Educating each other’s attention: Mothers’ and infants’ eye contact within natural interactions at 3 and 6 months of age

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Background
The interaction between infant and caregiver is empowered by mutual attention which manifests itself in the establishment of eye contact [1]. Senju and Csibra have shown that infants are sensitive to ostensive signals, such as i.e. eye contact and argue that infants are more likely to follow adult’s gaze when mutual eye contact is established [2]. Following this approach, we argue that infants’ social environment tries to affect their attention very early in development in order to establish a condition of mutual gaze. One of the basic ways of affecting infant’s attention is gazing at infant’s face [3]. Despite of numerous studies exploring infant’s and mother’s gaze behavior, only a few of them were conducted in natural settings and tried to find precise correlations and constant patterns in that behavior over time.

Objectives
Our goal was to arrange a natural mother-infant interaction setting and to find answers to the following questions:
- How do the patterns of gaze at the partner change over time?
- How do the mothers and their infants affect each other’s attention?
- Are there any patterns of gaze that develop very early in infant’s development and remain constant over time?

Results
Looking at the partner
We found changes in gaze duration between the 3rd and 6th month. Over time, infants gazed at their mothers significantly less, $t(14) = 3.04$, $p < 0.01$, while the overall duration of mothers’ gaze did not change significantly over time (see Fig.2).

In particular, infants looked at the mothers for significantly shorter intervals at 6 months, $t(14) = 3.00$, $p < 0.01$ (see Fig.3), but the frequency of looks did not change significantly, $t(14) = 0.21$, $p > 0.10$ (see Fig.4). Mothers looked at the infants for shorter intervals at 6 months as well, but with higher frequency. However, none of these changes was significant, for average duration of look $t(14) = 1.37$, $p > 0.10$ (see Fig.3), for frequency of looks $t(14) = 1.45$, $p > 0.10$ (see Fig.4).

Furthermore we found a large correlation between the total duration of mother’s gaze towards the infant and the total duration of the infant’s gaze at the mother at 3 months, $r_{\text{Pearson}} = 0.67$, $p < 0.01$ (see Fig.5) and at 6 months, $r_{\text{Pearson}} = 0.71$, $p < 0.01$ (see Fig.6) of infant’s age. The mothers who looked most at their infants were those who were also most looked at.

There was also a medium correlation between the total duration of mother’s gaze at the infant at 3 and 6 months of infant’s age, $r_{\text{Pearson}} = 0.43$, $p < 0.05$ (see Fig.7). We found no significant results while testing the correlation for infant’s gaze at the mother, $r_{\text{Pearson}} = 0.25$, $p > 0.10$.

Mutual gaze
We found a large correlation between the total duration of mother’s and infant’s mutual gaze at 3 months and 6 months, $r_{\text{Pearson}} = 0.52$, $p < 0.05$ (see Fig.8).

For the total duration of mutual gaze, there was a marginally significant decrease with age, $t(14) = 1.91$, $p = 0.08$ (see Fig.9).

Conclusions
The patterns of gaze behavior for mothers and infants during their interactions change over time. However, we could observe statistically significant changes only for infants: the overall duration of looking at the mother became shorter with infant’s age. At the age of 6 months infants gazed at the mothers with the same frequency but for shorter intervals. This decrease entailed also the decrease in mutual gaze between mother and infant over time (but only marginally significant).

Independently from infants’ age we found correlations suggesting that mothers and infants affect each other’s attention. The partners of interaction educate each other’s attention in a way that when one of them is spending more time looking at the other, the other is more likely to look back in response. Some patterns such as duration of mutual gaze and also the duration of mother’s gaze at the infant seem to develop very early in the infant’s development and remain quite constant over time. For example, if during their interaction at 3 months, mutual gaze between mother and her child was established for a long time, it continues to be a long interval at 6 months of children’s age. And the mothers who spent much time looking at their infants at the first time point looked at their infants longer at 6 months as well.

The above results not only confirm a well-known developmental transition occurring at around 6th month of age and manifesting itself in infants losing interest in face-to-face interaction, but also suggest that irrespective of that phenomenon, the mother and infant develop their own patterns of focusing attention on each other which remain quite constant over time.

References

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