# News from the Cognitive & Language Development Laboratory!

## Young Children are Amazing!

Young children learn about objects and people in the world around them at a surprisingly early age! They also learn new words very quickly and with little effort! How children manage these tasks and the strategies they use is the focus of our research at Concordia University. We would like to provide you with an update on some current findings from the lab. We appreciate the support and enthusiasm of the parents and children who have participated in our studies!

## Infants can Detect Inaccurate Emotions

Infants are exposed to a wealth of information from their surroundings. However, to effectively learn from others, infants need to be selective of who they learn from and trust. It is well known that infants prefer to trust reliable sources of information over unreliable sources. However, little is known about how infants become selective in who they choose to trust. Melissa Lazo, an undergraduate student enrolled in the Honours program, and Cristina Crivello, Ph.D. student, examined whether infants who are better at understanding others' mental states (e.g., beliefs, desires, and intentions) were better able to differentiate an experimenter who demonstrates unreliable and reliable emotions. The researchers were also interested in examining whether this ability was related to their associative learning skills (i.e., understanding cause-and-effect). Fourteen-month-old infants were either exposed to an experimenter who expressed happiness while looking inside a container that held a toy or was empty. Subsequently, the researchers examined whether infants would follow the experimenter's gaze behind barriers. Infants then played a series of games to assess their abilities to understand that the experimenter's knowledge was different from her own, as well as to understand cause-and-effect. For the cause-and-effect game, every time the infant pushed a button, a toy would light up and play music. Interestingly, our results demonstrated that infants who showed superior understanding of the experimenter's knowledge were better able to detect the emotional inaccuracy of the experimenter. No such effect was observed for associative learning. Therefore, these findings suggest that infants' social-cognitive skills are related to their ability to selectively trust others. These findings will shortly be submitted for publication to the journal *Developmental Science*.
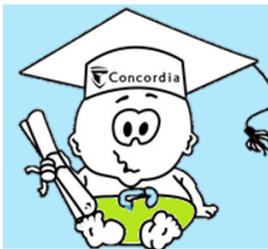
## Come join us!
We have many other studies in the lab that are ongoing or about to begin.
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## "One of These Is Not Like the Others": How Does Bilingualism Affect Object Categorization?

We have known for several years now that the addition of a label when teaching monolingual infants about object categories helps them form categories. The addition of a label during categorization highlights commonalities between two objects given the same name and notice objects that do not belong to the category. We also know that, due to their exposure to a single language, monolingual infants learn that each object is associated with one word. In contrast, bilinguals don't expect each object to have only one possible label as a consequence of learning two languages. However, to date, little is known about how this difference in word to object mapping between monolingual and bilingual infants affects their categorization abilities. Alexa Ruel, a Master's student, is examining if bilinguals and monolinguals differ in how they learn about object categories, and if this is affected by their expectations of the relationship between words and object kinds. Eighteen-month-old-infants participated in two short activities. In the first game, infants recognized that a series of objects were from the same group after an experimenter labeled them with a single novel word. During the second part of the session, infants were shown a video in which a known object (e.g. car) as well as one unknown object were presented. During each presentation, a female voice labeled one of the two objects displayed. Although data collection is still ongoing, our findings so far show that monolingual as well as bilingual infants do categorize when presented with 1-label for each object within the same category, even though the objects and their labels are novel. This study is still in progress in order to determine the performance of monolingual and bilingual infants when presented with 2-labels during the categorization game. We are also investigating if differences between monolingual and bilingual categorization is due to their differential expectation of how words refer to objects.

### Our Research Team

**Director:** Dr. Diane Poulin-Dubois | | **Lab Manager:** Catherine Delisle |

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| Melissa Lazo | Naomi Azar | Sara Kriplani | |

Please consult our webpage for more information about the laboratory: http://www.cldlab.com/

### Are children who orient more to faces better at inferring others' beliefs?

Children naturally prefer social aspects of their environment. For instance, they pay more attention to human faces and human motion compared to pictures of objects and mechanical motion. This orientation towards the social world should, in theory, encourage children's social and cognitive skills, such as their understanding that others have beliefs and thoughts that may be different from their own. However, few studies have examined the relation between social orientation and this latter ability, called Theory of Mind. Kimberly Burnside, Ph.D. student, examined whether children who displayed a greater preference for social stimuli also displayed a better understanding of an actor's thoughts and beliefs during a short film. For example, preschool-aged children were presented with social (human motion, human faces) and non-social (scrambled motion, pictures of objects) stimuli, and their preference for both was recorded. For the non-social stimuli, she used objects that are either highly salient (e.g., vehicles, blocks) or less salient (e.g., clothing, plants). Children also viewed a short film which measured their understanding of the actor's beliefs and thoughts. Our results indicated that preschool-aged children prefer social stimuli (e.g., face and human motion) over non-social stimuli, but not when paired with the objects that were of high interest. Also, children who displayed a greater social orientation towards human faces had a better understanding of the actor's beliefs and thoughts during the short film. These findings suggest that children naturally and selectively attend to their social world, and that this tendency fosters the development of socio-cognitive skills. We are planning on submitting these results to a scientific journal shortly.

### Is false belief a continuous ability when measured from infancy to preschool?

Kimberly Burnside, Ph.D. student, and Naomi Azar, Undergraduate Bachelor's student, assessed children's verbal and non-verbal ability to understand other people's beliefs (Theory of Mind). Our researchers were interested in examining whether Theory of Mind was continuous from infancy to early childhood. They were also interested in whether there was a distinction between these two reasoning systems in early childhood. For this study, two groups of children were tested on two separate occasions. The first group was tested at both 14 months and four years of age. The second group was tested at both 18 months and five years of age. When they first visited the laboratory, the infants participated in a series of games that assessed their understanding of beliefs and intentions.
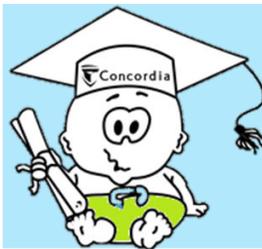
(continued) When they were re-tested, the children watched a short video that measured their understanding of the actor's beliefs and thoughts. During the video, the children's eye-gazes were recorded using an eye-tracking program. In addition, the children participated in a series of games that assessed their verbal abilities and their understanding of others' beliefs. Also, we used two tasks in childhood to measure the children's explicit understanding of others' beliefs, which was measured using verbal responses. Infants' performance on the tasks during infancy did not predict their performance on the tasks in childhood, indicating that Theory of Mind might not be a stable ability. Additionally, children's performance on the eye-tracker Theory of Mind task was not related to their performance on the explicit tasks measuring the same ability. This supports a theory that implicit and explicit Theory of Mind may be two separate abilities. These results are striking because they help us improve our understanding of Theory of Mind development in the early years. These findings are reported in a manuscript submitted for publication.

### Knowing Who Knows: The Mechanisms Underlying Selective Social Learning in Infancy

Children mainly learn from others, a phenomenon referred to as social learning. However, learning from the right people—those who are knowledgeable and competent— is crucial. In fact, infants are sensitive to several social cues that guide their learning. For instance, it has been shown that infants are attuned to informants' accuracy, age, and confidence to help them decide from whom to learn. However, little research is dedicated to understanding how this learning occurs. Olivia Kuzyk, a Master's student, examined whether infants have the capacity for metacognition—the ability to reflect on one's own mental states (e.g., thinking and learning)—and whether infants who have stronger metacognitive abilities are better at differentiating between a competent and incompetent speaker in a word learning game. Eighteen-month-old infants were either exposed to a speaker who correctly labeled a familiar object (reliable) or incorrectly name the same object (unreliable). Infants' willingness to learn a new word from the same speaker was then examined. They also played a series of games that assessed infants' abilities to monitor their confidence after making a decision about where to find a hidden toy (when to keep searching when failing to find the object). Data collection is ongoing but preliminary results indicate that infants as young as 18-months of age are able to make non-verbal metacognitive judgments that may direct their learning to accurate sources of information.