Babies are specially attuned to our voices and emotions

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Young babies' brains are already specially attuned to the sounds of human voices and emotions, according to a report published online on June 30 in *Current Biology*.

Three- to seven-month-old infants showed more activation in a part of the brain when they heard emotionally neutral human sounds, such as coughing, sneezing, or yawning, than when they heard the familiar sounds of toys or water. That activity appeared in an area of the temporal lobe known in adults for its role in processing human vocalizations. The babies also showed greater response to sad sounds versus neutral ones in another part of the brain involved in emotion processing in adults.

The researchers say the discoveries fundamentally advance our understanding of infant development.

"Our results suggest that the infant temporal cortex is more mature than previously reported," said Evelyne Mercure of University College London. "It is a rare demonstration that specialized areas exist in the brain very early in development."

"It is probably because the human voice is such an important social cue that the brain shows an early specialization for its processing," added Anna Blasi of King's College London. "This may represent the very first step in social interactions and language learning."

The findings are consistent with earlier evidence that infants can extract subtle information from human speech. Newborns prefer to listen to their mother's voice and their mother tongue. Young infants also differentiate between the voices of men and women, children and adults.

In the new study, the researchers used functional magnetic resonance imaging (fMRI) to record brain responses in sleeping babies while they were presented with emotionally neutral, positive, or negative human vocalizations or nonvocal environmental sounds.

"We were very surprised to find that the area of the temporal cortex that responded to the human voice more than to environmental sounds was so similar in its location to the adult area showing the same specialization," Mercure said. "Infant fMRI is not an exact science, and finding results that were so similar to the adult literature was reassuring and surprising at the same time."

The findings in normally developing babies call into question what happens to this voice-specialized brain region in babies that go on to develop behavioral or neuropsychological disorders, such as autism or schizophrenia, in which social communication is affected.

"We are now carrying out more research in this area to help us understand how differences in brain development arise, if we can use these to accurately identify babies who will go on to suffer from disorders such as autism, and if they can be used to help measure the effectiveness of interventions," added study author Declan Murphy, also of King's College London.

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