

# Even Before Language, Babies Learn The World Through Sounds

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It's not just the words, but the sounds of words that have meaning for us. This is true for children and adults, who can associate the strictly auditory parts of language— vowels produced in the front or the back of the mouth, high or low pitch—with blunt or pointy things, large or small things, fast-moving or long-staying things.

Do the same principles apply for young infants, and not just to things, but also to abstractions? A new study by Marcela Peña, Jacques Mehler, and Marina Nespor, working together at the International School for Advanced Studies, in Trieste, Italy and Catholic University of Chile, says yes. For the first time ever, the researchers have demonstrated that these physical properties of speech are associated, very early in life, with abstract concepts—in this case, larger and smaller. The findings will be published in an upcoming issue of *Psychological Science*, a journal of the Association for Psychological Science.

The researchers worked with 28 four-month-old babies from Spanish-speaking homes. The babies sat on their parents' laps (the parents were visually masked) in a soundproof room, into which were piped nonsense syllables composed of consonants followed by the vowels I or O, or E or A. The babies were simultaneously shown larger and smaller versions of circles, ovals, squares, or triangles, in different colors. Using an eye tracker, experimenters recorded which object the infants looked at first and how long they gazed at each object.

In previous research, adults reared in many different languages have shown an association of I and E sounds with small objects and O and A with large ones. In this study, the babies were shown objects that were larger or smaller in comparison to one another.

From the very start and almost 100 percent of the time, the babies directed their gaze first and looked longer at the smaller objects when they heard syllables using I or E, and at the larger ones with O or A.

“We don't know if this is something we are born with or something we have to learn—but it is a very early capacity,” says Peña. She stresses that “the baby is not learning the word—bigger, smaller, ball, triangle—itsself.” Rather, she or he is “exploiting the physical properties of a sound to help categorize another [abstract] property of the environment.”

Why is this important? “Early cognitive development is highly unknown. We want to understand how the infant very early in life can have a notion of the conceptual.” The findings “suggest that a part of [language learning] is based on the physical property of the stimulus itself, not just on a symbolic mind.”

The study gives researchers new methodologies to investigate the process of language and conceptual development—and to look at some of the persistent questions in cognitive psychology and linguistics: “What is the nature of language? Is everything symbolic or arbitrary?” Peña asks. “Or are there

particular physical aspects of learning that we exploit” to begin to make sense of a large, complex, and—for a tiny infant—brand-new world.