



Infant and Child Studies Newsletter

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About Us

The Infant and Child Studies Lab at UTM was established in 1973 for the purpose of studying children's perception of speech and music. Every year since then, hundreds of families from the surrounding communities (Mississauga, Oakville, Brampton, Burlington, Milton, Georgetown, Toronto) have visited the campus to participate in our studies. While infants and children engage in game-like tasks at our state-of-the-art facility, we gather valuable information about the development of listening skills.

What's New in our Lab?

Dr. Elizabeth Johnson left the Max Planck Institute in The Netherlands, where she spent four years directing the Nijmegen Baby Lab, to join the Infant and Child Studies Centre at UTM this past year. Dr. Johnson received her PhD training at The Johns Hopkins University in Baltimore, Maryland in the United States. She is currently completing construction of the UTM Infant Language and Speech Lab, and will be studying how English-learning children acquire the sound structure of their native language.

Marieke van Heugten, a recent graduate of the M.Sc. program in Cognitive Neuroscience at Radboud University in The Netherlands, began her PhD work in Dr. Johnson's Infant Language and Speech Lab last fall. Marieke has been working with Dutch- and French-learning toddlers to try to understand how children learn to comprehend small words like 'the' and 'a'. She is also interested in how infants deal with variability in the way people pronounce words.

Studies on music and speech perception that are currently in progress involve 6- to 8-month-olds, 12-month-olds, and 5- to 12-year-olds. Plans are underway for additional studies with younger infants, toddlers, and school-age children.



How Can I Participate?

For more information on how you and your child can participate in our studies, give us a call at 905-828-5446. Or visit us online at

www.utm.utoronto.ca/infantlab





Infants match voices with moving faces

Facial gestures as well as vocal sounds provide cues to the content of speech and to the identity of the speaker. Recently we demonstrated that infants who are 6-8 months of age perform the remarkable feat of matching the voice of an unfamiliar speaker with the moving face of that speaker. However, neither infants nor adults can match a singing voice with the singer's visual image.

Detecting changes to unfamiliar melodies

We have demonstrated that infants can detect subtle pitch and rhythmic changes in a melody. It has become clear, however, that some methods are successful in revealing such skills and others are unsuccessful. Much trial and error goes into figuring out which methods work best for infants of different ages.



Distinguishing up from down

The general belief is that most children cannot identify the direction of pitch change (up or down) until they are at least 7 years of age. We found, however, that 5- and 6-year-olds could successfully identify whether one pitch was higher or lower than another. By 8 years of age, children are as accurate as adults in judging the direction of pitch change, even when the pitch changes are tiny.



Variability in word sounds

Recent studies suggest that if a 7.5 month old hears a male speaker say 'dog', and then hears a female speaker say 'dog', then the infant will have a hard time realizing that the male and female speaker are saying the same word. Presumably, this is because the word 'dog' sounds very different when it is spoken by a male as opposed to a female (for example, females tend to have a much higher pitched voice than males). In the Infant Language and Speech Lab, we are interested in understanding how infants learn to cope with this variability in the way words sound when spoken by different individuals.

Infants' musical tastes

Even with unfamiliar music, it is relatively easy to predict which musical pieces adults will like and which they will dislike. At present, we are studying whether infants' likes and dislikes are similar to ours. Similarities reveal which preferences arise from our nature. Differences reveal the kinds of preferences that arise from our history of music listening.

Did You Know?

Newborns prefer the sound of their mother's voice to that of a stranger.

Newborns prefer to listen to their native language over another language.

Infants prefer infant-directed speech to adult-directed speech.

Infants prefer infant-directed singing to infant-directed speech.

See page 4, "References," to learn more about the source of this information.



Recognizing word boundaries in speech

Have you ever noticed that when you listen to someone speak in a foreign language, it is difficult to tell where one word ends and the next begins? You may have also felt that people you hear speaking in other languages speak incredibly fast and slur all of their words. This is because the speech signal does not contain any fully reliable cues to word boundaries. In other words, there are no little silences between words. Instead, words are spoken so that they blend into one another. In fact, it is only possible to hear speech as a string of individual words if you are familiar with the sound structure of the language you are hearing. In the Infant Language and Speech lab, we are interested in how infants learn to hear their native language as a string of individual words. Recent studies suggest that they begin to do so by 7 to 10 months of age.

Monolingual and bilingual children

We investigated bilingual and monolingual children's ability to decipher distorted speech. Bilingual children who had English as a second language performed more poorly on this task than monolingual English-speaking children. We also found that bilingual children had more difficulty than monolingual children perceiving speech in noisy backgrounds. These disadvantages are obviously minor compared to the numerous advantages of bilingualism.

Children's memory for pitch

Children remember the theme music that accompanies familiar TV programs. They also remember the pitch level at which they usually hear such music. For example, we demonstrated that children could distinguish original versions of the theme songs of TV programs from versions that were shifted upward or downward in pitch. By studying a group of children in Japan, we found that their memory for the pitch of familiar music was more accurate than that of Canadian children. Japanese children's greater experience with music in and out of school is likely to account for their superior pitch memory. In fact, children of Asian origin who are reared in Canada perform much like Canadian children.



Children's memory for songs

Adults recognize that a song like *Happy Birthday to You* is the same song whether it is sung by a man with a low voice or a woman with a high voice. In other words, their memories of familiar tunes are abstract and independent of the pitch level. Children's memories are less abstract. Shifts in pitch (transpositions) make the same song sound different to children who are 8 years of age or younger.

Deaf children enjoy music

Over the past few years, we have been studying a group of deaf children who hear by means of cochlear implants. These children, most of whom were born deaf, have been successful in acquiring speech. Cochlear implants were designed primarily for speech. Because they provide limited information about pitch, they are considered unsuitable for music. Nevertheless, we found that deaf children with cochlear implants enjoy listening to music, and some even enjoy singing. These deaf children succeeded in recognizing the theme music from familiar TV programs although they were less proficient than hearing children at this task. Like their hearing peers, some of the deaf children are avid fans of various pop artists and others are taking music lessons.



Deaf children recognize voices

Cochlear implants are considered less than ideal for voice recognition. To date, research on voice recognition by deaf children and adults with cochlear implants indicates that they have difficulty differentiating voices, especially same-gender voices. However, we found that deaf children with cochlear implants could distinguish their mother's voice from a male voice and a child's voice. Deaf children were even able to distinguish their mother's voice from the voice of another woman. The children used cues from their mother's speaking style (e.g., intonation, speaking rate) to help identify her voice.

References

The facts found in "Did you Know" on page 4 are taken from the following articles:

- Cooper, R.P., & Aslin, R.N. (1990). Preference for infant directed speech in the first month after birth. *Child Development*, 61:1584-1595
- DeCasper, A.J., & Fifer, W.P. (1980). Of human bonding: newborns prefer their mothers' voices. *Science*, 208:1174-1176
- Moon, C., Cooper, R.P., & Fifer, W.P. (1993). Two day olds prefer their native language. *Infant Behavior & Development*, 16: 495-500
- Nakata, T., & Trehub, S. E. (2004). Infants responsiveness to maternal speech and singing. *Infant Behavior & Development*, 27:455-464

Questions and comments

We invite you to submit questions about our research or about issues in child development. Answers to selected questions will appear on an upcoming "interactive" page on our website. To send us your questions, please email us at: infantst.utm@utoronto.ca. Questions or comments on the newsletter are also welcomed.

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