

## **Interactions with Three-month-old Infants: A Comparison Between Greek Mothers and Institutional Caregivers**

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This study investigates whether the interactions of biological mothers and their offspring differ from those of institutional caregivers and infants in their charge. Twenty-two home infants and 21 institutional infants at 3 months of age were studied while interacting with their primary caregiver. In a 30 minute observation period, 10 second timed-observations were made of infant behaviours, socialiser behaviours and mutual interactions. Results showed that biological mothers rocked and touched their infants and vocalised in a face-to-face fashion significantly more than did caregivers. In contrast, caregivers provided more vocalisation without establishing eye contact. Infant behaviour also differed according to childrearing group: Institutional infants vocalised and fussed significantly less than home infants. An inverse correlation was found between the amount of vocalising in institutional children and caregiver vocalisation without eye-contact.

### **INTRODUCTION**

Infants raised in institutions have traditionally shown developmental delays. These delays have been attributed to lower levels of both social and non-social stimulation (Casler, 1961). Bolwby's 1951 W.H.O. report focused attention on the adverse effects of early deprivation on infant development. This awareness resulted in the closure of orphanages in the United States and many other Western countries. In those countries where

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infant institutions still exist, great efforts have been made to improve the quality of care for the infants, with varying degrees of success.

One such "model" institution is the Babies' Center Metera located in the suburbs of Athens, Greece. This institution attempts to provide for its infants a home-like atmosphere and the maternal love and care that home-reared infants receive. Metera is a great change from the (now closed) Greek municipal orphanages, which had a 10 : 1 infant to caregiver ratio. On the average, Metera has a 4 : 1 infant to caregiver ratio. However, the adult to child ratio varies with the time of day and by activity. For example, during nap and sleep hours the ratio of infant to caregiver is much higher, and during feeding time, the ratio is usually 2 : 1. The Metera caregivers work in 6–8 hour shifts and the same staff are assigned to one pavilion in order to provide stability of care and the opportunity for infants to get to know and establish relationships with the same caregivers.

To ensure that the personnel are well-trained, Metera has a 3-year educational programme for infant caregivers. Thirty-five graduate caregivers are responsible for the 100 infants that Metera houses. There are also 70 trainees at the institution who assist the main caregivers with the infants.

Most of the infants, who come from unwed working-class mothers, are taken to Metera as soon as the mothers leave the hospital. When the babies arrive at Metera, they are kept under observation in isolation rooms for two weeks to make sure they do not have any contagious diseases. After the two weeks, the healthy babies are assigned to one of eight pavilions. These rooms are colourfully painted, large and airy, and all face peaceful gardens. One half of the pavilion is divided into three portions, each containing four cribs. The other half of the room consists of an open space supplied with mobiles and plenty of play material. The infants stay at Metera until they are at least three months of age, after which they are available for adoption. A few of the biological mothers, however, are reluctant to give up their babies. These indecisions and other legal matters may keep infants at Metera until an older age.

In spite of all the improvements and efforts at Metera to provide optimal rearing experiences for the infants, Metera babies still lag behind in their development when compared to home infants in Greece. A study by Karagellis (1959) found that Metera infants had lower scores on the Illingworth (a test of infant sensory and motor development) than home-reared infants. Similarly, Paraskevopoulos and Hunt (1971) compared the infants at the Municipal orphanages with Metera infants and with babies from lower-class homes in Greece. They found that the infants were most developmentally delayed at the Municipal orphanages. In particular, they found that Metera infants were slower than home-reared infants at reaching developmental stages in vocal imitation, object permanence, and

gesture imitation. Panopoulou-Maratou et al. (1982) showed that these developmental delays were proportional to the time spent at Metera before adoption. Similarly, a recent study by Drivas, Roe and Roe (1986) has shown that as early as 3 months of age the development of Metera infants, as measured by the Illingworth, already lags behind that of home-reared infants.

The findings of these studies regarding the relative developmental delay of Metera-reared infants versus home-reared infants raises the question of exactly what occurs at Metera between infants and caregivers compared to what happens between babies and mothers in Greek homes. Could the differences in development be attributed to differences in the caregiver-infant interactions in the two settings? It has been well documented that what the caregiver does with the infant affects the baby's development (Beckwith et al., 1976; Clarke-Stewart, 1973; Cohen & Beckwith, 1979; Elardo, Bradley & Caldwell, 1977). Thus, a primary objective of this study was to explore whether any difference exists in caregiver-infant interactions compared to mother-infant interactions.

## Procedure

The subjects were 43 three-month-old, full-term Greek infants with no serious history of pre- or post-natal complications. Twenty-two of the subjects came from stable Greek homes, and 21 subjects came from the Babies' Center Metera. The 12 female and 10 male, first-born, home infants were recruited from the obstetric records of a local hospital. At Metera, the subjects consisted of the first 10 girls and 11 boys who reached three months of age during the two-month study period. All infants were maturationally equivalent at assessment. The socioeconomic level of the parents of the home infants were lower class with the mothers having 12 years of schooling or less, while the socioeconomic level of the biological parents of the Metera infants could not be determined.

The birthweights of the infants in the two environments differed significantly. The home-reared babies were heavier than Metera babies ( $t = 3.08$ , 38 *df*,  $P < 0.01$ ), with an average of 3327g (range 2900g to 3950g, S.D. = 275.4) for home babies and 2976g (range 2200g to 3800g, S.D. = 417.6) for Metera babies. In statistical analysis, however, no significant correlation was found between weight and any of the behavioural measures of either the socialiser or the infant.

The infants were observed in their natural environments by two trained female experimenters. In order to avoid being influenced by the hypothesis, one researcher saw the infants and mothers in their homes, whereas a different researcher observed the Metera infants with their primary caregiver. Having blind observers and at the same time keeping the infants in their ecologically valid (natural and familiar) settings was not possible. The

researcher who collected the home data was used for establishing inter-observer reliabilities at Metera. To ensure that sequences of behaviour were accurately recorded, the same observer coded both the adult and infant behaviours.

Observations were conducted only when infants were awake, and excluded meal and bath time. The mother or caregiver in each situation was asked to go about customary tasks because the experimenter was supposedly present to observe the baby. However, the caregivers still seemed to be much more attentive towards the babies when the experimenter was present than at other times.

During a 30-minute observational period, the following single behaviours were recorded each time they occurred in a 10-second interval: infant fusses/cries, infant vocalises, and socialiser interactions such as talking to the infant either without eye-contact or face-to-face, holding, rocking while holding (hereafter called "rocking"), touching affectionately, kissing, and offering the baby a toy. In addition two mutual behaviours were coded: eye-to-eye contact and mutual smiling. Instances when "others" (i.e. non-primary caregivers) talked to the infant were also recorded. All infant and socialiser vocalisations were tape-recorded. Our choice of variables was dictated by the limited behavioural repertoire of three-month-old infants, and those caregiving behaviours that occurred with sufficient frequency to be analysed.

From the above raw data, contingent behaviours were derived by noting when one of the below listed behaviours followed its companion behaviour within the same or the immediately subsequent 10-second interval: percentage of baby vocalisations followed by the socialiser's talking to the infant, percentage of baby's crying or fussing followed by the socialiser's talking or picking up the infant (if the baby was already being held, providing further soothing actions by rocking or kissing the infant.)

Intercorrelations between the 13 caregiver and infant measures were examined. Of the 78 correlation coefficients, 35 were significant at  $P < 0.05$ , and 15 were significant at  $P < 0.01$ . In light of these correlations we have retained all 13 measures for subsequent analyses.

Inter-observer reliability was calculated by Pearson correlations. Based on two observers at Metera, the reliability coefficients ranged from 0.74 for rocking, to 0.99 for infant vocalising, and socialiser holding the infant. The mean reliability coefficient was 0.94.

## RESULTS

In order to assess whether interactions with institution-reared babies differed from those with home-reared babies, two-way Manovas followed by two-way univariate analyses of variance were carried out with child-

rearing setting (institution vs. home) and sex of infant as the factors. Since analyses on transformed data (logarithmic and square root) yielded identical results to those based on untransformed data, we present only the untransformed data here. The Manovas showed that childrearing setting was the only significant effect for both infant behaviours,  $F(2,38) = 5.57$ ,  $P < 0.01$ , and for caregiver interactions,  $F(11,24) = 4.96$ ,  $P < 0.001$ . The results of the subsequent univariate Anovas and the means and standard deviations on which they are based appear in Table 1. Since no sex differences were found, Table 1 shows only the main effect of childrearing setting and the sex by setting interaction.

In terms of babies' behaviour, we found that home babies were more responsive than were institutional infants. They vocalised more,  $F(1,39) =$

TABLE 1  
Means, Standard Deviations and Results of Setting x Sex of Child<sup>1</sup>

	<i>Home</i>		<i>Institution</i>		<i>F(1,39) Setting</i>	<i>F(1,39) Interaction</i>
	$\bar{x}$	<i>S.D.</i>	$\bar{x}$	<i>S.D.</i>		
<i>Infant behaviour:</i>						
Vocalises	29.6	22.2	17.5	14.1	4.8 <sup>3</sup>	ns
Cries	30.0	30.8	15.0	13.8	4.1 <sup>3</sup>	ns
<i>Socialiser behaviour:</i>						
Talks to infant, eye contact	95.2	37.1	66.0	29.4	8.0 <sup>4</sup>	ns
Talks to infant, no eye contact	6.5	7.1	24.1	18.0	17.2 <sup>5</sup>	ns
Holds	51.0	37.5	67.0	33.9	ns	3.1 <sup>2</sup>
Rocks	12.1	15.0	2.9	4.3	8.0 <sup>4</sup>	ns
Touches	43.4	20.8	32.8	14.6	3.5 <sup>2</sup>	ns
Kisses	6.7	8.4	5.4	5.9	ns	ns
<i>Mutual behaviour:</i>						
Eye-to-eye	80.2	38.6	76.3	33.2	ns	ns
Smile-to-smile	36.4	32.1	28.9	19.4	ns	ns
<i>Sequential behaviour:</i>						
Talks in response to infant vocalise (%)	57.9	20.6	54.4	20.5	ns	ns
Talks in response to infant cries (%)	46.5	20.8	46.9	16.2	ns	ns
Holds in response to infant cries (%)	13.6	11.5	10.3	10.7	ns	ns

<sup>1</sup>Sex of child was not significant in any Anova

<sup>2</sup> $P < 0.10$

<sup>3</sup> $P < 0.05$

<sup>4</sup> $P < 0.01$

<sup>5</sup> $P < 0.001$

4.8,  $P < 0.05$ , and fussed and cried more than did babies reared at Metera,  $F(1,39) = 4.1$ ,  $P < 0.05$ . In turn, the mothers and the institutional caregivers differed in their behaviour toward the infants. Whereas mothers engaged in more face-to-face talking to their infants than did caregivers,  $F(1,39) = 8.0$ ,  $P < 0.01$ , the caregivers at Metera talked more frequently to their infants without eye-to-eye contact  $F(1,39) = 17.2$ ,  $P < 0.001$ . Thus, what distinguished the home and institutional infants is not the amount of vocalisation that they were exposed to, but whether it was directly targeted to them and accompanied by eye-contact on the part of the socialiser.

Proximal behaviours were also used differentially by mothers and institutional personnel. Mothers rocked their infants significantly more  $F(1,39) = 8.0$ ,  $P < 0.01$ , and tended to touch their infants affectionately more often than did institutional caregivers  $F(1,39) = 3.5$ ,  $P < 0.10$ . In contrast, mothers and caregivers did not differ in the following variables: mutual eye-contact, mutual smiling, kissing and holding the infant and offering toys. Nor did any of the measures of contingent responsiveness differ between mothers and institutional personnel.

We also examined whether mothers and caregivers showed similar or different patterns of correlations between socialiser and infant behaviours. Significant differences in correlations (as assessed by  $z$ -tests between two correlations) were found. For mothers, talking to the infant without establishing eye-contact, holding the infant, and vocalising in response to the infants' cries, were essentially unrelated to other caregiving behaviours. In contrast, for institutional personnel, these three behaviours showed significant correlations ( $P < 0.05$  or better) with other caregiving interactions. Of special note was the finding that infant vocalisation was inversely correlated with caregiver talking without eye contact ( $r = -0.39$ ,  $P < 0.05$ ) whereas for home-reared infants, the only correlate of infant vocalising was mutual smiling ( $r = 0.41$ ,  $P < 0.05$ ).

## DISCUSSION

The objective of the study was to examine whether caregivers at the Babies' Center Metera treat infants differently than do biological mothers. From the various behaviours that we sampled, three behaviours were found to be significantly more frequent at home than at the institution. These behaviours were rocking the infants while holding them, touching them affectionately, and most importantly, talking to them in a face-to-face fashion.

Our findings may be an underestimation of the differences between mothers and institutional caregivers. First of all, caregivers knew which

babies were being observed, and they seemed unusually attentive and stimulating to those babies compared to the other babies in their charge. Second, because the observations were conducted in a relatively constrained time frame (lasting half an hour), the caregivers were more nurturant to all their babies during this time than they were at other times. It often seemed as if the caregivers perceived that they were being evaluated, even though we indicated that we were interested only in the identified baby. Home-mothers may also have demonstrated their "best mothering" during the observational period. However, since the caregivers were highly trained in what constitutes "good caregiving", they may have changed their behaviour more than did mothers in the direction of optimal caregiving.

Despite the enriched stimulation provided during the observation period of this study, caregivers talked without eye-contact to the infants much more than did mothers. In general, this occurred as the caregiver sought the infant's attention while the infant was averting its gaze. Caregivers were quite persistent and frequently disregarded the infant's cues, suggesting a certain insensitivity in caregiving. It was as if the caregivers failed to recognise that gaze aversion is one of the few techniques available to three-month-old infants by which they can regulate the amount of stimulation they receive.

Other evidence from this study suggests that, during the observation session, caregivers may have been overstimulating the infants. According to the correlations, caregivers, but not mothers, tended to stimulate the infant in many different modalities. Caregivers who frequently talked to the infant without establishing eye-contact were also likely to engage in frequent proximal bids of all types. They would hold, touch, rock and kiss the infant. For the caregivers (but not for the mothers) the various proximal bids were highly correlated with one another. This may indicate that caregivers, in their efforts to stimulate the child, used any and all types of stimulation, whereas mothers were more differential in the techniques that they used.

Even in a high quality institution such as Metera, caregivers are not consistently able to provide individualised attention to children. In the limited time they have to devote to one-on-one interaction with each child, caregivers try their best to make the child responsive, even if the infant is initially unwilling. If the baby does not respond to early attempts to engage its attention, the caregiver may escalate her efforts, switching from one type of stimulation to another. This pattern of interaction may result in indiscriminate stimulation not always attuned to the child's signals.

The institutional caregivers had good reason to want to stimulate the infants. Despite the fact that we coded only very few infant behaviours, Metera infants showed significantly lower frequencies of both distress and

non-distress vocalisations than did home-reared infants. Such differences in spontaneous vocal output so early in life are remarkable, and are similar to findings with other institution-reared infants (Provence & Lipton, 1961; Rheingold, 1956).

In our study, we also found that a low rate of vocalisation in institutional infants was correlated with a high rate of caregivers' talking to the infant without establishing eye-contact. Such a correlation permits various interpretations. It is possible that the caregivers' high rate of vocalisation without eye-contact was influenced by low vocal output of the infants. This explanation fits with our observation that caregivers responded to infant gaze aversion with a crescendo of verbal and other stimulation in attempts to attract the babies' attention and to stimulate vocalisation. It is also plausible that the elevated rates of caregiver vocalisations without eye-contact contributed to infants' low vocal output. Empirical findings and the theorising of other researchers have shown that face-to-face vocal exchanges between infant and caregiver are crucial for the emergence of the child's linguistic and cognitive competence (Brazelton, Koslowski, & Main, 1974; Lewis & Freedle, 1973; Papousek & Papousek, 1975; Rheingold, 1956; Roe, McClure, & Roe, 1982; Schaffer, 1979). When a socialiser establishes eye-contact while talking to an infant, she gives the infant the opportunity to engage in a dialogue-type interaction, which promotes longer attention spans and the development of cognitive skills indispensable for subsequent language and intellectual development. Talking to infants without eye-contact reduces the likelihood that the infant will respond. It is also possible that the correlation between low rates of infant vocalisation and high caregiver rates of talking without eye-contact are not causally related at all, but result from an association with unstudied variables.

In sum, this research has made three contributions to the literature. First we have clearly shown that institutional infants, by the age of three months, already differ from home-reared infants in vocal output. These results are consistent with other empirical findings of institutional infants. Second, we have identified differences between caregivers and mothers in several behaviours, including language-related behaviour. Third, we reported a theoretically meaningful correlation between reduced vocal output in infants and caregiver communication without eye contact. This last-mentioned finding, unlike the other findings, was correlational, and therefore may be due to factors other than those we considered.

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