Study Finds Baby Talk Means More Than a Coo

By SANDRA BLAKESLEE

When mothers in the United States, Sweden and Russia nuzzle their infants and croon baby talk, they are giving their babies a lot more than tender loving care, scientists have found. The women are producing highly exaggerated speech sounds that provide the basis for all subsequent learning of that language.

Baby talk is much more important than people realize, said Dr. Patricia Kuhl, chairwoman of speech and hearing sciences at the University of Washington in Seattle and the lead author of a new report on the university of "parentese" — the sing-song, exaggerated speech pattern that people use when talking to infants.

"Parentese has a melody to it," Dr. Kuhl said. "And inside this melody is a tutorial for the baby which contains exceptionally well-formed versions of the building blocks of language."

In a study published today in the journal Science, Dr. Kuhl and her colleagues found that mothers in the the three countries stretched out or exaggerated the pronunciation of three primary vowels when speaking to their infants — "ee," "ah" and "oo" — which are common to every spoken language in the world. This vowel stretching tunes the infant's brain to the widest possible range of vowel sounds, Dr. Kuhl said. As the baby learns the vowels of its mother tongue, the ability to hear subtle vowel distinctions in other languages is gradually lost.

Dr. Richard Aslin, a professor of brain and cognitive sciences at the University of Rochester, who was not involved in the research, said: "This is an important study showing that what mothers do naturally can help babies. But it does not yet prove that the exaggerated input causes language to develop. You'd have to show that infants who do not hear parentese do not acquire language as well or as swiftly."

Dr. Aslin said that such a study would be difficult since parents in every culture speak some form of baby talk to their infants.

Five years ago, Dr. Kuhl and her colleagues reported that by the age of 6 months, babies had learned the specific sounds of their mother tongue, suggesting that cells in the brain region that processes sounds are tuned to the frequency of vowels and consonants in that language. Parentese seemed to literally alter the baby's brain tissue.

How this happened remained a question.

"We knew that pitch and melody are altered in parentese," Dr. Kuhl said on Wednesday in a telephone interview. The question was, she said, "are the phonetic units — the sounds of language — modified in any way so as to enhance learning?"

In other words, she said, "Is there more than melody to the message?"

To explore this question, the researchers used the concept of vowel space, a standard conceptual framework for studying the sounds of a language. All languages contain three so-called point vowels — "ee" as in "bead," "ah" as in "pot" and "oo" as in "boot." Although these vowels differ ever so slightly in pronunciation from one language to the next, they tend to be pure sounds that are extremely similar.

In the concept, the three vowels are plotted as points on a triangle, Dr. Kuhl explained, and the sounds of all other vowels fall within the triangle. Where they fall depends on their frequencies — essentially complex mixtures of "ees," "ahs" and "oos" that comprise the specific sound system of a language. The vowels of every language fall within the triangle. Swedish has 16 vowels, English has 9 and Russian has 5.

In the study, Dr. Kuhl and her colleagues recruited 30 mothers, 10 from each country, and audiotaped them speaking first to their infants, 2 to 5 months old, and then an adult.

Whether the mothers spoke English, Swedish or Russian, all greatly exaggerated their "oos," "ahs" and "ees" when speaking to their babies, Dr. Kuhl said. As measured by vowel frequency. the mothers doubled the size of the triangle in speaking to their babies as compared to speaking with adults. The mothers did not produce identical super vowels, but they exaggerated the three vowels by the same degree.

These exaggerated vowels are important for several reasons, Dr. Kuhl said. First, it makes it easier for babies to hear distinctions in speech. Sounds are more easily contrasted and this benefits the brain mapping of language. Second, once an infant's brain is tuned to super vowels, it is easier for the infant to hear the less distinct vowels of normal speech.

Third, when mothers produce these sounds, they are giving their babies more "room" for hearing more sounds.

"It's like looking at a caricature of a face rather than at a real face," Dr. Kuhl said. "The caricature emphasizes the critical features of the face by exaggerating them and the same is true for sounds of a language."