

# Newborn memories of the “oohs” and “ahs” heard in the womb

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Newborns are much more attuned to the sounds of their native language than first thought. In fact, these linguistic whizzes can up pick on distinctive sounds of their mother tongue while in utero, a new study has concluded.

Research led by Christine Moon, a professor of psychology at Pacific Lutheran University, shows that infants, only hours old, showed marked interest for the vowels of a language that was not their mother tongue.

“We have known for over 30 years that we begin learning prenatally by listening to the sound of our mother talking,” Moon said. “This is the first study that shows we learn about the particular speech sounds of our mother’s language before we are born.”

Professor Christine Moon at her research lab at Pacific Lutheran University. (Photo by John Froschauer, Director of Photography)

Before the study, the general consensus was that infants learned about the small parts of speech, the vowels and the consonants, postnatally.

“This study moves the measurable result of experience with individual speech sounds from six months of age to before birth,” she said.

The findings was published in *Acta Paediatrica* in late December.

For the study, Moon tested newborn infants shortly after birth while still in the hospital in two different locations: Madigan Army Medical Center in Tacoma, Wash. and in the Astrid Lindgren Children’s Hospital in Stockholm. Infants heard either Swedish or English vowels and they could control how many times they heard the vowels by sucking on a pacifier connected to a computer.

Co-authors for the study were Hugo Lagercrantz, a professor at the Karolinska Institute in Sweden as well as a member of the Nobel Assembly and Patricia Kuhl, endowed chair for the Bezos Family Foundation for Early Childhood Learning and co-director of the University of Washington’s Institute for Learning and Brain Sciences.

The study tested newborns on two sets of vowel sounds – 17 native language sounds and 17 foreign language sounds, said Kuhl. The researchers tested the babies’ interest in the vowel sounds based on how long and often they sucked on a pacifier. Half of the infants heard their native language vowels, and the other half heard the foreign vowels.

“Each suck will produce a vowel until the infant pauses, and then the new suck will produce the next vowel sound,” Kuhl said.

In both countries, the babies listening to the foreign vowels sucked more, than those listening to their native tongue, regardless of how much postnatal experience they had. This indicated to researchers that they were learning the vowel sounds in utero.

“These little ones had been listening to their mother’s voice in the womb, and particularly her vowels for 10 weeks. The mother has first dibs on influencing the child’s brain,” Kuhl said. “At birth, they are apparently ready for something novel.”

While other studies have focused on prenatal learning of sentences or phrases, this is the first study to show the learning of small parts of speech that are not easily recognized by melody, rhythm or loudness. Forty infants were tested in Tacoma and another 40 in Sweden. They ranged in age from seven to 75 hours after birth.

Vowel sounds were chosen for the study because they are prominent, and the researchers thought they might be noticeable in the mother’s ongoing speech, even against the noisy background sounds of the womb.

The study shows that the newborn has the capacity to learn and remember elementary sounds of their language from their mother during the last 10 weeks of pregnancy (the sensory and brain mechanisms for hearing are intact at 30 weeks of gestational age).

“This is a stunning finding,” Kuhl said. “We thought infants were ‘born learning’ but now we know they learn even earlier. They are not phonetically naïve at birth.”

Prior to the kinds of studies like this one, it was assumed that newborns were “blank slates,” added Lagercrantz. He said that although it’s been shown that infants seem to be attuned to sounds of their mother tongue, this same effect now seems to occur before birth. This surprised him.

“Previous studies indicate that the fetus seems to remember musical rhythms,” he said. “They now seem to be able to learn language partially.”

Kuhl added that infants are the best learners on the planet and while understanding a child’s brain capacity is important for science, it’s even more important for the children.

“We can’t waste early curiosity,” Kuhl said. “The fact that the infants can learn the vowels in utero means they are putting some pretty sophisticated brain centers to work, even before birth.”