

VIII. Maternal regulation of visual attention in 2- to 4-month-old infants

Purpose

Mutual gaze has been shown of paramount importance in early mother-infant interaction. How partners are attuned has been extensively studied. However, the link between mutual gaze and cognitive development still needs to be investigated in the first months of life.

Attention to objects is basic to cognitive development. In 5-month-old infants, maternal stimulation toward objects scaffolds infants' attention, and fosters infants' self-controlled attention 3 months later (Pêcheux, Findji & Ruel, 1992 ; Findji, Pêcheux & Ruel, 1993). But before that age, that is, during the period of primary intersubjectivity (Trevarthen, 1979), infants are described as more interested in their mothers than in objects. However, little is known about young infants' exploration of objects during face-to-face interaction.

Mutual gaze may help the child to learn how to control his own attention, as the mother participates in attention getting and attention holding, coordinates her stimulation with the child's arousal so that the situation is a pleasurable one. The

focus of attention may be herself or an object.

We investigated here whether a link exists between early mutual gaze and attention to objects, both synchronically and diachronically. We hypothesize that the amount of mutual gaze should be related to attentional abilities, as they may be evaluated during face-to-face interaction including objects and in a visual habituation task.

Method

A sample of 20 full-term, healthy infants and their mothers was observed longitudinally using the following design (see Figure 1). Face-to-face interactions were recorded during 5 minutes, first without objects, and then with three age appropriate toys. Mothers' and infants' activities (gaze, facial expressions, posture, vocalizations) will be analyzed. Here preliminary results concerning gaze are presented: *Infant's gaze*: At the mother; Not focussed (casual attention); At own extremities; At an object; *mother's gaze*: At the infant's face; At the infant's body; At objects.

Habituation was assessed through an infant-controlled procedure. Several indices of habituation will be considered: total time to reach criterion, baseline, regularity etc..

Results

1. *Frequency of gaze shifts*

During face-to-face interaction infants change their focus of attention quite frequently (15 to 20 times per minute), with

	2 mo	3 mo	4 mo	5 mo	6 mo	7 mo	8 mo
Face-to-face without objects	*	*	*				
Face-to-face with objects	*	*	*				
Play with mother and objects				*	*	*	*
Habituation		*	*	*			
Contingency					*	*	*

Fig. 1. The longitudinal design. Only the highlighted cells will be commented upon.

no significant differences between situations (no object vs. object) or age. Situation makes a difference for the mothers, who change their focus of attention two times more when objects are present (10 times vs. 5 times per minute) This may be useful information for infants.

2. Percentage of time on various targets

While mothers spend most of their time looking at their infant, infants do not keep looking at their mothers: a large percentage of time is devoted to casual looking. With age another target is discovered: the hands.

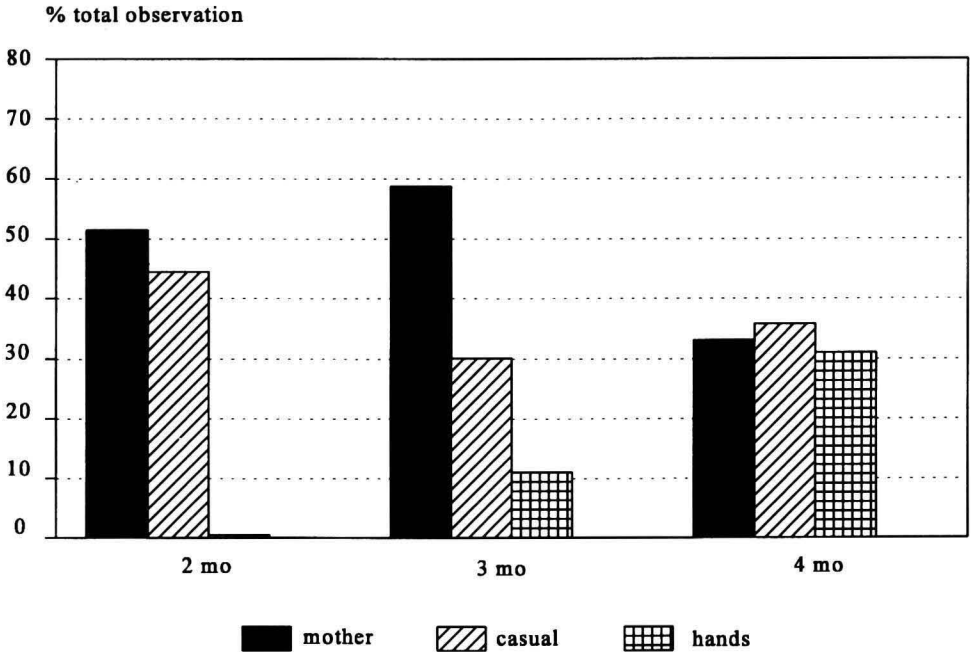


Fig. 2. Frequencies in the face-to-face without objects.

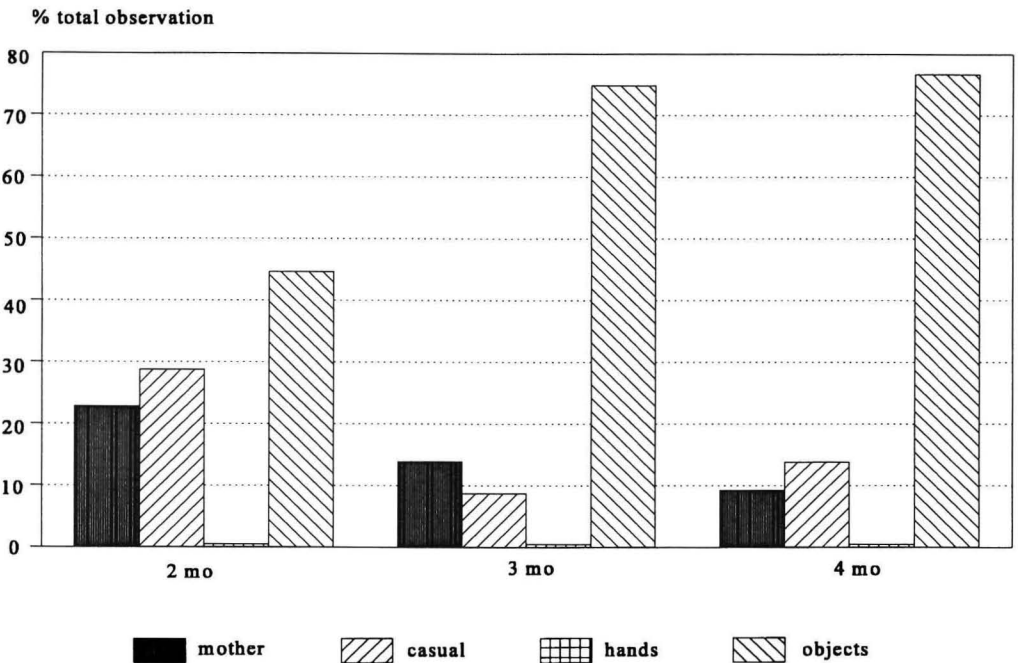


Fig. 3. Frequencies in the face-to-face with objects.

When objects may be presented by the mothers, infants preferentially look at them, even the youngest subjects, with an important increase with age.

3. Mean durations of fixations

Direct face-to-face looks at mother are longer than casual looks (5 vs. 3 sec), at 2 and 3 months. At 4 months both last the same time. When mothers present objects, looks at mother are quite short (2 sec), the duration of looks at objects increases with age (7, 11, and 15 sec).

4. Variability

On any index large variability between dyads is observed : for example, look at

mother at 2 months varies from 17% to 97%, look at objects from 6% to 78%. Infants who look much at mother when no object is present also look much at objects at the same age ($r=.59$). Infants who look long at objects at 2 months do the same at 3 months ($r=.53$).

5. Habituation

Infants whose mean duration of looks at mother is high at 2 months are fast habituators at 3 months.

Discussion

These preliminary results pertain only to a part of the larger longitudinal study (ac-

ording to the design depicted in Figure 1); moreover only a subsample was analyzed, at a few measurement points of the study. As such, these results do not answer the question of possible links between mother-infant-interaction and the development of attentional abilities. Facial expressions, vocalizations and postures need to be considered in a dynamic perspective. Concerning habituation, total time to reach criterion does not capture entirely the organization of attention: lags between fixations need to be considered.

However, the present results already raise a number of questions concerning infants' ocular activity and the interpretation of looks off mother as GAZE AVERSION. Gaze aversion is usually evaluated from the percentage of time spent off mother. First, for the same age, discrepant values are obtained in different studies (Van Beek, 1993): how can these discrepancies be explained? Second, the interpretation of such percentages must be qualified if one considers other indices of visual activity.

In the investigated situations, the mother keeps looking at the infant, and termination of mutual gaze is virtually always initiated by the infant. But shift from mother to something else may be initiated by an interfering stimulus: hands or object. Then the shift would come more from an attraction than from an aversion. Furthermore, at any observed age, infants change their fixation point quite frequently, with no difference between situations. Keeping a long fixation may be problematic for the ocular system, which needs to move. Finally, if mutual gaze teaches the infant to control his attention, it must include both going to and away from a fixation point. Then mutual

gaze would be optimal only if it also allows for shifts away from mother. Thus, the relation between mutual gaze and attention control may not be linear. Moreover, age needs to be taken into account. In 2-month-olds the duration of look at mother without object is linked to the duration of look at objects. A number of 4-month-olds reject face-to-face without objects, and look at objects is maximum at that age.

To discover possible links between early mutual gaze and subsequent attentional abilities, both stabilities and changes with age, on pertinent indices, in infant, mother, and the dyad, need to be investigated.

References

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