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ABSTRACT

In this study, twenty 3-day-old Caucasian neonates were observed before and during feeding in an attempt to demonstrate that individual characteristics of infants, such as alertness and social behaviors, are related to the interaction of mothers and infants during feeding situations. Ten of the infants were males, 10 were females; approximately 70 percent were first born; 60 percent were bottle-fed. All had normal Apgar scores. Infants were administered the Brazelton Neonatal Behavior Assessment Scale after their two o'clock feeding. During the five o'clock feeding, two observers watched the mother feed her infant and observed maternal and infant behaviors using a 10-second time sampling procedure. Sex differences in both infant and maternal behavior were apparent during the feeding observation. Correlational analyses done among all variables of both the Brazelton examination and the feeding observation indicated multiple significant correlations among the Brazelton items. Results also indicated significant correlations between several Brazelton examination items and one maternal behavior (looking at infant) during feeding, and between behaviors of the feeding situation. A discussion compares the study findings to results of earlier studies on mother-infant interaction. (SB)

INDIVIDUAL DIFFERENCES IN NEONATES AND MOTHER-INFANT INTERACTION DURING FEEDING

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Previous research concerned with mother-infant interaction has demonstrated that certain characteristics of the infant, particularly the sex and parity of the infant, influences the pattern of the interactions between the mother and her infant (Thoman, Leiderman and Olson, 1972; Thoman, Barnett and Leiderman, 1971). However, few studies have focussed upon the temperamental or individual characteristics of the infant as they relate to the mother-infant interaction during feeding. One exception is the study of Osofsky and Danzger (1974).

In their study, Osofsky and Danzger assessed infants with the Brazelton Neonatal Behavioral Assessment Scale (Brazelton, 1973). Observers rated these same infants and their mothers on five maternal variables and seven infant behaviors during a feeding session. These ratings included maternal attentiveness and sensitivity, quality and frequency of visual, auditory and tactile stimulation, as well as the amount of movement of the mother's head, face and mouth. Infant behaviors rated included initial and predominant state, eye contact, responsivity to auditory stimulation and three measures of responsivity to tactile stimulation. Osofsky and Danzger (1974) found consistencies across the experimental situations, that is, the infant who was alert and responded to auditory cues during the Brazelton Assessment looked at the mother a great deal during feeding. Their findings suggested that the attentive, sensitive infant tended to have a responsive mother and vise versa. Neither sex nor parity differences were reported.

Variables similar to those used by Osofsky and Danzger were of interest in the present study; however, the current study differed from the one by Osofsky and Danzger because behaviors were sampled not with the summary rating scales, but with a ten-second time sampling procedure. It was hoped that through this procedure, the observers would be less influenced by the overall maternal expertise, and thereby a more accurate analysis of the situation would be obtained. The purpose of the current study, then, was to demonstrate that individual characteristics of infants are related to the interaction of mother and infant during feeding situations.

Method

Subjects

Subjects for the present study included 20 three-day-old Caucasian neonates. ten of these infants were males, 10 were females. Approximately 70 percent were

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first born infants; 60 percent were bottle-fed. All subjects had Apgar scores within the normal range and were judged to be normal by the nursery staff.

Procedure

On the second or third day of a mother's hospital stay, she was approached concerning her infants' participation in Brazelton testing and/or observations of feeding behavior. Infants whose mothers consented were administered the Brazelton Neonatal Behavioral Assessment Scale after the two-o'clock feeding. During the five o'clock feeding, two observers watched the mother feed her infant.

The Brazelton Neonatal Behavioral Assessment Scale (Brazelton, 1973) provides a sample of 29 items including two state measures, 11 specific behavioral measures and 16 general measures of behavior. State is defined in six stages, from deep sleep to crying.

Behaviors observed during the feeding session included the following maternal variables: mother looking at infant, mother smiling, mother talking, mother stimulating infant with nipple, mother stimulating head, mother stimulating body, mother putting infant to the shoulder and mother holding away. The following infant behaviors were observed: Infant sucking, infant attached to the breast or bottle but not sucking, infant's eyes open, infant looking at mother and infant being force fed. The behaviors were observed using a ten second time-sampling procedure. Two observers watched the mother-infant pair for 10 seconds, then recorded their data during a 5-second recording period before resuming their observations. The number of ten-second blocks in which each behavior was recorded was then tallied and used for the analyses.

Results

Observer reliability

Three different experimenters administered the Brazelton examination. Prior to data collection. They were trained to 90 percent agreement with each other. Periodic reliability checks indicated that reliability of Brazelton ratings among the three experimenters remained very high, close to 100 percent.

Interobserver reliability was also calculated for the behaviors observed during feeding. Using the agreements divided by agreements plus disagreements method, reliability ranged from .29 to 100 across the thirteen behaviors, with a mean of .85.

Brazelton Assessment Correlations

Correlational analyses were done among all variables of both the Brazelton examination and the feeding observation. Multiple significant correlations were found among the Brazelton items. Table 1 shows the relationships of a group of items which are related to maturity of the infant. In general, higher scores on general tonus were related to increased scores on activity, peak of excitement, rapidity of buildup and irritability; in addition, the greater the infant's activity, the higher the scores on pull to sit and tremulousness.

Insert Table 1 about here

The orientation items from the Brazelton examination were also interrelated. Table 2 shows the relationship among these items.

Insert Table 2 about here

Orientation to the animate visual and auditory stimuli was not significantly correlated with orientation to inanimate objects, but was correlated significantly with the orientation to animate visual stimuli and animate auditory stimuli. Alertness was significantly positively correlated with all of the orientation items except inanimate auditory and was negatively correlated with irritability.

Correlations between the Brazelton Examinations and Behaviors During Feeding

One measure from the feeding observation was significantly correlated with measures of the infant orienting behavior from the Brazelton examination: mother looking at infant was significantly positively correlated with the infant's orientation to animate auditory stimuli and the baby's alertness, and was negatively correlated with the infant's irritability.

Table 3 shows the correlations among measures of social behavior from the Brazelton examination and measures of maternal and infant behavior during feeding. The infant who was scored as cuddly on the Brazelton also was able to quiet without intervention and scored high on alertness during the test; in addition, this infant also looked at the mother during feeding. Infants who were easily consoled or quieted themselves easily during the Brazelton examination were not likely to be put to the mother's shoulder during the feeding observation. As Osofsky and Danzger (1974) found, a baby who was scored as high in alertness during the Brazelton had a mother who spent a large amount of time looking at it during the feeding session.

Insert Table 3 about here

Feeding observations

The last set of correlations which were computed was the intercorrelations between behaviors of the feeding situations. Among the correlations of the behaviors measured during the feeding observation, significant correlations involving the behavior "infant force fed" were the most interesting. This behavior occurred only among bottle-fed infants. An infant who was being force fed tended to have its eyes open and was not sucking. When mothers force fed their infants, they were smiling; talking, and stimulating the infant with a nipple. In addition, when the infant had his/her eyes open, the mother was often smiling, talking and stimulating with a nipple.

Insert Table 4 about here

Sex differences in both infant and maternal behaviors were apparent during the feeding observation. Table 5 shows these findings. Female infants spent far more time with their eyes open and looking at their mothers than did male infants who tended to spend more time in non-sucking behavior than did females. Mothers seemed to respond differentially to males and females by looking more at male infants, but smiling more at female infants as well as stimulating them with the nipple and touching their heads more often.

Insert Table 5 about here

Discussion

Several of the findings of Osofsky and Danzger's findings that the infant's responsivity to animate auditory stimuli was correlated with the mother's looking at the infant. However, unlike Osofsky and Danzger's results, sex differences were prevalent in this study. Female infants spent more time with their eyes open and looking at their mothers, while male infants spent more time attached and not sucking during the observation.

The infant's responsivity to cuddling during the Brazelton examination was positively correlated with the infant's looking at the mother during feeding; that is, the infant who cuddles well also attends visually to its mother.

Maternal behaviors also seemed to differ according to the sex of their infants. Mothers of the male infants spent more time looking at their infants, while mothers of female infants spent more time stimulating their infant's heads, stimulating either with a nipple, and smiling at their infants. Brown, Bakeman, Snyder, Fredrickson, Morgan and Hepler (1975) also reported sex differences in their observations of mother-neonate behavior in which mothers stimulated males more. Although the present study's results do confirm that differences in maternal behaviors attributable to sex of the infant exist, they do not agree with the Brown et al. findings on the amount of time mothers spend stimulating males versus females.

One other group of maternal social behaviors merits special consideration. If an infant has its eyes open and is not sucking, the mother is likely to be smiling, talking and stimulating with the nipple; she is likely to be trying to force feed her bottle-fed infant. The partly-full bottle seems to tempt mothers to override their infant's wish not to suck. If attentive-sensitive reciprocol mother-infant interactions are the goal, breast-feeding may have some advantages for the mother-neonate relationship. Since for the first few days of her baby's life a breast-feeding mother is less likely to know how much is left, her temptation to force feed her baby is greatly diminished. If the theories stating that overfeeding in infancy leads to obesity later in life are correct, breast-feeding may also be advantageous since overfeeding by breastfeeding seems unlikely during the neonatal period.

The results of this study differ from previous reports, particularly with regard to the previously cited sex differences. However, both Osofsky and Danzger (1974) and Brown et al. (1975) used Black inner city samples, where as the sample in this study was Caucasian and predominantly middle class. Other differences between the studies include different procedures for collecting feeding behavior data and for assessing the neonatal characteristics. Brown et al. used behavioral sampling, as did this study, whereas Osofsky and Danzger used summary ratings of the feeding sessions. Behavioral sampling and recording seem to offer clear advantages in terms of differentiating exactly what occurs during the feeding session; it offers both more objective behavior recording and the possibility of sampling a greater number of maternal and infant behaviors. In both Osofsky and Danzger's study and the present study the Brazelton Neonatal Behavioral Assessment scale was used, while Brown et al. used the Graham-Rosenblith scale (Graham, 1956, Rosenblith, 1974). The Brazelton scale seems to have the same advantages as direct observation of behavior--that of a finer sampling of neonatal behavior.

In summary, findings on the occurrence of some neonatal behaviors, notably alertness and social behaviors, have been consistent across experimental paradigms. In addition, some of these behaviors, as well as the sex of the infant are related to differential responsiveness of the mother. Finally, the issue of forced feeding of infants by bottle-feeding mothers merits more attention, both with regard to effects upon nutritional status of the infant and mother-infant reciprocity.

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TABLE 1

SIGNIFICANT CORRELATIONS: MATURITY ITEMS

BRAZELTON ITEMS	GT 1	PTS 2	AC 3	POE 4	T 7
1. General Tonus					
2. Pull-to-sit					
3. Activity	.65*	.47			.53
4. Peak of Excitement	.62*		.57*		
5. Rapidity of Build-up	.45				
6. Irritability	.53*			.66*	
7. Tremulousness					

NOTE: CORRELATIONS REPORTED ARE THOSE OF $P < .05$. Those correlations followed by an Asterick (*) are significant at the level of $P < .01$.

TABLE 2

SIGNIFICANT CORRELATIONS: ORIENTATION ITEMS

	OIV 1	OIA 2	OAV 3	OAA 4	OAVA 5	AI 6	I 7
BRAZELTON ITEMS							
1. Orientation Inanimate Visual							
2. Orientation Inanimate Auditory	.53						
3. Orientation Animate Visual	.64*	.51					
4. Orientation Animate Auditory	.51	.62*					
5. Orientation Animate Visual and Auditory			.53*	.48			
6. Alertness	.55		.72*	.59*	.48		
7. Irritability						-.46	
FEEDING OBSERVATION							
8. Mother looking at Infant				.67		.69	-.88*

NOTE: Correlations reported are those of $p < .05$. Those correlations followed by an asterisk (*) are significant at the level of $p < .01$.

TABLE 3

SIGNIFICANT CORRELATIONS: SOCIAL BEHAVIORS

	CU 1	CO 2	SQ 3	AL 4
BRAZELTON ITEMS				
1. Cuddliness				
2. Consolability				
3. Self-quieting	.59*			
4. Alertness	.52			
5. Irritability				-.46
FEEDING OBSERVATION				
6. Infant looking at mother	.61			
7. Other behaviors	-.76	-.86*	-.76	
8. Mother looking at infant				.69
9. Mother shouldering infant		-.56*	-.53	

NOTE: Correlations reported are those of $p < .05$. Those correlations followed by an asterisk (*) are significant at the level of $p < .01$.

TABLE 4

SIGNIFICANT CORRELATIONS: FORCE FEEDING

FEEDING OBSERVATION	IFF 1	IEO 2	MZ 4
1. Infant Force Fed			
2. Infant's eyes open	.75		
3. Infant's not sucking	.78*		
4. Mother smiling	.75	.78*	
5. Mother talking	.67	.79*	.59*
6. Mother stimulating with nipple	.84*	.54	

NOTE: Correlations reported are those of $p < .05$. Those correlations followed by an asterisk (*) are significant at the level of $p < .01$.

TABLE 5

SEX DIFFERENCES IN BEHAVIORS DURING FEEDING

BEHAVIORS	Female (Mean number of seconds)	Male (Mean number of seconds)
Infant's eyes open	284	145
Infant looking at mother	126	33
Infant not sucking	56	136
Mother looking at infant	366	562
Mother smiling	202	83
Mother stimulating head	136	67
Mother stimulating with nipple	159	70