



# Center for Early Childhood Research 2021 Newsletter



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## Who We Are

The Center for Early Childhood Research consists of several researchers in the Department of Psychology at the University of Chicago that share an interest in understanding how infants and children learn and develop. We investigate motor development, social understanding, language acquisition, early math and science learning, and more. Research methods include experimental studies, naturalistic observations, eye-tracking, and recording brain activity.

### Laboratory Directors



**Jean Decety**

Irving B. Harris Distinguished Service Professor of Psychology and Psychiatry  
[Child NeuroSuite](#)



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[Human Nature and Potentials Lab](#)



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William S. Gray Distinguished Service Professor of Psychology  
[Infant Learning & Development Lab](#)



**Katherine Kinzler**

Professor of Psychology  
[Development of Social Cognition Lab](#)

**Have you recently moved?**

**Do you have a new baby?**

**Do you have friends who might be interested in our program?**

We are always recruiting new participants! We have a wide age range of studies for infants and children between the ages of 5-months and 11-years-old.

Please pass on our contact info or sign up online:

**Phone: (773) 834-9791**

**Email: [babylab@uchicago.edu](mailto:babylab@uchicago.edu)**

**Website: [babylab.uchicago.edu](http://babylab.uchicago.edu)**

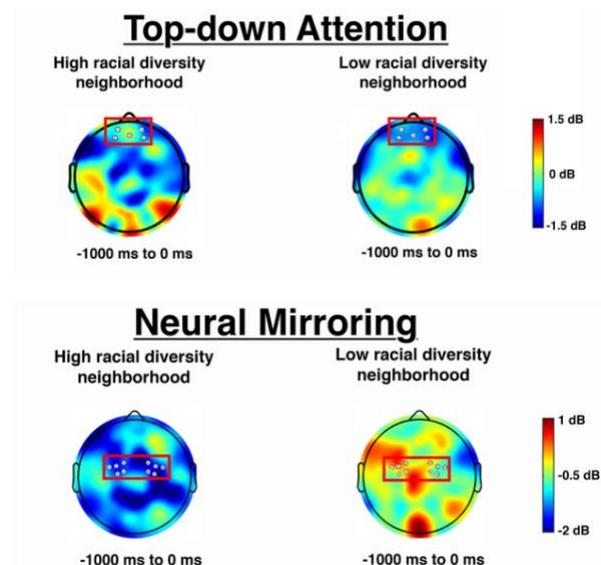
## Neighborhood racial demographics predict babies' neural responses to people of different race

In one of our latest studies, we find that neighborhood environments may already shape race perception in babies as young as 12 months of age. Specifically, we measured brain activity of 7- to 12-month-old white babies using EEG as they



viewed either an experimenter who was the same race as them or from a different racial background than them.

We found that white babies from more racially diverse neighborhoods exhibited greater frontal theta oscillation (an index of top-down attention) and more mu rhythm desynchronization (an index of motor system activation and action mirroring) to a person of color than white babies from less racially diverse neighborhoods. That is, white babies from racially diverse neighborhoods were more likely to pay attention to and exhibit greater action mirroring when they see a person of color than white babies from racially homogeneous neighborhoods.



Is this because babies felt more positively toward people of color? No, because neighborhood racial demographics did not relate to white babies' frontal alpha asymmetry (a measure of emotional approach-withdrawal motivation) toward a person of color.

These results bring into question the intuitive assumptions that emotional processing (e.g.,



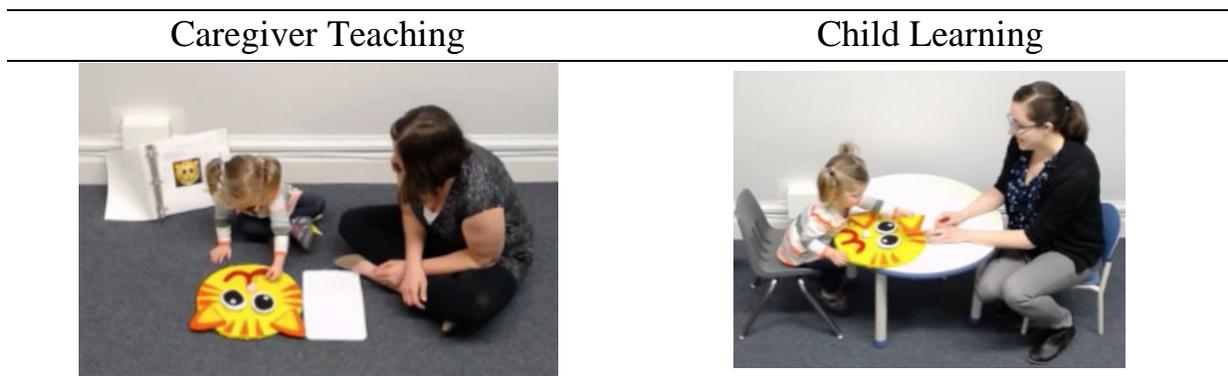
liking familiar same race people and disliking unfamiliar different race people) drive social biases early in life; rather, babies' attentional and mirroring mechanisms may play a more crucial role in shaping babies' initial responses to people from different racial backgrounds. Our findings suggest neighborhood environments may potentially shape social bias starting in the first year of life

and launch an exciting new direction in studying social biases in infancy.

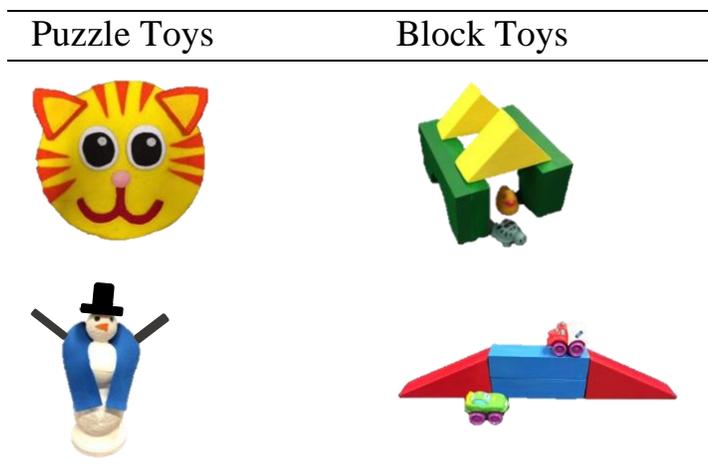
You can read this study called [“Neighborhood racial demographics predict babies’ neural responses to people of different race”](#) on our website.

## Toddlers’ object learning from caregiver teaching

Children are surrounded by objects like toys and books every day. How do children learn to use these objects? We wanted to understand how this learning happens during everyday play with caregivers. In this study, caregivers taught their 2-year-olds to put together new toys. We then measured children’s learning by testing how well children could put the toys together on their own.



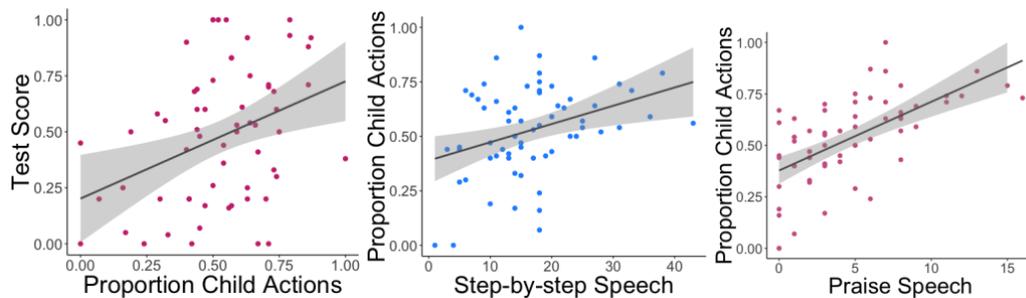
*Caregiver Teaching: A caregiver teaching her toddler to assemble the Cat Puzzle Toy. Child Learning: The experimenter testing how well the child could put together the Cat Puzzle Toy on her own.*



*The toys used in the study: Two Puzzle Toys (Cat and Snowman) and two Block Toys (House and Bridge). Each toy had a set of actions that caregivers taught children to perform, with the goal of putting together each toy.*

What helped children learn to put together the toys? We looked carefully at the videos of caregivers teaching their children to play with the toys and measured what the caregivers and children did. For example, we counted the number of times the caregivers and the children did each action to put together the toys, like putting the eye on the Cat Toy (see above). We also transcribed everything the caregivers said and categorized their speech, including when they offered instructions (“Put the ear on!”) and praise (“Good work!”). We then tested which behaviors were related to children’s learning.

We found that when children were learning, when children did the actions on the toys themselves, they learned more! When caregivers demonstrated how to put together the toys, children actually learned less. Instead, caregivers who supported their children’s actions through instructing and praising had children who learned more.



*Graph 1 – When children did more actions (“Proportion Child Actions”) during teaching, they learned more (“Test Score”).*

*Graph 2 – When caregivers offered more instructions to their children (“Step-by-step Speech”) during teaching, children were more active (“Proportion Child Actions”).*

*Graph 3 – When caregivers offered more praise (“Praise Speech”) during teaching, children were more active (“Proportion Child Actions”).*

We concluded that children’s own active experience was important for learning. Caregivers helped their children learn by supporting their children’s actions. This study shows that children are active learners during everyday play with caregivers.

## What helps children notice numbers?

Understanding number words is an important foundation for math skills and early understanding of number words helps prepare children for math learning in school. However, discovering what “one”, “two”, and “three” mean is not as easy as it appears.

Imagine you see a set of three big brown bears. Someone speaking an alien language labels this set as “blick”. What do you think “blick” means? Is it the alien word for ‘bear’, for ‘brown’, for ‘big’, for ‘three’? This is the situation facing children when they are first learning number words. Research shows that in contexts such as this, set size is the attribute children focus on the least. Even adults are more likely to guess that “blick” refers to non-numeric attributes of sets (such as color, texture, or object size) rather than set size.

How can we make set size more obvious? One way may be to use hand gestures. Gestures are great tools for teaching because they can emphasize the meanings of words. A *pointing gesture* can draw visual attention to the specific part of a scene the word refers to, while an *iconic gesture* can provide a physical clue to the word’s meaning (such as rotating one’s hand when saying “twist”).

In a collaboration between Susan Levine’s Cognitive Development Lab and Susan Goldin-Meadow’s Gesture lab, we are investigating whether number gestures can help children focus on set size. Children will play a series of games with an experimenter over Zoom. We hypothesize that children will be more likely to notice numerical information when the experimenter gestures the number (for example, holding up two fingers for “two”) than when the experimenter does not. Results from this study will shed light on gesture’s role in numerical development and lead to better ways of teaching children number words.



Photo created by freepik - [www.freepik.com](http://www.freepik.com)

If you have a child aged 2 or 3 years old, we want to hear from you! Participation is virtual and takes less than 15 minutes.

## Who will be the leader? Investigating early-life roots of thinking about power and leadership

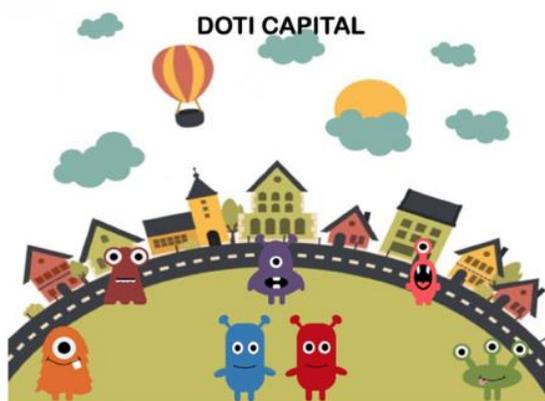
Leadership and political decision-making can seem far-removed from the ideas of young children. However, young children's emerging ideas about related, yet simple, scenarios can provide insight into the early-life roots of adults' thinking. In an ongoing project, we are exploring how children think about leaders who embody different traits, as well as in what contexts children prefer some traits over others.

In these studies, we introduce 3-6-year-old children to Dotiville, a fictional town where the Dotis live, but which currently does not have enough water. For some children, we frame the situation as involving competition: The Dotis are competing against another group to get more water. For other children, we frame

the situation as involving cooperation: The Dotis are working together (among themselves or with another group) to get more water.

All children learn that the town is choosing a new leader to help them. We tell children about two prospective leaders that differ in their traits. One leader's traits represent strength and power ("This Doti is the biggest and strongest. Other Dotis see them as powerful"). The other leader's traits represent skills and respect ("This Doti is the most skilled and smartest. Other Dotis see them as respected"). We ask children which Doti they think will be the leader and then ask children open-ended questions about their choice (for example, "What might this leader do to help?")

Results from our first experiment (tested in Spring and Summer 2020) show that children's ideas about leadership depend on how we frame the problem at hand. Children are more likely to think the strong Doti will be the leader when the situation involves competition, but are more likely to think the respected Doti will be the leader when the situation involves cooperation. Children's ideas also change between ages 3 and 6. Whereas younger children are more likely to prefer the strong Doti, older children are more likely to prefer the respected Doti.



These results reflect a potential shift in children’s reasoning about power and leadership early in life: Children may first represent power and leadership in terms of external traits (being big and strong) and then more gradually come to think about internal traits and qualities (for instance, certain skills) as also important for being a leader. Our initial findings also closely parallel research with adults, which shows that a country’s current events and the way these events are framed can influence people’s voting behavior and leader preferences. Our findings so far underscore the idea that these patterns of real-world thinking may have their roots early in life.

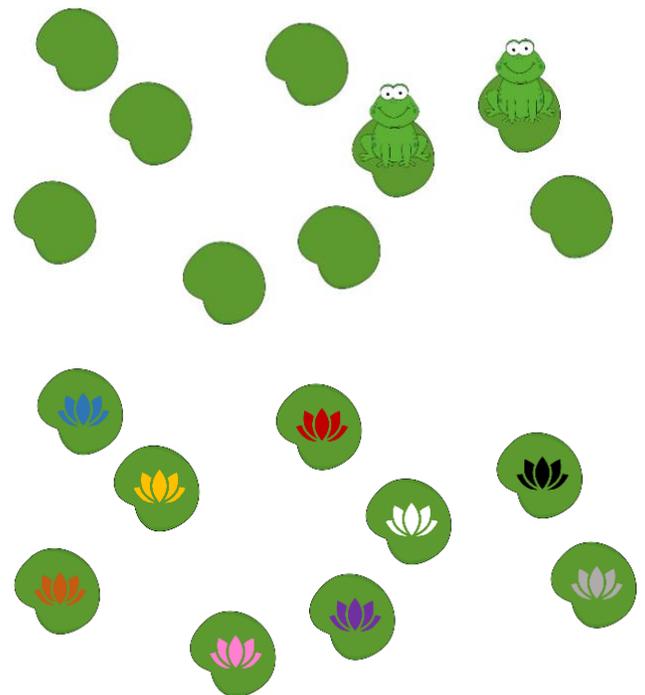
## How do children perceive and understand new math concepts?

Nonverbal communication plays a huge role in the learning process by influencing the information learners remember from their teacher’s lesson. Understanding how to incorporate nonverbal communication in math lessons for children could be an effective way to help children better understand new math concepts.

The Goldin-Meadow lab aims to understand why some teaching strategies are more effective than others. Our past studies have shown much about the importance of using both verbal and

nonverbal communication strategies while teaching children abstract concepts, like math. But what exactly are children thinking while they learn? And how are they processing new math-related concepts?

Before COVID-19, we used functional magnetic resonance imaging (fMRI) to understand how children’s brains develop as they learn math. fMRI generates images of brain activity by measuring differences in blood volume over time throughout the brain. Increased blood flow in a brain region indicates that the region needs more oxygen and, thus, is being used for that task. We used fMRI to study the regions of the brain that children use when thinking about numbers and math.



Figures 1 and 2: A game created by Dr. Kersey to test visuospatial working memory.

Recently, the Goldin-Meadow lab at the University of Chicago and the Movement and Learning lab at Loyola University have developed a new online study. Drs. Susan Goldin-Meadow, Alyssa Kersey, and Elizabeth Wakefield and University of Chicago doctoral student Cristina Carrazza are using lessons shared through Zoom to understand children's math learning process. Children who participate in this study play math games and observe a new teaching strategy. They also play games that test their memory and problem-solving skills. Throughout the study, we ask children what they think they are being taught and what they've learned from the math lessons. By asking these questions, our goal is to understand how children perceive new math lessons and what cognitive skills enable them to understand new math concepts.

We hope that this study can help researchers identify teaching strategies that are the most effective way to teach particular math concepts. Additionally, we hope to gain a better understanding of why certain teaching strategies work best. We are still recruiting 8- to 10-year-olds to participate, and we would love to hear from you if you are interested in participating!

## What do kids think 'umm' means? It depends.

Young children learn a lot about the world from what other people tell them. To learn from other people, children need to keep track of not just *what* someone says, but also *how* they say it. In particular, hesitation in someone's speech might tell you a lot about what they think. In this project, researchers in the **Developmental Investigations of Behavior and Strategy (DIBS) Lab** asked whether kids pick up on hesitation and use that to make guesses about what someone might know or like.

To answer this question, 4-to-9-year-old children were told a story about two characters playing with two stuffed animals. In the knowledge version of the story, both characters correctly labelled the toys, but one did so hesitantly (saying "This one is a umm... tiger"). When asked which character knows more about tigers, children as young as 4 said that the quicker, fluent speaker would be more knowledgeable.



In the preference version of the story, both characters talked about which animal they liked best, but one did so hesitantly (saying “Umm... the tiger is my favorite”). When asked which character liked tigers more, only children ages 6 and older said that the quicker, fluent speaker would have a stronger preference.

Altogether, this project suggests that even young children understand that *how* someone says something might be as important as *what* they say. By age 6, children further understand that saying “umm” might mean different things depending on what someone is talking about.



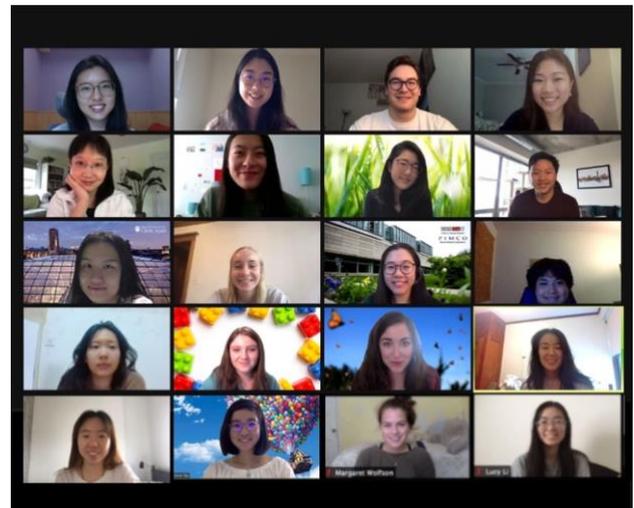
This study took place on Zoom, so it also provided researchers with crucial evidence about working with children remotely. We were able to compare our Zoom data to past data for the knowledge version of this story from a similar in-person project, and we saw very similar results. This consistency helps us to be more confident about collecting data when working with families remotely!

## How do children perceive awe?

Awe is a profound emotion that has been closely linked to wonder and the sublime and is thought to be an integral component of many spiritual, religious, and peak experiences. However, the perception of awe experiences during development remains largely underexplored. Awe by its very nature is a self-transcendent emotion, which binds us and helps us transcend to groups and entities larger than ourselves, but we know very little about the emergence and development of self-transcendent emotions like awe in childhood. Artemisia Deluna and Fan Yang in the Human Nature & Potentials Lab begin to address this void in our understanding of self-transcendence by asking: How do children perceive awe experiences?

Across several studies, the researchers investigate children’s perceptions of and emotional responses to awe experiences. In the first studies, children watch awe-inspiring videos of the BBC’s *Planet Earth* consisting of a montage of sweeping panoramic footage of natural landscapes as well as a neutral video of plants in a small garden. Children then answer questions about how the videos make them feel. In comparison to more-neutral experiences, awe experiences lead children to perceive themselves as smaller

in size, relative to the rest of the world, to feel an overall increased motivation to explore unknown things, and to perceive mysteries in the world. These findings begin to show novel evidence that children perceive awe experiences and discern them from neutral experiences. These results suggest that children may have profound, potentially self-transcendent, emotional experiences, inspiring questions about the evolutionary and adaptive functions of awe experiences in emotional and cognitive development.



*The Yang lab meeting virtually over Zoom. This has become a great way for us all to stay connected while working from home!*

### **Participate Online!**

Due to Covid-19, all of the studies conducted by the CECR are currently taking place online via Zoom meetings, surveys, and online games. While we miss seeing everybody in the lab, we are pleased that we are able to invite families from all over the country to participate in our studies from the comfort of home.

**You can read more about our online studies on our [Current Studies](#) website page!**

### **Thank you for your participation!**

Your family's contribution to our work is vital, and we appreciate every time you visit our labs. Thank you so much for your continued support of our research program!

### **Questions?**

Please contact us or find more information on our website: [babylab.uchicago.edu](http://babylab.uchicago.edu)

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