

Babies Learn Sounds of Language by 6 Months: How parents speak to infants exerts important influence...

By SANDRA BLAKESLEE

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Babies Learn Sounds of Language by 6 Months

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BABIES learn the basic sounds of their native language by the age of 6 months, long before they utter their first words, and earlier than researchers had thought, a new study suggests.

The findings indicate that recognition of these sounds is the first step in the comprehension of spoken language. As a result, the researchers suggest, babies whose hearing is damaged by chronic ear infections may have lifelong language problems, and the way parents speak to their infants exerts important influences on language learning.

Previous studies suggested that infants' sound perception changes by about 1 year old, when children begin to understand that sounds convey word meanings.

The new research, reported in the current issue of *Science*, was conducted by Dr. Patricia Kuhl of the University of Washington in Seattle and colleagues at Stockholm University in Sweden, the Massachusetts Institute of Technology and the University of Texas in Austin.

Adaptability of Newborn

Newborns are language universalists, Dr. Kuhl said. Able to learn any sound in any language, they can distinguish all the sounds that humans utter. But adults are language specialists, she said. Exposure to their native language reduces their ability to perceive speech sounds that are not in that native tongue. Thus Japa-

How parents speak to infants exerts important influences.

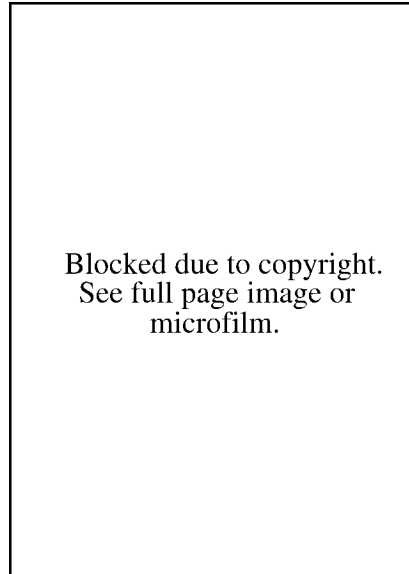
nese infants can hear the difference between the English sounds "la" and "ra," but Japanese adults cannot because their language does not contrast those sounds.

Dr. Kuhl said she and her colleagues set out to discover when, during language development, experience alters sound perception and to explore the nature of the change. She said she had thought it could be earlier than other researchers believed.

Recognizing Slight Differences

To test her idea, she used the concept of phonetic prototypes: idealized mental representations of the key sounds in a given language. An English prototype sound is the vowel linguists write as "i," pronounced as in the word "fee." When an adult English speaker hears something very close to this "i" sound (as when the sound is spoken by someone with a head cold), Dr. Kuhl said, the listener will hear the prototype "i" and not the slight variation. The prototype sound acts like a magnet, she said, pulling all similar sounds into one mental slot for language processing.

But the same is not true of foreign languages. Because English speakers



have not memorized the prototype for a foreign vowel — like the Swedish vowel "y" (an EE-sound pronounced with front-rounded lips), they can discern when the vowel is pronounced slightly differently. They have no "magnet" that makes the sounds identical.

Using identical computer equipment to generate prototype Swedish and English sounds, Dr. Kuhl and her colleagues tested the magnet effect on 64 6-month-old babies in Sweden and the United States. During the experiment, each baby sat on its mother's lap and listened to pairs of "i" and "y" sounds. Babies were

trained to look over their left shoulders when they heard a difference in the sounds (they would see a cute puppet bang a drum) and to ignore any sound pairs that seemed the same.

American babies routinely ignored the different pronunciations of "i" because they heard it as the same sound, Dr. Kuhl said. But they could distinguish slight variations in the "y" sounds.

The exact opposite was true of the Swedish babies, she said. They ignored the variations in "y" because they sounded the same, while they noticed the variations in "i."

The experiment confirms that linguistic experience in the first half year of life alters an infant's perception of speech sounds, Dr. Kuhl said. Infants show a significantly stronger magnet effect for their native language prototypes.

The study shows that phonetic perception does not depend on the emerging use of words, Dr. Kuhl said, and that language experience shapes perception far earlier than anyone expected.

The research calls attention to the language tutoring role of parents, Dr. Kuhl said. By talking "motherese" with its high pitch, exaggerated intonation and clear pronunciation, she said, parents help babies acquire phonetic prototypes that are building blocks to language.

The study also underscores the importance of treating chronic ear infections in infants, Dr. Kuhl said. There is evidence that such infections may impair language development later in life.