

The First Year Of Life

Psychological and Medical Implications
of Early Experience

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Chapter 1

Issues in the Study of Social Behaviour in the First Week of Life

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INTRODUCTION

The issue of whether social behaviour is determined in part by events early in life is of interest to a number of disciplines. Members of the 'caring' professions—psychiatrists, psychologists, and paediatricians—hope that correct diagnosis of developmental problems and the ability to prevent long-term consequences of early events will result from research on this topic. But at a research level the problem becomes one of disentangling relationships of cause and effect—of deciding whether a particular event will give rise in time to a predictable outcome, and whether, in reverse, a given outcome is related to one or another candidates as a possible cause (Sameroff, 1975). Questions of this nature cannot be tackled adequately without a proper understanding of the processes through which the causal link is established. A model involving relatively complex and detailed hypotheses is essential when relationships are multiple and extended over long periods of time.

In studying the growth of social relations, psychologists commonly examine the effects of specific factors on the behaviour between a mother and her infant (Moss, 1967; Lewis, 1972). Two distinct approaches have now focussed on the postpartum period as an important source of the origins of particular styles of interaction between the two partners. On the one hand there are empirical studies suggesting that events such as separation of mother and baby can have deleterious effects (Klaus and Kennell, 1970; Richards, Chapter 2, this volume), and that characteristics of the mother's handling (Sander, 1969), or the baby's temperament and behaviour (Osofsky and Danzger, 1974), partly determine subsequent interaction. In contrast, microanalytic studies of the behaviour between mothers and slightly older infants have revealed that the infant himself contributes a great deal to the 'dialogue' with his mother (Stern, 1971; Trevarthen, 1975), and that similar attention to an earlier period of development would be of value.

There has been a tendency, however, to ignore some of the complexities of the

postpartum period by compartmentalizing features into 'independent' and 'dependent' variables. It seems more profitable to view this period as being affected by a host of complex—and often inseparable—factors. This chapter will highlight some of what is known about the setting of birth in our culture today, the abilities and skills that mother and baby bring to the emerging social relationship, and some of the attendant methodological problems involved in studying social behaviour and interaction in the first week. To illustrate these points data will be presented on 145 mother–infant pairs collected during a study carried out in a London teaching hospital on the effects of obstetric medication on the neonate. Discussion will be limited to characteristics of the sample as a whole because analysis is in a preliminary phase, and it would be premature to specify significant labour or drug effects. The intention is to emphasize the diversity of experiences and attitudes of mothers, and the range of differences between infants, which shape early social relations and thus make the study of this period so difficult and inexact.

NEWBORN CAPABILITIES

Recent work on social behaviour now recognizes the greater role played by the infant (cf. Schaffer, 1977a), and it is appropriate to begin with a description of the neonate's capabilities. The myth that babies neither see nor hear in the first six weeks has been dispelled by systematic experiments on perception, although unfortunately mothers do continue to be given such outdated information in many maternity units. Most empirical work has concentrated on perception and learning, but the experience of the neonate (and to some extent, the older infant), is strongly social in character, for all contact with the world of material objects and natural events is mediated by the actions of his caregivers.

The infant's readiness to participate in social interaction depends on at least two developments: his perceptual abilities in orienting and maintaining attention to social stimuli, and his capacity for sustaining an alert and responsive state. To a lesser degree his motoric control (holding his head in the midline, and sitting at an angle without flopping), and his autonomic maturity (not startling or becoming tremulous in response to changes in light, noise, and temperature) also play a part. Mothers may well take account of the infant's individual characteristics—willingness to smile, 'cuddliness', physical appearance, and propensity to be soothed by her voice—in initiating and sustaining interaction.

State

The infant's ability to modify his wakefulness and alertness to suit the circumstances contributes to his status as a partner, rather than just a recipient, in social interaction. The concept of behavioural 'state' has proved very

valuable in infant research (Gregg, Haffner and Korner, 1976). Most of the work on state treats it as a descriptive evaluation defined by observable behaviour (Escalona, 1962; Brazelton, 1973), though reference to physiological measurements such as EEG has clarified some of the parameters (Prechtl and coworkers, 1968; Stern and coworkers, 1969). Six states are generally utilized in infancy work: (1) deep sleep, where breathing is regular and movement absent; (2) light sleep, with irregular breathing, occasional restlessness and rapid eye movements; (3) drowsy awakesness; (4) alert awakesness; (5) a fussing, high activity state; and (6) crying.

State must be taken into account in research for a number of reasons:

1. The type and quality of response that the infant makes to stimuli is strongly related to the state which he is in at the time (Korner, 1969; Thoman, 1975). For example, it is easiest to obtain consistent orienting responses in an alert state (Prechtl, 1965; Brazelton, 1973).
2. Both internal and external events determine state. Important factors such as time since last feed, amount of sleep, noise, light, and temperature levels can be modified to bring an infant into an appropriate state for testing. If such variables are not taken into account in observational and experimental work spurious or misleading conclusions may be drawn (Beintema, 1968).
3. The infant shows a tendency to change to, and remain in, a state that is appropriate for the situation. Stimulation will wake him, and usually he will become alert. If he is overwhelmed by stimulation he will fuss, and finally cry. But he is able, usually, to quiet himself again and return either to an alert state or to sleep. The particular pattern of the state changes will depend on the demands of the situation, on the baby's resources, and on the particular baby (Thoman, Leiderman and Olson, 1972).

The infant's ability to maintain his own state is influenced by the efforts of those caring for him to manipulate his state. The stimuli most likely to bring him in a controlled way from sleep to alertness are human stimuli, and several studies have documented the way in which human sounds become more effective at stopping his crying over the first few weeks (Wolff, 1969; Korner and Grobstein, 1966). Opinions differ on the extent to which the neonate's behaviour can be called intentional; we must recognize the problems of defining such an intangible and elusive aspect of human action. Nothing we have said here about control of state goes beyond the degree of sophistication of a simple homeostatic mechanism, but clearly the infant does *become* intentional in his actions as he develops. It may be that the most important contributor to this is the degree to which a mother will inevitably *treat* behaviour as deliberate and conscious. A mother devotes a great deal of time to shaping the infant's state. Thus she will attempt to wake him to ensure stronger suckling, or reduce his heightened state of activity and crying by soothing him to sleep. As Thoman (1975) puts it, 'state acts as a prelude, a mediator, and an elicitor,

as well as the context for any interaction that occurs between the infant and his mother'.

Perceptual abilities and state: the first hour

Numerous studies have documented the infant's perceptual skills during the early weeks. It is well established, for example, that the infant can discriminate visual patterns of relatively fine detail, and tends to prefer areas of high contrast or movement (Fantz, Ordy and Udelf, 1962; Brennan, Ames and Moore, 1966). Extensive work has been devoted to the topic of an innate preference for social stimuli, particularly 'facedness' as reported by Fantz (1961). Hershenson (1965) and Wilcox (1969), however, both failed to confirm a preference for faces in infants under 16 weeks. Comprehensive reviews of perceptual behaviour in the neonatal period are contained in Bronson (1974), Cohen and Salapatek (1975), and McGurk (1974).

Few have described these skills in the period immediately after delivery, although the manner in which the mother makes use of such skills in the first interactions is discussed by many (Klaus and Kennell, 1970; MacFarlane, 1977). Of the 145 infants in the study of obstetric analgesia, detailed observations and assessments are available on 116 of the infants at delivery, beginning from the moment that the head was delivered.

There was great variation in the interval after birth before the baby first opened his eyes, and in the total length of time for which the eyes were open during the first 20 minutes. Although one-quarter of the sample had opened their eyes within the first 15 seconds, and a third within the first minute, more than one-third had not opened their eyes by 10 minutes, including seven infants who had not opened their eyes by the end of the observation period. Slightly less than half of the sample kept their eyes open for more than 10 minutes, including eight babies whose eyes were almost always open. However, it was rather more difficult to specify how well they were seeing things during this time, as there was often nothing near enough to the infant for him to focus on while unattended in the cot. Three-quarters of the infants exhibited scanning behaviour during that period, and half of them focussed during at least one 15-second time interval. However, although almost half of the infants showed scanning for 3 minutes, fewer than 10% focussed for as long. A summary is presented in Table 1.1.

The first 20 minutes were also characterized by frequent state changes with only brief periods of alertness. The typical infant gave a short 'birth cry', and then settled into a quiet, semi-alert state, interspersed with an occasional alert episode of less than a minute. Only half of the infants cried for more than 3 minutes, although many of them fussed a great deal. Conversely few of them slept; 75% never went into State 1 or 2, and those who did so tended to have had minor respiratory depression. More than one-third of the infants never

Table 1.1 Spontaneous visual behaviour in the 20 minutes immediately following birth: % infants

	Latency to open eyes	Total time eyes open	Time scanning	Time focusing
Never	7	9	33	50
0-15 sec	25	2	1	9
15 sec-1 min	9	5	6	13
1-13 min	15	15	17	19
3-5 min	11	11	13	5
5-10 min	17	21	22	2
10-15 min	12	25	6	1
15-20 min	4	12	2	1
	100	100	100	100

reached a spontaneous alert state, and fewer than 20% stayed alert for more than 10 minutes.

The infants at delivery were far more labile than they would be 24 hours later during a full neonatal assessment. Again, the 'typical' infant shifted into a new state about every 90 seconds. Only a third changed state fewer than 5 times, and 4% changed more than 30 times. Some of this lability was undoubtedly due to the propensity for medical staff to intervene in these early minutes with caretaking tasks—weighing, measuring, and so on. Nearly one-quarter of the infant's time was spent being handled by medical staff, and 4 of these 5 minutes were coded as 'aversive' procedures. Not surprisingly, the typical response was to cry. About half of the infants always cried to such handling; only 10% never cried in these situations.

At the end of the observation period 88% of the infants could be coaxed into a quiet and alert state in which visual and auditory skills could be assessed using selected items from the Brazelton Neonatal Assessment Scale (1973). Of these the majority showed evidence of response to sound, and of the ability to follow briefly a bright object or human face as shown in Figure 1.1.

It is striking that more babies tracked the examiner's face at delivery better than they did a string of bright beads, and were more likely to turn if the examiner talked at the same time. There was no difference in their responses to a rattle versus a voice, but it is possible that the rattle was slightly louder.

The infant's perceptual abilities at birth are likely to help the mother to consider her infant as a real person. Klaus and Kennell (1970) noted that nearly three-quarters of the mothers in their sample 'asked' the infant to open his eyes, and spent increasing periods of time adjusting the infant so that they were in an *en face* position. Like Robson and Moss (1970) they also mention that mothers often commented on feeling closer to the baby after he had looked at them.

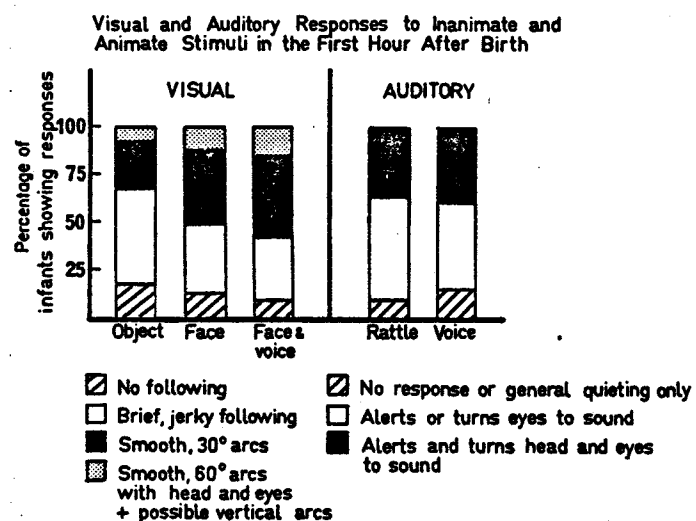


Figure 1.1 Visual and auditory responses to inanimate and animate stimuli in the first hour after birth

Developmental changes

Over the next few days and weeks the infants in the study came to spend more time in an awake state, and to be quite capable of responding to maternal solicitations. Infants were awake for 7 hours on the first day, despite the fact that they received fewer feeds than on subsequent days. This accords well with physiological studies of the first few days (Theorell and coworkers, 1973), and suggestions that the first 24 hours are an optimal time for social interaction (Hales and coworkers, 1977). By day 2, time asleep had increased, and feeds occupied most of the awake periods; only on day 7 did the awake periods reach the level they had been on the first day.

During administration of the Neonatal Assessment from day 1 (24 hrs) onwards, three-quarters of infants were in a predominantly quiet and alert state, thus maximizing the possibility of interaction with the tester. When disturbed by stimuli in the test, half of the infants quieted spontaneously or were easily calmed by the examiner's face and voice alone. When this was not effective a variety of additional procedures were tried. As generations of parents have discovered, the most consistently successful method of soothing was to hold the baby and rock him. On day 1, 95% could be quieted in this way, but subsequently infants polarized into two groups: those who quieted very easily, and an increasing number (12-15%) who became extremely difficult to soothe by any means. This core of 'irritable' babies were in the first week less likely to maintain a stable alert state unless held tightly, swaddled, or given a dummy to suck, but they were as competent as the more amenable infants on orientation tasks when such conditions were met.

Visual skills developed rapidly in the first week, particularly tracking inanimate objects as can be seen in Table 1.2. Though the concern here is with the first week, it is interesting to note that very little change took place between week 1 and week 3 in the sample, but that at 6 weeks almost all the infants demonstrated reliable visual tracking. In the auditory sphere the number of babies who, at the least, alerted to sound increased steadily. However, although the behaviour of individuals was very consistent over the weeks, the mean of the group fluctuated from session to session. From the observations of the infants in the testing situation their early response to sounds often seemed to be an automatic orienting response of reflex type.

The inconsistent progress of the group over the first six weeks therefore, might reflect the changing nature of this response as it gradually approximates to true visual localization under voluntary control that occurs around 3 months (Uzgiris and Hunt, 1975). In interactions with the infants at 6 weeks, it seemed that their visual behaviour also was *qualitatively* different; they were interested not only in the immediate stimulus object, but in scanning the entire room and then fixating on items or people of particular interest. Experimental studies

Table 1.2 The development of orienting skills over the first six weeks: % of infants demonstrating behaviour at, or better than, this level

	Birth	Day 1	Day 3	Day 7	Day 21	Day 42
Visual Following:						
Object						
a. Brief, jerky	83	95	92	95	98	100
b. Smooth, $\geq 30^\circ$ arcs	50	57	67	75	79	95
Visual: Face						
a. Brief, jerky	86	97	97	98	100	100
b. Smooth, $\geq 30^\circ$ arcs	50	71	74	81	74	97
Visual and Auditory:						
Face + Voice						
a. Brief, jerky	89	95	95	98	99	100
b. Smooth, $\geq 30^\circ$ arcs	58	74	80	85	87	97
Auditory: Rattle						
a. Alert to, or eyes turn	89	90	98	97	98	100
b. Turn head and eyes	36	61	70	63	60	70
Auditory: Voice						
a. Alert to, or eyes turn	84	90	95	94	94	98
b. Turn head and eyes	38	54	59	61	54	69
Number of infants tested	89	120	125	121	131	126

suggest that this is the age at which one would expect smooth object tracking (White, Castle and Held, 1964; Dayton and Jones, 1964), accommodation to various distances, and the ability to maintain a 'steady fixation on small centrally located stimulus elements' (Bronson, 1974).

Although 12% of the infants could not maintain an alert state long enough to orient to stimuli immediately after birth, this proportion had dropped to 6% by the seventh day, and to less than 1% at 3 and 6 weeks. With three-quarters of the sample reliably attentive to a human face and voice, by the third day there was obviously much scope for social interaction between these mother-infant dyads in the first week.

TECHNIQUES OF INVESTIGATING NEONATAL BEHAVIOUR

Infant tests

It is only recently that neonatal observation has moved from single-variable studies of the infant's capacities towards a more global, multidimensional concept appropriate to the study of social behaviour (Yang and coworkers, 1976). Even for the assessment of the effect of medical interventions on the neonate much reliance has been placed on the Apgar score (Apgar, 1953), which is an observation of five vital signs made at 1, 5, and sometimes 10 minutes. It is inadequate for reflecting subtle or sophisticated behaviours (Scanlon, 1973; 1974), or for interpreting delayed birth effects which are common even in the normal neonate (Brazelton, 1970; Escardo and De Coriat, 1960). However, medical researchers have frequently concluded that various obstetric practices, including medication, had no effect on the neonate simply because the Apgar scores do not differentiate the experimental and control groups (Noble and coworkers, 1971; Wingate, 1974; Thalme, Belfrage and Raabe, 1974). The poor predictive value of such assessments may be because later socioeconomic circumstances are of greater importance (Sameroff, 1975), or that single obstetric events thus measured are of only transient importance (Parmelee and Haber, 1973). But it could also be because the 'trauma' is only evident in more complex behaviours which are not easily observable in the neonatal period (Parmelee and coworkers, 1975).

During the same period, however, developmental psychologists and paediatricians have developed a variety of 'neurobehavioural' tests (Rosenblith, 1961; Scanlon and coworkers, 1974; Brazelton, 1973). Brazelton's test, in published form (1973), is probably the most comprehensive and widely used of these. It also offers an explicit focus on social behaviour, aiming to measure those characteristics of the infant which are most likely to promote appropriate caretaking and interaction from the mother. Special attention is paid, therefore, to visual and auditory responsiveness (see previous section), and the infant's

ability to control his state and respond in a systematic and appropriate manner to both stimuli and tester. Higher neurological functions are also assumed to be reflected in the test items which require the infant to habituate to, or 'tune out' repeated presentations of an 'irrelevant' stimulus. Motor tone, power, and activity are observed, as well as tremulousness and startles. A selection of reflexes drawn from the more comprehensive neurological examinations of Prechtl and his colleagues (Prechtl and Beintema, 1964) are also included.

Unlike tests for older infants (Bayley, 1969; Griffiths, 1954), the Brazelton assessment is designed to elicit and rate the best performance from an infant rather than his average, and is therefore more sensitive to the neonate whose skills may only be evident for transient periods between a sleeping and a crying state. The test has been used to compare the normal, full term neonate with those who are of low birthweight (Als and coworkers, 1976), malnourished (Brazelton and coworkers, 1977), or suffering the effects of maternal obstetric medication (Aleksandrowicz, Cayne and Aleksandrowicz, 1974; Tronick and coworkers, 1976). It has also proved sensitive to cultural characteristics of non-Western populations: the Zinacanteco Indians (Brazelton, Robey and Collier, 1969); Chinese, Malay, and Tamil infants (Woodson and Woodson, 1977); Chinese-American infants (Freedman, 1969); Navajo Indians (Chisholm, 1977); and Zambian infants (Tronick, Koslowski and Brazelton, 1973).

Despite its popularity this type of investigation is not flawless. As with other infant tests the Brazelton assessment assumes that the infant's behaviour is systematic and quantifiable, and can be classified into neat categories. Although quite easy to obtain high reliability between observers (Horowitz and coworkers, 1971), it is a test in which each clinician seems to elicit behaviour in a slightly different manner; for instance, simply by holding the infant closer or talking in a softer voice the tester may unconsciously encourage a better performance from a given infant. Scanlon (1974) indicates some of the problems inherent in behavioural observation of this sort as being: 'observer subjectivity or bias, the quantification of measurement criteria, difficulties in controlling extraneous variables during testing, and inherent biases in population selection.' This last problem applies to any observations or experiments that depend on the infant's initial state conforming to set criteria; the selection of 'alert' babies as subjects, for example, introduces a bias towards higher scores. Estimates of an infant's appearance and 'cuddliness' as included in the Brazelton assessment are difficult to make, and are highly subjective and difficult to justify to medical clinicians. Despite these problems the Brazelton Neonatal Assessment remains at present one of the most useful tools in the investigation of neonatal behaviour.

Experimental methods

Laboratory studies have been more commonly employed in the study of

perceptual development and learning, but such techniques occasionally have been used to assess aspects of social skills under controlled conditions. For instance, early studies of perception suggested that the eyes are salient features when neonates scan faces and face-like stimuli (Fantz, 1961; Ahrens, 1954). Carpenter (1974) utilized a 'preference' technique in which she measured the amount of looking to each of two visual stimuli, and found that 2-week old infants preferred mother's face to a stranger's, and that some infants even showed gaze aversion to the stranger's face. Three-week old infants can learn to suck significantly longer when the mother's voice follows the sucking than when a stranger's voice rewards their performance (Mills and Melhuish, 1974). MacFarlane (1975) has demonstrated the development of olfactory discrimination and preference for mother over stranger. By presenting mother's vs. stranger's breast pad on either side of the infant's cheeks he found that at 2 days the babies turned equally frequently to both, whereas by 5, and more clearly at 10 days, they turned towards the pad of the mother rather than that of the stranger. These early abilities in discriminating the mother from other caregivers are considered to be an important base for later 'attachment' behaviours (Schaffer and Emerson, 1964; Ainsworth, 1967; Blehar, Lieberman and Ainsworth, 1977).

Many conditioning experiments also have implications for social behaviour. For example, extensive research has documented the differences between non-nutritive and nutritive sucking patterns (Dubignon and coworkers, 1969; Wolff, 1968), and specified those variables which reinforce particular aspects of sucking. In experimental situations nutritive sucking rates can be altered by the amount of fluid delivered with each suck (Crook, 1976), the frequency with which the sucks are reinforced (Bosack, 1973), the characteristics of the nipple (Christensen, Dubignon and Campbell, 1976), the taste of the fluid (Crook and Lipsitt, 1976; Crook, 1977), and exteroceptive stimuli (Crook, Burke and Kittner, 1977).

Obvious comparisons can be drawn with components of the mother's behaviour and the feeding situation in the early weeks. The neonate's well-organized sucking behaviour therefore can be modulated by the mother's selection of certain formulas, bottles, and probably by the manner in which she interrupts the regular burst-pause pattern of his sucking, or reinforces his sucks by faster milk delivery. It is possible that subtle shifts in, say, the speed of administering milk, or teats which vary in hole-dimension from feed to feed, coupled with an infant whose sucking is rather irregular, may lead to dysynchronies in interaction which present as feeding problems in the early weeks and months.

One must use caution, however, in generalizing from the laboratory to the real life situation for a number of reasons. The experimental situation is usually highly artificial, with the infant restrained in a chair, attached to wires, electrodes, and feeding tubes, and in a silent, and temperature-controlled room.

White (1971) has suggested that a situation in which reinforcements are delivered at a constant rate, is quite unlike the natural situation, where the relationship between the stimuli and responses is more erratic. Such an experimental situation may then not be representative of the way young infants really learn. Because of the rigorous demands on the infant inherent in experimental modification of behaviour there is some degree of selection and bias introduced. To be included in a learning experiment infants usually must reach either a criterion number of sucks in the baseline minute, or a criterion amplitude, in order to activate equipment which delivers the reinforcement (Crook, 1976; Swoboda, 1976). Those infants whose sucking is strong and regular may well be developmentally more mature, or suffering less from the effects of birth trauma, thus yielding a less-than-representative group. Lewis and Johnson (1971) have commented that those babies who do not complete an experiment initially, but are subsequently retested do, in fact, perform differently, so that their elimination results in significant bias.

In order to validate experimental findings it is necessary then to discover whether the mother, and other caregivers, predictably reinforce infant behaviour, and whether the infant regularly responds.

In early observational work, Gunther (1955, 1961) described how aversive or avoidance conditioning takes place naturally when the infant's nostrils are occluded by the mother's breast while he is sucking so that he turns his head, struggles, and becomes agitated. Lipsitt (1970) suggests that some infants then develop a conditioned aversion to the mother which is a result of the simultaneous elicitation of strong approach and avoidance responses in the feeding situation. His research group has gone on to demonstrate that classical aversive conditioning can occur in the early weeks (Little, 1970). Kaye (1977) has investigated the social implications of the modification of feeding responses by observing the mother's stimulation of her infant when he pauses between sucking bursts; these findings are discussed in the later section on feeding. His study provides a useful corollary to the experimental investigations of Crook, Burke and Kittner (1977) into the way in which auditory stimuli may disrupt nutritive sucking, and its implications for strategies of encouraging sucking through external stimulation.

Indirect assessment

Direct observation and infant testing have often been supplemented by 'second-hand' data on the infant given by the mother. Richards and Bernal (1972), for example, asked mothers to keep diaries of the infants' daily cycle of feeding, sleeping, and crying. These records produced valuable information on feeding; breast fed babies tended to cry more after feeds, and their mothers responded quickly to their crying (Bernal, 1972). These diaries also made it clear that babies who were regular night wakers at 14 months had been more

irritable and wakeful during the first 10 days of life, and continued to have consistently shorter sleep bouts in the intervening months (Bernal, 1973). Carey has also investigated factors relating to night-waking (1974) and 'difficult' behaviour (1972) in infancy by means of a maternal self-administered questionnaire based on Thomas and associates' (Thomas and coworkers, 1963; 1969) interview concerning infant temperament. Sleep disturbance between 6-12 months showed a significant correlation with low sensory threshold (Carey, 1974), while 'difficult' babies were more apt to have colic, as well as to have more lacerations requiring suture in the second year (Carey, 1972). In a follow-up of the Richards and Bernal cohort at 3 years, Barnes (1975) found an association between lacerations and 'poor birth status'; another attribute of the 'poor birth status' group was sleep disturbance at both 14 months and 3 years.

The Carey Infant Temperament Scale has only recently been modified for use in the neonatal period (Sostek and Thomas, 1977). In their small study of 18 infants, 'distractible' infants showed *better* social and motoric interaction and state control in a previously administered Brazelton Neonatal Assessment, and 'intense' infants had better motoric interactive scores. Distractibility and intensity also predicted better Bayley test scores at 10 weeks.

Diaries and temperament scales have also been used in the present research, but their predictive value and interrelationships have not yet been established. They contribute another valuable dimension to evaluating infant behaviour and, in particular, allow a global assessment covering traits, or time periods where direct observation is impractical. Nonetheless they may be methodologically less sound than other forms of measurement. Bernal (1972) notes that diaries are 'crude and can be unreliable' because mothers vary in the accuracy of their remembering and recording, or there may be a bias toward, say, multiparae being too busy to notice or record accurately. This point is, in the authors' experience, particularly important in hospital where night records are possibly less accurate because the mother herself is asleep, and nursing staff may infrequently check on, and record, the state of the infant. Carey discusses some of the methodological problems of his scale (1970), such as the discrepancies between the mother's impression of her infant's temperament and the actual behaviour which she describes. Thus mothers minimized the difficulties of their infants, possibly because of their wish to make the infant seem more socially desirable; in the long term follow-up of the drug study cohort there was a tendency for the mother to rate her infant as 'easy' or 'average' even though she may have indicated elsewhere that her infant wakes at night, refuses food, and does not settle easily into a routine.

STUDIES OF THE MOTHER AND INFANT

In the previous section the extent of the neonate's abilities, and some aspects of the way his behaviour is constrained, regular, and modifiable, were discussed;

in this section the social relations of mother and child in the first week of life are examined. There are two particular topics of interest for many researchers: the delivery room and the feeding situation. Both are of theoretical importance and provide opportunities for detailed investigation of some aspects of the baby, or of the mother-child relationship. Many authors, however, have argued that even while in utero the infant is influenced by factors in the mother or her environment, so that it is important to consider potential prenatal determinants of neonatal and maternal behaviours first.

Pre-natal influences

An attempt to relate maternal factors and subsequent infant behaviour was made as early as the 1940s when Sontag looked at the role of anxiety in pregnancy (Sontag, 1941). His findings were responsible for a surge of interest into the effect of the emotional status of the mother on her attitude to the baby, as well as the conduct of the labour and delivery (Turner, 1956; Ottinger and Simmons, 1964; Abramson, Singh and Mbambo, 1969). The problems here are typical of this work in general: that of developing an adequate model of the delayed or long-term consequences of interacting events, or selecting properly controlled sample groups, and of designing robust and reliable assessments. In reviewing the literature on the role of emotional factors in obstetric outcome, McDonnald (1968) concluded that anxiety is the major agent; 'anxiety and extremes in its duration and intensity are postulated as necessary and sufficient conditions, respectively, for the development of psychogenic obstetric complication'. But he points out that the findings of such studies are often marred by small samples, inadequate or absent control groups, and retrospective data. These points are re-emphasized by Copans (1974) who adds to this list the lack of 'non-blind' testing and the failure to distinguish between environmental and intrapersonal variables.

In the drug study there are significant correlations between anxiety and depression in pregnancy, and the mother's initial behaviour and attitude toward her infant at birth, but these emotional states are also dependent on her parity and social class, as well as being confounded with the type of drug she received for pain relief. Emotional status did not determine her length of labour, or the amount of medication administered to her. This is in contrast to several other studies (Yang and coworkers, 1976; Brown and coworkers, 1975; Zuckerman and coworkers, 1963) which do report a relationship between poor adaptation to pregnancy and analgesic administration. Yang stresses that 'such a maternal disposition may be enduring', so that the mother's need for more drugs may be a part of a particular personality which also determines her interactive style. The absence of such effects in the present study may be attributable in part to the more normative sample, or the smaller drug dosage.

These points are extremely important; any study of the neonate that attempts

to link his characteristics to the behaviour or emotions of his mother some months beforehand must take great pains to exclude any possible effects due to the mother's handling and caring for her child. Yet psychologists have often shown minimal appreciation of the adaptability of the newborn. Neonates have been tested at any of a variety of times during the first week, and on occasion no attempt has been made to control for feeding differences (i.e. breast versus bottle; e.g. Ourth and Brown, 1961). Even Copans' suggested solution to this problem seems to underestimate the reactivity of the neonate; he argues for 'making the necessary assumption that postnatal influences are at a minimum on day 3 since the predominant environment is the hospital nursery'. Admittedly, mother-child contact is very much less in America in the first days after delivery than it is in Britain (cf. Barnet and coworkers, 1970), but even so it could be argued that the neonate will already have made many adjustments to his environment and the people caring for him (Sander and coworkers, 1970).

And, equally important, these caregivers will have made adjustments to him. There is a failure, when looking for prenatal effects, to recognize that the baby exerts a powerful influence on his mother as well. Psychologists have begun to proffer more complex models of this transaction—such as Sameroff's 'mutual modification' (1975)—but these models lend themselves poorly to operationalization and testing. If, for instance, one wanted to examine the likelihood of behaviour disturbance after mild respiratory difficulties, and accepted that particular factors in the mother (such as schizophrenia) might modify or exacerbate individual characteristics of the infant (excessive irritability), it would be necessary to observe a great number of mother-infant dyads to test adequately all combinations of mother and child characteristics. Furthermore, only intervention studies can determine whether detrimental consequences of a prenatal or perinatal event are inevitable, or merely a reflection of the lack of resources, or knowledge for appropriate management or treatment. The fixed belief that premature infants were likely to have later handicaps or do poorly in school was challenged when new techniques and equipment were developed to cope with respiratory distress and feeding problems which frequently accompanied prematurity. Now that these hazards can be controlled the gestational age of the infant is of less prognostic importance than the complications he may develop after delivery. The consequences of adverse events during pregnancy may well have to be evaluated in a similar fashion.

Studies of the delivery room and first contact

The most recent statistics for the UK (DHSS, 1974) indicate that 90% of all births take place in hospital. Thus in most cases the experience of a hospital delivery will stand at the beginning of the relationship of a woman with her

child. It is important to know if any aspects of birth in a hospital can affect this relationship, or the development of the child in the long term. The events of the delivery room have also attracted attention for other reasons—first, because the delivery room provides the first opportunity for a detailed examination of the neonate's abilities, and second, because the mother's responses to her child at their first meeting, are presumed to be of much significance.

A hospital's policy on the use of such techniques as induction and acceleration of labour, forceps extraction, caesarean section, and analgesia, may impose certain general characteristics on the infant population in that hospital. Some infants will show the effects of drowsiness or minimal depression resulting from maternal medication (Tronick and coworkers, 1976), bruising caused by forceps delivery (Vulliamy, 1972), or slight prematurity associated with induction (Calder and coworkers, 1974). The stress may be compounded by the interrelations of these factors; primiparous women tend to have longer, more painful labours, and in the present study more often received epidural anaesthesia and an instrumental delivery. Kitzinger (1975) suggests that induced labour tends to be more intense and painful, and thus also may result in epidural administration. Paediatricians cite the use of forceps as a factor in the occurrence of neonatal jaundice (Friedman and Sachtleben, 1976), and some have implicated the use of induction agents such as oxytocin as well (Jeffares, 1977). The jaundiced infant suffers from an increased demand upon the liver detoxification systems, and so is less well able to metabolise the drugs that cross the placenta during labour (Burt, 1971). These medical interventions may result in particular responses from the mother which are more attributable to the condition of the infant than to any 'natural' behaviours.

Labour and delivery experiences may also be determined by sociological parameters. For example, decisions about the choice of pain-killing drugs will depend on such objective indications as parity, and cervical dilation, but also on the woman's preconceptions about the degree of pain to expect, her attitude about the extent to which pain 'ought' to be endured, the support she receives from the nursing and medical staff, and the way that the latter interpret her signs of discomfort as indications for the use of analgesia (O'Driscoll, 1975).

The experiences of mother and of baby will vary from one situation to another partly because they will involve those aspects of hospital policy that relate to ways of dealing with the labouring woman, the mother she becomes, and the baby. The mother who delivers in hospital, for example, is less likely to handle her baby in the first hour than one who has a home confinement (Garrow and Smith, 1976). The baby may be given to the mother at times which suit the convenience of the medical attendants, but are not necessarily the most appropriate for the mother's comfort or for the baby's state of alertness. In the present study the two periods when contact is most likely are immediately after the cord is clamped, for a brief cuddle, and after the infant is cleaned up;

at both these times the baby is often crying as a result of the stressful handling he has just received, and may not give the mother much positive feedback.

Having said that there are a complex of factors—social, psychological, and physiological—at work at the time of delivery, how are we to interpret studies of early maternal handling and the effects of separation? These studies are based on the concept of 'attachment', or 'bonding', and this in turn owes much to the ethologists' observations of 'imprinting'. The findings are striking, but it is hard to take seriously the explanations that are given for the importance of early contact. Several authors have now discounted the notion that parturition brings about particular hormonal changes that constitute a critical or sensitive period for mothering (Wortis 1971; Schaffer, 1977).

Just what is important about early contact remains to be discovered; is it physical contact per se, or the attitude changes that may accompany it? What is 'early'—the first hour, the first eighteen hours (Hales and coworkers, 1977), or the first week? Do the infant's characteristics play no part? The careful work of Robson and Moss (1970) goes some way toward extending our insights into the process of 'attachment'. Defining attachment as 'the extent to which a mother feels that her infant occupies an essential position in her life', 54 primiparae were interviewed during the three months following the birth. The researchers noted a typical pattern of response by the mothers; at delivery they were preoccupied with finishing the task as quickly and painlessly as possible, and on first seeing their infant interest was in appearance only. Strong feelings of attachment in the mother were not present until the third month.

By this stage the infant's particular responses to the mother apparently contributed in an important way to the feelings of maternal attachment; in contrast 34% felt that their first contact with the child had elicited no feelings at all. Robson and Moss argue that there is an important difference between the mothers' emotional responses, and the attachment observable in animal species; the latter is triggered by species-specific infant behaviour, and involves attendance to physical needs, while the onset of positive feelings in the human mother seemed to reflect the 'infant's capacity to exhibit behaviours that characterize adult forms of social communication'.

Barnet and coworkers (1970), again on the basis of interview data, consider that separation—routinely after delivery, or that experienced by the mothers of premature babies—may produce differences in at least three areas: the sense of commitment or attachment to the infant; the development of confidence in mothering abilities; and the ability to establish an efficient caretaking routine. They point out that each of these will be affected in addition by such factors as parity, desire to have the child, birthweight, and the infant's prognosis. The two cases of negative reactions to the baby in their study were associated with an initially poor prognosis for the very premature baby—cases, in effect, of 'anticipatory mourning'.

In a random allocation of mothers of premature babies to contact or no-contact groups, however, Leifer and coworkers (1972) failed to demonstrate any consistent caretaking differences between their groups. Leiderman and Seashore (Seashore and coworkers, 1973) found that mothers separated from their premature infants held, caressed, and smiled less at the infants after discharge from hospital, but that by one year this difference had nearly disappeared. Separation seemed to lower the confidence of mothers of first born infants, and there was a higher divorce rate in the twenty-two families where the mothers of prematures had not had contact. These findings implicate stress as creating problems within the family unit rather than just between mother and infant, and draw attention once more to the interplay of factors in the mother's previous experience, personality, family support, and her expectations and trust in the medical institution.

The authors' observations in the delivery room suggest that the *first* contact between mother and infant is not a very long or satisfying one. Most mothers were given the infant within a few minutes of delivery, but 6% did not interact with the infant, and half of the sample interacted at this time for less than 5 minutes. Many mothers held the baby without actually interacting with him; that is, they 'discussed' the infant with their husband, with occasional glances at the infant as if to maintain him as the object of reference. Thus 18% never looked at their infant in the first 20 minutes, and fewer than 20% sustained visual contact for more than half the observation period. Talking was infrequent, nearly half of the mothers not talking to their infant at all.

The tactile exploration seen by Klaus and Kennell (1970) was very rare in this group of mothers; half of them never touched the infant or stroked him during this period, and only a very few stroked the hands or feet in the manner described by Klaus and Kennell. It is, of course, possible that mothers would have shown greater interaction if circumstances had been more favourable. For example, the infants were nearly always swaddled in this early period, and warnings about 'cold' were frequent enough to discourage mothers from unwrapping or undressing the infants while staff were present. It is also common in the unit studied to encourage the mothers to hold their infant while being sutured after routine episiotomy, in order to give them a distraction from the discomfort. In a semi-recumbent position, and with their legs in stirrups it is not surprising that mothers found it extremely difficult to devote their full attention to the baby.

After a further period of interaction with the baby the mother's behaviour was rated, albeit crudely, on the amount of holding and contact and its quality. By this criterion 62% had a rating of 'good' while 31% showed 'indifferent' behaviour, marked by few interactions, although they may have talked quite positively about the baby with their husband; 7% of the mothers were rated 'negative', in that they refused to hold the baby at all. The mothers who were less positive toward their infant had indicated greater depression and anxiety

during pregnancy, but their infants also were in marginally poorer condition at birth. Infants of these mothers performed no worse on the behavioural tests, but they did smile less to the examiner at 6 weeks of age. It was intriguing to find that in a postal follow-up of these infants later on in the first year (where 80% of the study mothers replied overall, 6 out of the 7 'negative' mothers did not return the questionnaire. This might indicate that they were finding child-rearing a less satisfying experience, or simply unwilling to share such experiences with someone connected with the hospital.

Fathers too were involved in the delivery room, three-quarters of them being present for the birth of their infant. Of those not attending, 11% chose not to see the birth while the rest were generally absent due to circumstances such as work obligations or insufficient warning. Of those attending, half were rated as having a 'good' attitude to the infant, and half 'indifferent', again in the sense of not actively talking and interacting with the baby. Unlike the mothers none of the fathers observed actually ignored their infant or refused to hold him when encouraged to do so. It seemed, in fact, that more fathers would have interacted with the infant had they been encouraged to actually hold him, rather than just gaze at him from afar; therefore the fewer 'good' scores may have been an artifact of the coding system, which specified 'holding and talking' to the baby. No importance can yet be attached to the father's attendance at the delivery and his early attitude to the baby. Richards, Dunn, and Antonis (1977) noted a correlation between presence at birth and later participation in caretaking activities in their longitudinal study of 80 infants. However, they emphasize that this is not necessarily a causal relationship, particularly as Greenberg and Morris (1974) found that attendance or non-attendance at the birth did not have later effects on paternal attitude. This does not mean, of course, that further efforts should not be directed toward making fathers feel welcome at the birth of their infant. Most of the fathers spoken to in this study were delighted to have had a part in the experience, and the mothers generally felt that their husband's support during labour had been rewarded by his being able to see the moment of birth.

Observations of mothers and infants during feeding

Quite apart from any theoretical arguments about the importance of feeding for the psychological development of the infant, an observer on the postnatal ward will notice that the feeding of her child provides a mother with almost her only meaningful contact with him. In addition it has the advantage for the psychologists that it is an often repeated activity, it usually involves mother and infant alone, and it is a goal-directed operation that has, furthermore, an apparently well-defined and unambiguous goal. It has therefore been studied more often and in greater detail than any other maternal caretaking activity.

However, on closer examination the purpose of this work has usually not been to tell us much about the *process of feeding* itself. Rather, the existence of a common activity has been used to provide a basis for comparisons of various groups. Research has documented differences between primiparae and multiparae (Thoman and coworkers, 1972), breast with bottle-feeders (Dunn, 1975; Bell, 1968), high with low-maternal contact groups (De Chateau and Wiberg, 1976), schizophrenic and normal mothers (Schacter and coworkers, 1977), and greater versus lesser quantities of analgesic medication (Brown and coworkers, 1975; Parke, O'Leary and West, 1972). The study by Schacter, in fact, completely excluded coding of offering and accepting of food during the feed as they were interested only in extra-nutritive behaviour. A variety of measures have been produced to facilitate these comparisons, e.g. looking at baby, time *en face*, amount of affectionate contact, and so on, but we end up in the paradoxical position of knowing that groups of mothers may differ in their behaviours toward their infants, while knowing nothing about why these differences appear, how they relate to the process of feeding, and whether they are likely to have any significance for the child's later development.

In a sample of black low-income mothers who bottle-fed their infants, Brown (Brown and coworkers, 1975) observed that the 'feeding' session actually turned out to consist of a series of brief feeding episodes which only lasted a total of 11 minutes out of the observed 30. They engaged in caretaking tasks about 10% of the time, while 21% of their time was spent in rubbing, kissing, rocking, and other affectionate behaviour. The fact that the infants kept their eyes open for 43% of the time, and that the infants were more likely to have their eyes open when the mother was presenting the bottle emphasizes the potential for turning the feed into a social occasion. Although light and heavy infants responded similarly to stimulation, mothers were more likely to stimulate the heavier baby by talking to him, and male infants were more likely to elicit affectionate behaviours. Brown suggests that in their particular population large male infants are most valued, whereas in Thoman's (Thoman and coworkers, 1972) sample of breast-feeding infants, mothers talked to and smiled at their female infants more often than the males.

By examining the sequences of talking and looking in greater detail, Dunn and Richards (1977) demonstrated that these activities did occur when the baby was on the nipple, but when he was not sucking, and that the probability of looking away and not talking while he was actually sucking increased over the days. The feeds became more coordinated and 'successful' over time as well, as measured by an increase in the time spent sucking, and a corresponding decrease in the number of times the nipple came out of the infant's mouth, and in the mother's attempts to stimulate sucking or change the infant's position. It was found that despite previous suggestions (Levy, 1958), the mother's 'affectionate' behaviours were not closely related to each other or with their response to crying; rather, 'affectionate' talking was significantly

associated with the infant's sucking rate. The breast-feeding infant was more likely to determine the pacing of his mother's behaviour than the bottle-feeder, particularly in terminating sucking bouts and affecting his mother's talking and touching.

In several of their papers, Dunn and Richards have drawn attention to some of the methodological problems inherent in the study of mother-infant interaction. Firstly (Dunn and Richards, 1977), a finer analysis may be necessary to elucidate elements in the interaction; the use of time-sampling, for example, in such a fast-paced situation, makes it impossible to attend to subtle changes in the direction of gaze or postural adjustment. For this reason video-taping of the situation improves the available depth and breadth of focus and has been the choice in recent studies of face-to-face interaction in an *en face* play situation (Brazelton and coworkers, 1975) and during feeding (Kaye, 1977). Another problem in the interpretation of mother-infant studies is that neither maternal nor infant measures can be assumed to be independent of previous interactions between the two (Dunn, 1975). Their work has been invaluable in demonstrating the need to take related variables into account even when one is dealing with a fairly homogeneous obstetrically normal population. The measure of 'affectionate' talking, for instance, was related consistently to suck rate in the early feeds which were influenced by labour and delivery events; the relative smoothness of the feed, and the incidence of difficulties in feeding were not useful predictors of later interactive behaviours.

More serious theoretical issues about methodology have been raised by Rosenthal (1973) who begins by stating that "Interaction" has been one of the most evasive and misused concepts in the literature of Developmental Psychology'. Most psychologists, she argues, have really been engaged in examining the impact that one member of the pair has on the other, i.e. the 'unidirectional arrow' whereas interaction involves 'the changing pattern of the mutual perceptions and behaviours of both infant and caretaker vis-a-vis each other as a result of their respective previous mutual perceptions and behaviour via-a-vis each other'. The use of a variable such as 'dyadic gazing' (Robson, Pederson and Moss, 1969) or the charting of variables such as simultaneous smiling, looking, and talking (Lewis, 1972) goes some way toward elucidating frequency of interaction, types of behaviours, and the context in which interaction takes place. Rosenthal also cautions that even when an adequate design and observation framework has been developed there are problems in finding an adequate statistical model to deal with such an analysis. The usefulness of contingency tables with statements of conditional probabilities has been reported by Gewirtz and Gewirtz (1969) and Freedle and Lewis (1971): correlation coefficients between aspects of the infant's behaviour and of the mother's behaviour are not a sufficient indication of interaction between the two partners.

The microanalytic studies provide clearer descriptions of the 'meshing' of feeding behaviours that can really be termed interaction. Kaye's (1977)

approach regards feeding as an example of the development of 'dialogue', and he cites two distinct themes as giving impetus to his own theoretical position. The first of these is 'turn-taking', which involves the use of fairly standardized signals by both partners, whether they be adults (Kendon, 1967; Duncan, 1972) or mother-infant dyads (Robson, 1967; Jaffe, Stern and Peery, 1973), and the implication that these 'rules' for turn-taking might be learned in early infancy. The other concerns such early dialogue as a precursor to language proper, particularly as it contributes to what Bruner (1975) terms the *alternation-of-comments-upon-a-common-topic*.

In a study of 30 newborn infants observed during a feed, Kaye concentrated attention on two superficially simple phenomena, the infant's sucking and pausing, and the mother's attempts to alter the tempo by jiggling the infant or the bottle. And yet the pattern of jiggling and sucking brings together aspects of a mother's need to find regularity in the interaction with her infant, as well as the increasing ability of the infant to accommodate his own actions to the demands of the situation. Thus, initially, mothers interpret the infant's pausing as 'signs of flagging' and stimulate him by jiggling. The infant, however, responds instead to the end of jiggling by a resumption of sucking, so that the mothers change their response to 'jiggle-stop', which leads at two weeks of age to a shorter duration of jiggling and pausing. She utilizes his immaturity, with its guarantee of 'salient regularity, rhythmicity, predictability ... she can predict the temporal structure of her infant's behaviour ... to build, through mutual differentiation of responses, a basic pattern of interaction which will *not* depend upon biological clocks, but upon mutual monitoring and feedback'.

Kaye considers that later interactions will reiterate the phenomenon found in feeding during the newborn period: a first phase in which the mother accommodates to the infant's autonomous patterns of behaviour, then the next phase in which the actions form a 'mutual contingency' or 'game'. He also suggests that the social interaction between mother and baby will show continuity and consistency across other tasks, events, and ages. For example, the mutual regulation between the partners should predict (to some extent), the mother's postpartum recovery and sense of role satisfaction; smoothness and self-regulation in the baby's behaviour during a Brazelton Neonatal Assessment should predict the success of the mother's anticipation of her infant's sucking and pausing pattern. There is some evidence that this may be the case. Osofsky (1976) found that the behaviour of both mother and infant was consistent between a feeding session and the mother's 'stimulation' of her own infant using selected Brazelton items. In particular the mother's attentiveness to the infant, and the infant's predominant state, eye contact with the mother, and responsiveness were consistent across situations. The finding that infant responsiveness during a feed correlated strongly with maternal attentiveness and sensitivity to the infant gives credence to Kaye's predictions, even though

Osofsky was not directly concerned with food intake and sucking regulation.

CONCLUSIONS

Safe delivery of an infant marks the climax of nine months of hopes and expectations, and often anxieties and irrational fears about his well-being. When the mother leaves hospital at the end of the first week with her infant she will have mastered, or re-established, the rudiments of caretaking, and made a start at understanding the rhythms of his behaviour and at predicting his immediate needs. During this long period she will have depended on the professional skills of a great many hospital staff, and absorbed new information through her contact with friends, relations, and fellow patients. She will use all of this experience in developing an individual and idiosyncratic style of interacting with her equally individual and idiosyncratic infant. She knows this new baby of hers is unique, regardless of the inevitable policies and procedures designed for the 'average' baby which constrain her activities.

And yet, the assumptions in studying this period have often been limited to a search for group differences or effects of specific events which might predict later behaviour. It is too early to make long term predictions from the small data base, imprecise methods of measurement, and great number of uncontrollable variables which distinguish many studies in this area. Indeed Dunn (1975) emphasizes that the mother adapts to her first infant so rapidly over the first 10 days that predictions made from the first few feeds could be misleading. If anything, insight into the postnatal period is more important for pinpointing the complexities and methodological problems in evaluating and interpreting social relations, *even* when the behavioural repertoire of the infant and the contingent responses of his mother are fairly narrow and predictable. The findings now appearing on the nature of the neonate's abilities and the relationship with his mother have a *practical* significance, in so far as they provide an informed basis for decisions on the organization of obstetric and paediatric care, in order to provide not only a safe delivery and puerperium for the mother and her infant, but also a relaxed and supportive environment in which they can develop patterns of interaction. The findings also have a value for *theoretical* issues, providing evidence that supports a certain type of view of the nature of a child's development. They can contribute to our understanding of the *processes* of the child's development, and the initiation of these processes in the early experience of mother and child together. From this point of view the outcome of development is effectively certain; the vast majority of infants grow to become competent adults acting efficiently in a social world, and our interest is focused on the way in which the change from a social infant to social adult is made.

The newborn infant shows fairly consistent and recognizable patterns of behaviour, and will modify these patterns in response to adults' actions.

Upon this foundation his mother imposes modes of interaction at a level of sophistication that the infant is not capable of sustaining alone. Schutz and Luckman (1974) have rephrased this into a phenomenological framework: 'The one confronting him (e.g., his mother) always conducts herself in such a way as to presuppose a certain reciprocity on the part of the child. One of the partners always conducts himself as if it were a genuine we-relation.' Even in later infancy the mother continues to control and interpret the infant's social (Stern, 1974) and communicative contributions (Snow, 1977; Ryan, 1974). His increasingly active participation in social interaction is an integral part of the acquisition of the rules and structures which govern adult language (Bruner, 1975; Cicourel, 1973; Habermas, 1970).

Finally, the events of the first week of a child's life can be viewed as having a significance in themselves. Through processes of mutual modification, mother and infant begin to establish a pattern that will provide the basis for the long development to adulthood. The infant's responses to his mother give specific information about his individual needs. The structure of the hospital setting imposes demands on the pair; individuals will respond in different ways, and the very process of adjusting to these demands will create new and varied situations for the mother and infant to develop satisfying modes of relating to each other. As Stratton reminds us (1977) the most crucial function of the newborn period may be to 'establish in the mother an understanding of her baby and an appropriate set of attitudes toward him'.

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