationship to the infant, but may project them onto her
perception of the father-infant relationship.

6. The perceived role of the infant in the mother's life was assessed using four sets of items.

   (a) All mothers indicated that their infant liked them to spend time with him or her besides the time spent feeding, changing and bathing (Q:38); twenty-one reported they spent time in non-caregiving interaction more than once a day, three reported interacting in this way once a day, and two did so less than once a day.

   (b) Subjects were asked to estimate the extent to which having a baby restricted their work, school and social lives (Q:45). They rated this restriction on five-point scales ("a great deal"-"not at all"); the mean response regarding work/school ($\overline{X}=2.8$) indicated that having an infant was felt to be somewhat of a restriction in this area of the mothers' lives. Five of the sixteen mothers to whom this item applied indicated that the infant caused a great deal of restriction, four felt they were fairly restricted, one felt she was somewhat restricted, one felt she was not very restricted and five felt no restrictions on their work or school life as a function of having a baby. The mothers apparently felt less restricted with regard to their social lives. The mean response to this item was 3.2, with all subjects responding. Four mothers felt a great deal of restriction, four felt they were fairly restricted, five felt somewhat restricted, eleven felt little restriction and three felt that having the baby had placed no restrictions at all on their social lives.

   (c) Subjects were asked to assess the extent to which having a baby had altered their marital relationship (Q:46,47). Using a five-point scale ("a great deal"-"not at all") the subjects' mean response ($\overline{X}=3.7$) showed that at one month postpartum, these new mothers felt their relationship with their husbands had been altered quite a bit. However, only two felt it had been
altered a great deal while four felt it had been altered a fair amount and five felt it had been altered somewhat; six felt it had been altered only a little and ten felt that their marital relationship had not been changed at all. The mother's estimate of change in the marital relationship was correlated with her self-confidence in caregiving ($r = .40, p < .05$) and her ability to understand her infant's signals ($r = .38, p < .05$), such that greater change in the husband-wife relationship was related to greater self-confidence and greater ability to understand the infant's signals. This is not surprising, especially since the change specified most often was having less time together (Q:47). Thus the time the mother needs to learn how to care for her infant takes time away from the marital relationship, which in turn causes changes in that relationship. Some recent work by Pedersen and his colleagues (Pedersen, Anderson & Cain, 1977) has given attention to the linkages between the parent-infant and spouse relationships, and indicates that the quality of the relationship between husband and wife can affect mother-infant and father-infant relationships both negatively and positively. The present research, although not specifically designed to study the relationship of the parents, does appear to lend some support to the notion that the three dyadic relationships among mother, father and infant have a great deal of impact upon each other.

(d) When asked how often they had been out of the house without their baby in the first month (Q:48), twelve mothers indicated they had not yet gone out alone. Only one reported that she had gone out several times per week, while two said they had been out once a week during the month; four had been out alone two or three times and eight had been out only once during the first postpartum month. Using a precoded checklist, fourteen of the mothers who had gone out without their infants indicated how they felt about doing this (Q:49). Eleven indicated that it felt good to be out, but only one felt
she wished she could go out more often than she had. Four mothers indicated that they missed their babies, three worried about them and one wondered if she was doing the right thing by leaving her baby. However, thirteen out of the fourteen were confident that their baby was being well cared for in their absence by either their husbands, relatives or friends.

K. Postpartum Questionnaire — correlations with other measures.

Let us now turn to the relationships found between the Postpartum Questionnaire and other measures, in order to assess the extent to which postpartum attitudes can be predicted from prenatal attitudes, perinatal events and postpartum behaviour.

1. Postpartum Questionnaire — Prenatal Questionnaire

(a) Physical and emotional feelings. Of the seven scales assessing both prenatal and postpartum feelings, only one, "elated"—"depressed", was significantly correlated across time ($r=.40, p<.05$). This would appear to indicate that emotional feelings connected with pregnancy and with the early postpartum period are more situation-specific than they are stable. The number of physical problems reported on the Prenatal Questionnaire was correlated with the number of maternal physical problems reported on the Postpartum Questionnaire ($r=.42, p<.05$), indicating perhaps that physical difficulties during pregnancy may extend through the early postnatal period, or that general poor health may account for physical problems in both periods.

(b) Support of husband. Postpartum report of how having the husband as a partner during labour and delivery had worked out was unrelated to prenatal items which assessed husband's support, as was postpartum report of how much the husband participated in infant care. However, how confident the husband was judged to be in caring for the infant was positively related to prenatal maternal prediction of mother-infant attachment ($r=.43, p<.05$), and negatively
correlated with mother's clear prenatal picture of what it would be like to have an infant ($r = .51, p < .01$).

(c) **Hospital experiences.** Postpartum report of how easy or difficult labour and delivery had been, and how satisfied mothers had been with their experiences in the caseroom and on the maternity unit were unrelated to prenatal report of how much was learned in, or satisfaction with prenatal classes, or with prenatal expectations of labour and delivery. Postpartum report of satisfaction with experiences in the caseroom was significantly correlated with prenatal report of a planned pregnancy ($r = .58, p < .01$), and prenatal report of initial maternal feelings toward pregnancy ($r = .43, p < .05$); report of satisfaction with experiences on the maternity floor was significantly correlated with prenatal report of a planned pregnancy ($r = .49, p < .01$). Thus although hospital experiences as reported postnatally were unrelated to prenatal expectations of them, they were related to prenatal acceptance of the pregnancy. The acceptance of pregnancy is undoubtedly related to an overall acceptance of the idea of having a baby, which would be an important mediating variable for feelings during the hospital experiences leading up to and following the birth of the baby.

(d) **Confidence in caregiving.** Postpartum estimates of self-confidence in caring for the infant and report of how feeding was progressing were unrelated to items on the Prenatal Questionnaire. How long the mother planned to nurse her infant (reported postnatally) was significantly correlated with prenatal report of how much had been learned in, and satisfaction with, prenatal classes ($r = .62, p < .01; r = .52, p < .05$, respectively), and was also related to the mother's feelings toward pregnancy in the third trimester ($r = .43, p < .05$) and to her prenatal expectations of labour and delivery ($r = .44, p < .05$). Thus, the longer a mother was planning to nurse her infant, the more positive her prenatal feelings had been. It might be hypothesized from these findings
that intention to continue nursing is determined as much prenatally (by becoming enthusiastic about it in prenatal classes, and by being generally positive in feelings toward the pregnancy and therefore toward the idea of having a baby), as it is by the actual day-to-day experiences of breastfeeding during the early postpartum period.

The mother's postpartum report of her ability to understand her infant's signals was significantly related to her prediction prenatally of her ability to do so ($r=.39, p<.05$), which lends some support to the idea that prenatal expectations with regard to child care may be related to actual postpartum behaviour. The mother's postpartum report of how much difficulty she experienced in quieting her crying infant, however, was found to be unrelated to any of the prenatal items. This is perhaps less surprising if one recalls that prenatally, mothers tended to have a rather positive (perhaps unrealistic) picture of what their infant would be like.

(e) Role of the infant. Postpartum items assessing the role of the infant in the mother's life -- the restrictions on her work/school and social life, changes in her relationship with her husband, and how much she had gone out without the baby -- were found to be unrelated to items predicting these sorts of changes on the Prenatal Questionnaire. It would therefore appear that the kinds of changes the mother would have to make in her life to accommodate to her infant are quite unanticipated during the prenatal period.

(f) Parent-infant attachment. Prenatal prediction of mother-infant attachment was significantly correlated with postpartum estimates of mother-infant attachment ($r=.62, p<.01$), infant-mother attachment ($r=.42, p<.05$), and infant-father attachment ($r=.42, p<.05$). In addition, prenatal prediction of infant-mother attachment was significantly correlated with postpartum report of perceived infant-mother attachment ($r=.42, p<.05$). Postpartum report of the mother's feeling that her infant was really hers soon
after birth was significantly correlated with mother's prenatal feelings toward pregnancy after she got used to the idea that she was pregnant ($r = .39$, $p < .05$) and during the third trimester of pregnancy ($r = .39$, $p < .05$).

Thus it would appear that although the mother-to-be was unable to predict many things about the postpartum period, including how restricted she would be by having a new infant, she was well able to predict her own and her infant's attachment (maternal prediction of father's attachment was not included in the Prenatal Questionnaire). Thus, perhaps the most important kinds of prediction, that is, how close mother and infant would be to one another, were successfully made by these women about to have their first child.

2. Postpartum Questionnaire — Chart Variables and Diary

Items on the Postpartum Questionnaire were not systematically related to Chart or Diary variables, although a few interesting patterns did emerge. Postpartum plan to continue breastfeeding was found to be correlated with duration of labour, type of delivery, and infant outcome ($r = .60$, .63, $p < .01$ for both; $r = .52$, $p < .05$, respectively) such that planning to breastfeed for a longer period was related to a longer labour, a more difficult delivery (i.e. caesarian section), and the initial admission of the infant to the Intensive Care Nursery. A possible explanation for this may be that the longer labour, difficult delivery, and the initial separation of mother and infant may have engendered greater concern on the part of the mother for the infant's health and well-being, which would in turn predispose her to nurse her baby for a longer period of time, as if to help make up for any difficulties caused by the birth experience.

The second correlation of particular interest is that between maternal postpartum estimate of mother-infant attachment and the proportion of time spent with the infant in the first twelve hours after birth ($r = .66$, $p < .05$) such that a report of greater attachment between mother and infant was related
to fewer hours spent together in the first twelve hours after the birth. These
two correlations are supported by a third correlation between number of hours
spent together in the first twelve hours after the birth. These two correla-
tions are supported by a third correlation between number of hours spent
together and the mother's postpartum report of when she felt the baby was
really hers ($r = .69$, $p < .01$).

Again, a smaller proportion of time spent together was related to the
mother's feeling that the baby was really hers quite soon. These results
appear to be contrary to what would be expected if the conclusions drawn
concerning the work of Klaus and Kennell (1976) are correct. That is, it has
been asserted on the basis of the research of Klaus and Kennell and their
colleagues (e.g., Kennell, Jerauld, Wolfe, Chester, Kreger, McAlpine, Steffa
& Klaus, 1977) that the course of mother-infant bonding is facilitated by
allowing the mother and infant to be together after the birth and during the
first twelve hours of the infant's life. These conclusions have been
questioned earlier in this paper on the basis of sampling bias and
methodological problems, and recently, Klaus (1978) has indicated that the
popularly-supported conclusion that the first few hours after birth were
all-important to the future relationship of mother and baby is counter-
intuitive and cannot be supported by thoughtful consideration of the research
upon which it is based. In the present research, items concerning the amount
of time mother and infant spent together after birth were included in the
Diary specifically in order to gather information concerning this issue. Just
as it would be unwise to conclude that the first twelve hours after birth are
of paramount importance to the mother-infant relationship had the signs of
the correlations been negative, it would be equally unwise to conclude on
the basis of the signs of the correlations which were found that the first
twelve hours of the infant's life are of no importance to the mother-infant
relationship. Without doubt, the situation is a great deal more complicated, and various interactions may be at work which would enhance or vitiate the importance of the first few postpartum hours for any individual mother-infant pair.

3. Postpartum Questionnaire -- Maternal Composites

The Postpartum Questionnaire does not appear to be systematically correlated with the observed Maternal Composites, which are derived from observed maternal behaviour at one month postpartum. Physical and emotional feelings, reports of experiences in hospital, husband's support, caregiving practices and variables related to the role of the infant in the mother's life were all found to be unrelated to the Maternal Composites. One set of Postpartum Questionnaire items, those concerning maternal perception of parent-infant attachment, does appear to be related to some of the Maternal Composites. Although reported mother-infant attachment was found to be correlated with the Maternal Composites Physical Contact ($r=-.48$, $p>.01$), Tactile Engagement ($r=-.39$, $p<.05$), and overall Social Engagement ($r=-.39$, $p<.05$), such that report of closer attachment was related to a greater amount of observed maternal social and tactile behaviour, and to less observed physical contact. Maternal estimation of father-infant attachment was found to be correlated with observed maternal Visual Engagement ($r=-.38$, $p<.05$) and observed Caregiving ($r=.43$, $p<.05$) such that mother's report of closer attachment of father to infant was related to more observed maternal visual behaviour toward the infant and to less observed maternal caregiving behaviour. Although these correlations are somewhat sparse, parent-infant attachment as reported by the mother does appear to have some basis in fact; that is, it does appear to be related to actual observed maternal behaviour. Response to the postpartum question concerning the mother's ability to quiet her crying infant was found to be correlated with observed Physical Contact and Tactile
Engagement ($r=-.61, -.58$ respectively, $p<.01$ for both) such that maternal report of ease in quieting the infant was related to more observed physical contact and tactile behaviour.

4. **Postpartum Questionnaire — Maternal Ratings** (Table 21)

As was found with the Maternal Composites, there are only a few groups of Postpartum Questionnaire items which were systematically related to the maternal Rating Scales. (Note: Generally, more positive responses on the Postpartum Questionnaire have been given lower scores (e.g., one out of five), while the more positive Maternal Rating scores are high (e.g., nine out of nine). Thus, negative correlations would indicate that more positive responses to the questionnaire items are related to more positive scores on the Maternal Rating scales. Consistent with earlier practice, the signs of the correlations in Table 21 and in the text have been reflected to avoid confusion.)

Postpartum maternal perceptions of mother-infant and infant-mother attachment were found to be correlated with several of the Maternal Rating scales: Perception of the infant ($r=.61, .44$, $p<.05$ for both), amount of physical contact ($r=.40, .43$, $p<.05$ for both), effectiveness of response to infant crying ($r=.48, .57$, $p<.01$ for both), amount of visual contact ($r=.55, .50$, $p<.01$) and the total Maternal Rating score ($r=.49, p<.01; r=.37, p<.05$). Perception of mother-infant attachment was found to be correlated with amount of auditory contact ($r=.40, p<.05$) and encouragement of sensorimotor development ($r=.46, p<.05$). In addition, maternal perception of infant-mother and infant-father attachment was correlated with rated availability of the mother to the infant ($r=.42, .46$, respectively, $p<.05$ for both). Again it would appear that maternal self-report of parent-infant attachment is at least somewhat related to an observer's perception of that attachment.

A mother's reported ability to understand her infant's signals was found
to be correlated with maternal perception of the infant ($r = 0.56$, $p < 0.01$), amount of visual contact ($r = 0.42$, $p < 0.05$). Similarly, maternal report that the infant used non-crying rather than only crying signals to communicate with her was found to be correlated with Maternal Ratings for ability to give information about the infant ($r = 0.38$, $p < 0.05$), maternal availability to the infant ($r = 0.44$, $p < 0.05$) and encouragement of sensorimotor development ($r = 0.40$, $p < 0.05$).

(Note: these correlations appear in Table 21 as positive because maternal report of non-crying signals was coded as a higher number than was maternal report of crying signals.) Thus observed maternal sensitivity did show some relationship to maternal self-report of ability to be sensitive to the infant's communications.

Maternal postpartum report of ability to quiet a crying infant was found to be correlated with Maternal Ratings for amount of physical contact ($r = 0.54$, $p < 0.01$), effectiveness of response to infant crying ($r = 0.39$, $p < 0.05$), amount of visual interaction ($r = 0.46$, $p < 0.05$), encouragement of sensorimotor development ($r = 0.41$, $p < 0.05$) and the total Maternal Rating score ($r = 0.47$, $p < 0.05$). The number of different maternal responses to a crying infant was found to be correlated with amount of interaction offered ($r = 0.43$, $p < 0.05$), appropriateness of interaction ($r = 0.57$, $p < 0.01$), amount of physical contact ($r = 0.39$, $p < 0.05$), amount of visual contact ($r = 0.47$, $p < 0.05$), amount of play interaction ($r = 0.46$, $p < 0.05$), stimulus potential of the environment ($r = 0.41$, $p < 0.05$), encouragement of sensorimotor development ($r = 0.43$, $p < 0.05$), and the total Maternal Rating score ($r = 0.47$, $p < 0.05$). Again, self-report of sensitivity and effectiveness of maternal contact were related to observation of actual sensitive and effective behaviour. Generally, it would appear that correlations between the Maternal Rating scales and the Postpartum Questionnaire items lend support to the validity of some of the self-report measures used in this research.
CONCLUSION

The guiding purpose behind this research was to examine the underlying premises of and the methods used in current research on maternal-infant bonding. The specific objectives of this research were twofold: to test measures and instruments for use in studying the attitudes and behaviour which are components of the mother-infant bond, and to provide information which would support the notion that the mother-infant relationship begins prior to the birth of the infant and should legitimately be studied longitudinally, beginning before parturition. The extent to which these two objectives were met will now be evaluated.

Evaluation of Instruments

Prenatal Questionnaire. The Prenatal Questionnaire was designed to assess prenatal attitudes, expectations and preparation for birth, infant care and the parental role. The information gained from this instrument provided a profile of the expectant parent, and gave some insight into the specific concerns and problems of parents expecting their first baby. It is interesting that the importance of many of these concerns, e.g., the thoroughness of prenatal class preparation, or the realistic anticipation of needing help at home after the baby's birth, did not become evident to the parents until the postpartum period. Although the factor analysis of the Prenatal Questionnaire did not completely confirm the choice and organization of items in the Questionnaire, it did provide an indication that there are several constellations of attitudes or expectations which are salient to the expectant parent. Probably the most valuable aspect of the Prenatal Questionnaire was the set of items concerned with prediction of parent-infant attachment, which were found to predict well to various postpartum measures. A valuable addition to this instrument would be a systematic method for coding open-ended questions
regarding the expectant parent's own views of parent-infant attachment, including the forms they would expect that attachment to take, and the stages through which they would expect the attachment to progress.

Another valuable addition to a Prenatal Questionnaire or interview would be a method of assessing the nature and style of the spouse relationship. Other researchers have begun to explore the parent-infant triad, and have found in preliminary results that the spouse relationship is a factor in both the mother-infant and father-infant relationships (Parke, O'Leary & West, 1972; Parke & Sawin, 1976; Pedersen, Anderson and Cain, 1977; Soule, 1974; Weinraub, 1978; Yarrow, 1974). It would be especially valuable to know whether interactive styles generalize from the spouse relationship to the parent-infant relationships, as this would provide another window into the nature of close relationships.

Infant Temperament Prediction and Report. The Infant Temperament Prediction and Report were designed to assess parental expectations and perception of the infant's temperament or style. Empirical tests of this instrument have shown that their reliability is generally not high, and the fact that very little relationship was found between both ITP and ITR and other questionnaires and measures used in this study would seem to indicate that they did not add much information to the data collected in other ways. The main finding obtained for these two measures was the lack of correlation between them, indicating that the reality of infant temperament and infant functioning comes as a surprise to new parents, and has little to do with their prenatal expectations. The disconfirmation of these expectations is no doubt a factor in other aspects of parent-infant interaction; however, the present research did not attempt to measure that impact.

Hospital Chart and Diary Variables. Information regarding the course of labour and delivery, perinatal medication, infant outcome and postpartum
medication was taken from hospital charts in order to determine what contribution these factors made to the overall mother-infant relationship. Although birth experiences and the early postpartum period could not possibly be considered to be unimportant in the development of the maternal-infant relationship, the variables measured were not found to be highly related to either direct observation of mother-infant interaction, subjective ratings of maternal behaviour, or self-report of maternal adjustment. It is possible that the influences of the perinatal-early postnatal period fade over the first month of the infant's life as day-to-day activities and events take on more importance. Observations of mother-infant interaction in the early postpartum period (i.e., while mother and infant are still in hospital) would probably be helpful in clarifying the role of perinatal events in the development of maternal attachment.

The Hospital Diary was a self-report measure designed to provide information about the amount of mother-infant contact experienced during the hospital stay. In its present form, the Diary was found to be inconvenient for subjects to use; possibly in its revised form it would make a more important contribution to the research. Some evidence was found, however, which called into question the conclusions of several maternal-infant bonding research projects, namely that maternal-infant contact in the very early postpartum period is essential for the optimal development of the mother-infant bond. In this way, despite its inadequacies, the Diary provided some valuable information for this research project.

Postpartum Questionnaire. The Postpartum Questionnaire was designed to assess postpartum experiences with the infant, various aspects of infant care, and maternal adjustment to the parental role. Like the Prenatal Questionnaire, it provided a profile of the new parent. The results indicated that concern about feeding and feeding problems dominated maternal perception of the first
month of the infant's life. As was the case for the Prenatal Questionnaire, the most valuable items on this instrument were those dealing with the development and progress of parent-infant attachment; responses to these items were found to be related to independent assessments of mother-infant interaction and maternal behaviour. Especially important was the fact that prenatal predictions of parent-infant attachments were found to be related to postpartum maternal perception of those relationships. It cannot be ascertained from the data whether this correlation is a function of a general attitude on the part of the mother which spans the prenatal to the postpartum period and is not strongly influenced by actual experiences with the infant, or whether a positive expectation in the prenatal period in some way influences the mother's actual behaviour with the infant, which in turn influences the development of mother-infant, father-infant, infant-mother, and infant-father relationships. Independent assessments of infant functioning, using an instrument such as the Brazelton Neonatal Assessment Scale (Brazelton, 1973) and a series of observations of mother-infant interaction throughout the early postpartum period would be required in order to evaluate these hypotheses.

It is interesting that prenatal predictions regarding both changes in maternal social and professional life, as well as changes in the marital relationship, were found to be unrelated to postpartum reports of changes in those aspects of the mother's life. This lack of correlation lends more evidence to the notion that, no matter how complete an expectant parent's picture of life with a first infant might be, the reality of that life comes as a surprise. Notes made after postpartum interviews show over and over again how often a new mother would preface her remarks by saying, "I simply had no idea... (how tired I would be; how difficult it would be to get nursing established; how much my baby would cry; how little my baby would sleep, etc.)." It would appear that the transition from expectant parenthood
to actual parenthood is characterized more by change than by continuity of expectations or attitudes. Again the point should be made that this lack of continuity, the disconfirmation of expectations, should be considered as a factor in parental adjustment to a new infant and to the development of the maternal-infant bond. Instruments developed for future research in this area must include some way of measuring this type of change, and a way to assess the impact of change on the developing mother-infant relationship.

Behavior Record and Maternal Composites. The instrument designed for this research which showed the most promising results was the Behavior Record. A time-sampling system to observe naturalistic mother-infant interaction was found to be practical, and yielded valuable information when the individual behaviours were grouped together in behavioural composites which were determined a priori. These Composites were found to be related to items on the Prenatal Questionnaire which were concerned with maternal perception of parent-infant attachment, as well as with other items concerned with self-confidence in caregiving ability and awareness of forthcoming change in the marital relationship which might be a function of the duties associated with a new infant.

As will be discussed below, the Maternal Composites were also found to be related to the Maternal Rating scales and this relationship can be seen as lending validity to the observational system. It would be important, however, to test the observational system empirically to determine whether it would discriminate between groups of mothers found to be different using independent measures, e.g., abusive versus normal parents.

A problem associated with all observational systems is that specific behaviours must be grouped together if meaningful data are to be derived. Thus, it is almost inevitable that various sorts of vocalizations, for example, are grouped together under one category, "Vocalization", and the qualities of
different types of vocalization are lost in the attempt to collect analyzable data. Qualitative distinctions among types of vocalizations (e.g., negative versus positive) would be possible, but this would require the observer to make split-second judgments about any given vocalization while also attempting to record other behaviors which occur simultaneously with the vocalizations. In a system involving fifteen-second intervals, the observer is quite taxed to record accurately all behavior occurring during one interval without also having to make such judgments. The addition of tape-recording equipment which would help with this problem would sacrifice the non-intrusive aspects of this system.

To use a specific example to illuminate these problems, in the present system, certain easily identifiable types of vocalizations were included, such as use of a name or nickname, and maternal requesting of a response from the infant. Invariably, however, problems of interobserver agreement would center around the criteria for such categories as "request response", and the attempt to agree upon an adequate operational definition often resulted in either the inclusion of behavior which was not felt to be satisfying the original criteria, or the exclusion of behavior which clearly had the characteristics of a "request". However, this category, and several others discussed previously, were found to contribute a great deal to the observational system in terms of quality of behavior, and attempts to capture this quality would be lost if only easily definable and identifiable behaviors were included in the observation schedule.

It is nevertheless this quality of behavior which is important for analysis of individual behavioral styles, and which lends so much information to the overall research. Attempts to record this kind of quality should not be abandoned, and indeed, the success of the Maternal Rating Scales, in terms of relationships found between the scales and other measures, is further
evidence that attempts to illuminate quality of behaviour are worthwhile.

Maternal Rating Scales. The Maternal Rating Scales were included in the study to provide a subjective, "clinical" judgment of maternal behaviour which would supplement the objective observations of interactive behaviour. One of the most valuable aspects of the scales is that they are concerned with more than merely the behaviour which can be observed in an objective observation; by using the scales, the researcher can take into account the "tone" of the entire situation, which includes but is not limited to observable bits of behaviour. The warmth and closeness the mother shows toward her infant are often evident in her tone of voice, and the specific kinds of things she says while talking to her infant and while talking about the infant. The scales provided a great deal of information which would have been lost had there been no "subjective" way to capture it. In addition, the validation of the observational data through the numerous and substantial correlations found between the Maternal Composites and the Rating Scales was valuable.

It is also quite encouraging that the Maternal Rating Scales were found to be related to various infant behaviours; this relationship should be pursued in subsequent research, in order to provide more information about the interactive, "spiraling" nature of the mother-infant relationship.

The first goal of this research appears to have been accomplished. We are left with two questionnaires, a behavioural observation system and a set of rating scales which have been able to provide a great deal of information for the study of the maternal-infant relationship and which are meaningfully related to one another.

Longitudinal Research of the Mother-Infant Relationship

Evidence has been provided which shows that there are important aspects of the mother-infant relationship which begin before the birth of the infant.
and which may affect the course of development of the mother-infant bond. Specifically, the prediction of a pregnant woman regarding her anticipation of the attachments which will develop between herself and her infant has been shown to be related to her report of these attachments and to observation of her attachment behaviour once the infant is born. These results require replication, of course, but they appear robust enough to provide vindication for the longitudinal design of this research and an indication that future research in the area of maternal-infant bonding should be designed to include data collection in the prenatal period.

The relationship found between prenatal prediction and postpartum report and behavioural observation of the maternal-infant bond lends support to the notion of the "maternal promise" or commitment discussed in the Introduction. This commitment was described as having two aspects, a cognitive one in which an intentional choice is made to become involved with the infant, and an emotional one in which strong love for the infant is expressed. Surely the emotional tie is preceded, or at least accompanied by, the cognitive component. And surely one part of the cognitive aspect in the maternal-infant relationship must be the acceptance of the pregnancy and the coming baby, and a prenatal anticipation of a relationship with the infant. These prenatal anticipations have been shown to be related to the actual mother-infant relationship both as observed and as reported by the mother. This prenatal "pre-adjustment" may be the beginning of the durable nature of the mother-infant bond which makes it possible for this bond to "endure through time" (Klaus and Kennell, 1976, p. 2) and persist throughout physical separation. The research reported here lends credence to the idea that the mother-infant relationship is characterized by continuity which does begin in the prenatal period, that the commitment the mother makes to her infant has its foundation in her adjustment to and acceptance of the infant who will soon be a part of her
life. The present research suggests that, in order to understand the nature and individual variation of the mother-infant bond, its foundations as well as its manifestations must be explored. Thus the second goal of this research, the search for empirical support for the notion that the mother-infant relationship should be studied longitudinally, has been accomplished.
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### Table 1
Prenatal Questionnaire
Demographic Variables

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<th>Questionnaire Group $\bar{X}$</th>
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<td>Mother</td>
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<td>Father</td>
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<tr>
<td>Length of common residence (in months)</td>
<td>45.4</td>
<td>44.3</td>
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<sup>a</sup>Hollingshead Code for occupation is used (Hollingshead, 1957).
### Table 2

**Prenatal Questionnaire**

**Correlation Among Reported Physical and Emotional Feelings**

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<th>comfortable</th>
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<th>curious</th>
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<tr>
<td>comfortable</td>
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<td></td>
</tr>
<tr>
<td>content</td>
<td></td>
<td>.52**</td>
<td>.43*</td>
<td>.49**</td>
<td></td>
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</tr>
<tr>
<td>elated</td>
<td>.43*</td>
<td></td>
<td>.51**</td>
<td></td>
<td>.42*</td>
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<tr>
<td>curious</td>
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*Note: only statistically significant correlations are shown*

*p < .05

**p < .01
Table 3
Prenatal Questionnaire
Reported Physical Problems

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<tr>
<th>Problem</th>
<th>Core Group %</th>
<th>Questionnaire Group %</th>
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<tr>
<td><strong>Mild</strong></td>
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<tr>
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<td>fluid retention</td>
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<tr>
<td><strong>Moderate</strong></td>
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<td></td>
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<tr>
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<tr>
<td>anxiety</td>
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<td>8</td>
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<tr>
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<td>5</td>
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<tr>
<td><strong>Serious</strong></td>
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<td>8</td>
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<tr>
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<td>10</td>
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<tr>
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<td>kidney disease</td>
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</tr>
<tr>
<td>diabetes</td>
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<td>0</td>
</tr>
<tr>
<td><strong>Mean number reported</strong></td>
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<td>2.54</td>
</tr>
<tr>
<td><strong>Mean scaled score</strong></td>
<td>2.41</td>
<td>2.60</td>
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Table 4
Prenatal Questionnaire

Correlations Among Items Assessing Feelings Toward the Pregnancy

<table>
<thead>
<tr>
<th>Pregnancy Planned</th>
<th>Wife's Feelings</th>
<th>Husband's Feelings</th>
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<tbody>
<tr>
<td></td>
<td>At First</td>
<td>Later</td>
</tr>
<tr>
<td>Pregnancy planned</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Wife's Feelings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At First</td>
<td>.70**</td>
<td>--</td>
</tr>
<tr>
<td>Later</td>
<td>.50**</td>
<td>--</td>
</tr>
<tr>
<td>Third Trimester</td>
<td>.46**</td>
<td>--</td>
</tr>
<tr>
<td>Husband's Feelings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At first</td>
<td>.51**</td>
<td>.53**</td>
</tr>
<tr>
<td>Later</td>
<td>.44*</td>
<td>--</td>
</tr>
<tr>
<td>Third trimester</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: only statistically significant correlations are shown.

*p < 0.05

**p < 0.01

all others:  p < 0.10
Table 5
Prenatal Questionnaire
Correlations Among Items Assessing Support of Husband

<table>
<thead>
<tr>
<th></th>
<th># Prenatal Classes Attended</th>
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<tbody>
<tr>
<td></td>
<td>Wife</td>
</tr>
<tr>
<td>Labour</td>
<td></td>
</tr>
<tr>
<td>Wife's desire for partner</td>
<td>--</td>
</tr>
<tr>
<td>Plan for partner</td>
<td>--</td>
</tr>
<tr>
<td>Delivery</td>
<td></td>
</tr>
<tr>
<td>Wife's desire for partner</td>
<td>.47*</td>
</tr>
<tr>
<td>Plan for Partner</td>
<td>--</td>
</tr>
<tr>
<td>Partner's enthusiasm</td>
<td>--</td>
</tr>
<tr>
<td>Husband to care for infant</td>
<td>.64**</td>
</tr>
<tr>
<td>Husband's preparation for infant care</td>
<td>.52**</td>
</tr>
</tbody>
</table>

Note: only statistically significant correlations are shown

* p < .05
** p < .01
all others: p < .10
Table 6

Prenatal Questionnaire

Items Included in Factor Analysis

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Variance</th>
<th>Original communality (squared multiple correlation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:1 energetic</td>
<td>1.308</td>
<td>0.333</td>
</tr>
<tr>
<td>relaxed</td>
<td>1.326</td>
<td>0.507</td>
</tr>
<tr>
<td>comfortable</td>
<td>1.711</td>
<td>0.447</td>
</tr>
<tr>
<td>content</td>
<td>1.808</td>
<td>0.579</td>
</tr>
<tr>
<td>curious</td>
<td>1.200</td>
<td>0.523</td>
</tr>
<tr>
<td>A:2 Total physical problems</td>
<td>2.033</td>
<td>0.641</td>
</tr>
<tr>
<td>A:3 Scaled physical problems</td>
<td>2.031</td>
<td>0.551</td>
</tr>
<tr>
<td>A:12 Satisfaction - prenatal classes</td>
<td>1.039</td>
<td>0.701</td>
</tr>
<tr>
<td>A:13 Amount learned - prenatal classes</td>
<td>1.381</td>
<td>0.705</td>
</tr>
<tr>
<td>A:14 No. books read - prenatal class</td>
<td>1.417</td>
<td>0.503</td>
</tr>
<tr>
<td>A:16 Plan to return to work</td>
<td>0.807</td>
<td>0.707</td>
</tr>
<tr>
<td>A:17 When plan to return to work</td>
<td>2.469</td>
<td>0.744</td>
</tr>
<tr>
<td>A:18 Pregnancy planned</td>
<td>2.573</td>
<td>0.605</td>
</tr>
<tr>
<td>A:19 Wife felt first</td>
<td>1.243</td>
<td>0.542</td>
</tr>
<tr>
<td>A:20 Wife felt later</td>
<td>0.533</td>
<td>0.611</td>
</tr>
<tr>
<td>A:21 Wife felt third trimester</td>
<td>0.390</td>
<td>0.589</td>
</tr>
<tr>
<td>A:23 Husband felt first</td>
<td>1.059</td>
<td>0.609</td>
</tr>
<tr>
<td>A:24 Husband felt later</td>
<td>0.540</td>
<td>0.807</td>
</tr>
<tr>
<td>A:25 Husband felt third trimester</td>
<td>0.410</td>
<td>0.788</td>
</tr>
<tr>
<td>A:26 Pregnancy changed life style</td>
<td>1.759</td>
<td>0.561</td>
</tr>
<tr>
<td>A:30 Expectation of labour &amp; delivery</td>
<td>0.985</td>
<td>0.411</td>
</tr>
<tr>
<td>A:36 Partner's feelings</td>
<td>0.890</td>
<td>0.562</td>
</tr>
<tr>
<td>A:37 What infant in hospital room</td>
<td>1.084</td>
<td>0.562</td>
</tr>
<tr>
<td>A:38 Want infant right after birth</td>
<td>1.133</td>
<td>0.380</td>
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<tr>
<td>A:39 Wife preparation for child care</td>
<td>0.756</td>
<td>0.608</td>
</tr>
<tr>
<td>A:41 Husband preparation for child care</td>
<td>1.074</td>
<td>0.560</td>
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Table 6 (Continued)
Prenatal Questionnaire
Items Included in Factor Analysis

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Variance</th>
<th>Original communality (squared multiple correlation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:42 Need help at home</td>
<td>1.527</td>
<td>0.399</td>
</tr>
<tr>
<td>A:47 Can baby signal needs</td>
<td>0.083</td>
<td>0.577</td>
</tr>
<tr>
<td>A:49 Mother-infant attachment</td>
<td>0.778</td>
<td>0.383</td>
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<tr>
<td>A:50 Infant-mother attachment</td>
<td>1.103</td>
<td>0.724</td>
</tr>
<tr>
<td>A:51 Infant-father attachment</td>
<td>1.309</td>
<td>0.684</td>
</tr>
<tr>
<td>A:53 No. books read</td>
<td>2.394</td>
<td>0.468</td>
</tr>
<tr>
<td>A:56 Picture of infant</td>
<td>0.825</td>
<td>0.517</td>
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<tr>
<td>A:57 Experience with infants</td>
<td>1.796</td>
<td>0.333</td>
</tr>
<tr>
<td>A:59 Infant restrict work</td>
<td>2.181</td>
<td>0.376</td>
</tr>
<tr>
<td>A:59 Infant restrict social</td>
<td>1.305</td>
<td>0.511</td>
</tr>
<tr>
<td>A:60 Concern for spoiling infant</td>
<td>1.629</td>
<td>0.577</td>
</tr>
<tr>
<td>A:62 Relationship with husband</td>
<td>1.591</td>
<td>0.390</td>
</tr>
<tr>
<td>Wife's age</td>
<td>19.320</td>
<td>0.520</td>
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<tr>
<td>Wife's education</td>
<td>5.444</td>
<td>0.533</td>
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</table>
Table 7

Prenatal Questionnaire

Eigenvalues and Percent Variance Accounted for in Ten Factor Solution

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue of Minres Solution</th>
<th>Percent Variance Accounted for</th>
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<tbody>
<tr>
<td>I</td>
<td>3.9195</td>
<td>9.7988</td>
</tr>
<tr>
<td>II</td>
<td>2.6592</td>
<td>6.6479</td>
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<tr>
<td>III</td>
<td>1.9920</td>
<td>4.9800</td>
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<tr>
<td>IV</td>
<td>1.6860</td>
<td>4.2151</td>
</tr>
<tr>
<td>V</td>
<td>1.6022</td>
<td>4.0055</td>
</tr>
<tr>
<td>VI</td>
<td>1.4257</td>
<td>3.5642</td>
</tr>
<tr>
<td>VII</td>
<td>1.3508</td>
<td>3.3769</td>
</tr>
<tr>
<td>VIII</td>
<td>1.0861</td>
<td>2.7153</td>
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<tr>
<td>IX</td>
<td>1.0375</td>
<td>2.5939</td>
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<tr>
<td>X</td>
<td>.9473</td>
<td>2.3682</td>
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Table 8
Prenatal Questionnaire
Factors and Rotated Factor Loadings

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<th>Loading</th>
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<tbody>
<tr>
<td>I</td>
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</tr>
<tr>
<td>Wife felt first (A:19)</td>
<td>.55</td>
</tr>
<tr>
<td>Husband felt first (A:23)</td>
<td>.62</td>
</tr>
<tr>
<td>Pregnancy planned (A:18)</td>
<td>.76</td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Husband preparation for child care (A:41)</td>
<td>.39</td>
</tr>
<tr>
<td>Husband felt later (A:24)</td>
<td>.77</td>
</tr>
<tr>
<td>Husband felt third trimester (A:25)</td>
<td>.72</td>
</tr>
<tr>
<td>Want infant in hospital room (A:37)</td>
<td>.47</td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td>Wife felt later (A:20)</td>
<td>.79</td>
</tr>
<tr>
<td>Wife felt third trimester (A:21)</td>
<td>.70</td>
</tr>
<tr>
<td>Mother-infant attachment (A:49)</td>
<td>.41</td>
</tr>
<tr>
<td>Curiosity (A:1)</td>
<td>.37</td>
</tr>
<tr>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>Total physical problems (A:2)</td>
<td>.70</td>
</tr>
<tr>
<td>Scaled physical problems (A:2)</td>
<td>.58</td>
</tr>
<tr>
<td>Content (A:1)</td>
<td>.47</td>
</tr>
<tr>
<td>Relaxed (A:1)</td>
<td>.35</td>
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<tr>
<td>Comfortable (A:1)</td>
<td>.35</td>
</tr>
<tr>
<td>Expectation of labour and delivery (A:30)</td>
<td>.21</td>
</tr>
<tr>
<td>No. books read (A:53)</td>
<td>-.30</td>
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<tr>
<td>Wife's age</td>
<td>-.38</td>
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<tr>
<td>V</td>
<td></td>
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<tr>
<td>Amount learned - prenatal class (A:13)</td>
<td>.83</td>
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<tr>
<td>Satisfaction - prenatal class (A:12)</td>
<td>.81</td>
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<tr>
<td>VI</td>
<td></td>
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<tr>
<td>Infant-mother attachment (A:50)</td>
<td>.81</td>
</tr>
<tr>
<td>Infant-father attachment (A:51)</td>
<td>.80</td>
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<tr>
<td>Partner's enthusiasm (A:36)</td>
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</table>

cont'd....
Table 8 (Continued)

Prenatal Questionnaire

Factors and Rotated Factor Loadings

<table>
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<th>Factor</th>
<th>Loading</th>
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</thead>
<tbody>
<tr>
<td>VII</td>
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<tr>
<td>Need help at home (A:42)</td>
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<tr>
<td>Experience with infants (A:57)</td>
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<td>Wife's education</td>
<td>.39</td>
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<tr>
<td>Picture of infant (A:56)</td>
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<td>VIII</td>
<td></td>
</tr>
<tr>
<td>Plan to return to work (A:16)</td>
<td>.53</td>
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<tr>
<td>When plan to return to work (A:17)</td>
<td>.96</td>
</tr>
<tr>
<td>IX</td>
<td></td>
</tr>
<tr>
<td>Pregnancy changed life style (A:26)</td>
<td>.65</td>
</tr>
<tr>
<td>Energetic (A:1)</td>
<td>.32</td>
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<tr>
<td>Infant restrict work (A:59)</td>
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</tr>
<tr>
<td>Infant restrict social (A:59)</td>
<td>-.54</td>
</tr>
<tr>
<td>Infant change marital relationship (A:60)</td>
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<tr>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Can baby signal needs (A:47)</td>
<td>.50</td>
</tr>
<tr>
<td>No. books read – prenatal class (A:14)</td>
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</tr>
<tr>
<td>Want infant after birth (A:38)</td>
<td>-.32</td>
</tr>
<tr>
<td>Concerned with spoiling infant (A:60)</td>
<td>-.69</td>
</tr>
<tr>
<td></td>
<td>Infant Temperament Prediction</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------</td>
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<tr>
<td>1.</td>
<td>Sleeping schedule</td>
</tr>
<tr>
<td>2.</td>
<td>Bedtime</td>
</tr>
<tr>
<td>3.</td>
<td>Feeding schedule</td>
</tr>
<tr>
<td>4.</td>
<td>Appetite</td>
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<tr>
<td>5.</td>
<td>Hunger signals</td>
</tr>
<tr>
<td>6.</td>
<td>Diaper change signals</td>
</tr>
<tr>
<td>7.</td>
<td>Clothes change</td>
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<tr>
<td>8.</td>
<td>Both</td>
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<tr>
<td>9.</td>
<td>Stimulation</td>
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<td>10.</td>
<td>Strangers</td>
</tr>
<tr>
<td>11.</td>
<td>New situation</td>
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<td>12.</td>
<td>Amuse self</td>
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<td>13.</td>
<td>New toy</td>
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<tr>
<td>14.</td>
<td>Physical activity</td>
</tr>
<tr>
<td>15.</td>
<td>Mood</td>
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</table>

* $p < .05$

** $p < .01$
Table 10

Behaviour Record

Individual Behaviour Means, Standard Deviations, Frequencies and Inter-observer Agreement

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Mean (^{a})</th>
<th>S.D.</th>
<th>Frequency</th>
<th>Inter-observer agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(No. of subjects for whom behaviour was recorded at least once)</td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>close contact</td>
<td>103.4</td>
<td>50.0</td>
<td>27</td>
<td>.94</td>
</tr>
<tr>
<td>left</td>
<td>38.6</td>
<td>34.3</td>
<td>25</td>
<td>.78</td>
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<td>right</td>
<td>27.9</td>
<td>32.3</td>
<td>20</td>
<td>.94</td>
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<td>lap</td>
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<td>45.5</td>
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<td>.88</td>
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<td>13.1</td>
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<td>.91</td>
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<td>27</td>
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<td>.9</td>
<td>9</td>
<td>.86</td>
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<td>en face</td>
<td>37.0</td>
<td>34.8</td>
<td>25</td>
<td>.95</td>
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<td>eye/eye</td>
<td>31.0</td>
<td>29.3</td>
<td>26</td>
<td>.50</td>
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<td>look</td>
<td>179.6</td>
<td>46.4</td>
<td>27</td>
<td>.93</td>
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<td>monitor</td>
<td>6.8</td>
<td>7.8</td>
<td>18</td>
<td>--</td>
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<td>vocalize</td>
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<td>67.5</td>
<td>27</td>
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<td>5.4</td>
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<td>17</td>
<td>.66</td>
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<td>3.5</td>
<td>19</td>
<td>.55</td>
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<td>7.4</td>
<td>22</td>
<td>.67</td>
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<td>.82</td>
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<td>23.4</td>
<td>27</td>
<td>.68</td>
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<td>pat/stroke</td>
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<td>42.3</td>
<td>27</td>
<td>.87</td>
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<td>play-face</td>
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<td>1.9</td>
<td>8</td>
<td>1.00</td>
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<td>12.6</td>
<td>23</td>
<td>.96</td>
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<td>vestibular stim</td>
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<td>35.9</td>
<td>27</td>
<td>.93</td>
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<td>feed</td>
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<td>.80</td>
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<td>stop feed</td>
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<td>3.1</td>
<td>16</td>
<td>1.00</td>
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<td>22.1</td>
<td>27</td>
<td>.94</td>
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<td>imitate</td>
<td>1.1</td>
<td>1.6</td>
<td>12</td>
<td>.98</td>
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</table>

cont'd....
### Table 10 (Continued)

#### Behaviour Record

**Individual Behaviour Means, Standard Deviations, Frequencies and Inter-observer Agreement**

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Mean a</th>
<th>S.D.</th>
<th>Frequency</th>
<th>Inter-observer agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant</td>
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<tr>
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<td>36.9</td>
<td>26</td>
<td>.85</td>
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<tr>
<td>mother</td>
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<td>4.9</td>
<td>19</td>
<td>.65</td>
</tr>
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Note:  

a) Based on 240 fifteen-second observation intervals  
b) Total possible = 27
Table 11

Correlations Among the Maternal Composites

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<th>Maternal Composites</th>
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Note: only statistically significant correlations are shown

*p < .05    **p < .01    all others:  p < .10
Table 11 (Continued)
Correlations Among the Maternal Composites

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Note: only statistically significant correlations are shown.
*p < .05    **p < .01  all others: p < .10
Table 12  
Correlations Between Maternal Composites and Prenatal Questionnaire Items

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<td>.38</td>
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Note: only statistically significant correlations are shown  
*p < .05    **p < .01    all others: p < .10
Table 12 (Continued.)
Correlations Between Maternal Composites and Prenatal Questionnaire Items

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Note: only statistically significant correlations are shown.

*p < .05  **p < .01  all others: p < .10
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Note: only statistically significant correlations are shown

*p < .05  **p < .01  all others:  p < .10
Table 13 (Continued)

Correlations Among Maternal Rating Scale Items

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*p < .05  **p < .01  all others: p < .10

cont'd....
Table 13 (Continued)

Correlations Among Maternal Rating Scale Items

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Note: only statistically significant correlations are shown

*p < .05   **p < .01   all others: p < .10
Table 14
Correlations Between Maternal Rating Scales and Maternal Composites

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Note: only statistically significant correlations are shown

*p < .05  **p < .01  all others: p < .10

cont'd....
Table 14 (Continued)

Correlations Between Maternal Rating Scales and Maternal Composites

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<th>Maternal Rating Scales</th>
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Note: only statistically significant correlations are shown

*p < .05    **p < .01    all others: p < .10
Table 15
Correlation Between Maternal Rating Scales and Infant Behaviour and Infant Outcome

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<th>Infant Outcome</th>
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<td>on objects</td>
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<tr>
<td>Delight</td>
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<tr>
<td>Acceptance</td>
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<td>---</td>
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<tr>
<td>Information</td>
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<tr>
<td><strong>Feeding</strong></td>
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<td>Synchrony</td>
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<tr>
<td>Amount</td>
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<td>Rate</td>
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Note: only statistically significant correlations are shown
*p < .05  **p < .01  all others:  p < .10
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<th>Acceptance</th>
<th>Information</th>
<th>Feeding Synchrony</th>
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<td>.42*</td>
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<td>--</td>
<td>.41*</td>
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Note: only statistically significant correlations are shown

* < .05     **p < .01     all others: p < .10  
cont'd....
Table 16 (Continued)
Correlations Between Maternal Rating Scales and Some
Prenatal Questionnaire Items

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<th>Appropriateness</th>
<th>Contact Amount</th>
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Note: only statistically significant correlations are shown

*p < .05      **p < .01  all others: p < .10

cont'd....
Table 16 (Continued)
Correlations Between Maternal Rating Scales and Some Prenatal Questionnaire Items

<table>
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<tr>
<td>picture of infant</td>
<td>.48*</td>
<td>.55**</td>
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Note: only statistically significant correlations are shown
*p < .05    **p < .01    all others: p < .10
Table 17

Postpartum Questionnaire

Correlations Among Physical and Emotional Feelings

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<th>Physical and Emotional Feelings</th>
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<th>curious</th>
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Note: only statistically significant correlations are shown.

*p < .05 **p < .01 all others: p < .10
Table 18
Postpartum Questionnaire
Reported Physical Problems

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Table 19
Postpartum Questionnaire
Correlations Among Parent-Infant Attachment Items

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<th>When felt infant really yours</th>
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<td>Father-infant</td>
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<td>.71**</td>
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<td>--</td>
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<td>--</td>
</tr>
<tr>
<td>Infant-Father</td>
<td>--</td>
<td>.43*</td>
<td>.59**</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>When felt infant really yours</td>
<td>.54**</td>
<td>--</td>
<td>.53**</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Only statistically significant correlations are shown

*p < .05       **p < .01
Table 20

Postpartum Questionnaire

Correlations Between Parent-Infant Attachment Items and Other Postpartum Variables.

<table>
<thead>
<tr>
<th>Parent-Infant Attachment</th>
<th>Clarity of infant signals</th>
<th>Ability to quiet infant</th>
<th>Father participation in infant care</th>
<th>No. maternal problems</th>
<th>No. infant problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother-infant</td>
<td>.70**</td>
<td>.37</td>
<td>--</td>
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</tr>
<tr>
<td>Father-infant</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.52**</td>
</tr>
<tr>
<td>Infant-mother</td>
<td>.48**</td>
<td>.45*</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Infant-father</td>
<td>--</td>
<td>--</td>
<td>.44*</td>
<td>-.46*</td>
<td>-.52**</td>
</tr>
<tr>
<td>When felt infant really yours</td>
<td>.40*</td>
<td>.43*</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Only statistically significant correlations are shown

*p < .05       **p < .01     all others:  p < .10
Table 21
Correlations Between Postpartum Questionnaire Items and Maternal Rating Scales

<table>
<thead>
<tr>
<th>Postpartum Questionnaire Items</th>
<th>Parent-infant attachment</th>
<th>Mother-infant</th>
<th>Father-infant</th>
<th>Infant-mother</th>
<th>Infant-father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Rating Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Perception</td>
<td>.61*</td>
<td>--</td>
<td></td>
<td>.44*</td>
<td>--</td>
</tr>
<tr>
<td>Delight</td>
<td>--</td>
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<tr>
<td>Acceptance</td>
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<tr>
<td>Information</td>
<td>--</td>
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<tr>
<td>Feeding</td>
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</tr>
<tr>
<td>Synchrony</td>
<td>--</td>
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<tr>
<td>Amount</td>
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<td>Rate</td>
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<tr>
<td>Availability</td>
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</tr>
<tr>
<td>Availability</td>
<td>--</td>
<td>--</td>
<td>.42*</td>
<td>.46*</td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>--</td>
<td>--</td>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Appropriateness</td>
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<tr>
<td>Contact</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Amount</td>
<td>.40*</td>
<td>--</td>
<td>.43*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Quality</td>
<td>--</td>
<td>--</td>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Response to Cry</td>
<td>.48**</td>
<td>--</td>
<td></td>
<td>.57**</td>
<td>--</td>
</tr>
<tr>
<td>Interaction</td>
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<td>.55**</td>
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<td>.50**</td>
<td>--</td>
</tr>
<tr>
<td>Auditory</td>
<td>.40*</td>
<td>--</td>
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<tr>
<td>Play</td>
<td>--</td>
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</tr>
<tr>
<td>Facilitation</td>
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<td>Stimulus</td>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Encouragement</td>
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</tr>
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<td>--</td>
<td></td>
<td>.37*</td>
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</tr>
</tbody>
</table>

Note: only statistically significant correlations are shown

*p < .05          **p < .01

cont'd.....
Table 21 (Continued)

Correlations Between Postpartum Questionnaire Items and Maternal Rating Scales

<table>
<thead>
<tr>
<th>Maternal Rating Scale</th>
<th>Ability to perceive signals</th>
<th>Type of signals</th>
<th>Ability to quiet infant</th>
<th>No. of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>.56**</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Delight</td>
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<td>--</td>
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<tr>
<td>Acceptance</td>
<td>--</td>
<td>-.38*</td>
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<tr>
<td>Information</td>
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<tr>
<td>Feeding</td>
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<tr>
<td>Synchrony</td>
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<td>Amount</td>
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<td>Rate</td>
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<td>Availability</td>
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<tr>
<td>Availability</td>
<td>--</td>
<td>-.44*</td>
<td>--</td>
<td>-.43*</td>
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<tr>
<td>Interaction</td>
<td>--</td>
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<td>--</td>
<td>-.57**</td>
</tr>
<tr>
<td>Appropriateness</td>
<td>--</td>
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</tr>
<tr>
<td>Contact</td>
<td></td>
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<tr>
<td>Amount</td>
<td>--</td>
<td>--</td>
<td>.54**</td>
<td>-.39*</td>
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<tr>
<td>Quality</td>
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<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Response to Cry</td>
<td>--</td>
<td>--</td>
<td>.39*</td>
<td>--</td>
</tr>
<tr>
<td>Interaction</td>
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<td></td>
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<tr>
<td>Visual</td>
<td>.42*</td>
<td>-.54**</td>
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<td>-.47*</td>
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<td>Auditory</td>
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<td>Play</td>
<td>--</td>
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</tr>
<tr>
<td>Facilitation</td>
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<td>.41*</td>
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<td>-.41*</td>
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<td>Encouragement</td>
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<td>-.40*</td>
<td>.41*</td>
<td>-.43*</td>
</tr>
<tr>
<td>Total Score</td>
<td>.44*</td>
<td>--</td>
<td>.47*</td>
<td>-.47*</td>
</tr>
</tbody>
</table>

Note: only statistically significant correlations are shown

*p < .05          **p < .01
APPENDIX A

PREGNATAL QUESTIONNAIRE

NAME ___________________________ HUSBAND'S NAME ___________________________
ADDRESS ___________________________________ PHONE _________________________

LENGTH OF RESIDENCE TOGETHER ___________________________

EDUCATION: YOURS ___________________________ HUSBAND'S _______________________

OCCUPATION: YOURS ___________________________ HUSBAND'S _______________________

ESTIMATED DATE OF DELIVERY ___________________________ PHYSICIAN _______________________

DATE OF BIRTH: YOURS __________________ HUSBAND'S __________________ Family Doctor

TODAY'S DATE ___________________________ Obstetrician _______________________

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

INSTRUCTIONS: When filling out scales, circle the point which best describes how you feel.

1. Some women feel "better than even" when they're pregnant, some feel worse than they usually do, and some feel about the same as they always did. Although your feelings have probably varied throughout your pregnancy, given your overall health and condition before you became pregnant, how would you say you feel now?

(If you have been having mood swings, feeling, for example, very happy and very unhappy at different times, circle the point which indicates the way you feel overall.)

<table>
<thead>
<tr>
<th>very energetic</th>
<th>normal for me</th>
<th>very tired</th>
</tr>
</thead>
<tbody>
<tr>
<td>very anxious</td>
<td>normal for me</td>
<td>very relaxed</td>
</tr>
<tr>
<td>very happy</td>
<td>normal for me</td>
<td>very unhappy</td>
</tr>
<tr>
<td>very uncomfortable</td>
<td>normal for me</td>
<td>quite comfortable</td>
</tr>
<tr>
<td>content</td>
<td>normal for me</td>
<td>impatient</td>
</tr>
<tr>
<td>depressed</td>
<td>normal for me</td>
<td>elated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>........</td>
</tr>
</tbody>
</table>
curious  normal for me  bored

2. Have you had any physical problems during your pregnancy? (Check off the problems you have had.)
   ___ morning sickness  ___ bleeding  ___ diabetes
   ___ insomnia  ___ toxaemia  ___ fluid retention
   ___ high blood pressure  ___ varicose veins  ___ fatigue
   ___ anxiety  ___ back problems  ___ other _________
   ___ kidney problems

3. When did you first go to see a physician about this pregnancy?
   ___ to confirm pregnancy
   ___ as soon as I know I was pregnant
   ___ fifth month or later
   ___ other ___________________________

4. Have you seen any other health care workers during this pregnancy?
   ___ yes (Specify) __________________________________________
   ___ no

5. Have you attended or are you now attending prenatal classes?
   ___ yes
   ___ no
   **IF YOU DID NOT ATTEND PRENATAL CLASSES, SKIP TO QUESTION 15

6. Where were the classes held, and who sponsored them?
   _______________________________________________________

7. How many of the classes did you attend (or are you planning to attend)?
   ___ 1  ___ more than 4, but not all
   ___ 2-4  ___ all

8. Were the classes open to husbands as well as to wives?
   ___ yes
   ___ no

9. Was your husband interested in going to the classes with you?
   ___ yes
   ___ no
10. If he did go, how many classes did he attend (or does he plan to attend)?

____ 1
____ more than 4, but not all
____ 2-4
____ all

11. What topics did the classes cover?

____ explanation of pregnant woman's body
____ exercises
____ specific labour and delivery exercises
____ information about new born baby
____ information about child care
____ nutrition
____ other (Specify) ____________________________

Are there any other topics not covered in the classes which you would like to have discussed?

__________________________________________________________________________

12. How happy were you with the classes?

| very pleased | quite disappointed |

13. How much did you learn from the classes?

| learned | very little |

a lot

14. Did you read any books that were suggested in the classes?* (Write the titles in the boxes provided and indicate how helpful you felt they were on the scale.)

| TITLES | Very helpful | a waste of time |

| | | |
| | | |
| | | |
| | | |

*For other books not suggested by the classes, see question 53.
15. Were you working and/or going to school before you became pregnant?
   ____ yes, I am still working/going to school
   ____ yes, I worked/went to school until ________ (which month?)
   ____ no

16. If you were working or going to school previously, do you plan to return after the birth of the baby?
   ____ yes
   ____ no
   ____ undecided

17. If you do plan to return to work or school, when do you think you might return?
   ____ 1-3 months
   ____ 3-9 months
   ____ 9-15 months
   ____ 15-24 months
   ____ undecided

18. How much would you estimate that this pregnancy coincided with your plans?

   definitely ________________ totally ________________
   planned ________________ unexpected ________________

19. How did you feel when you learned that you were pregnant?

   very happy ________________ mixed feelings ________________ very unhappy

20. How did you feel when you got used to the idea that you were pregnant?

   very happy ________________ mixed feelings ________________ very unhappy

21. How do you feel now?

   very happy ________________ mixed feelings ________________ very unhappy

22. How did your husband feel when he learned you were pregnant?

   very happy ________________ mixed feelings ________________ very unhappy
23. How did he feel after he got used to the idea that you were pregnant?

| very happy | mixed feelings | very unhappy |

24. How do you think your husband feels now?

| very | mixed feelings | very unhappy |

25. To what extent has being pregnant made changes in your way of life?

| not at all | a great deal |

26. Do you have any preference for a boy or a girl?

| I really want a boy | I have no preference | I really want a girl |

27. Does your husband have any preference?

| He really wants a boy | He has no preference | He really wants a girl |

28. Have you chosen names for the baby yet?

| ____ yes (Write names chosen) | __________ |
| ____ not yet |

29. How do you expect your labour and delivery to be?

| easy | __________ | difficult |

30. Do you feel that the hospital's standard routine is going to be good for you, or are you planning to make some special arrangements with your doctor?

| ____ I haven't thought about it |
| ____ regular hospital routine is all right with me |
| ____ I am planning to make arrangements with my doctor (Specify) |

31. Have you discussed with your doctor the use of drugs during labour and delivery?

| ____ yes |
| ____ no |
32. What decisions have you come to about the use of drugs?

I will leave the decision up to my doctor

| definitely | not unless | undecided | probably | definitely |
| planning not | necessary | to use drugs | will | planning to use some |

33. Would you like to have someone with you during labour other than the hospital personnel?

| very much | undecided | not at all |

   a. Are you planning to have someone with you during labour other than hospital personnel?

| plan to have someone with me | undecided | plan to be on my own |

   b. If you are planning to have someone with you, specify

34. Would you like to have someone with you during delivery other than hospital personnel?

| very much | undecided | not at all |

   a. Are you planning to have someone with you during delivery other than hospital personnel?

| plan to have someone with me | undecided | plan to be on my own |

   b. If you are planning to have someone with you, specify

35. If you are planning to have a partner during labour and delivery, how does that person feel about it?

| quite enthusiastic | willing | not very enthusiastic |

………
36. How much of the time do you think you will want to have the baby in your room while the two of you are in hospital?

as much as
about half
only for
possible
the time
feedings

37. Do you think you will want to have the baby with you right after the birth?

very much
undecided
probably not

38. Do you feel well-prepared to take care of the baby once it is born?

very well
somewhat prepared
very
prepared
unprepared

39. Has your husband expressed any interest in taking care of the baby?

____ yes
____ no

40. If he wants to take care of the baby, how well-prepared do you think he feels to take care of the baby?

very well
somewhat prepared
very
prepared
unprepared

41. Do you anticipate needing help once the baby is home?

a great deal
not at all

42. Have you discussed arrangements for help?

____ Yes (Specify) ____________________________
____ No

43. If you have made arrangements for help, to what extent are you happy with these arrangements?

very satisfied
very unsatisfied
44. How do you plan to feed your baby?
   ___ bottle
   ___ breast
   ___ breast and bottle
   ___ undecided
   ___ haven't thought about it yet

45. If you are planning to breast-feed, how long would you like to continue nursing?
   ___ one or two months
   ___ three or four months
   ___ five or six months
   ___ seven or eight months
   ___ more than eight months
   ___ undecided
   ___ I'll see how it works out

46. Do you think your baby will be able to let you know what she/he needs or wants?
   ___ yes  If yes, how? ____________________________________________
   ___ no

47. If the baby were crying and you knew that she/he had been fed recently and you checked the diapers and they were dry, do you think you would be able to calm the baby down?
   ___ yes  If yes, what would you do? ________________________________
   ___ no

48. When do you think you will develop a strong feeling toward your baby?

   ___ I have right at birth
   ___ within first two weeks
   ___ by a month
   ___ by three months

49. When do you think your baby will develop a strong feeling for you in particular?

   ___ already birth to two weeks
   ___ by a month
   ___ by three months
   ___ six months or later
50. When do you think your baby will develop a strong feeling for his/her father?

<table>
<thead>
<tr>
<th>Birth to two weeks</th>
<th>by a month</th>
<th>by three months</th>
<th>by six months</th>
<th>later than six months</th>
</tr>
</thead>
</table>

51. Have you made arrangements for the baby's arrival?
I plan to:

- [ ] acquire other equipment (Specify) ____________________

I did already:

- [ ] acquire other equipment (Specify) ____________________

52. Have you read any books on pregnancy/childbirth, child care or child development?
(Write the titles in the boxes provided and indicate how helpful you felt they were on the scale.)

<table>
<thead>
<tr>
<th>TITLES</th>
<th>very helpful</th>
<th>a waste of time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

53. Have you been reading any magazine or newspaper articles about pregnancy or child care.

- [ ] yes  From which newspapers or magazines? ____________________
- [ ] no  ____________________
54. In general, how helpful would you say they were?

| very helpful | a waste of time |

55. Do you think you have a clear picture now of what it will be like to have a new baby?

| quite clear | somewhat hazy | quite unclear |

56. Do you have any experience with infants or young children which has given you some idea of what it is like to take care of a baby?

| a lot of experience | no experience |

57. To what extent do you now consult the following sources for information about pregnancy, childbirth, infant behaviour and child care?

- quite often
- rarely

| husband | | | | |
| own mother | | | | |
| own father | | | | |
| husband's mother | | | | |
| husband's father | | | | |
| brothers/sisters | | | | |
| other relatives | | | | |
| friends | | | | |
| books | | | | |
| physician | | | | |
| nurses | | | | |

58. To what extent do you think having a baby will restrict your work/school or social life?

- a great deal
- not at all
59. Are you afraid that your baby might become spoiled?

<table>
<thead>
<tr>
<th></th>
<th>unconcerned</th>
<th>quite concerned</th>
</tr>
</thead>
</table>

60. Once the baby is born, to what extent will you seek advice about child care from the following sources?

<table>
<thead>
<tr>
<th>Source</th>
<th>quite often</th>
<th>rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>husband</td>
<td></td>
<td></td>
</tr>
<tr>
<td>own mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>own father</td>
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<td></td>
</tr>
<tr>
<td>husband's mother</td>
<td></td>
<td></td>
</tr>
<tr>
<td>husband's father</td>
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<td></td>
</tr>
<tr>
<td>brothers/ sisters</td>
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<tr>
<td>other relatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>friends</td>
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61. To what extent do you think your relationships with your husband will change when you have a new baby?

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<th>a great deal</th>
<th>not at all</th>
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If you think that the existence of the new baby will alter your relationship with your husband, in what ways do you think this will happen?

62. What was the size of the family you grew up in? (Include everyone who lived in the house.)

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<td>mother, father, sisters, brothers</td>
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<td>other relatives</td>
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</table>
63. What was the size of the family your husband grew up in? (Include everyone who lived in the house).

#_________ mother, father, sisters, brothers
#_________ other relatives
#_________ others

64. Does your family live near you now? (Specify who lives where):

own family

___________ in the neighbourhood
___________ in the city
___________ within 100 miles
___________ further than 100 miles

husband's family

___________

65. How frequently do you see your family?

own family

___________ nearly every day
___________ more than once a month
___________ about once a month
___________ about once a year
___________ rarely

husband's family

___________
APPENDIX B

INFANT TEMPERAMENT PREDICTION

We know that babies differ in the way they get along with people and how they adjust to their surroundings. Given your own temperament and your husband's temperament, we would like you to predict how you think your baby will react in the following situations. Please circle the choice that you feel best describes what you think your baby will be like.

1. I think my baby will:
   a) quickly establish and stick to a regular pattern of sleeping and waking up
   b) usually have a settled sleeping routine but will sometimes be irregular
   c) have an irregular sleeping pattern, waking and going to sleep as his/her mood dictates

2. I think my baby will:
   a) often resist going to bed at night and for naps
   b) accept being put to bed at night and for naps
   c) be happy and content when he/she is put to bed at night and for naps

3. I think my baby will:
   a) want to be fed on a regular schedule and will become fussy if his/her feeding times are changed
   b) usually want to be fed on a regular schedule but will tolerate some variation of feeding times
   c) want to be fed at all different times, depending upon his/her mood and appetite

4. I think my baby will:
   a) have a big appetite and eat a lot at most feedings
   b) eat a moderate amount at each feeding
   c) eat a small amount at feedings but eat more often

5. When my baby gets hungry, I think he/she will:
   a) cry loudly and demandingly
   b) fuss or cry a bit
   c) just whimper a little to let me know

6. If my baby has a wet or dirty diaper, I think she/he will:
   a) be able to tolerate it for a while without fussing
   b) tolerate it only sometimes
   c) be very fussy until I change her/him

7. When I change my baby's diaper or clothing, I think he/she will:
   a) enjoy it—laugh and smile during the changing
   b) accept it but not especially enjoy it
   c) cry and squirm and resist being changed
Appendix B (cont'd)

8. I think my baby will:
   a) dislike being bathed—kick and fuss the whole time
   b) not mind being bathed
   c) really enjoy being bathed—smile, laugh and play during the bath

9. I think my baby will
   a) enjoy bright lights, colors and sounds
   b) pay little attention to most sights and sounds
   c) be startled or cry when presented with lights, colors and sounds

10. I think my baby will:
    a) be shy of strangers
    b) react the same way to strangers as to familiar people
    c) enjoy seeing new people

11. When I take my baby to a new place or into a new situation, I think she/he will:
    a) accept it and enjoy it within the first few minutes
    b) sometimes accept it and sometimes not, depending on her/his mood
    c) become and remain unhappy or fussy during the new situation

12. When my baby is by him/herself in a crib or playpen, I think he/she will:
    a) be able to amuse him/herself for quite a while
    b) sometimes be able to play by him/herself
    c) indicate a need for attention or new occupation after a few minutes

13. When my baby is given a new toy, I think she/he will:
    a) take it right away and play with it
    b) sometimes take it and play with it, but sometimes reject it
    c) reject or be wary of it for a while

14. With regard to physical activity, I think my baby will:
    a) be quite active most of the time
    b) usually be moderately active
    c) be only mildly active most of the time

15. I think my baby will:
    a) be happy and contented most of the time
    b) have a variable mood
    c) be unhappy and fussy most of the time
APPENDIX C

INFANT TEMPERAMENT REPORT

We know that different babies adjust differently to people and to their surroundings. Even the same baby responds differently at different times. We would like you to describe how your baby reacts to the following situations. Try to think how the baby acts overall, and make your answers reflect the baby's average reaction. Circle the choice that you feel best describes your baby's responses.

1. My baby has:
   a) quickly established and stuck to a regular pattern of sleeping and waking up.
   b) a regular sleeping routine but is sometimes irregular
   c) an irregular sleeping pattern, waking and going to sleep as his/her mood dictates

2. My baby:
   a) often resists going to bed and has a hard time settling down
   b) usually accepts being put to bed but sometimes has a hard time settling down
   c) is usually happy and content when put to bed and settles down right away

3. My baby:
   a) wants to be fed on a regular schedule and becomes fussy if his/her feeding times are changed at all
   b) usually wants to be fed on a regular schedule for can tolerate some variation of feeding times
   c) has no regular schedule for feeding, and wants to be fed at different times, depending upon mood and appetite

4. My baby:
   a) has a big appetite and eats a lot at most feedings
   b) eats a moderate amount at each feeding
   c) eats a small amount at each feeding but needs to be fed more often

5. When my baby gets hungry, she/he:
   a) cries loudly and demandingly
   b) fusses or cries a bit
   c) whimpers just a little to let me know

6. If my baby has a wet or dirty diaper, she/he:
   a) is able to tolerate it for a while without fussing
   b) will tolerate it only sometimes
   c) is very fussy until I change the diaper

7. When I change my baby's diaper or clothing, he/she:
   a) enjoys it—laughs and smiles during the changing
   b) accepts it but does not seem to especially enjoy it
   c) cries and squirms and resists being changed
Appendix C (cont'd)

8. My baby:
   a) dislikes being bathed—kicks and fusses the whole time
   b) doesn't mind being bathed
   c) enjoys being bathed—smiles, laughs and plays during the bath

9. My baby:
   a) enjoys bright lights, colors and different sounds
   b) does not seem to pay much attention to most sights and sounds
   c) is startled and/or cries when presented with lights, colors or sounds

10. My baby:
    a) is shy of strangers
    b) seems to react the same way to strangers as to familiar people
    c) enjoys seeing new people

11. When I take my baby to a new place or into a new situation, she/he:
    a) accepts it and enjoys it within a few minutes
    b) will sometimes accept it and sometimes not, depending on her/his mood
    c) becomes and remains unhappy or fussy during a new situation

12. When my baby is by him/herself in a crib or playpen, he/she:
    a) is able to amuse him/herself for quite a while
    b) is sometimes able to play by him/herself
    c) shows a need for attention or new occupation after a few minutes

13. When my baby is shown a new toy or object, she/he:
    a) takes to it right away and tries to play with it or manipulate it
    b) sometimes takes to it, but sometimes rejects or is wary of it
    c) usually rejects it or is wary for quite a while

14. I would say that my baby is:
    a) quite active most of the time
    b) only moderately active
    c) rather inactive most of the time

15. I would say that my baby is
    a) happy and contented most of the time
    b) variable in his/her moods
    c) unhappy and fussy most of the time
APPENDIX D
DIARY - FIRST 12 HOURS

We would like to have some information about the contact you and your husband had with your new baby in the time immediately following the baby's birth.

1. What time was the baby born? __________________ o'clock.

2. Was the baby with you immediately following birth? ___ Yes ___ No
   If yes, for how long? (estimate if you aren't sure) ______ minutes

3. What did you do with the baby while you were still in the delivery suite? (Check off the appropriate choices)
   ___ Held the baby  ___ Talked to the baby  ___ Other (Specify)
   ___ Touched the baby  ___ Breast-fed the baby

4. Did your husband see the baby immediately following birth?
   ___ Yes ___ No

5. If he did see the baby, what did he do?
   ___ Held the baby  ___ Talked to the baby
   ___ Touched the baby  ___ Other (Specify)

6. When was the next time you saw the baby (After the baby was taken up to the nursery, and you came up to the floor) ____________ o'clock.

7. For how long did you have the baby with you then? ____________ minutes.

8. What did you do with the baby then?
   ___ Held the baby  ___ Talked to the baby  ___ Fed the baby  ___ Other (Specify)
   ___ Touched the baby  ___ Breast
   ___ Bottle

9. How much time would you estimate that you spent with the baby during the first twelve hours after birth? ____________

10. What were your impressions about your birth experience (labour and delivery), the time immediately following the birth, and the first twelve hours after the birth?
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    __________________________________________________________
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**APPENDIX E**

**HOSPITAL DIARY**

- Baby comes in
- Baby in crib
- Baby on my bed
- Holding
- Cuddling
- Playing
- Feeding
- Change diaper
- Bathing
- Just Watching
- Baby sleeps
- I sleep
- Husband comes
- Visitor comes
- Nurse comes
- Baby back to nursery
- Other
185
APPENDIX F
BEHAVIOUR RECORD - OBSERVATION SHEET


APPENDIX G

Behaviour Record: Definitions

Maternal Behaviour.

cl/c (1/r)  Close contact: mother holds infant in her arms, on her
shoulder, or in ventro-ventral contact.
Left (1) or right (r) side.

lap  Lap: mother holds infant on her lap, either sitting while being
held or lying down on her lap; infant's trunk not in
contact with mother's body.

loose/c  Loose contact: infant is not held on mother's arm or on
lap, but a part of mother's body is in contact with
the infant; eg., infant is lying next to mother on
chair or couch, etc.

sec/h  Secure hold: mother holds infant securely in her hands,
away from her own body; eg., to pick up, place on
table, etc.

adj.  Adjusts: mother adjusts clothing, bedding, breast or
bottle for infant's comfort; mother changes infant's
position while holding, e.g., from one breast to
another, or moves infant into a better or more secure
position.

sec  Secures: mother secures infant's position for safety, e.g.,
straps infant to change table or in infant seat,
keeps in contact by using her hand while she looks
for diaper or equipment; or changes infant's position
for safety, e.g., moves infant to far end of changing
table while she goes out of the room.

e/f  En face: mother holds her head in a parallel plane to
infant's face so that her eyes are in a parallel plane
to the infant's eye.

e/e  Eye-to-eye: mother and baby are in eye-to-eye contact; position
of head, eyes or body is not important.
If e/e is marked for mother "foc/att M" should be
marked for infant.

look  Looks: mother looks at baby's face or body, either proximally
or distally. Her main focus of attention is on the
baby.

cont'd....
APPENDIX G (Continued)

Behaviour Record: Definitions

mon

Monitors: mother looks briefly at infant but her main focus is elsewhere; eg., she is talking to another person, looking at television, etc.

voc

Vocalizes: mother talks to infant.

name

Name: mother uses infant's name while talking to infant or addresses infant by name.

n/n

Nickname: mother uses a nickname in addressing infant. Write down nickname used.

rq/rsp

Requests response: mother verbally asks for a response from the infant; eg., "look at me", "talk to me", "smile at me". NB. If mother says, "What are you going (or trying) to say?" or "What are you thinking about?"
Mark rq/rsp and note what she said.

kiss

Kiss: mother kisses infant or rubs her own face on infant's head or face.

smile

Smile: mother smiles at infant.

touch

Touch: mother touches infant with her fingertips, or inspects infant's hands, feet, ears, etc.

pat/str

Pat/stroke: mother pats or strokes infant with her whole hand or palm; includes patting or rubbing while burping.

pl/race

Play/face: mother makes a playful face at infant.

play

Play: mother plays with infant with or without an object or toy.

vis/st

Visual Stimulation: mother provides visual stimulation with a toy or object by placing it in the infant's visual field. She does not have to be holding the object herself as long as she has placed it where the baby can see it.

aud/st

Auditory stimulation: mother provides auditory stimulation for the infant by making sounds herself (clicks, whistles, snaps fingers, etc.) or using an object -- rattle, music box, musical mobile, etc.

cont'd.....
APPENDIX G (Continued)

Behaviour Record: Definitions

tac/st  Tactile stimulation: mother provides tactile stimulation by rubbing an object or fabric on baby's skin, tapping baby with her finger, etc. Does not include wiping or rubbing during feeding or caretaking. Includes rocking or bouncing infant's arm or leg.

vest/st  Vestibular stimulation: mother bounces, jiggles or rocks infant; or stresses infant's musculature by pulling up by arms, etc.

feed  Feed: mother feeds infant using breast or bottle (note if bottle).

st/feed (m/b)  Starts feed: mother begins feed or replaces nipple in infant's mouth. When feeding is stopped, mark initiator of this by circling m for mother or b for baby if you can tell which one initiated stopping the feed.

c tk  Caretak es: mother bathes or diapers baby, changes baby's clothes, wipes infant's face, puts on powder or cream, etc.

r/___  Responds: mother responds to an infant behaviour. Write mother's behaviour in space provided and draw line from eliciting infant behaviour.

foc/att  Focuses attention: infant looks at person or object. Fill in what the infant is looking at: M for mother, F for father, D for other person; Obs for observer; Obj for object, toy, couch, curtains, etc.

voc  Vocalizes: infant makes a sound using his or her vocal chords.

grunt  Grunt: infant grunts or makes a sucking or smacking sound.

move  Movement: infant moves head, arms, legs or trunk. Does not include infant merely curling and uncurling fingers or toes.

cry/fuss  Cry/fuss: infant is fretting or crying or otherwise exhibiting distress.

smile  Smile: infant smiles.

other  infant yawns, burps, spits up, etc.
Rater ____________________ Name ____________________ Visit(s) ______

### General Attitude of M toward B and Maternal Role.

**MA-1: M's perception of B**

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Comments:

**MA-2: M's Delight with B**

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Comments:

**MA-3: M's Acceptance of B**

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Comments:

**MA-4: M's Attitude to B as Evidenced by her Excellence as an Informant**

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Comments:

### Feeding

**MB-1: Feeding: Synchronization of M's Interventions with B's Rhythms**

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Comments:

**MB-2: Feeding: Determination of Amount and End of Feeding**

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Comments:
Appendix H (Continued)

MB-3: Feeding: M's Synchronization of Rate of Feeding to B's Pace

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

C. Availability
MC-1: M's Availability to B

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

MC-2: Amount of Interaction Offered by M

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

MC-3: Appropriateness of M's Initiations of Interaction

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

D. Contact
MD-1: Amount of Physical Contact

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

MD-2: Quality of Physical Contact in Holding B

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

E. Response to Crying
ME-1: Effectiveness of M's Response to B's Crying

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:
Appendix H (Continued)

F. Interaction

**MF-1: Amount of Visual Contact**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

**MF-2: Amount of Auditory and Vocal Contact**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

**MF-3: Frequency of Play Interaction**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

G. Facilitation of Sensorimotor Development

**MG-1: Stimulus Potential of the Physical Environment**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:

**MG-2: M's Encouragement of Achievement**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments:
APPENDIX I
MATERNAL-CARE RATINGS

A. General Attitude of Mother Toward Baby and Maternal Role
   MA-1 Mother's Perception of Baby
   MA-2 Mother's Delight in Baby
   MA-3 Mother's Acceptance of Baby
   MA-4 Mother's Attitude Toward Baby as Evidenced by her Excellence as an Informant

B. Feeding
   MB-1 Synchronization of Mother's Interventions with Baby's Rhythms
   MB-2 Determination of Amount of Food and End of Feeding
   MB-3 Mother's Synchronization of Rate of Feeding to Baby's Pace

C. Availability
   MC-1 Mother's Availability to Baby
   MC-2 Amount of Interaction offered by Mother
   MC-3 Appropriateness of Mother's Initiations of Interaction

D. Contact
   MD-1 Amount of Physical Contact
   MD-2 Quality of Physical Contact in Holding Baby

E. Response to Crying
   ME-1 Effectiveness of Mother's Response to Baby's Crying

F. Interaction
   MF-1 Amount of Visual Contact
   MF-2 Amount of Auditory and Vocal Contact
   MF-3 Frequency of Play Interaction

G. Facilitation of Sensorimotor Development
   MG-1 Stimulus Potential of the Physical Environment
   MG-2 Mother's Encouragement of Achievement
MA-1 MOTHER'S PERCEPTION OF THE BABY

The basic distinction here is between realistic perception and perception which is distorted by projection, denial or other marked defensive operations. At the low end of the scale, the mother's perception of the baby and his needs, feelings, and abilities is determined unduly by her own needs, feelings and fantasies rather than by the baby's behavior and the context in which it occurs. This distortion is facilitated both by the fact that a young infant's signals are often ambiguous and difficult to interpret accurately and by the fact that his mother's wishes often are incompatible with his. Examples of distortion are as follows: when a baby is seeking attention from his mother, she, not wishing to attend to him, may perceive him as sleepy and therefore cranky, and put him to bed out of sight or hearing; or she may perceive crying as happy singing sounds; or, impatient to get on with other activities, she may perceive any slowing down in the rate of feeding as a sign of satiation; or, anxious about her ability to nourish a baby, she may interpret the slightest of mouth­ing movements as a sign that he is hungry.

Realistic perception is not distorted thus. Some women are able to per­ceive their babies realistically only by dint of submerging their own affect, however, and thus appear intellectual or detached in their perception. The middle ranges of the scale tend to stress intellectualization. Realistic per­ception does not have to be intellectual and detached, however: The most realistic perception of all is that in which the mother can accurately perceive her baby's behavior and at the same time be aware of her own needs and affect.

It is often said that the mother of a new baby tends to view him as a narcissistic extension of herself. She may do so, and still perceive his needs accurately; and interpret his affect truly. Even though she may feel that the baby is very much part of her own self, she somehow manages to recog­nize that his needs and affects are not necessarily precisely the same as her own. On the other hand, some mothers whose babies seem narcissistic exten­sions of themselves have distorted perception of them either because they at­tribute to their babies their own current feelings about the world, or because they use their babies for their own pleasures regardless of the pain or frus­tration the babies may incur thereby.

1. Distorted perception. M's perception of B is frequently distorted by her own idiosyncratic distortions and she ministers to him accordingly. Con­sequently her care of B tends often to be inappropriately geared to his needs, rhythms, and signals.

3. Inconsistent perception. Sometimes M's perception is distorted; sometimes it is realistic. Her realistic perception tends to be intellectual and detached, however. When she is detached, she can care for him in an effi­cient nurse-like way; when she distorts, her ministrations tend to be in­appropriate. The vacillation between the two modes of care is notable.
5. Perception usually realistic, occasionally distorted. M's perceptions of B are realistic on the whole, and only occasionally distorted. She tends to maintain realistic perception by being intellectual and detached in her dealings with B, and by keeping her own needs and affects submerged. In some ways, however, she may permit her own affect to appear without distorting her perception of B. This may occur in moments of relaxation and play or during feeding or in some other special context. The point is, however, that it is only at times that she can acknowledge her own affect while still giving appropriate care.

7. Realistic perception, considerable affective involvement. M. in most regards perceives B realistically, and, on the whole, she manages to maintain this objectivity without intellectualizing and without submerging her own feelings in a detached sort of way. There are some aspects of this care, however, in which she cannot cope with her own feelings and needs and with his simultaneously, and which handles either by detachment or by distortion.

9. Realistic perception, much affective involvement. M perceives B realistically and at the same time she is much involved affectively. She manages to attribute full validity to his needs and affects, and to view with both objectivity and interest his development and the emergence of his own individual characteristics. She has both fondness and respect for "the other". At the same time she is quite herself, considering her own needs, wishes, and feelings as valid. This, of course, is possible only for a woman who is both quite maternal in her orientation an at the same time self-accepting and spontaneous.
When a mother is delighted with her baby, she not only feels great pleasure but she is capable of expressing it. She need not express it intensely, although she may. Indeed, delight with a very young infant may be expressed quietly, gently and tenderly. Even though the expression of delight may be gentle, tender and muted, the feeling of delight is an intense one, and like all intense feelings it comes and goes. There is probably no such thing as "mild" delight. There is however a kind of bland, mild positive feeling—not deslight—which finds frequent expression in a smiling face. It is sometimes difficult to know just how much real affect lies behind a habitually smiling face—but it is probably not delight.

Delight is situation-specific or behavior-specific, experienced and expressed in response to the baby himself—in response to his own spontaneous expressions or reactions, or in response to his behavior when in interaction with his mother or others. As such, there is delight in the baby being himself. This delight must be distinguished from the pleasure of pride. A mother may take pride in her baby because of his appearance or accomplishments, because he is living up to her expectations, doing what she wants him to do, or bringing credit to her in the eyes of other people. She may be proud that the baby is a boy, or big, or tiny, or pretty, or accelerated in development. Or a mother may take pride in her role as mother, and in the baby as living proof that the role is truly hers. To distinguish between delight and the pleasure of pride is not always easy, but it can be done—chiefly in terms of delight being specific and appropriate to a situation, a response of the mother to the baby, present now and behaving now.

Sometimes delight is quite absent at first, and the only positive feeling is one of pride. Sometimes the mother is at first overwhelmed by depression and feelings of inadequacy, or, perhaps a little later, by disappointment or resentment that the baby is not what she expected. In such cases delight may only gradually emerge as the baby develops, perhaps with the first social smiles, perhaps only later as the baby can take more initiative in social interaction. In any event, delight is more likely as the baby becomes more responsive. Nevertheless, in some mothers it occurs from the beginning in its tender, muted form of expression.

1. Delight is absent. Manifests no delight. She may be detached. Or she may show mild, bland, positive feeling, without the appropriate-to-situation quality of delight. Or she may be more or less overtly rejecting, with perhaps her rejection partially cloaked by her pride in herself as a mother.

3. Delight is rare. M manifests delight on only rare occasions. More usually she is bland or matter-of-fact. Of, if her feelings are intense, they are generally prideful.

5. Occasional delight. M commonly expresses positive feeling, and occasionally she manifests real delight.
7. Fairly frequent delight. Delight occurs fairly frequently and appropriately. It occurs in the context of a warm, relaxed atmosphere, and is the highlight of interaction between M and B.

9. Markedly frequent delight. M is noted for the frequent delight she displays in response to B. She finds all kinds of expressions and actions of his delightful. She is enormously interested in everything he does, and can be delighted even with a pout or a gesture of rejection or a cry of protest. This interest is no mere curiosity or detached scientific interest. It is interest that occurs in the context generally of pleasant, uninhibited, relaxed and comfortable interaction.
MA-3 MOTHER'S ACCEPTANCE OF THE BABY

This scale deals chiefly with the mother's degree of acceptance or rejection of the baby in terms of the degree to which he is felt to interfere with her own autonomy. She has other ties, interests and responsibilities—her husband, perhaps other children, her housework, her hobbies, her social life, and perhaps a job or other responsibilities outside the home. To what extent is the baby perceived as encroaching unduly upon these other spheres of the mother's life and as interfering with her own sense of autonomy and integrity? Some women are frank in their admission that they perceive the baby's needs and demands as an infringement of their own autonomy. Others submerge their resistance to this encroachment under a disguise of "training" the baby or "not spoiling" him. Undoubtedly it is implicit in the mother-infant relationship that a mother must temporarily surrender some of her autonomy in the interests of the baby's welfare. Perhaps the crucial difference between women in this regard is the degree to which this is resisted and resented in contrast to the degree to which it is accepted as a necessary but temporary surrender. Finally, there are differences between women who accept the temporary surrender insightfully and without regret, and those whose overanxiety or dutiful dedication indirectly betray the resentment they cannot acknowledge to themselves.

1. Open rejection of B. M is openly resentful or rejecting. She may voice overt complaints, but whether she does so or not, she gives other clear evidence of chafing at the time she must spend with B and the amount of time he requires of her. She tends to view B as a burden or an interference, and his needs as unwelcome demands. There are other things she feels she must do, or wants to do, with which B interferes.

3. Covert rejection of B. M rejects B, but her rejection is more often covert and presumably unconscious than overt and conscious. She may be matter-of-fact in her care of B, but nevertheless she is ambivalent in her attitude towards the time and effort B requires of her. Sometimes she perceives B as so helpless and vulnerable that she gives freely of her time and attention, but at other times she perceives his needs as unwelcome demands and a tiresome interference. At such times she shows her rejection of B by ignoring his signals, or by delaying in responding to them, or by attending to him perfunctorily. Such a mother may rationalize her practices as an effort to train B or not to spoil him.

5. Acceptance of B, with some strain. M enjoys having B, but she does not equally enjoy the work of caring for him. She accepts the responsibility of caring for him, and sometimes her pleasure in him is uppermost. But, nevertheless, it is apparent that she finds B a strain on her own autonomy and an interference with her other responsibilities or interests. She may show this strain by occasional covert rebellion, in which she pushes him aside for other things, having made inadequate arrangements for substitute care, either with or without an attempt to rationalize her actions. Or she may betray her guilt at wishing for much more autonomy either through overanxiousness or through a masochistic kind of dutifulness in her care.
General acceptance of B and the responsibilities he entails. M does not permit the fact that B sometimes strains her autonomy to diminish her loving care. She may be explicit that she looks forward to a time when he will require less of her. On rare occasions she may go off on her own or with her husband without making thoroughly good arrangements for substitute care. But on the whole she has an accepting attitude toward the fact that she must surrender much autonomy in the interests of looking after a small baby.

Complete acceptance of B. M completely accepts B at this stage of his development, and the responsibilities entailed—neither minimizing nor exaggerating these responsibilities. She is sensible and neither over-anxious nor masochistic. She has no regrets about the temporary surrender of her autonomy. She finds rewards in caring for a little baby, and she would not give them up for anything. She may not state so explicitly, but it is clear that she feels this, and indeed, she feels that the special rewards in caring for an infant will vanish all too quickly as B develops, and that there will be plenty of time later for her to do the other things she wants to do. When this mother does decide to leave B to do something on her own, she invariably makes good arrangements for his care, considering both the adequacy of his physical care and the psychological needs appropriate to his stage of development.
MA-4 MOTHER'S ATTITUDE TOWARD HER BABY AS EVIDENCED BY HER EXCELLENCE AS AN INFORMANT

It is acknowledged that some people "do" better than they "say", and that what a mother does in relation to her baby is much more significant than what she says about what she does. Nevertheless, since we rely on interview as well as on direct observation, it is pertinent to assess the cues that interview affords. There are several points of interest here. First, what a mother reports of her observations of her baby throws some light on how observant she has been—which in turn reflects both the extent of opportunity she has had to observe him, and her degree of interest in observing. Secondly, the degree to which a mother volunteers information about her baby, or at least responds readily to questions rather than wishing to talk of other things, reflects her degree of interest and involvement in the baby. Finally, there is the matter of false or misleading information which a mother may give in order to avert possible criticism of the ways she has handled the baby's care, or cover up the fact that she has not been particularly perceptive of what has really happened. It is not easy on the occasion of any one interview to detect false information, but it is not difficult over time.

A few cautions are in order in regard to this rating. First, the rater should not hesitate to give middle or even low ratings to mothers who did the sensitive things without being able or willing to verbalize her perceptions and actions in the form of interview information. Secondly, weight should be given especially to information about interaction, idiosyncracies and sensitive little things that testify to a mother's interested perception even though she may be vague about quantitative facts such as times of feeding on the previous day, hours the baby sleeps and the like. On the other hand some mothers who are quite poor observers of the subtleties of the baby's behavior, can report precise facts of schedule, hours, dates, height and weight in compulsive detail. Finally, many mothers like to take advantage of a visitor's presence to talk about other things, adult to adult. Unless a mother seems to be evading giving information about the baby, she should not be down-rated for wishing to talk about other things as well as talking about the baby.

1. M is a poor informant. There are two kinds of response that warrant this rating: (a) M volunteers little information about B; she may give a brief spurt of information at the beginning of a visit, because she feels it is expected, but it is soon exhausted, and she finds it difficult to answer questions about B's behavior because she has not been observant enough to know what B does; (b) M falsifies information about B; sometimes this falsification emerges only in response to questions, but sometimes it is offered spontaneously; it can be detected as false only in terms of discrepancy between what is said and what is observed, and this sometimes takes time. But in either case M is obviously more interested in talking about other things than about B—whether this is a rumination about her own affairs or a more socially acceptable conversation about "things that matter in the world."
3. M is a relatively poor informant. She volunteers some information, but usually only gives information when asked. In either case her offerings tend to stress her own side of the mother-infant relationship rather than B's. She may talk about what she did, what she decided, or about what she thought, but little about what B did. She is not a sensitive observer of B, and, on the whole, would rather talk of other things.

5. M is a moderately good informant. She can give information about what usually happens in a day, and she can talk about B spontaneously. But her offerings tend to be factual, and reflect little of her inferred view of B's experience of his personality. The fullness of the factual offerings may tend to disguise the fact that M does not describe B's interactions with her.

7. M is a good informant. M volunteers information about B and about her relationship with him, and also answers inquiries fully and perceptively. There is obviously strong interest in B reflected in M's descriptions, but the descriptions, if full, tend to be matter-of-fact. (Mothers can be so rated who do not give full factual information, but who give, in snatches information of a subtle sort about B's preferences, idiosyncracies and interactions).

9. M is a very good informant. M talks graphically about B's interaction with her, bubbling over with interest and delight in B and his ways. She observes and reports the subtleties of B's behavior—slight signals, preferences, idiosyncracies, etc.—which a less sensitive observer might easily miss. She does not need to be questioned; she is full of her topic. The distinguishing feature of the mother rated thus is that she manages to make the observer feel that he had been there, for he can see the episode vividly through M's description.
FEEDING: SYNCHRONIZATION OF MOTHER'S INTERVENTIONS WITH BABY'S RHYTHMS

It is assumed that the neonate has an activity cycle in which periods of activity and waking are fairly well coincident with hunger, and periods of inactivity and sleep follow--either because hunger has been satiated or because the baby's activity and crying have exhausted him or simply because of a biological clock which determines the basic cycle of the rhythms themselves. Needless to say, periods of crying tend to coincide with periods of activity, waking and hunger. Interventions of the adult may occur at any point in the activity cycle.

It is our hypothesis that the optimal timing of the mother's feeding intervention is when the baby is awake, active and hungry, but before he has reached a peak of hunger and crying. Under these circumstances the baby might be expected to feed well since he is hungry enough to be interested and yet not so hungry and upset that it is difficult to calm him down enough to feed. A baby fed with synchronization of interventions to his rhythms might be expected to learn a number of important things: (a) to stabilize his rhythms so that he becomes hungry at regular intervals; (b) to anticipate that slight hunger would be followed by gratification; (c) to be less distressed by slight hunger, to learn the beginnings of frustration tolerance, and to cry less massively; (d) to expect that what he does (i.e. the signals he gives of hunger) has some consequence and thus that he has some control over what happens to him; and consequently (e) to give more clear-cut signals of his state, which in turn makes it easier for his mother to synchronize her interventions to his state.

Interventions of the adult may be quite arbitrary, however, and out of synchrony with the baby's rhythms. Sometimes the intervention may come at the optimum time, but sometimes it may be long delayed, after the baby has reached a peak of hunger and crying and is so upset as to be difficult to feed. And sometimes the intervention may come too early while the baby is sleepy and inactive or so late that he has again fallen asleep; in either case he tends to be unresponsive and does not feed well. One might expect that a baby who is fed arbitrarily might have his natural rhythms disorganized rather than stabilized, for if he has not fed well it might well be expected that he would become awake, hungry and active more quickly than if he had been fed at a time when he was more receptive and could ingest a normal amount. One might further expect that a baby fed arbitrarily would be slower to learn frustration tolerance and to modulate massive neonatal crying, that his signals would continue to be primitive and difficult to interpret, and that he would not come to feel that he had any control over what happened to him.

Mothers who depart from optimal timing are not so likely to be completely arbitrary in their interventions as they are to delay. Let us first consider delays so long that the baby is fed only after he has been crying for some time, and may be presumed to have reached a desperate pitch of hunger. Such babies are difficult to feed because they are too upset and hungry to feed well at first, and they tend to become upset all over again at each slight interruption. One might expect a baby so treated to come to feel that he had some influence over what happened to him, but that he could exert his influence only through screaming or other very intense demands, and that slight hunger would be a cue not for gratification but for something much more painful before gratification might ensue.
Short delays are undoubtedly another matter. A mother may interpose some slight delay between a baby's first signals of hunger and the feeding—either to ensure that he is properly hungry and hence that he will feed well, or to nudge him towards regularization of rhythms, i.e. towards a schedule. These slight delays seem to constitute no departure from optimal timing.

Mention has been made of the baby's hunger signals. These usually include mouth movements, rooting, general restlessness, and eventually fussing and/or crying. The signals are, however, somewhat idiosyncratic. Some babies announce hunger very promptly by crying; others become increasingly restless and increase sucking and rooting responses before they begin to cry. Still others suck and root so much when they are not hungry at all that this behavior cannot be taken as a dependable signal of hunger. Because of this, and because crying may obviously occur as an expression of states other than hunger, hunger signals are to some extent ambiguous, and an accurate interpretation of signals requires experience with a particular baby, perception of an undistorted nature, and consideration of the context in which the signals occur.

Whether to wake a baby to feed him is an issue for some mothers, and, even more than delaying feedings, they consider this to be the issue which differentiates demand from scheduled feeling. It appears to us, however, that waking a baby to feed him may not be an arbitrary intervention and that it, like slight delay, may help to stabilize the baby's rhythms. Some babies seem to oversleep—whether because their threshold of arousal is constitutionally high, because they nap in unusually quiet and unstimulating surroundings, or because they have been overfed—and of these the latter is perhaps the most important, for it seems that the baby's hunger cycle is much affected by the amount he is fed. Babies who oversleep are typically eager to be fed when they are awakened. If this is the case, or if the mother wakes the baby tactfully and then waits until he seems ready before feeding him, it does not seem a gross departure from optimal timing to wake a baby to feed him.

Some babies have rhythms which are more clear-cut in the beginning than others. A middle or low rating on this scale might reflect a difficult baby rather than a rigid or insensitive mother; this might be expected to be the case only at the beginning, however, for a sensitive and flexible mother may help enormously to stabilize the rhythms of even a baby who is initially difficult. On the other hand a rating of 9 might not be achieved, even by a very sensitive mother, until the end of the first quarter-year, since it reflects mutual adaptation.

Two further questions remain. First, how much weight is an observer to give to what the mother says she does if this is at variance with what she was observed to do? If the mother is judged to be an otherwise accurate and credible informant, and implies somewhat more flexibility than she seemed to have when observed, the rating should reflect this somewhat greater flexibility—for sometimes mothers time their feeding interventions to suit the observer, for example, holding a hungry baby off until the observer arrives so that he can witness the feeding. On the whole, however, greatest credence should be given to what is actually observed, for there can be a gross discrepancy between the practices a mother professes to follow and what she actually does.
Finally, one may ask what constitutes a feeding? When feedings are spaced out every three hours or so, they may be demarcated clearly. There are, however, some mothers who conduct feedings in installments—and this practice makes it difficult to demarcate one feeding from another. Some mothers who feed on a very flexible schedule use installment feedings; a feeding given in response to too slight a signal may be discontinued and deferred briefly until the baby is really ready to be fed, or a "snack" may be given to hold a baby off until the more or less scheduled time of his main feeding. Other mothers who use installment feedings are overfeeders; they feed the baby as much as he will take, and then offer him more after some delay, and then perhaps repeat the offerings again and again over an extended period of time. Still other mothers discontinue feeding too soon, but renew the feeding when the baby cries again, and thus feed in installments. For the purpose of this scale, the timing of feeding refers to the first feeding intervention, after a lapse of two or three hours or more, and not to the soon-repeated renewals of feeding that may be described as installment feeding.

1. Very arbitrary timing. M is very arbitrary in her feeding interventions so that they are very badly geared to B's rhythms and disregard his signals. The most conspicuous manifestation or arbitrariness is very prolonged delay, during which M does not respond to B's signals even when they become demanding cries. But even more fundamental than long delay is an essential arbitrariness—an erratic and irregular timing which makes it very difficult for B to adjust his rhythms and/or expectations. Some mothers are arbitrary because they must be in control of B and refuse to adjust to his timing even though his signals may be perceived. Others are arbitrary because they do not allow themselves to perceive B's signals or to perceive them correctly.

3. Arbitrary timing. M's interventions are somewhat more appropriate but there is still considerable arbitrariness. Mother rated thus are not so much erratic, however, as delaying. There are various patterns which may be given this rating. One pattern is a striving towards a schedule with too widely spaced feedings—which sometimes results in a delay so long that B exhausts himself and falls asleep before being fed, and has to be awakened. Some mothers who delay in this way are well aware of B's signals of hunger but choose to ignore them. Other mothers respond to B's crying with repeated interventions, but either fail to perceive the crying as a hunger signal or determine not to respond appropriately until the predetermined time for feeding finally arrives. Another pattern which seems to deserve this rating may be described as "pseudo-demand"—without such a long initial delay in the timing of feedings, but with premature terminations which leave B so unsatisfied that he soon demands again. In either case B is gratified only by a very active and vociferous demand, whether the demand is a prolonged and continuous response to a long delay, or a briefer response to a briefer delay but with intermittent and persistent demands to ensure that the feeding persists long enough for gratification.

5. Some adjustment to B's timing. M's interventions have some flexibility and some relationship to B's rhythms, signals, and demands, but they are still not well adjusted to them—and are sometimes sufficiently out-of-phase to interfere with the stabilization of rhythms. Some mothers should be
rated thus because they are pushing a schedule too hard, and, although they do not delay as long or intervene as imperceptively as mothers given lower ratings, they will do not advance the time of feeding flexibly enough. Others attempt to feed B when he signals hunger, but whether because they are unprepared for his demand, or interrupted, or too compulsive to interrupt themselves, there is still a delay before feeding—although not as long as in the case of those with lower ratings. Here also belong mothers who, having upset B's natural rhythms by deliberately overfeeding him (in the hope that he will sleep long and thus make no demands), do not seem to be able to establish any cycle of interventions which seems mutually satisfying in regard to timing.

7. Flexible timing. M feeds B with enough flexibility that the external observer would find it difficult to judge whether she feeds by schedule or on demand. Nevertheless M is not guided entirely by B's signals. Sometimes she judges it is time to feed him when he has given no hunger cues, or perhaps she wakes him to feed him. Or sometimes she may delay feeding until after B has become obviously hungry, crying and upset. But, if she delays, it is not for long, and she tries not to let B get into a state of high tension. If she wakes him, she does not actually begin the feeding until he is obviously ready—or else she discontinues the feeding and comes back to it a little later. Although she may be trying to regularize B's rhythms, she gives high priority to gratifying him.

9. Excellent adaptation of timing. M and B are mutually adapted in regard to feeding. B knows what it is to be hungry and to anticipate feedings, but he is not permitted to build up to a state of distressing tension. He is not fed before he is ready and eager, but when he reaches that state there is minimal delay. This adaptation may be the outcome either of thoroughgoing, consistent demand feeding, or sensitive and flexible schedule feeding—but it tends to be achieved only after a period of mutual adaptation.
Ideally, if the baby is fed when he is hungry but before he gets too hungry and upset, and if he is allowed to feed at his own pace, he can be relied upon to terminate his own feeding, signalling when he has had enough, and still take the optimum amount of food. Some mothers, both from a knowledge of the amount of food a baby of this age is likely to need and from attention to the baby's signals, give the baby the right amount of food. The baby is gratified and does not become hungry soon again, and yet at the same time he is not given more than he needs or more than he can easily digest. Under such circumstances it looks as though the baby terminates the feeding. Either he is content when the food is gone, or his mother stops offering him more when he signals that he is finished.

How does the baby signal that he has had enough? He may drowse off to sleep—but this is not a dependable signal, for often enough he likes to drowse for a moment with the nipple in his mouth, only to rouse and take more; so the mother has to wait to see whether the drowsing is merely temporary or not. Or he may be more active in indicating he is finished. He may fail to swallow milk or solid food, and let it dribble out of his mouth. Or he may spit it out. Or he may close his mouth tightly and refuse the nipple or spoon. Or he may turn his head away. Any of these behaviors may indicate either momentary refusal or a real effort to terminate feeding, and the mother must become sensitive to the signals of this particular baby.

Some mothers press their babies to take more after they have signalled termination of the feeding. This may be done through coaxing, stimulating the lips with nipple or spoon, in an attempt to induce the baby to take more—and sometimes the mother may prolong the feeding a long time, with persistent or intermittent coaxing. Or the mother may resort to forcing the baby to take more. If the baby falls asleep, the mother may inflict painful stimulation in order to wake him up, and if the baby cries, she takes advantage of the open mouth to insert the nipple or a spoonful of food. In the extreme it may be difficult to distinguish between coaxing and forcing, for coaxing may become noxious if it is persistent enough.

The apparent reasons for coaxing or forcing the baby to take more than he spontaneously takes are several. Sometimes this goes along with badly timed feedings; the baby having been wakened before he is ready to feed is not hungry and stops before he has ingested as much as he might reasonably be expected to want. Or he may have had to wait so long for a feeding that he falls asleep and is not really ready to feed despite his long wait. Other mothers coax or force the baby to take more than the usual amount for a baby this age, and, in effect, overfeed the baby. Overfeeding may come about because of the mother's desire to gratify the baby fully, or because she is anxious about her own capacity to nurture him. Or it may be undertaken deliberately in the hope that the baby, stuffed to full capacity, will sleep soundly and long and be little trouble.

Other mothers follow a reverse pattern, discontinuing the feeding too soon and before the baby has had enough. Such mothers tend to be impatient, and terminate feeding at the first sign that the baby is slackening his pace of intake, or if the baby pauses to look around, or to interact socially, or
merely to hold the nipple in his mouth. Some babies, having had to wait too long for a feeding, are over-hungry and fussy; the mother may misinterpret the restless fussiness as refusal. If the feeding is too brief, the baby is likely to cry soon again, demanding more food. Even though this subsequent demand is met, this pattern of feeding tends to be chaotic and the baby find it difficult to regularize his rhythms. In either case the baby tends to be underfed.

1. Very arbitrary termination. It is M who determines the termination of the feeding and she does so in almost total disregard of B's signals, and thus in disregard of any attempt to gratify B optimally. Some mothers so rated force B to feed after he has signalled termination, and may induce pain and thus crying as part of the forcing operation. Others, although they do not actually force-feed, may carry coaxing to the point of noxious stimulation. Still others terminate the feeding much too quickly, either because of impatience because of distractions, and the baby gets far too little food in the feeding.

3. Arbitrary termination. It is still M who determines the end of the feeding and this is still a relative lack of regard for B's gratification, even though M may be somewhat more considerate of B's signals than mothers with lower ratings. M may deliberately overfeed B, for the express purpose of getting him to sleep a long time and be no trouble. But, at this rating-level, it is a matter of coaxing rather than forcing, and nearly always coaxing stops short of noxious stimulation. If M terminates the feeding too soon, so that B is still hungry and soon again demands food, M is at least willing to give him more soon again.

5. M terminates feeding, but believes that B does. Mothers given this rating attempt to gratify B, and underfeed or overfeed him through misunderstanding of his needs. Some mothers overfeed because they misinterpret B's signals, believing he is signalling for more when he roots, mouths or is merely active. Others have an inflated notion of B's needs, prepare too much for him, and then return to the feeding at the slightest indication that B might be ready to take more. Other mothers underfeed, not because they are impatient or distracted or unwilling to prolong the feeding, but because they miscalculate the amount of food B needs at this age, and prepare too little for him.

7. Flexible termination. M is flexible in terminating the feeding when B indicates he has had enough, but continues it until he so signals. She may coax him a little, offering more two or three times before she is convinced he is finished, and sometimes he may be thus induced to take too much. She may sometimes stop too soon, misreading his signals, But, on the whole, it is B who determines the amount he will take and when he will end the feeding.

9. Excellent mutual adaptation in regard to amount of food. M is flexible and perceptive in meeting B's nutritive needs, gratifying him without giving him too much. She knows approximately the right amount to offer him, and at the same time knows that he may want more at some feedings than at others. If he signals termination, she will wait a little to see if he
wants more in a moment, but she neither coaxes him nor terminates abruptly. At another feeding, if he seems to want more than the usual amount, she is flexible in providing it. She is flexible also in "tiding him over" between feedings, and even giving him a "snack" to comfort him if this seems indicated, but she certainly does not confuse hunger signals with other signals, and does not substitute food for interaction.
Although this variable interacts to some extent with the other three feeding variables, it has its own unique features, and these are considered to be very important. Perhaps the most important aspect of pacing is the extent to which the mother respects the baby's own autonomy and, to the extent that he is able, encourages him to take some initiative in the ingestion of food. Feeding is something that the mother does with the baby and not to the baby. The extent to which the baby can determine the pacing differs from the sucking part of the feeding (whether bottle or breast feeding) and the spoon-feeding part.

Let us first consider bottle or breast feeding. The baby has innate patterns of behavior which determine his rate of ingestion. He may suck strongly or weakly, quickly or lazily. He may suck for a while without pause, then "stall" with the nipple in his mouth and not suck at all for a while, only to resume sucking later. He may cling to the nipple when his mother tries to remove it, or he may eject it firmly when he wants no more of it, or he can just let go the suction and release it gently. As long as his mode of intake is by sucking, his mother can do little to make him feed, and to force him is likely to arouse resistance. There are, however, ways in which the mother can interfere. She may, whether unwittingly or with intent, provide him with a nipple which delivers milk to his mouth faster than he can swallow it. Although he may learn to cope with a fast nipple, he is likely at first to choke and struggle. Another way in which the mother can try to speed up the baby's pace in sucking is to jiggle the nipple in his mouth whenever he slackens, or to try to remove it.

Most babies, after the first fine rapture of sucking, tend to pause and even drowse. They hold the nipple in the mouth, either quietly or mouthing it gently without sucking. But then, after the pause, they resume sucking, although perhaps less strongly than before. Some mothers recognize this pattern and are tolerant of the drowsing or "playing around", but others are impatient and feel that if the baby is not sucking strongly, he is no longer hungry and terminate the feeding, or, at least, jiggle the nipple to get the baby active again.

If the baby is sucking well, the mother may nevertheless interfere by interrupting the feeding. "Burplings" are a good excuse for interruption. Whereas some mothers manage to time the "burplings" to signals that the baby gives indicating that he is willing to pause, others "burp" the baby arbitrarily, interrupting him in the full spate of sucking. Even though "burplings" are well timed, they may constitute a disruption of the baby's pacing if they are too long. Some mothers interrupt even more arbitrarily, presumably because of their own needs to remain in complete control of the situation; at arbitrary intervals they withdraw the nipple from the baby's mouth, only to reinsert it in a moment or perhaps to tease him by putting it to his lips but not letting him have it.

When it comes to spoon feeding of solids the baby has even less control over the pacing of the feeding than when he is sucking. After he has become accustomed to spoon feeding he can indicate that he is ready for more by opening his mouth, or by sucking and rooting behavior. And he can indicate that
he is not ready by closing his mouth or by averting his head. Of, if the food is nevertheless given to him, he can reject it by letting it dribble out or by tonguing it out, or even by spitting up. But, on the whole, the pacing is under his mother's control.

If the baby is extremely hungry at the beginning of a feeding and is spoon fed first, he may fuss unless the spoonfuls come at a very fast rate. Even later in the feeding, he may fuss if there is too much delay between spoonfuls, as there sometimes is if the mother is distracted by some other demand on her attention. A well-timed feeding of solids is, however, marked by fine mutual adaptation. It seems as though the spoonful of food is ready when the baby's mouth opens as a signal that he is ready for it.

Forced feeding of solids, as described in both MB-2 and MB-3, is, of course, an infringement of the baby's autonomy in pacing. Some mothers are so controlling that they insist on setting the pace, and if the baby rebels and refuses they force him to take food, either by squeezing his cheeks so that he must open his mouth or by making him cry or taking advantage of crying to spoon food into the open, crying mouth. In either case, the mother puts the food in his mouth at her own pace and he is forced to accept it or choke.

At the well adapted extreme, the mother not only allows the baby to pace himself, but she also manages spoon feeding so that the baby can display active initiative in ingesting the food. Rather than merely depositing the food in his mouth she presents it in such a way that he must take some initiative in getting it. Some mothers present the spoonful in such a way that in order to get the food the baby must suck or 'gum' it from the spoon. Techniques vary, but they have in common the outcome that the baby is active in receiving his solids.

1. M interferes unduly with B's pacing. This occurs in both bottle (or breast) feeding and in the feeding of solid foods. M has no adequate appreciation of B's natural rate of feeding. When B sucks, M either cannot tolerate him drowsing with the nipple in his mouth and forcibly removes it, or she provides him with so fast a nipple that he frequently chokes. When feeding solids M may force feed, opening B's mouth by force, or causing him pain till he cries and the food may be put into his mouth. Or M may feed B so slowly or with so many interruptions that he becomes very frustrated and upset or so distracted that he loses interest in the situation.

3. M tends to determine the pacing. In bottle or breast feeding M tends to let B pace himself, except that she may be impatient if he loaf s on the job or she may provide him with such a fast nipple that he occasionally chokes. When feeding solids, however, M tends consistently to interfere with B's rate. She may do this by forcing him to take solids when he does not wish them or faster than he wishes to go—although not to the extent of forcing used by mothers with a lower rating. Or she may avoid overt protest by popping the nipple in B's mouth between spoonfuls. Or she may feed slowly and insensitively, perhaps with interruptions to attend to other things, so that the pleasure goes out of the feeding, even though it is not so disorganized as feedings given a lower rating.
5. M alternates between determining pacing and letting B determine it. M. lets B determine his own rate fairly well in bottle (or breast) feeding neither withholding the nipple when B wants it nor trying to speed him up. But the feeding of solids, although not exactly forced, is not sensitively attuned to B's rate of ingestion.

7. M is sensitive to B's pacing. In bottle or breast feeding, M lets B drowse and loaf, if he is so inclined, and she neither coaxes him to begin sucking again until he is ready, nor does she cut him short if he is just pausing. Similarly in regard to the feeding of solid foods, she gears herself pretty sensitively to B's rate of ingestion, although the harmony of the interaction is not as impressive as it is with mothers with a higher rating.

9. M is very well adapted to B's pace. M's sensitivity to B's pacing is impressive, both in bottle (or breast) feeding and in spoon feeding. M and B work in harmony. In spoon feeding, the spoon is ready just at the time that B opens his mouth for it. More important, the way M presents the food on the spoon requires initiative from B to get it—sucking or "gumming" it off rather than having the spoonful deposited in his mouth. If B can get the contents of the spoonful at his own rate, this reduces to a minimum the amount he must let overflow and which must subsequently be scraped into his mouth by his mother.
The variable being considered here is primarily the extent to which the mother is available to the baby for some kind of contact—physical, visual or auditory—in the course of the day. Availability does not ensure interaction, of course, nor does it ensure that the interaction is healthy and appropriate. But it is a necessary condition for interaction.

A mother may be unavailable to the baby because she is home for but a small proportion of each day. Indeed, it is the working mother (or her equivalent, e.g., the busy club woman) who makes it advisable to consider availability as a variable distinct from amount and quality of interaction. The usual defense offered by the mother who chooses to work is that the interaction she has with the baby before she goes to work and/or after she returns is adequate in amount and, indeed, superior in quality to the interaction she would have had with him if she stayed at home. This may indeed be true, but it is not proven. In any event, there is still the question of establishing the minimum amount of availability that is adequate. It is as a step toward an investigation of this issue that this scale is offered.

Absence from the house is not the only condition of unavailability, and other conditions must be considered in the same terms. A mother who does not leave the house at all may be almost as unavailable as the mother who is away from home. She may be in one part of the house and the baby in another. There is also a less obvious kind of unavailability which some mothers display. She may spend an extended time in the same room with the baby and still pay no attention to him, occupied with her own activities, thoughts or feelings, and thus be unavailable to him for contact, except of a relatively tenuous sort through the baby's distance receptors. Depression or obsessive rumination are two obvious states which may lead to this kind of unavailability, and there are others.

In this scale "gives attention" and "pays attention" are intended to refer to the mother's psychological availability, and are not intended to imply anything about the quality of interaction. But they do imply that the mother is not only physically able to perceive the baby's signals because she is present, but also that she is in a psychological state of readiness to perceive them because she has not closed herself off from the baby. It is inconceivable that a mother in this state of psychological readiness would not be more responsive to the baby's signals and interact with him more frequently than a mother who is withdrawn, but the two can be kept separate to some degree. In any event, a mother may be available to the baby and attentive to him in the sense of alertness without being constantly in interaction with him.

It is reasonable to assume that it makes a difference whether, when his mother is unavailable to him, the baby is or in the company of another caretaker. This, however, is another variable.

The chief difficulty in rating availability pertains to mothers who are alert to their babies—i.e. hear them and know what is going on—even though they do not intervene and thus do not provide the baby with contact, whether physical, visual or auditory. Such a woman should be rated in the middle
ranges of the scale, and not at the low end—at least if she is geared to intervene if the baby's behavior warranted intervention in her terms. There is a difference between ignoring a minimal intermittent fuss and ignoring a scream. There is similarly a difference between ignoring a little vocalization and ignoring a happy, excited greeting. Another similar difficulty is presented by the woman who puts the baby in an isolated room but who is otherwise alert to him. The question is whether she is really available to him when he is isolated enough that she can hear him only when he cries hard and is not alert to little waking sounds. If she can hear him if he really cries, she is not entirely unavailable during this period—but she is less available than a mother who is able to hear all the little vocalizations and sounds of movements.

1. **Very low availability.** This rating will be given either (a) to a mother who is so preoccupied, withdrawn, and unresponsive that she gives B little or no attention beyond a minimum of perfunctory routine care, and for the most part seems oblivious to him and to his signals, or (b) to a mother who is absent for very long periods of the day, e.g. away at work, and either busy in the evenings as well, or preoccupied and perfunctory when she is at home.

3. **Low availability.** This rating will be given either (a) to a mother who is absent for long periods of the day, but when at home is fairly available to B—fairly alert to his signals and giving him somewhat more than routine care—or (b) to a mother who is generally unavailable psychologically—preoccupied, withdrawn, or unresponsive—but who, for brief periods perhaps inconsistently, is alert to B and gives him somewhat more than routine care.

5. **Moderate availability.** This rating will be given for the following sets of conditions: (a) M is absent for the working day or its equivalent, but makes it up to B when she is at home by being alert and available to him and by giving him attention substantially beyond the minimum requirements of routine care. (b) M is at home most of the time and gives B substantially more than routine care, but who nevertheless is often too preoccupied with other things for B to be able to "get through" to her easily. (c) M is at home most of the time and gives B substantially more than routine care; nevertheless there are periods during which she withholds response to his signals even though she perceives them and is prepared to respond if he gives signals which seem to her to justify intervention.

7. **High availability.** M is available to B for most of the day. Although there are certainly times at which her threshold of alertness to him is high because she is busy or preoccupied with other things, B can always get through to her, and, by and large, she pays B much attention.

9. **Very high availability.** M is not only present nearly always, but has the ability to divide her attention so that she is always alert to B even when engaged in other activities. Although her attention to B may ebb and flow in response to his behavior, she is nearly always psychologically available to him, and indeed pays B much attention.
This variable is identified as the amount of interaction offered by the mother chiefly because in the first two or three months it is the mother rather than the baby who initiates interaction in any intentional or even semi-intentional sense. Thus, this variable would be defined in terms of the amount of stimulation given by the mother—that is, direct stimulation given through her own behavior rather than indirect stimulation given by the mobiles, music boxes etc. that she may provide for him.

When one speaks of mother-infant interaction one may first think of the interaction that takes place through a little distance in a face-to-face confrontation—with smiling, and vocalization and head-nodding. It is true that this kind of invitation to interaction is potent even with a very young infant, but it is by no means the only kind of interaction pertinent to this variable. Equally important, and perhaps even more important, is the interaction that takes place when the mother holds the baby and adjusts her posture to his, and to his little shifts that indicate a search for a new position. This kind of interaction may, of course, be combined with smiling and vocalization in a face-to-face confrontation, but it may be silent and muted down, and be nevertheless potent as a mode of interaction. Merely holding does not, however, qualify as interaction if the mother offers herself as a mere platform and pays no attention to the baby who is lying across her knees and enters into no reciprocal postural adjustments.

This variable is obviously related to other variables. It is related to the mother's availability to the baby, for availability is a necessary condition for interaction, although mere availability does not guarantee that the mother will offer interaction. Nevertheless, the lowest ratings will be given to mothers who offer little interaction because they are not available, physically or psychologically.

On the other hand, this variable is not totally independent of the quality of the mother's interaction with the baby. The qualitative nature of the interaction tends to affect the quantitative aspect, in that if the mother offers inappropriate interaction, the baby will be unable to respond adequately and chains of interaction will not be established; thus poor quality may be associated with low quantity. Indeed, the appropriateness of the interpersonal stimulation offered by the mother is so important that one might well question the usefulness of a scale which deals with amount without considering appropriateness. Nevertheless, there is reason to believe that insufficient interaction may have effects which differ from interaction that is adequate in quantity but distorted or inappropriate in quality. Therefore, we offer a scale dealing with the amount of interaction offered by the mother.
1. **Very little interaction.** M offers very little stimulation to interaction. She may not be present much of the time, and if or when present she tends not to be available psychologically. Even during routine care she tends to be either too hurried or too preoccupied to stimulate interaction.

3. **Little interaction.** M, although unavailable or unstimulating most of the time, occasionally attempts to initiate interaction, either in the course of routine care or sporadically in the periods intervening between routines.

5. **Moderate interaction.** M, without giving much stress to attempts to stimulate interaction, nevertheless does give substantially more than minimum stimulation. For example, she may allow some time for socialization in the course of routine care, or she may hold the baby for some time after feeding. She may take time to greet B when she approaches him, and attempt to elicit a response from him. Or she may pick him up and cuddle him at times not associated with routine care. But these occasions are neither frequent nor prolonged.

7. **Much interaction.** M offers much stimulation to B either in face-to-face confrontations with an attempt to elicit interaction or in holding and cuddling or both. This interaction may be concentrated in the periods of routine care, but it is either fairly prolonged then or fairly frequent at other times.

9. **Very much interaction.** M gives much emphasis to interaction with B. This may in some cases imply overstimulation but in other cases it does not. Whatever her motives may be, M enjoys interaction with B, and this is obviously just as important in her eyes as other aspects of the care of B—or more important.
Even though the responsibility for the initiation of interaction during the earliest months rests more on the mother than on the baby, the success with which interaction is established depends on the appropriateness of her behavior. Appropriateness is in part a matter of the mother's timing of her advances and interventions in terms of the baby's state and current activity. The mother may respond to a slight cue from the baby, or she may sense somehow that this is a time when he is likely to be responsive to her. If he is already vocalizing, for example, she may sense that this is a time when she may induce him to vocalize in response to his vocalization. If he is a little restless, she may sense that this is a time when he would enjoy being held up in such a position that he can not only be close to her, but also from that vantage point survey his world. If he is snuggly after feeding she may infer that this is a time he would enjoy being cuddled and occasionally smiled at.

Appropriateness is also a matter of matching the kind of stimulation given to the baby to his capabilities—matched to his stage of development as well as to his state. Furthermore, appropriateness depends on knowing when to desist from stimulation, sensing when the baby is not in the mood or when he has had enough.

Stimulation may be inappropriate because it is badly timed. The mother, for example, may try to elicit a smile when the baby is too sleepy, or too hungry, or too distressed, to be responsive. She may try to cuddle him close when he is alert and interested in being upright and seeing the world around him. Stimulation may be inappropriate because it is too sudden, too brief, or too intense. Even if the stimulation is of a kind that might be appropriate in small quantities, it may be given in a barrage which is more than the baby can cope with, or it may be too prolonged or too cumulatively exciting for the baby to bear. Overstimulation may come in play which is too intense, too vigorous, too prolonged, or too exciting. Overstimulation may also come about through the mother's attempts to instruct or train the baby in behavior which exceeds his present capabilities. Gross examples of overstimulation may be observed with mothers whose desire to control the baby's behavior leads to a teasing, even a tormenting, kind of stimulation.

Finally, of course, the mother may be inappropriate in offering too little stimulation, or in failing to respond to the baby's slight cues which might signal her to initiate interaction.

1. Highly inappropriate stimulation. This rating would be given to a mother (a) who offers little or no social stimulation to B, not even holding; (b) who forces B's responses by a teasing or tormenting kind of stimulation; (c) who is so insensitive in timing or in the kind of stimulation offered that B cannot respond; or (d) who offers such prolonged or intense stimulation that B responds with distress.

3. Inappropriate stimulation. M tends to be inappropriate in her stimulation of interaction, although not to the same degree implied in lower ratings. She may be understimulating. Or she may time her advances inappropriately. Or she may give a barrage of stimuli, one following another so quickly that B does not have a chance to mobilize a response. Or she may give a little spurt of attention, and then turn away just as B responds, so that
he receives no feedback to his social behavior. Or she may overstimulate with behavior which is not itself noxious but which is either too intense or too prolonged,

5. Fairly appropriate stimulation. M has learned that certain times are most appropriate for her to hold the baby or to attempt to initiate interaction. She has learned the kinds of stimulation that will elicit responses, and is therefore usually able to get interaction going when he attempts to do so. Perhaps at times she may overwhelm or overexcite B, but she is fairly quick to desist when she sees his reaction. She does not understimulate B. She is, however, not particularly sensitive to B's cues in her timing of stimulation.

7. Appropriate stimulation. M tends to be sensitive in her interaction with B, and is sensitive in picking up his signals as her cues. She tends to try to evoke smiles when he is in a responsive mood; she cuddles him when he is in a cuddly mood. She is quick to desist if she has selected an inappropriate time for or mode of interaction, or if she sees that she has overstimulated him. On the whole, her timing and her modes of stimulation are appropriate, and she is usually successful in eliciting interaction.

9. Highly appropriate stimulation. M is exquisite in her sensitivity in interaction with B. She is not only appropriate in her timing and in the kind of stimulation she gives, but she is also very sensitive to the little cues he gives, so that there is novelty and variety in their interchanges as well as plenty of the repetitive kind of tried-and-true interactions that have given them both much pleasure previously.
The amount of physical contact a baby has with his mother includes body-to-body contact when the baby is held and also manual contact when he is being patted and rubbed, as well as when being bathed and cleaned.

There seem to be three major classes of situations in which there may be physical contact: routine care, soothing, and others. By routine care here is meant feeding, bathing, changing, and transporting from place to place. Although some physical contact is unavoidable in routine care, some mothers keep it to a minimum—e.g. bottle-propping, placing the baby in an infant seat while feeding him or transporting him, changing diapers with a minimum of skin-to-skin contact. By soothing is meant activity intended to stop crying and reduce tension. This may involve contact—e.g. holding, cuddling, patting and rubbing—but other methods of soothing may be preferred—e.g. jiggling the carriage or seat, talking soothingly, etc. Outside of these two main classes of situations contact may be avoided if the mother wishes to do so, and hence it is contact outside of routine situations and soothing that is most significant in contributing to the larger amounts of physical contact. How much does the mother hold the baby, cuddle him, touch him when he is not being fed, bathed, etc. and when he has not been crying? How much does interaction and play involve physical contact?

1. Very low physical contact. Physical contact is limited to routine care, and tends to be somewhat restricted even in routines. Physical contact outside of routine care is rare.

3. Low physical contact. Physical contact is confined chiefly to routine care, but M usually prolongs or interrupts routine care for at least a few moments in order to hold B for a while, perhaps interacting with him, perhaps patting him or rocking him. On the other hand, M rarely picks B up except for routine care or when his cries are very demanding, and she rarely holds him except in the context of routine care and the minimum amount to soothe him.

5. Moderate physical contact. B is in physical contact with M a moderate amount of time. There is substantially more than the minimal physical contact in routine care, and there are a fair number of instances of physical contact at other times.

7. High physical contact. B is in physical contact with M quite a lot, both in routine situations and at other times. M by no means holds B all or most of the time, but when she interacts with him there is nearly always some physical contact.

9. Very high physical contact. B is in physical contact with M for much of the time that he is awake. She often holds him outside the context of routine care or soothing.
MD-2 QUALITY OF PHYSICAL CONTACT IN HOLDING THE BABY

Here we are concerned with the quality of the physical contact which occurs when the mother holds the baby, when feeding him, when transporting him, and when merely holding. We are not here concerned with the quality of the skin-to-skin contact when the mother undresses, changes or bathes the baby, or when there is contact play.

Although the amount of physical contact depends entirely on the mother during the earliest months of development, the quality of the physical contact depends partly on the baby and how adept he is in adjusting his posture to his mother's way of holding him. Nevertheless, it seems likely that the baby's "cuddliness" is not wholly constitutional, but rather that it is in part acquired on the basis of his experience with the way his mother holds him. It is the mother's contribution to the interaction with which we are concerned here.

In part, we are concerned with closeness of contact. Some mothers tend to avoid holding the baby close to the body. Instead of carrying the baby held close to the breast-chest-shoulder area of her body, she carries him loosely cradled in her arms, or held face outwards. Instead of holding the baby cradled while feeding him, she holds him loosely sprawled across her lap. Instead of holding him against her body, she tends to lay him on her knees as though her lap were a mere platform.

In part, we are concerned with the way in which the mother facilitates the baby's own postural adjustments. She may make it difficult for the baby to adjust his own posture by holding him too close—for example, holding him across the shoulders with his legs dangling, so that he can gain no purchase against her body. Or, on the other hand, she may give the baby's body support in the right places, but also leave him free to adjust his posture. She may facilitate the baby's postural adjustments more actively, by responding to his cues or restlessness or slight discomfort by shifting his position, or by adjusting her own posture, or both.

1. Very low quality of contact. M gives the impression of being very rigid and unaccommodating. She may avoid close contact and may habitually hold and carry B either so loosely that he finds it difficult to snuggle in, or so inappropriately that he cannot make postural adjustments.

3. Low quality of contact. M may handle B in an efficient, nurse-like way and thus avoid the extremes of inappropriate handling. But she is impersonal when she is in physical contact with B, and either tends to avoid closeness or tends to be somewhat restricting. She does not facilitate his postural readjustments either by shifting his position or by adjusting her own posture in response to his cues.

5. Intermediate quality of contact. M is adept in holding B in some situations but in other she tends to be unaccommodating or insensitive. Sometimes she shifts B's position in response to his cues or adjusts her own posture, but she does not consistently facilitate his readjustments.
7. High quality of contact. M tends to have close physical contact with B, and facilitates his postural adjustments both by her habitual ways of holding him and by her readjustments in response to his cues.

9. Very high quality of contact. When holding B, M is so well-adapted to him that they seem to be as one. She adapts herself so smoothly to his posture and movements that conscious effort seems quite absent.
ME-1 EFFECTIVENESS OF MOTHER'S RESPONSE TO BABY'S CRYING

This scale is based on the assumption that the crying of a young infant is an expression of tension, discomfort or distress and that it has the biological function of attracting the adult to him and inviting her intervention on his behalf. It is based on the further assumption that it is good for the baby to have his tension, discomfort or distress relieved before it has built up to such a degree of intensity that he cannot maintain whatever degree of integration and coordination he has ordinarily achieved. Even if the baby does not cry so hard that he "falls apart" and merely cries or fusses in a prolonged fashion, it is nevertheless believed that this reflects tension or distress. The causes of tension and distress are not limited to hunger, pain, and discomfort from physical causes. Extrapolating from other species, it seems likely that the human infant is predisposed to cry when he perceives himself to be alone or out of contact.

Nevertheless, this scale is concerned with something more than signals of minimal or momentary displeasure. It is also not concerned with little fusses that for some babies are part of the waking up or going to sleep process. It is concerned with cries and fusses which, if ignored, are likely to build up into prolonged crying since they are expressive of discomfort or distress which will not spontaneously subside, and which require adult intervention for relief. It is concerned also with crying from pain or discomfort (e.g., from "colic") which cannot easily be relieved by the adult, although her interventions may make the baby somewhat more comfortable or may conceivably give the baby some sense of security even though they do not altogether do away with either the distress or the crying.

The scale deals with three chief facets of maternal behavior—heeding the baby's cry, interpreting the cause of the crying correctly, and responding appropriately. The focus of interest here is on responding appropriately, although both heeding the cry and interpreting it correctly are necessary conditions for responding effectively, and hence are taken into consideration.

(a) Heeding the baby's cry. Some mothers do not notice a baby's crying, either because he is in his own room with the door closed, or because she "tunes him out". Others are unwilling or unable to stop what they are doing in order to attend to the baby. Still others do heed the baby's cry, but respond only after a longer or shorter delay. The mother may explain her failure or delay in responding in various ways—a desire not to spoil the baby, a belief that he enjoys crying, or that it is good for him to cry, etc. Any chronic failure to heed crying and any habitual long delay is considered inappropriate and ineffective response to crying. This does not imply that it is appropriate always for the mother to jump promptly to intervene whenever the baby cries, especially if the cry is mere fussing. On the contrary, the mother who is sensitive in interpreting the baby's crying knows when she should intervene promptly and when a delay is appropriate. Thus, for example, a mother may be quite appropriate in not responding to the baby's cry when he is first put down to sleep, for she has learned that he habitually cries briefly at first before he settles down to sleep—but she would attend to him if his cry was more than usually prolonged or if he seemed to be working up to a state of high tension.
(b) **Interpreting the cause of the crying correctly.** If a mother is to respond to a baby effectively, she must have a fairly accurate notion of why he is crying. Is he hungry? In pain? Fatigued? Overstimulated? Waking to find himself alone? Some mothers have a pretty good idea of the cause of their babies' cries—either because they have learned to differentiate the cries themselves, or because of the context, or both. This does not imply necessarily that such a mother has an intellectual appreciation of the cause of crying; she may hear the cry and respond appropriately in an intuitive way without needing to think about it. Other mothers misinterpret cries, either because of inexperience or, more grossly, because their perception is distorted by their own needs or projections. Thus, one mother may misinterpret a cry from being alone or out of contact as being caused by fatigue and need for sleep. Another may believe that the baby wants to be picked up when in fact he is crying from hunger. Still another may believe him to be hungry when in fact he is suffering from gastric discomfort.

(c) **Responding appropriately to the crying.** Responding appropriately to crying implies feeding the baby when he is hungry, changing his position if he is uncomfortable, removing or discontinuing noxious stimuli, picking him up or socializing with him—or even distracting him—if he seems to want attention, and soothing him if he is very distressed or upset. An appropriate response may be made even though the initial interpretation of the cause of crying is unknown or incorrect. Many mothers respond effectively after a brief period of trial and error, during which they flexibly persist in their interventions.

The fact that a mother can interpret her baby's cry correctly does not imply that she will respond appropriately. She may know he is hungry and not want to feed him yet. She may realize that he wants to be picked up, and be unwilling to do so. She may know he is in pain, but not know how to relieve him. Nevertheless, this scale has been constructed on the assumption that it is good for a baby if his mother intervenes appropriately before he has built up to such a high state of tension that he "falls apart" and loses integration, that reasonable promptness in gratifying his needs and relieving his distress will help him to acquire frustration tolerance, and that it will not "spoil" a baby to respond to him when he is crying because he is alone or out of contact.

If a mother consistently ignores her baby's crying and intervenes entirely at her own convenience, he may become apathetic, cry little, and behave much like a deprived institution-reared baby. On the other hand, chronic inappropriateness of response to a baby's crying may lead to a vicious spiral in which the baby cries more frequently and more desperately and yet, at the same time, it becomes even more difficult to know what is wrong and how to soothe him. It is believed that a mother who responds effectively to crying helps her baby to cry less frequently and less intensely, and to learn to find other ways of signalling his needs which are more easily interpreted than the hard cry. Therefore, this is a scale which reflects characteristic mother-infant interaction, and the baby's behavior cannot be left out of account.
A final word should be said about crying which has an organic basis, for example, the chronic, persistent crying of the baby with organic damage, or more commonly, the occasional persistent crying of the baby who has gastric distress or is miserable because he is ill. Under these circumstances it is difficult to soothe a baby. Nevertheless, some mothers are remarkably adept in soothing a baby even under these difficult conditions, perhaps holding him comfortably and quietly until he calms, perhaps with a series of shifts of position or kinds of contact. Others, perhaps because they become so overwhelmed by anxiety when the baby cries intensely and persistently, give up after a few unsuccessful interventions, and try to tune the baby's crying out. Nevertheless, it is believed that babies who are soothed effectively from the very beginning become increasingly less in need of soothing.

1. Very low effectiveness of response. This rating will be given to a mother:
   (a) who does not respond to B's crying, but intervenes entirely at her own convenience or caprice; (b) who often delays her intervention until after B has built up to such a state of high tension that it is then difficult to calm him; (c) who responds inappropriately to B's crying, either because she misinterprets the cause of the cry or because she refuses to make the correct response, so that B builds up to a state of high tension; or (d) who sometimes responds in such a way that the situation is worsened rather than improved.

3. Low effectiveness of response. This rating will be given to a mother who sometimes intervenes effectively but who, nevertheless quite often either permits B to get into a state of high tension or lets him fuss more or less continuously for prolonged periods. She may do this either (a) because she delays her interventions unduly, (b) because she tends to give up easily after an ineffective intervention, or (c) because she tries a series of inappropriate interventions either being unable to discover the cause of the cry or refusing to make the intervention that she knows would be effective.

5. Moderate effectiveness of response. M more usually intervenes effectively than do mothers with lower ratings. She does not delay her interventions unduly. Fairly often, however, she postpones the truly effective intervention, but may substitute a series of temporary measures which quiet B for a while. B rarely is permitted to get into a state of high tension, but when he does she attempts to soothe him, and persists for some time before giving up her efforts. This rating will also be given to a mother who is very effective in her response to B's crying except when she has put him down for a nap; then she lets him scream for a prolonged period without attempting to soothe him. (This applies only in cases where B does in fact scream. Some babies regularly fuss a little before falling asleep, and their mothers have learned that this is a mere prelude to sleep and that it will subside fairly promptly without intervention).

7. High effectiveness of response. When B cries M nearly always intervenes effectively, and rarely allows him either to get into a state of high tension or into a prolonged fuss. M's interpretations of his crying are usually correct, and when they are not correct she is flexible in trying to find the effective intervention. She does not make regular use of sub-
stitutive interventions when she knows the cause of the crying. On the rare occasions when B does cry or fuss persistently and is difficult to soothe she persists, if necessary, for long periods, trying a variety of modes of soothing before giving up.

9. Very high effectiveness of response. M characteristically intervenes appropriately and without significant delay when B cries. She never wittingly lets B's crying to reach a point of high tension. She knows how to distinguish between little fusses which are not indicative of distress and fusses which are distressed and which will become prolonged if the appropriate intervention is not made. She is so effective that her soothing activities can rarely be distinguished from her regular mothering activities. On the rare occasions when her usual interventions are not immediately successful in quieting B, she is flexible, sensitive, sympathetic and persistent in her efforts to soothe him, and usually succeeds in doing so.
MF-1 AMOUNT OF VISUAL CONTACT

This variable deals with the extent to which the mother, deliberately or otherwise, makes it possible for the baby to sustain visual contact with her and/or with other members of the household during his waking hours. If a baby is too young to crawl or to sit, the amount of visual contact he has with his mother (and others) depends upon the way she arranges his physical environment.

A high level of visual contact may be facilitated in a variety of ways. The mother may take the baby with her from room to room, placing him in an infant seat or playpen, or on a bed or on the floor, in such a position that it is easy for him to see her. Or she may keep him in the midst of family activity, placed so that visual contact is possible for much of the time, even though she herself may not be constantly in his potential visual field. If she keeps him in his own room, she may spend much time hovering nearby and thus remain in his potential visual field.

A low level of visual contact also may come about in several ways. The baby may be kept much of the time in his own room, or otherwise away from the main stream of family activity. Visual contact may be hampered by the high sides of a bassinette or carriage, or his vision may be restricted by the panels of a crib or playpen or by other obstructions, or he may be placed in an infant seat but facing away from people. And even though the mother may facilitate visual contact when the baby is "up", she may nevertheless restrict it in a total sense by having him nap so far away that she does not know he is awake unless he cries, so that he may well spend many waking hours in isolation.

It may be noted that we are not concerned here with simultaneous visual and physical contact, but rather with visual contact in the absence of physical contact. Nevertheless, a mother who frequently holds the baby in a face-to-face confrontation would be rated higher on this variable than one who holds the baby equally much but close to the body without encouraging visual contact during holding. On the other hand, a mother who habitually places the baby so that his opportunity to see her is maximized will be given a higher rating than a mother who emphasizes face-to-face confrontations while holding the baby, but pays little attention to visual contact during the many hours when she is not holding him.

It may be noted further that we are not concerned with how much the baby avails himself of the opportunity to watch his mother, but only with how possible it is for him to do so.

1. Very low level of visual contact. M makes no attempt to place B so that he can see her or other members of the household. By and large, he can see her only when she approaches him directly, and she tends to approach only to give him routine care.

3. Low level of visual contact. M occasionally places B so that he can see her, but does not make a point of this. She tends to remain out of the baby's potential visual field but he is not quite as isolated as a baby with a lower rating.
5. Moderate level of visual contact. M is in B's potential visual field a moderate amount of time. She makes some effort to place him so that he can watch her and other members of the household, but this effort is by no means consistent, and B spends quite a bit of his waking time without M available to him visually.

7. High level of visual contact. When B is awake, M tends to keep in his potential visual field much of the time. She may not stay in the same room with him constantly, but she habitually places him so that his opportunity to see her is maximized.

9. Very high level of visual contact. M not only places B so that he is able to see her, but also she approaches him more closely on frequent occasions, bending over him to watch him or to coax a smile, etc.
In this scale we are concerned with three aspects of auditory and vocal contact: (a) such contact as an alternative to being alone and isolated; (b) contact through voice and distance receptors as a potential mode of interpersonal interaction; and (c) the stimulation such contact and interaction give to the development of vocalization, and ultimately, to the development of language and symbolization.

When the baby is not in actual physical contact with his mother or other members of his household he may, nevertheless, keep in contact with them through his distance receptors—through hearing as well as through vision. There is good reason to believe that the human infant, like the young of other species, is prompted to some kind of potential attachment behavior when he finds himself alone and usually this is some kind of vocal activity in the human, crying. Although perhaps at first the actual physical proximity of his mother (or a substitute for her) is required to terminate the crying, it seems likely that auditory stimulation may come to substitute for actual proximity to some extent—what the baby can hear of people and their activities, especially their voices, and most especially his mother's voice. It is assumed that this is most likely to become meaningful to the baby if he can watch as well as listen, and it is further assumed that auditory stimulation is most meaningful when it is an accompaniment of interaction with him, as when his mother talks to him during routines or while playing. But even if the baby is isolated visually, he may not feel alone if he can hear familiar voices and the sound of activity nearby. (We are not concerned in this scale, however, with auditory stimulation, even the human voice, coming from TV or radio).

It is assumed that vocal transactions may come to be a significant mode of interpersonal interaction, even in infancy. It seems likely that a baby who has much exposure to people's talking, and especially when the talking is part of interaction with him, will build vocalization into his organization of attachment behavior to a greater extent than one who has less exposure, and moreover, it is likely that he will also develop more rapidly vocally. Particularly effective as a way of facilitating vocal development in the early months, however, is a sensitive attempt of the mother to insert her own vocalizations into a secondary circular reaction which the baby has got going, or to initiate reciprocal vocal interaction. Occasionally this can be accomplished by verbalization or through an attempt to get the baby to imitate adult vocalization but more usually the adult must imitate the baby, selecting one of the baby's own characteristic sounds to emit repeatedly until he responds.

1. Very low level of auditory contact. B spends much of his time isolated from the main stream of activity of the household; those sounds which reach him are muffled by distance, or masked by continuous monotonous sounds from TV or radio. Even when he is with his mother there is relatively little auditory stimulation. She tends to deal with him silently and rarely talks to him. She may talk to other people in his presence, but seems to regard a preverbal infant as an inappropriate person to talk to.
3. Low level of auditory contact. B spends a fair amount of time isolated from the noises of the household. His mother is not silent, however, and talks to him at least occasionally in the course of routine care. But she does not especially emphasize vocal contact, and rarely responds to his vocalization by vocalizing herself.

5. Moderate level of auditory contact. B spends a substantial amount of his time surrounded by the ordinary noises of the household. M talks to him a moderate amount; she tends neither to be silent in her dealings with him nor to stress vocal interaction. She sometimes tries to elicit vocalizations but she gives no special emphasis to either.

7. High level of auditory contact. M talks to B quite a lot when she is with him and responds vocally to his vocalizations. She occasionally attempts to elicit vocalization from him. She does not, however, make a point of providing him with vocal contact when she is outside of his potential visual field, although she may do so incidentally while talking to other people.

9. Very high level of auditory contact. M gives much emphasis to auditory contact. She is sensitive in encouraging vocal interaction by responding to him, emitting a sound he has just made, or by eliciting vocalization by making a sound in his characteristic repertoire. She also seems aware that her voice may be a way of sustaining contact when she is out of B's sight, and may keep him company by talking to him from the next room or as she moves around in the same room.
What constitutes play with a little baby? Play is perhaps more easily recognized than defined. A mother may tell us that she plays with her two month-old infant after feeding and before putting him down to nap. What does she mean by play?

Let us begin by considering repetitive interactions which are clearly recognizable as play, and which are frequently labelled by the mother as a "game". These include: touching games, with repetitive touching and stopping touching; movement games, in which the adult may rhythmically move the infant's body or hands or legs back and forth, sometimes while holding him and sometimes while he is lying down; tickle games, perhaps games in which mother's fingers "walk" up the baby's tummy. Later the games may become more vigorous, and include bouncing, raising and lowering, sailing through the air, or tossing and catching. Action games may be accompanied with little rhymes, songs or repetitive vocalizations. There are visual games, such as peek-a-boo, with many variations—and hiding objects and finding them again.

Play may occur in relaxed moments when there is no routine, or it may accompany or interrupt routines such as bathing, changing or feeding. Play is usually undertaken for fun—for pleasure. Ideally it is for mutual pleasure of adult and baby, and at least it ought to be undertaken for the baby's pleasure. Sometimes, however, play has the ulterior motive of instructing or distracting the baby or showing him off. And sometimes it seems to be undertaken merely for the pleasure of the adult. For the purposes of this scale the motivation of play does not matter, nor are we concerned here with the degree of appropriateness or inappropriateness of play.

In this scale we are concerned with interactive play, in which the focus is on the baby's interaction with his mother. We are not here concerned with non-interactive play in which the baby is left to his own devices to enjoy his own bodily movements, to explore his own body, or to investigate his effect on his physical environment—mobiles, toys, etc. Toys may enter into interactive play, to be sure, but the focus is on the interaction and not on the toy itself.

In this scale we are concerned only with play activities after two months of age. The neonate is not coordinated enough in his muscular responses and does not rely dependably enough upon his distance receptors for play to be usual or appropriate. The earliest "play" seems to come after a baby has demonstrated that he has the potential for reciprocal exchange. He sometimes smiles and sometimes vocalizes in response to an adult who is attempting to evoke a response from him. At this level, obviously, play is indistinguishable from the commonest forms of social interaction between the baby and an adult. Although in these earliest weeks some babies are capable of the simplest forms of play and some mothers try to evoke a playful response very early, we are assuming that most mother-infant pairs do not play until the baby is eight or nine weeks old. And by this age a distinction may be made between mere efforts to evoke smiles and vocalizations and efforts to initiate playful interaction. In any event, we are concerned in this scale with something beyond reciprocal smiling and reciprocal vocalization.
1. Very infrequent play. M rarely or never plays with B. Whether she undertakes routine care perfunctorily, or fully and competently, or tenderly and lovingly, she does not enter into playful interaction with B. When routines are over, M may hold B, or she may put him down—but she does not play with him.

3. Infrequent play. M plays with B infrequently. She may occasionally—perhaps once or twice in the course of a four-hour visit—tickle him or wiggle him playfully or sail him up in the air, but these episodes are brief as well as infrequent.

5. Moderately frequent play. Play is not a conspicuous part of M's interaction with B, but it does occur. Sometimes reciprocal exchanges of smiling or vocalization develop into play. Sometimes there are little playful moments in the course of routines.

7. Frequent play. M frequently plays with B. She tends to embellish routines with playful overtures, and she may play with B at other times too. Nevertheless, playfulness is often absent from their interaction and it is easy to demarcate play from non-play.

9. Very frequent play. Play is so interspersed with routine care and so spills over into other periods of the day that it is difficult to distinguish play from non-play in this infant-mother pair. This does not mean that all of M's interaction with B is playful, but play develops very spontaneously and easily in their interaction, so that play shades into non-play and back into play again without clear-cut points of demarcation.
MG-1 STIMULUS POTENTIAL OF THE PHYSICAL ENVIRONMENT

This title does not sound like a maternal-care variable, but it is because the mother is largely responsible for arranging the baby's physical environment. Here we are concerned with the extent to which the physical environment and the objects in it tend to facilitate sensorimotor development, both through their stimulating qualities and through their appropriateness to the baby's present level of development. Here we are not concerned with the stimulus to development which may come about through infant-mother interaction, but with the stimulus potential of the baby's environment when he is unattended and hence not in interaction.

In a very young infant there are two chief factors to be considered: (a) what is available to the baby to look at and to listen to, and (b) the freedom permitted to the baby to move his limbs and body and to experience kinaesthetic and tactual feedback. Most white middle-class babies nowadays are provided with something to look at—a mobile, patterned decorations on crib and crib bumper, and toys placed so that the baby can see them in his crib—and most are also provided with a music box to listen to, and often enough there is background music from TV or Hi-Fi or radio. At the earliest stage perhaps the presence and appropriate degree of complexity of these stimulus-objects is more important than their variety. But there is little point in either complexity or variety if the objects are beyond the baby's rather limited visual range. Mobiles can be hung too high and toys and decorations may be too far away. Music boxes have the disadvantage that they have to be wound up by an adult, and too often this is done only to soothe the baby or at nap-time and not merely for his pleasure.

Although the baby may be bundled up for outside expeditions, and he may be wrapped up to promote sleep, most babies spend their waking hours with freedom to move hands and arms. The legs may, however, be hampered by long garments. Or the baby may spend most of his early weeks in a tiny bassinette or carriage, the high sides of which not only limit his visual field but also hamper his movements. Furthermore, although infant seats may greatly enlarge the baby's visual field they tend to restrict movement, and especially they constrict the arms. The position in which the adult places the baby is important before the baby is able to roll over by himself. The supine position facilitates looking at a mobile or striking at strings of bells or a cradle gym, but seems likely to retard locomotor development and hamper manipulation. The prone position, on the other hand, seems to facilitate locomotor development and manipulation, especially if toys are placed close to the baby and where he can see them. It is likely to be good for a baby's position to be varied.

Later on, of course, the picture becomes much more complex—with the onset of grasping and manipulation, the possible proliferation of toys and their choice, and possible exposure to a variety of new experiences and environments. But there are still the two main factors—what is available to look at and listen to and freedom to move, and this comes to include freedom to touch, to manipulate and to crawl about and explore. Increasingly it becomes important too that interaction between these is possible, and that secondary circular reactions can be established in the course of which the baby's own movements have an interesting visual or auditory consequence—that he can jiggle his own mobile, ring his own bells and the like.
It must be reiterated that this scale pertains to the stimulus potential of the physical environment when the baby is not engaged in interpersonal interaction. A mother may be rated high on amount and appropriateness of interaction and give much stimulus to sensorimotor development, and yet be rated low on this present variable.

1. Very low stimulus potential. The baby when alone in his crib or carriage has little or nothing to look at or to listen to and either clothing or the conformation of his "container" tend to hamper his movements.

2. Low stimulus potential. The baby's environment is pretty limited. He may have something to look at, but it is either badly placed or poorly chosen. His movements may be less hampered by clothing or "container" but his position tends to be too stereotyped for him to make optimum use of what is provided for him.

5. Moderate stimulus potential. The equipment provided for the baby is pretty standard for our society. The baby is not unduly hampered in his movements either by clothing and equipment or by a stereotyped position. But the mother feels her job is done when she has provided toys and equipment and uses little imagination or sensitivity in helping the baby to make good use of what she provides, or in perceiving when he is ready for a change appropriate to his new developmental potentialities.

7. High stimulus potential. The objects in the baby's physical environment are well chosen. He has appropriate stimulus objects to look at and listen to and his movements tend not to be hampered by clothing, crib or stereotyped position. Moreover, the mother pays some attention to varying the stimulus objects appropriately as the baby develops, and to helping him to make good use of these. She jiggles the mobile for him, starts the music box, places a new toy nearby, all for his pleasure, and not merely to distract him or to soothe him.

9. Very high stimulus potential. The mother is very sensitive to the baby's interest in his physical environment and to his developmental stage. She is imaginative in her selections of toys and equipment and spends some time helping the baby discover their potentialities. She is also sensitive to his response to different positions and, indeed, to varying his physical environment from crib to infant seat to play pen, etc.
Although by providing a physical environment with adequate stimulus potential the mother is obviously facilitating sensorimotor achievement here we are concerned with the kind of encouragement that comes more directly through her own interaction with the baby. Furthermore, although sensorimotor and social developments are intertwined, here we are primarily concerned with the encouragement of sensorimotor achievements—the various stages of locomotor development, vocalization, comprehension, etc., and not with encouraging smiling and other more obviously social responses. Because it seems reasonable for a mother not to press these aspects of development in the earliest weeks, these ratings deal with only the eight weeks' old baby and older.

Here we are concerned only with the mother's encouragement or sensorimotor achievement, and not with any assessment of its appropriateness. But even so this is a complex variable. In part we are concerned with the mother's own more or less conscious policy. Does she believe in "readiness" in the sense that encouragement is not required, and that the baby will achieve when he is ready to achieve, regardless of her actions? Does she believe in being even more conservative, holding a baby back from achievements, either because she thinks this is a good policy or because she wants to keep him a little baby as long as she possibly can, whether for her own enjoyment or for convenience? Does she try to instruct, teach, train or stimulate, and in the course of so doing run the risk of being inappropriately stimulating or over-stimulating? Does she try to dominate and control to the extent that she tries to force the pace of achievement—whether some achievements or over-all? Or does she deliberately hamper achievement, in whole or in part?

1. Very little encouragement. M either gives B mere routine care and otherwise lets him lie without attention and without interaction, or she more deliberately follows a policy of understimulating him, in the hope of keeping him young, helpless and undemanding as long as possible.

3. Little encouragement. M is "laissez-faire" to a marked degree. She believes that B will develop sensorimotor abilities when he is ready, and that it is either unnecessary or undesirable to foster their development with any special stimulation.

5. Moderate encouragement. M tends to be somewhat "laissez-faire". She is not obviously understimulating, but, on the other hand, she makes no special conscious effort to facilitate development. At the same time she may unwittingly, for her own convenience or the sake of infant-mother pleasure, foster development in specific ways.

7. Considerable encouragement. M exerts some pressure on B towards sensorimotor achievement, whether as unilateral pressure on her part or in a pleasurable interactional way, and whether wittingly or unwittingly.

9. Much encouragement. Whether wittingly or unwittingly, M much encourages B to achieve. She stimulates him toward development, whether through play or through obvious training. Even though she may not have accelerated development as a conscious goal, it is obvious to the observer that it is important to her that B achieve well.
APPENDIX J

CHART VARIABLES

Name __________________ Subject No. __________

1. Date of Birth (day/month/year) __________________________
2. Length of Labour (hrs/min) __________________________
3. Type of Delivery
   1. vaginal  2. c/section
4. ARM
   1. yes  0. no
5. Pitocin
   1. yes  0. no
6. Forceps
   1. yes  0. no
7. type
   1. high  2. mid  3. low
8. Analgesia
   1. narcotic  2. tranquillizer
9. amount
   1. 25 mg  2. 30–100 mg  3. 100+ mg
10. Time before birth (hrs./min) __________________________
11. Anaesthesia
    1. local  2. regional  3. general
12. Gestational age (wks) __________________________
13. Post delivery medication
    1. yes  0. no
14. Analgesia
    1. narcotic  2. non-narcotic
15. Amount (mg) __________________________
16. Antibiotics
    1. yes  0. no
17. Amount (mg) __________________________
18. Infant
    1. male  2. female
19. Weight (gm) __________________________
20. 1 min. Apgar __________________________
21. 5 min. Apgar __________________________
22. Outcome
    1. 6S/Reg.  2. ICN  3. VGH
23. Time before transfer to regular nursery (hrs.) __________________________
24. Jaundice treatment
    1. yes  0. no
25. Other treatment
    1. yes  0. no
APPENDIX K

PRENATAL QUESTIONNAIRE SUBSCALES AND RELATED ITEMS

A. Mother's feelings toward pregnancy: Items 1, 2, 18, 19, 20, 21, 26

B. Support of husband/partner: Items 9, 10, 23, 24, 25, 34b, 35b, 36, 40, 41

C. Mother's experience in prenatal classes: Items 6, 7, 8, 11, 12, 13, 14

D. Mother's preparation for labour and delivery: Items 30, 31, 32, 33, 34, 34a, 35, 35a

E. Mother's confidence in caregiving ability: Items 39, 47, 48, 57, 60

F. Projected role of the infant in the mother's life: Items 15, 16, 17, 27, 28, 42, 43, 44, 56, 59, 62

G. Arrangements for child care: Items 45, 46, 52, 53

H. Prenatal involvement with and prediction of attachment to infant: Items 37, 38, 49, 50, 51, 56
APPENDIX L

INTRODUCTION TO PARENT-INFANT PROGRAM

A program designed to learn more about the feelings and experiences of parents who are having their first child is now being offered to couples who plan to give birth at St. Paul's Hospital. Information gained through this program will enable professional to plan more comprehensive care for expectant couples and new parents.

Participation in the program will involve sharing your feelings about your pregnancy, the baby's birth, and the first few weeks of new parenthood. One of the program staff will visit you before the baby's birth to talk about your pregnancy experiences and your expectations for childbirth. After the baby's arrival there will be one or two more visits to discuss your birth experience and your new role as parents. Information will also be gathered from your hospital records and from observations of your new baby in your home environment.

Previous participants in this program have found that talking with a professional whom they know during the first weeks of parenthood helps with the adjustment period after the baby's birth.

We invite you to join our program and share your experiences with us. One of our staff will be in touch with you in the next week to answer any questions you may have about this program. If you wish to call for more information, our phone numbers are listed below.

Susan Lee Painter
Department of Psychology, U.B.C.

Sheena Davidson
School of Nursing, U.B.C.
APPENDIX M

INFORMED CONSENT FORM

We understand how this study will involve us and our baby and that the results of this study will be written in such a manner that our identities will remain anonymous. We also understand that the report of this research will be available for students and professionals interested in childcare. We understand that the minimal discomfort we may experience involves the exposure to the interviews, questionnaires, observations during feeding and the evaluations of our infant. We understand that we may choose not to participate or to withdraw from this study at any time. We also understand that we are free to ask questions at any time throughout the study and that we will be given a copy of this consent form for our own information.

_________________________________________________________
Mother's signature

_________________________________________________________
Father's signature

_________________________________________________________
Investigator
We appreciate your interest in the Parent-Infant Program. Enclosed you will find a set of our prenatal questionnaire and three copies of a consent form for you and the baby's father to sign. One copy is for you to keep; the other two copies are for our records.

Would you please complete these questionnaires and sign the consent forms prior to our meeting on

Thank you very much.

Yours sincerely,

Parent-Infant Program.
I will be calling you soon to make an appointment to observe your baby and talk to you about the events of the past month. I would like to come at a time when the baby will be awake for at least an hour and observe a feeding and any other activities that you and the baby do during this time.

I have enclosed a set of postpartum questionnaires for you to fill out; it would be best if you could fill them out as close to the baby's one-month birthday as possible. I will discuss them with you when I come to visit. I will also pick up your hospital diary at this time.

I am looking forward to seeing you and the baby.

Sincerely,

Parent-Infant Program
APPENDIX P
REVISED DIARY

PLEASE INDICATE THE TIMES YOUR BABY WAS IN YOUR ROOM BY SHADING IN THE SPACE BETWEEN THE APPROPRIATE HOURS. IF THE BABY WAS IN YOUR ROOM FOR ANY PART OF A GIVEN HOUR, SHADE IN THAT SPACE.

Circle: Mon Tue Wed Thu Fri Sat Sun
APPENDIX Q

POST-PARTUM QUESTIONNAIRE

NAME ____________________________________________

BABY’S NAME _________________________________ BIRTH DATE ____________

TODAY’S DATE ________________________________

INSTRUCTIONS: When filling out scales, circle the point which best describes how you feel.

1. Although your feelings have probably been changing from day to day over the past month, how would you say you feel now, having been home with the baby for nearly four weeks?

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<thead>
<tr>
<th></th>
<th>very normal for me</th>
<th>very tired</th>
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</thead>
<tbody>
<tr>
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<table>
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<th></th>
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<table>
<thead>
<tr>
<th></th>
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<tbody>
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<table>
<thead>
<tr>
<th></th>
<th>normal for me</th>
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<tr>
<th></th>
<th>normal for me</th>
<th>elated</th>
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<tbody>
<tr>
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<tr>
<th></th>
<th>normal for me</th>
<th>bored</th>
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</thead>
<tbody>
<tr>
<td>curious</td>
<td></td>
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</tbody>
</table>

2. Have you had any physical problems since you’ve been home from hospital?
   ___ fatigue                ___ sore nipples            ___ constipation
   ___ problems w/stitches   ___ depression             ___ insomnia
   ___ excessive bleeding   ___ back/leg problems      ___ other (specify)

......
3. Has the baby had any physical problems since you've been home?
   ___ rash   ___ diarrohea   ___ feeding problems   ___ cold
   ___ colic   ___ constipation   ___ jaundice   ___ other
   specify ________

4. Have you seen or spoken to your physician since you've been home?
   ___ yes   ___ seen   ___ spoken to
   ___ no

5. If you have, for what reasons, and how many times? ________ time(s)
   Reasons ________________________________________________

6. Have you seen or spoken to any other health care workers during this time?
   (for example, nurses)
   ___ yes   ___ seen   ___ spoken to
   ___ no

7. If you have, for what reasons, and how many times? ________ time(s)
   Reasons ________________________________________________

8. Looking back on it, how would you say your labour was?
   easy    medium    difficult

9. How would you say your delivery was?
   easy    medium    difficult

10. How happy generally were you with your experience in the case room at
    the hospital during your labour and delivery?
    very    neutral    very
    happy    unhappy

11. How happy generally were you with your experience in hospital during your
    stay on the maternity floor?
    very    neutral    very
    happy    unhappy
12. Can you describe one (or more) things or experiences in hospital that you felt especially pleased about?

________________________________________________________________________

13. Can you describe one (or more) things or experiences in hospital that you felt especially unhappy about?

________________________________________________________________________

14. Did you have someone with you during labour other than hospital personnel?
   ___ yes (Specify) ____________________________
   ___ no

15. If someone was with you, how would you say that worked out?
   ____________________________ all right ____________ not very well at all
   better than I expected

16. Did you have someone with you during delivery other than hospital personnel?
   ___ yes (Specify) ____________________________
   ___ no

17. If someone was with you, how would you say that worked out?
   ____________________________ all right ____________ not very well at all
   better than I expected

18. Now that you are home, how confident do you feel about taking care of the baby?
   very mixed feelings very
   very confident unsure

19. Does your husband or partner participate in taking care of the baby?
   a great deal somewhat not at all

20. If he does participate, how confident is he about taking care of the baby?
   very mixed feelings very
   very confident unsure
21. Have you had any other help during the time since you have been home from hospital?
   ____ yes (Specify) ___________________________________________
   ____ no

22. If you have had other help, how helpful would you say that was?
   ___________________________ somewhat helpful
   very helpful
   very little help

23. How are you feeding the baby now?
   ____ bottle
   ____ breast
   ____ bottle and breast

24. Have you always fed the baby this way since you came home from hospital?
   ____ yes
   ____ no (Specify when you switched) _____________________________

25. If you did change the way you have been feeding the baby, what were your reasons for doing this?

   ____________________________________________________________

26. Some mothers feel it is better to have a regular feeding schedule for the baby; other feel it is important to feed the baby whenever he/she is hungry. How do you handle the feeding situation?
   ____ regular schedule
   ____ self-demand
   ____ combination

27. How would you say feeding has been progressing?
   ___________________________ very smoothly
   ___________________________ lots of problems

28. If breast-feeding, how long do you think you will continue nursing?
   ____ will stop very soon  ____ 6-7 more months  ____ undecided
   ____ 2-3 more months  ____ 8-10 more months  ____ I'll see how
   ____ 4-5 more months  ____ more than 10 more months  ____ it works out

........
29. Some parents and babies feel close to each other right away, and some take a while getting acquainted. How close do you feel to your baby right now?

| very close | still seems like a stranger |

30. How close does your husband or partner feel to the baby right now?

| very close | still seems like a stranger |

31. How close would you say the baby feels toward you right now?

| very close | not at all close yet |

32. How close would your husband or partner say the baby feels toward him right now?

| very close | not at all close yet |

33. When did you begin to feel that the baby was really yours?

| right away | still don't feel that way |

34. How well are you able to tell what your baby needs or wants?

| very well | not very well at all |

35. What signals does your baby use to communicate with you?

36. If your baby is crying and you're sure she/he is not hungry or wet, what would you do? (Check off as many as apply)

- talk
- pick up
- play music or sing
- give a toy
- rock
- let baby cry it out
- give a pacifier
- feed
- pat
- other (Specify)
37. Do you find it difficult to quiet the baby down once he/she is crying or fussing?

| very easy | very difficult |

38. Does your baby like you to spend time with him or her besides the time that you usually spend feeding, diapering, bathing, etc.?

___ yes
___ no
___ don't know

39. If yes, what do you usually do during that time?

__________________________________________________________________________

How often would you say you do this? ________________________________

40. Some babies seem pretty much the same at one month as they did when they were born; others seem to change quite a bit during the first month. What would you say about your baby?

| changed a lot | seems the same |

41. What do you enjoy the most about your baby so far?

__________________________________________________________________________

42. What does your husband or partner enjoy the most about the baby so far?

__________________________________________________________________________

43. What do you enjoy the least about the baby so far?

__________________________________________________________________________

44. What does your husband or partner enjoy the least about the baby so far?

__________________________________________________________________________

45. To what extent has having a baby restricted your work/school or social life?

<table>
<thead>
<tr>
<th>work/school</th>
<th>social</th>
</tr>
</thead>
<tbody>
<tr>
<td>a great deal</td>
<td>not at all</td>
</tr>
</tbody>
</table>
46. Do you think that having a new baby has altered your relationship with your husband or partner?

| a great deal | not at all |

47. If your relationship has changed, in what ways would you say it has changed?

________________________________________________________

48. Have you been out without the baby during the time since you have been home from hospital?

___ yes  (How often?) _________________________________

___ no

If yes, who stayed with the baby? _________________________________

49. How did you feel while you were out? (Check off as many as apply)

___ really missed the baby
___ worried about the baby
___ knew the baby was being well cared-for
___ thought a lot about the baby
___ wondered if I was doing the right thing
___ felt good to be out for a change
___ wished I could go out more often
___ other (Specify) _________________________________
APPENDIX R

BOOKS SUGGESTED IN PRENATAL CLASSES

Canadian Mother and Child
New Childbirth
Nursing Your Baby
Preparation for Childbirth
Great Expectations
Lamaze Method
Please Breastfeed Your Baby
The First Twelve Months of Life
Dr. Spock: Infant & Child Care
How to Succeed in Breastfeeding
Pregnancy: The Psychological Experience
How to Parent
The Magic Years
The First Five Years
The Womanly Art of Breastfeeding
What Now?
Controlled Childbirth
APPENDIX S

MATERNAL BEHAVIOURAL COMPOSITES

I. Physical Contact = sum of: close contact
loose contact
lap
secure hold

II. Visual Engagement = sum of: en face
eye-to-eye

III. Vocal Engagement = sum of: vocalize
request response

IV. Tactile Engagement = sum of: touch
pat/stroke

V. Play Engagement = sum of: smile
play
play face

VI. Provides Stimulation = sum of: visual stimulation
auditory stimulation
tactile stimulation
vestibular stimulation

VII. Affection = sum of: kiss
nickname
name

VIII. Caregiving = sum of: feed
start feed
mother stop feed
caretake
adjust

IX. Contingent Response = sum of: all maternal behaviour
recorded in response
to infant behaviour
The attached questionnaire is part of a study being done at UBC and St. Paul's Hospital on parent-infant relationships. In the main study, we are asking pregnant women to fill out our questionnaire, and then we plan to follow them through the birth of their infants and into the first month of life. We are trying to see how prenatal attitudes and expectations are related to later behaviour and the mother's relationship to her infant.

In order to validate our questionnaire, we need a great many women to fill it out; then we will analyze the information, refine the questionnaire and use it in our main study. For this reason, we are asking expectant women who are attending childbirth classes to help us by filling out this version of the questionnaire.

Our main need now is for women who are having their first baby. If you have children at home but have never had a baby before, you would still be considered to be having your first baby, and we would like your help as well.

We are not asking the women who help us now to become further involved in our study, that is, to be followed through birth and into the first month. However, if you are planning to give birth at St. Paul's Hospital and you would be interested in participating in the study, we would be happy to include you. Just put your name and phone number on the questionnaire and one of our researchers will call you and give you more information about our address, phone number, husband's name or physician's name on the questionnaire. We would be interested in the other information, however (date of birth, education, occupation, and estimated date of delivery). Please feel free to write comments about the questions, or to add choices if we have not selected the right alternatives for you.

The researchers of the Parent-Infant Study thank you very much for your help with our research. We plan to make the information we get from our study available to the Childbirth Association, and if you are interested in the results, you will be able to obtain them from the Association or from us at UBC by September of this year.

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