

Infant and Child Studies Newsletter

Dr. Sandra Trehub
Dr. Elizabeth Johnson
Dr. Glenn Schellenberg
CCT 4032
3359 Mississauga Road North
Mississauga, Ontario L5L 1C6



About Us

The Infant and Child Studies Lab at the University of Toronto Mississauga (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 early development of listening skills. In the past year, our research has been presented at conferences throughout North America, as well as Japan, Italy, France, Germany, the U.K., and the Netherlands.



Babies are Better with Words than We Thought

Have you ever listened to an unfamiliar foreign language and had difficulty determining where one word ends and the next begins? You might think that the speaker of the foreign language is speaking exceptionally fast or blending their words together too much. But the truth is that people who are unfamiliar with English have the same problem picking out English words. This is because when we speak, we do not place tiny silences between words. Words in a familiar language are only easy to pick out because we are so familiar with the way words in language typically sound. Recent research in our lab suggest that by 6 months of age, infants have already started solving this word segmentation problem.



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

American vs. Canadian English

There are subtle differences in the way Canadians and Americans typically pronounce certain vowels, e.g., speakers of Southern Ontario English and American English pronounce the vowel in the word 'house' very differently. Adults easily adjust to the way speakers from different regions pronounce words. But how do infants cope with this type of accent variation? In collaboration with researchers at Purdue University in Indiana, we have found that 9-month-old infants have great difficulty recognizing words when they are spoken in different regional accents. Our results suggest that they would perceive the word 'house' spoken by a person from Toronto as an entirely different word than the word 'house' spoken by a person from Indiana. In our future work in this area, we will further investigate how infants eventually learn to cope with this type of variation.



about how different a pair of tunes sounded. In a study carried out at the Ontario Science Centre, we found that children of all ages could use both kinds of information. Younger and older children were equally likely to use pitch level information, but older children were more likely to use pitch order information than younger children.

Children's Perception of Pitch

If you hear "Happy Birthday" played on a tuba and then played on a flute, it is easy for adults to tell that they are the same song, even though they are played at different pitch levels. Similarly, if you hear "Happy Birthday" and then "Mary Had a Little Lamb", it is easy to tell that they are different songs because the order of pitches changes. We wanted to know if children can use these different kinds of pitch information (pitch level and pitch order) when making decisions

Consonance and Dissonance

Previous studies have shown that the preference for consonant (pleasant sounding) music over dissonant (less pleasant sounding) music is present from birth. However this evidence is based entirely on only two notes played together, which is not typical of music in our culture. We investigated preferences for consonance over dissonance in 6- and 12-month-old infants using simple melodies in one experiment and simple melodies with chord accompaniment in another. In both age groups, infants showed no preference for the consonant melody. When the melody was accompanied by chords, 6-month-olds showed no preference, but 12-month-olds listened significantly less to the consonant music. Our results suggest that the preference for consonance observed in previous studies may be unique to simultaneous combinations of 2 tones. The results also highlight the effects of early exposure to music. Older infants who have had more exposure to music showed a preference for music that was moderately dissonant or distinct from the music ordinarily heard in their environment, suggesting that they may have learned about the structure of the music in their environment.



Speech Perception in Monolingual and Bilingual Children

Do children who are fluent in only one language (monolingual) process speech differently compared to children who are fluent in more than one language (bilingual)? Speech is made up of a wide range of frequencies. When some of these frequencies are removed, the speech signal becomes degraded and thus, more difficult to understand. We are currently investigating whether 7-8 year old children's ability to understand this degraded speech differs depending on if they are monolingual or bilingual.

Matching Faces and Voices

Facial gestures as well as vocal sounds provide cues to the content of speech and to the identity of the speaker. In a previous study 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 in subsequent studies, neither infants nor adults matched a singing voice with the singer's visual image. In these studies, the audio clip and the video clip of the moms were of different speech and singing samples. In the most recent study, we found that infants were able to match the singer's moving face to the voice when both audio and video were a performance of the same song.



Toddlers' as Pronunciation Experts

Have you ever wondered why toddlers mispronounce words? Is it because they cannot hear how the words should be pronounced? Past research has suggested that toddlers do know how words should be pronounced. For example, imagine a child is shown a picture of a dog and a baby and is asked to find either the 'doggie' or the 'goggie'. If children know that 'goggie' is not the correct pronunciation of 'doggie', then you would expect them to have greater difficulty understanding the request to find the 'goggie' than the request to find the 'doggie'. This is indeed what researchers have found. Children are far slower to recognize words when they are mispronounced. We are now investigating what types of mispronunciations toddlers are most likely to detect.

Recognition of Emotion in Music

Emotional expression is a central component to music. We wanted to know if children of different ages could accurately identify the emotions (happy, sad, scary, or peaceful) being conveyed by short tunes. We found that accuracy improved with age, and that accuracy was better for more intense emotions (happy, scary). At younger ages, girls were more accurate than boys. We were also interested in whether children liked certain kinds of emotional tunes better than others. Liking was greatest for the more intense emotions (happy, scary). Boys tended to like sad and scary tunes, while girls tended to like happy and peaceful tunes.



Listen to Your Mom and Dad!

Nearly everything we know about infant speech perception comes from laboratory studies using voices that are unfamiliar to the children participating in the studies. However, speech researchers know that even adults have an easier time processing familiar than unfamiliar voices. In the lab, we have been asking whether 7.5-month-old infants would exhibit better speech processing abilities if they were presented with highly familiar voices. In this study, infants are presented with the voices of their own parents or the voices of another infant's parents. Preliminary results suggest that voice familiarity may facilitate speech processing by infants.

Putting Baby Statisticians to the Test

Although we have learned a lot about early language acquisition, researchers are still struggling to explain how babies learn language so quickly. One explanation is that infants have calculator-like brains that allow them to track and record all of the speech sounds heard, and then analyze the statistical structure of this input to understand how language works. However, we still know very little about what sorts of language knowledge infants can track and remember. We are beginning a series of studies designed to help us better understand whether infants really can learn language statistically. One way we do this is by creating what we call artificial languages. These made-up languages sound nothing like English, but contain statistical patterns. By asking how readily infants can learn the statistical



patterns in our simplified language, we hope to better understand how infants might be able to pull out consistencies in real languages

What's in a Name?

By 4.5 months of age, infants have already learned their name. We know this because children of this age will preferentially listen to recordings of their own name over recordings of another child's name. By 6 months, there is some evidence that infants process utterances containing their names better than those that do not. We are now studying how hearing one's own name might help infants process sentences.

Thank you to the many organizations for assistance in informing parents about our program including Peel Regional Health Unit, Credit Valley Hospital, Trillium Hospital, and the Ontario Early Years Centers. Most importantly, thank you to all the families that have participated in our studies! If you know anyone who would be interested in participating, please pass on this newsletter, as we are always looking for more Junior Scientists!

Thank you to the National Sciences and Engineering Research Council of Canada (NSERC), the Canadian Institutes of Health Research (CIHR), and the Social Sciences and Humanities Research Council of Canada (SSHRC) for continued funding of our research.

