

enartment of Psychology

## Infant Studies Group Newsletter 2024

The Infant Studies Group is a collection of research labs in the Department of Psychology, Neuroscience & Behaviour at McMaster University. The last few years have been extremely successful with dozens of studies investigating how young children learn and develop. Our talented postdocs, graduate students, undergraduates, and staff spend countless hours designing experiments, interacting with families, and analyzing data in order to understand the minds of children. We have gained new insights into the way infants and children learn about the world around them. This newsletter includes summaries of just some of the exciting research studies we have conducted.

None of this would be possible without the participation of families like yours. If you are receiving this newsletter, you probably contributed time and effort to support our science. THANK YOU! We could not do this without you and your little scientists. We rely on the community in Hamilton and the surrounding area, and we are deeply grateful to families who have visited our labs and helped spread the word about our work. Your efforts have made significant contributions to our understanding of child development.

We hope you enjoy reading about some of the research you have been part of.

Best wishes,

Infant Studies Group



Auditory Development Lab

**Child Emotion Laboratory** 

## McMaster Baby Lab

#### The Impact of Emotion on Face Perception

Carie Guan, Naomi Geller, Dr. Naigi G. Xiao Babies' ability to recognition unfamiliar faces heightens as they develop. However, emotions, such as vocal sounds, may help infants re-learn how to recognize these faces. This study investigated the impact of emotion on babies' face recognition abilities. In a learning stage, infants (3 -33 months) saw one face on the screen, accompanied by an emotional vocal sound. Then, in the testing stage, infants would see this face presented beside a new face which they have not seen before. Across the study, babies underwent 3 learning stages while hearing happy, sad, or neutral vocal sounds. Infants learned the faces that were paired with happy and sad sounds, but not those paired with neutral sounds. These results suggest that emotion has a biological role in our facial recognition abilities. Babies can simultaneously incorporate emotional cues by seeing and hearing, demonstrating the importance of emotion during development.



## How Do Senses Collaborate In Infancy?

#### Rachel (Xinyang) Liu, Dr. Naiqi G. Xiao



#### Racial Differences in Face Perception

Carie Guan, Elysha Springer, Emma Resendes, Thuy Tran, Christina Kannampuzha, Dr. Naigi G. Xiao The ability to identify similar facial features is important to our social interactions. This study explores how infants recognize similarities in faces and form a representation of faces from other races across 2022 and 2023. In a learning stage, infants saw 12 faces that were morphs of one sample face and a unique face. In the test stage, babies saw the sample face beside a new face. Infants recognized the sample face when it was from another race but could not identify this face when it was from their own race. Infants in 2022 had a more pronounced recognition for faces from other races than babies in 2023. Infants' recognition of faces from other races may contribute to later biases, thus highlighting the importance of diverse exposure and experiences early in life. Our results suggest that restrictions, such as those during the COVID-19 pandemic, limited infants' exposure to faces.

We refer to both heard speech sounds and seen mouth movements to increase the reliability of speech perception. The McGurk effect exemplifies this multisensory process, e.g., when hearing the sound /ba/ while watching a mouth articulating /ga/, we perceive /da/ sound instead. Western adults were found to be more likely to demonstrate the McGurk effect than Eastern adults. This study examines whether Western and Eastern infants exhibit difference in McGurk effect. Chinese and Canadian infants heard speech sounds dubbed onto videos of female faces articulating a particular syllable. Face videos were interleaved by a still-face image to produce a moving-still-moving-still pattern, so perception is altered only when the face (specifically, mouth) moves. Alternating trials used sound-face stimuli that provoke the McGurk effect while non-alternating trials do not. We found that Canadian but not Chinese infants looked longer at the alternating trials, indicating that this cultural difference has an early onset.

## McMaster Baby Lab

#### How Toddlers Learn to Explore: The Impact of Emotions Shown by Different People

Wei Fang, Naomi Geller, Selena Li, Meg Lyu, & Dr. Naigi G. Xiao Recent research has shown that toddlers can use emotional signals to auide their own behaviors and learn the external world. This study focused on understanding toddlers, aged 12 to 24 months, respond to emotional cues from different people and how this influences their visual exploration with new objects. During the study, toddlers watched videos where different actresses expressed happiness, sadness, or neutrality towards some novel objects. The children's visual exploration to these objects were then recorded. We found that when all actresses showed sadness, toddlers tended to avoid the associated object. However, happy emotions from all adults didn't significantly increase their interest. Interestingly, when adults showed mixed emotions (e.g., some showed happy while some showed sad), toddlers showed no clear preference but were more explorative compared to the all-sad scenario. This study is crucial in understanding early childhood development. It highlights that toddlers are sensitive not only to the type of emotion (positive or negative) but also to its consistency across different individuals.



#### The Connection Between Language Learning and Face Processing

Dr. Anna Krasotkina, Dr. Naiqi G. Xiao

Have you ever had trouble learning another language? On the other hand, think of how easy it was to learn your native language: You did it as a toddler with no conscious effort! Each of us is born with the ability to use the patterns of the words we hear and faces we seem to automatically learn languages and process faces. It seems almost like a superpower, but we lose these learning abilities early during childhood as our brains become specialized to the faces and languages which surround us as infants. As developmental psychologists at the McMaster Baby Lab, we are researching how these processes develop in infants and young children, as well as how to prolong this period of effortless learning for languages and faces. How do these developments play out in the real world where infants often have to process new faces and languages at the same time? An interesting outcome of our current work is that when confronted with unfamiliar languages and face types, infants actually use similarity between the new language and their native language to assign visual attention to faces. For example, if White infants hear a new language (e.g. Korean) that bears no similarity to their native language (e.g. English), they will pay more attention to unfamiliar Asian faces than White faces as their brain attempts to learn more about these unfamiliar types of stimuli.



## Child Emotion Lab



#### **Extremely Low Birth Weight Survivor Study**

Dr. Louis Schmidt, Dr. Saroj Saigal, Dr. Karen Mathewson, Chaeeun Shin

At McMaster Children's Hospital between 1977 and 1982, we recruited premature babies and their families to participate in a study investigating a long-term impact of being Extremely Low Birth Weight (ELBW) survivors. The ELBW and the Normal Birth Weight (NBW) control participants have been part of this study for about 45 years, and are now being assessed once again for their visit to the lab in the fifth decade of life. The McMaster ELBW Cohort is the oldest known cohort of ELBW survivors in the world! So far, we had found significant impact of being ELBW survivors in physiological (vision, motor control, etc.) and psychological (mental health and well-being) aspects of their lives. Being an ELBW survivor is not always associated with problematic outcomes. In fact, we have shown their risk-aversion tendency seems to result in lower likelihood of developing substance use problem! Through studying long-term outcomes of premature birth, we hope to help current and future low birthweight survivors to thrive.

#### Cross Cultural Differences in Children from Eastern and Western Cultures

Xiaoxue (Sonia) Kong, Christina A. Brook and Louis A. Schmidt

I am conducting research on cross-cultural differences in children's personalities, parenting, and social-emotional development. The study's findings provide valuable insights into the development of shyness subtypes among young children in the Eastern and Western cultures. Both cultures display early manifestations of temperament-based shyness, predicting social anxiety. However, distinctions emerge in the later development of shyness subtypes, which require a higher level of self-control and cognitive skills, known as regulated shyness. In the Eastern culture, regulated shyness aligns with cultural values and does not impact social anxiety, while in the Western culture, it conflicts with societal expectations of confidence and social initiative, resulting in socially anxious behavior in regulated shy children. This underscores the significant influence of culture on children's socio-emotional development. In multicultural societies like Canada, educators, parents, and policymakers should comprehend how culture shapes children's personalities and social-emotional development. This understanding is crucial for assisting children in better integrating into diverse cultural environments.



# **Auditory Development Lab**

#### Movement Coordination During Singing and Speech

Erica Flaten, Laurel Trainor

We explored how moms and babies coordinate with each other while moms sing to their babies. Specifically, we had each mom and baby wear sensors to measure body movement so we could explore how movement coordination may differ during singing compared to speech. For example, we would predict moms' and babies' movements to be more similar, or coordinated, during singing compared to speech, since music with a regular beat is known to help people move in time together. Currently, this study is being adapted to include measures of eye gaze, to investigate how mothers and infants coordinate their looking behaviours during singing and speech interactions.

#### **Rhythm Study**

Erica Flaten, Laurel Trainor

In both music and language, the brain organizes incoming sounds at multiple levels to aid in perception. For example, in speech we can group sounds into syllables, syllables into words, and words into sentences. For music, we organize the rhythm into beats, and the beats into groupings called meter. For example, groupings of 2-beats, such as in a march, is called duple meter (ONE two THREE four FIVE six), groupings of 3-beats, such as in a waltz, is called triple meter (ONE two three FOUR five six). A recent study in our lab used electroencephalography (EEG) to show that infants' brains can be trained to perceive a rhythm in duple or triple meter, a skill that would benefit language development. We are currently finishing a follow-up study that is exploring whether this ability of infants to perceive a trained meter would generalize for rhythms that vary in tempo.











## **Auditory Development Lab**



#### Infants' Sensitivity to Bass

Ciara Ritchie, Daniel Cameron, Laurel Trainor

When we move to music, we tend to lock in with the bass. But, do infants have the same sensitivity to bass that adults do? In this study, we recorded infants' brain responses as they listened to sequences of piano tones. Once in a while we'd surprise the infants with a note coming slightly earlier than expected. By comparing the brain's responses to the surprising low notes and the responses to surprising high notes, we will learn whether infants and adults have the same types of responses. This will help us understand whether our bias to move to bass is something learned in childhood, or rather a product of fundamental brain processes.

### An itsy bitsy audience: Live performance facilitates infants' attention and heart rate synchronization

Laura Cirelli, Haley Kragness LIVELab/ Auditory Development Lab

Get caught up on the findings from researchers at University of Toronto Scarborough in the opera concert for babies hosted at McMaster's LIVELab in 2019. Thanks to all our local babies who participated!

Check out the article here: An Itsy Bitsy Audience





#### **Tablet Rhythm Study**

Dan Cameron, Nicole Caldarone, Monica Morrone-Sanchez, Laurel Trainor

An important part of music is that it makes us want to move our bodies, and rhythm is most important for getting us in the groove. Adults and older children like to move most to rhythms that are a bit complex and unpredictable, but we don't know if infants have the same urge to move for funky rhythms or whether they prefer more predictable and simple rhythms. In this study, infants get to choose what kinds of rhythms to listen to. They get to use a tablet with cartoon animals on it, and when they touch the animals, different rhythms play. As they get used to the tablet and the rhythms, we observe which types of rhythms they choose most. We also watch closely for infants wiggling along!

# We would love to have you visit us!

Our goal is to make visits to our lab enjoyable for the whole family. First and foremost, we design our studies to be fun and short, so that your child has a good time. Taking home a children's book or maybe even a bath toy or lab t-shirt helps with that too.

We also try to make it an interesting outing for parents by telling you about our studies and answering questions about early learning. And siblings who tag along during each appointment often have a great experience. They get to play in our beautiful, playful, and bright lab space with enthusiastic McMaster students, many of whom are pursuing careers related to child development, education, neuroscience, statistics, speech therapy, parenting, health, and medicine.

Complete this linked <u>form</u> to join our participant data base if you have never participated before!

Visit our website at <u>baby.mcmaster.ca</u>



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