

From sounds to the meaning

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Credit: Rebecca Trynes

Without understanding the "referential function" of language (words as "verbal labels," symbolizing other things), it is impossible to learn a language. Is this implicit knowledge already present early in infants? A study conducted by the Language, Cognition and Development Lab of SISSA says it is.

The word "apple", as we pronounce it, is a sequence of sounds (phonemes) that we use whenever we want to refer to the object it indicates. If we did not know that a referential relationship exists between the sound and the object it would be impossible for us to use or learn a language. Where does this implicit knowledge come from, and how early in [human development](#) does it manifest? This is the question Hanna Marno and her SISSA colleagues attempted to answer in a study just published in *Scientific Reports*.

"A sensitivity to [speech sounds](#) is already present in newborns. These types of sounds are, in fact, perceived as special starting from the first days of life, and they are processed differently from other types of [auditory stimuli](#). What makes this type of stimulus so special for the newborn?" asks Marno. "There's definitely a 'social' saliency: Speech sounds signal interaction between conspecifics, which is important for the survival of the infant. But there is also another important aspect, i.e., referentiality: Words are symbols that carry meanings and convey messages. If infants didn't know this, albeit implicitly, they wouldn't be able to acquire language."

"Try to imagine an infant who, on several occasions, sees his mother holding up a cup while uttering the word 'cup,'" explains the researcher. "He could just think that this is something his mum would do whenever

holding the cup, a strange habit of hers. But instead, in a short while, he will learn that the word refers to that object, as if he were 'programmed' to do so".

To test this hypothesis, Marno conducted experiments with infants (4 months old). The babies watched a series of videos in which a person might (or might not) utter an (invented) name of an object, while directing (or not directing) their gaze toward the position on the screen where a picture of the object would appear. By monitoring the infants' gaze, Marno and colleagues observed that, in response to speech cues, the infant's gaze would look faster for the visual object, indicating that she is ready to find a potential referent of the speech. However, this effect did not occur if the person in the video remained silent or if the sound was a non-speech sound.

"The mere fact of hearing verbal stimuli placed the infants in a condition to expect the appearance, somewhere, of an object to be associated with the word, whereas this didn't happen when there was no speech, even when the person in the video directed the infant's gaze to where the [object](#) would appear, concludes Marno. "This suggests that infants at this early age already have some knowledge that language implies a relation between words and the surrounding physical world. Moreover, they are also ready to find out these relations, even if they don't know anything about the meanings of the words yet. Thus, a good advice to mothers is to speak to their infants, because [infants](#) might understand much more than they would show, and in this way their attention can be efficiently guided by their caregivers. This doesn't only facilitate the task of acquiring a [language](#), but also helps to learn about their surrounding world".

More information: "Can you see what I am talking about? Human speech triggers referential expectation in four-month-old infants" *Scientific Reports* 5, Article number: 13594 (2015) [DOI:](#)

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