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Infant brains are hardwired to link images and sounds as they learn to speak

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New research examining electrical brain activity in infants suggests that we are biologically predisposed to link images and sounds to create language.

In a paper published in the journal *Cortex*, an international team of researchers in the UK and in Japan, including those at the University of Warwick, examined the electrical activities of the brain in 11 month-olds at the initial stages of word learning.

They used novel words ('kipi' or 'moma') to refer to pictures of a spiky or a rounded shape. They found the infants very quickly began to match the word to the image.

One of the authors, Dr Sotaro Kita from the University of Warwick said: "The oscillatory activity of the infant brainincreased when the word they heard matched the shape they were shown, compared to when it did not. This suggests that the infant brain spontaneously engages in matching visual and auditory input."

An analysis of how different areas of the brain are communicating with each other also showed surprising results.

Dr Kita said: "Communication traffic between regions of the brain was light when the word matched the shape, but the traffic became heavy especially in the left hemisphere, where language is typically processed, when the word did not match the shape. The left-hemisphere had to

work harder to associate visual and auditory input when they are not a natural match."

"The N400 response was higher for mismatching word-image pairs, which is a classic index of word meaning processing in the brain. This indicates that the infants were trying to work out the meaning of the novel words."

Dr Kita added that these findings reveal that sound symbolism allows 11-month-old infants to spontaneously bind the speech sound and the visual referent, and this spontaneous binding may provide infants an insight that spoken words refers to objects you can see in the world.

He said: "It is this cross-modal mapping between sound and image that plays a key role in the origin and development of language-learning."

More information: Michiko Asano, Mutsumi Imai, Sotaro Kita, Keiichi Kitajo, Hiroyuki Okada, Guillaume Thierry, "Sound symbolism scaffolds language development in preverbal infants," *Cortex*, Volume 63, February 2015, Pages 196-205, ISSN 0010-9452, DOI: 10.1016/j.cortex.2014.08.025.

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