

Facial expressions are an important way to communicate emotions. Over the last decades, a variety of behavioral studies have shown that human infants are adept at discriminating a range of facial expressions. By 3 months of age, infants discriminate happy from angry expressions. Furthermore, there is evidence showing that infants are sensitive to the affective tone these expressions convey. By 4 to 6 months of age, infants display more positive expressions in response to happy faces and more negative expressions in response to angry faces. While behavioral evidence points to an early ability to discriminate and recognize happy and angry facial expressions, little is known about neural processing of facial expressions as revealed by event-related brain potentials and how this processing might develop over the course of ontogeny.

Event-related brain potentials were measured in 20 adults and 20 7-month-old infants to assess neural processing of angry and happy facial expressions. ERPs were recorded while participants viewed photographs of a woman wearing either a happy or an angry facial expression.

Adults' ERPs when shown angry faces were more negative than ERPs elicited by happy faces as early as 250 ms after stimulus onset. This difference between the emotions reached its peak amplitude around 350 ms, and was statistically significant in the 300-400 ms latency interval ($F(1,19) = 20.92, p < 0.0002$). In contrast to the findings with adults, infants' ERPs for happy faces were more negative than ERPs elicited by angry faces as early as 350 ms after stimulus onset. This difference between the emotions reached its peak amplitude around 450 ms, and was statistically significant in the 400-500 ms latency interval ($F(1,19) = 5.59, p < 0.03$).

In adults, angry faces elicited a more negative amplitude than happy faces. This replicates previous findings in adults and in children. Interestingly we found a negativity in infants' ERPs distinguishing happy from angry faces. This indicates that, even by 7 months of age, there are measurable differences in the electric brain responses corroborating with the ability to discriminate happy and angry emotions behaviorally. The negative component invoked by both expressions is similar to a negative component observed in previous infant studies, thought to reflect allocation of attention. In contrast to adults, the amplitude of the negative component was larger for happy than for the angry face. This suggests that 7-month-olds allocated more attentional resources to the happy than to the angry face. This interpretation is consistent with previous findings showing that infants 4 and 6 months of age look longer at happy than angry expressions. The finding that, in contrast to adults, infants at 7 months of age do not allocate more attentional resources to the angry face, suggests that

experience with facial expressions may play a key role in the development of specialised cortical mechanisms responsible for processing emotional information conveyed by the face. However, it remains to be specified when during development the human brain begins to allocate more attention to angry as compared to happy facial expressions.