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EXAME DE PROFICIÊNCIA DE LEITURA EM LÍNGUA ESTRANGEIRA

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CADERNO DE PROVA

Idioma:

INGLÊS

Área de Pesquisa:

(4) LINGUÍSTICA, LETRAS E ARTES

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Babies Learn to Recognize Words in the Womb



Muffled memories. Brain wave patterns show that babies recognize "pseudowords" they heard in the womb.

Be careful what you say around a pregnant woman. As a fetus grows inside a mother's belly, it can hear sounds from the outside world—and can understand them well enough to retain memories of them after birth, according to new research.

It may seem implausible that fetuses can listen to speech within the womb, but the sound-processing parts of their brain become active in the last trimester of pregnancy, and sound carries fairly well through the mother's abdomen. "If you put your hand over your mouth and speak, that's very similar to the situation the fetus is in," says cognitive neuroscientist Eino Partanen of the University of Helsinki. "You can hear the rhythm of speech, rhythm of music, and so on."

A 1988 study suggested that newborns recognize the theme song from their mother's favorite soap opera. Other studies have expanded on the idea of fetal learning, indicating that newborns already familiarized themselves with sounds of their parent's native language; one showed that American newborns seem to perceive Swedish vowel sounds as unfamiliar, sucking on a high-tech pacifier to hear more of the new sounds. Swedish infants showed the same response to English vowels.

But those studies were based on babies' behaviors, which can be tricky to test. Partanen and his team decided instead to outfit babies with electroencephalograms (EEG) sensors to look for neural traces of memories from the womb. "Once we learn a sound, if it's repeated to us often enough, we form a memory of it, which is activated when we hear the sound again," he explains. This memory speeds up recognition of sounds in the learner's native language and can be detected as a pattern of brain waves, even in a sleeping baby.

The team gave expectant women a recording to play several times a week during their last few months of pregnancy, which included a made-up word, "tatata," repeated many times and interspersed with music. Sometimes the middle syllable was varied, with a different pitch or vowel sound. By the time the babies were born, they had heard the made-up word, on average, more than 25,000 times. And when they were tested after birth, these infants' brains recognized the word and its variations, while infants in a control group did not, Partanen and colleagues report online today in the *Proceedings of the National Academy of Sciences*.

Babies who had heard the recordings showed the neural signal for recognizing vowel and pitch changes in the pseudoword, and the signal was strongest for the infants whose mothers played the recording most often. They were also better than the control babies at detecting other differences in the syllables, such as vowel length. "This leads us to believe that the fetus can learn much more detailed information than we previously thought," Partanen says, and that the memory traces are detectable after birth.

"This is a well-respected group and the effects are really convincing," says Patricia Kuhl, a neuroscientist at the University of Washington in Seattle. Combined with previous work, she says, these results suggest "that language learning begins in the womb."

Developmental psychologist Christine Moon, of Pacific Lutheran University in Tacoma, Washington, agrees. "I think it is a very good paper with important results," she says, and it points the way to future studies that could break down the learning process in even more detail.

Just because babies can learn while in utero doesn't mean that playing music or language recordings will help the child. Partanen says there is no solid evidence that stimulation beyond normal sounds of everyday life offers any long-term benefits to healthy babies. Moon adds that playing sounds to a fetus with speakers close to the belly could even be risky because this could overstimulate the fetal ear and the rapidly developing brain. Too much noise can interfere with the auditory system and may disrupt the baby's sleep cycles.

