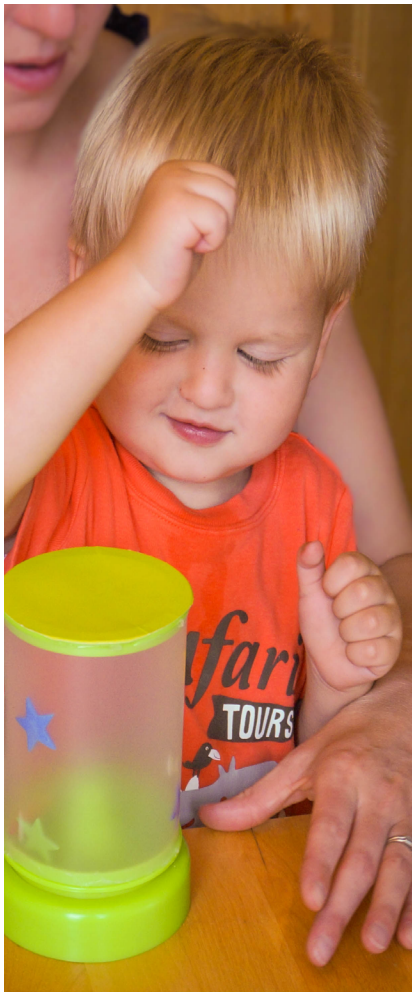
The Center for Early Childhood Research

THE UNIVERSITY OF CHICAGO



December 2015 **babylab.uchicago.edu** **Newsletter**

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Inside this issue:

We would like to introduce you to the Center's newest Laboratory the DIBS Lab

The Developmental Investigations of Behavior and Strategy (DIBS) lab is the newest lab in the Center for Early Childhood Research. It is led by Dr. Alex Shaw, who became an assistant professor in the University of Chicago Psychology Department in 2015. Before taking a faculty position, Dr. Shaw completed his PhD in Developmental Psychology at Yale.

Research in the DIBS lab is focused on children's developing understanding of reputation. We are interested in how children track other people's reputations and how children modify their own behavior to improve their own reputation. We have three main lines of work investigating three related topics: fairness, alliance formation, and intellectual property.

1) To share or not to share: How do humans develop a sense of fairness?

What motivates people to behave fairly? How do children perform on tasks that may lead to unfair outcomes for themselves or others? Our first line of work attempts to understand children's developing sense of fairness. This includes differentiating fairness from envy and generosity, as well as investigating the role that reputation plays in fairness.

2) Who is better friends with whom: How do children track others' social relationships?

What are the cues that children use to track who is friends with whom and to determine the social "pecking order"? How does this influence children's behavior and how they interpret information from others (e.g., Is sharing secrets a sign of close friendship?). We have recently begun a project that looks into what factors children use to make predictions about the strengths of others' friendships.

3) Whose idea is it anyway: What do humans think about intellectual property?

How do children understand the concept of intellectual property, and what factors motivate this understanding? We examine the reputational factors that drive children's emerging objections to violations of intellectual property (such as plagiarism or taking credit for other people's ideas), and we suggest that part of the reason children and adults object to idea theft is that they dislike when plagiarizers falsely gain reputations as creative or talented individuals.

Check out their research here!

Cognitive Development Lab

Dr. Susan Levine
cogdevlab.uchicago.edu

Number Word Learning: A Parent-Driven Training Study

Number words ("one, "two", "three" and so on) are difficult to learn. Although children can learn to count relatively quickly, it typically takes children 1-2 years to learn which number words represent which quantities. A previous study from our lab found that how many number words children had learned by the age of 46 months was predicted by how much their parents talked about numbers between the ages of 14 and 30 months. This motivated us to ask whether we could increase parent number talk in an effort to accelerate children's number learning.

We created picture books to teach children about numbers and asked parents to read the books with their children for four weeks. To find out how many number words children learned over the course of the four weeks, we measured how many number words each child understood before and after the four-week reading period. We found that reading number books with their parents increased children's number knowledge in just four weeks. Since it typically takes much longer for children to learn the meaning of each number, these results demonstrate how effectively parents are able to increase their children's number understanding by providing children with frequent number input.

Even without number books, these results along with other research from our lab suggest that talking about numbers – by counting everyday objects (e.g. "can you count the apples?") and using number labels ("right, there are THREE apples!") – can have a big impact on children's number knowledge.

Cognitive Development Lab

Dr. Susan Levine
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Math At Home

Parent math talk is important for their children's math knowledge and achievement. But past research has shown that not all math input is as good as other types of input. For example, parents who are high in math anxiety (meaning they feel fear or apprehension about doing math) may actually provide math homework help that is detrimental to their children's math achievement. In a collaboration between the Levine Lab and the Beilock Lab, we are currently evaluating the benefits of using an iPad app that may help cut the negative link between parent math anxiety and children's math achievement by providing scripted ways for parents to talk to their children about math.

The app, called Bedtime Math, provides a nightly passage and corresponding math questions for parents and children to work on together. Questions range in difficulty from a preschool to late-5th grade level, making the app appropriate for a wide-range of ages and ability. The passages are engaging and fun, covering topics including current events, hobbies, holidays and animals.

While this is an ongoing study, the results already look promising. Children who used the math app with their parents made greater gains in math over the course of 1st grade than did children who did not use the app. Most interestingly, the app is particularly helpful for students with high-math-anxious parents. By providing an engaging way for math anxious parents to share math with their children, the math app may help cut the link between parents' high math anxiety and children's low math achievement. The app may give parents – especially high-math-anxious parents who may have less math skill and interest in engaging in math – more and better ways to talk to their children about math not only during app usage, but also during everyday interactions.

Infant Learning and Development Lab

Dr. Amanda Woodward
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Brain Activity, Eye-tracking, and Action Prediction

In one study, we are examining the brain network involved in action understanding. Recent research suggests that the part of your brain that is used to understand other people's actions may be the same part that helps you move yourself. To better understand whether this is true, we're currently recruiting 9- to 10-month-old infants for a special study. We first fit infants with a special cap with sensor sponges on it. These sensor sponges passively record infants brain activity while they reach for toys. This fun game tells us what parts of the brain that are recruited when infants produce simple actions.

After we identify the part of the brain involved in producing actions, infants watch short movies on our eye-tracking computer monitor. The eye-tracker has special cameras on the bottom of a computer monitor that track where infants are looking as they watch short movies. In these movies, a person reaches for toys. By tracking where infants look when they watch other people act on toys, we can determine whether infants predict which toy the person will grasp. We can then combine the brain activity measures with the eye-tracking data to better understand the relationship between brain activity and behavior.

Learning about Collaboration

From early in development, infants watch as others collaborate fairly often, such as when two people are in the kitchen working together to make dinner. Each person is performing actions that will achieve their own individual goal, such as setting the table vs. chopping onions, but they also have the shared goal of getting dinner ready to eat. An ongoing study examines the age at which infants understand that two individuals can have a shared goal and whether their own experience engaging in a collaborative activity can boost their understanding. We are currently recruiting 10-month-old infants to participate in the following study: In the current study, 10-month-old infants will play an interactive game with an experimenter in which they work together to get little toys out of boxes. Then, the infants will watch on an eye tracker as two women participate in the same type of collaborative activity. We are measuring whether infants visually predict the actions of one of the women they just saw when she is by herself. We know from a previous study that 14-month-old infants will predict that the woman will reach for the object that was the shared goal of the interaction, even when she is alone. We are curious as to whether 10-month-old infant can make this same type of prediction.

Infant Learning and Development Lab

Dr. Amanda Woodward
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Social Learning about Food

Figuring out what food is appropriate to eat is an important problem that humans face across our lifespan. Infants rely on caregivers to meet their nutritional needs, so it is possible that they do not need to think in sophisticated ways about foods. On the other hand there may be early-emerging systems for learning about food. Zoe Liberman is conducting a series of studies to see if young infants (between 6-months and 15-months depending on the particular study) think about food choice as different than object choice, and make smart inferences about which people will each which foods. In these studies infants see one person express a preference for either a food or an object. Then, infants see a second person act in two ways: sometimes the second person agrees, and sometimes she disagrees. Because infants look longer at events they find surprising, we use their natural attention to these two types of videos to see whether infants generalize the preference (expect agreement), or withhold generalization (and expect disagreement). We find that infants expect people to agree in their food preferences, but do not think people will agree in their object preferences. Additionally, infants' generalization of food preferences is influenced by social information: they think people who have previously affiliated or who have spoken the same language will be more likely to share food preferences than people who have previously socially disengaged or spoken different languages. These results demonstrate an early developing ability to think in smart social ways about food choice, show that the way infants think about food is different from how they think about objects. We are trying to finish up this set of studies, so please let us know if you or a friend has an infant between 12- and 15-months old!

Have you recently moved?
Do you have a new baby?

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Phone: (773) 834-9791
Website: babylab.uchicago.edu

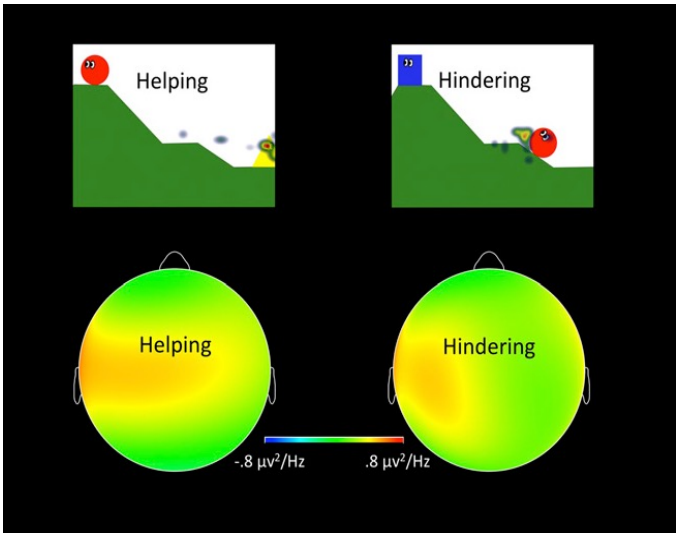
Do you have friends who might be interested in our program?
We are always recruiting new participants. We have a wide range of studies for infants and children between the ages of 5-months through 11-years-old. Please pass our contact info on or pick-up a brochure in one of our labs.

Child NeuroSuite

Dr. Jean Decety
childneurosuite.org

Neuroscience of Moral Development

There are many theories about the development of morality in infants. This year the Child Neurosuite completed a study with seventy-three infants to explore how they perceive prosocial and antisocial behavior, and how this can impact their subsequent behavioral responses. Infants looked at cartoon characters helping (prosocial) and hindering each other (antisocial), and played with toys which they then could share with someone.
Interestingly, we found that age did not contribute to preference for the helper or hinderer, and did not affect sharing. Rather, an infant's individual disposition and their parental socialization predicted whether the infant reached for the prosocial or antisocial character. Using our special cap (featured below), we were able to examine brain waves to get a better sense of how infants perceived the cartoon characters. Even in the youngest children, there was an early, automatic difference in their brain responses (within 200 milliseconds) when they viewed the cartoon characters helping or hindering. Nearly half a second later, children's brain responses showed a return to thinking about the moral action. Further analysis showed that individual differences in these brain responses were predicted by parental values of injustice towards others. Children of parents who reported a higher sense of justice showed greater differences in their evaluations of good and bad actions. These children were also more likely to share a toy. However, the decision to share does depend on many other factors as well.
While children looked at the cartoon characters, we used eye tracking to gauge where they were looking. Infants were drawn to looking at the helping character rather than the one receiving help. Additionally, in depth analysis of preferential looking showed that infants were more likely to engage with positive (helping) character. Taken together, these results shed important light on how young children's brains guide moral judgment and moral behavior.



Learning Lab

Dr. Lindsey Richland
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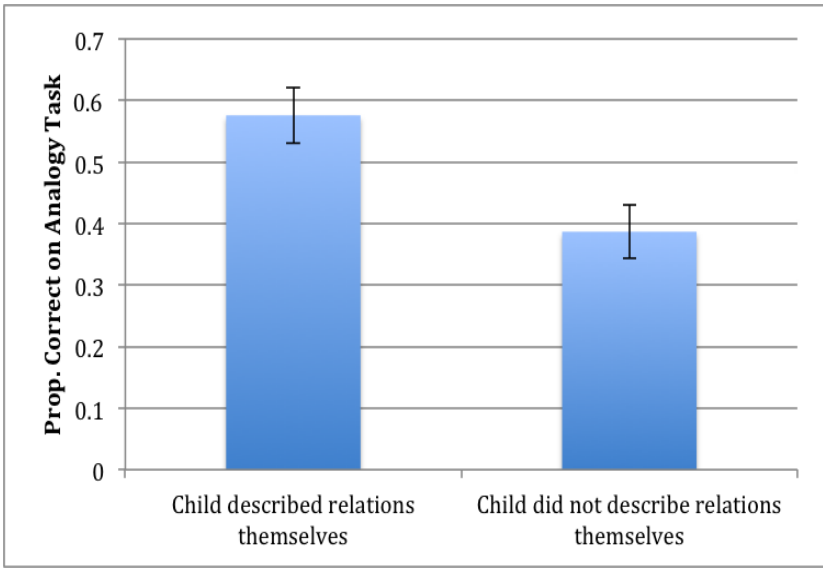
Spontaneous parent-child talk and attention to relations

In one study, we asked how parents and children talk about relational information and whether this related to children's attention to relations. Parents and 3- to 4-year-olds talked to each other while they worked together on a problem-solving task that involved both object properties and relationships between objects. Children also independently completed a separate analogy task, where attention to relations was required to succeed. We found that the frequency of children's – but not the parents' – relational talk on the collaborative task predicted children's analogical performance. Children who described a relation themselves even once were better at the analogy task than children who never did so (Figure 2). Thus, children who tended to actively engage in finding and describing relations while talking with their parents also tended to be better at reasoning analogically, which requires attending to relational information.



Active versus passive relational talk and attention to relations

Since the frequency of children's relational descriptions with their parents was related to their analogical reasoning, it may be that children need to practice actively engaging in finding and describing relations to advance these skills. So, in a follow up study, we are asking 4-year-olds to either describe relationships between objects themselves or to listen to an experimenter describe them. We expect that children who describe the relations will do better on a subsequent analogical reasoning task. If so, this would suggest that passive exposure to relational talk is not as effective in shaping children's attention to relations as actively engaging them in constructing relational talk themselves. This has important implications for how to encourage attention to relations and improve children's reasoning skills.

Learning Lab

Dr. Lindsey Richland
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Early socialization of attention to relations and analogical reasoning

In any situation, there are many kinds of information that a child might notice and think about. We are interested in how social interactions influence children's attention to relational information, which includes relationships between objects and the roles that objects are playing in a larger context. For example, a cat chasing a mouse is like other cats that are furry, four-legged, and so on; however, it is also like a non-furry, two-legged boy who is chasing his sister, because they are both chasers (Figure 1). Relational information is key for sophisticated reasoning, for example understanding analogies. Prior research from the Learning Lab and other labs has shown that younger children tend to focus on individual objects and their properties, such as color or shape, but as children get older, they are better able to also think about relations.

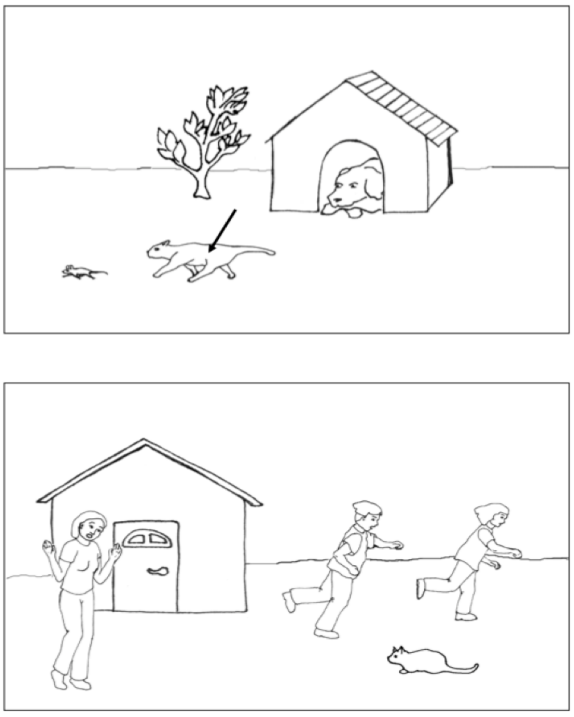

Figure 1. Young children reliably notice that the cats in the two pictures are alike (object similarity), but often miss that the two chasers are alike (relational similarity).

Want more information on studies published in 2015 Check out our recently work!

Berkowitz, T., Schaeffer, M. W., Maloney, E. A., Peterson, L., Gregor, C., Levine, S. C. & Beilock, S. L. (2015). Math at home adds up to achievement in school. Science, 350, 196-198

Cowell, J.M., & Decety J. (2015) Precursors to morality in development as a complex interplay between neural, socioenvironmental, and behavioral facets. PNAS, 112 (41) 12657-12662

Fan, S., Liberman, Z., Keysar, B., & Kinzler, K.D. (2015). The exposure advantage: Early exposure to a multilingual environment promotes effective communication. Psychological Science, 26(7), 1090-1097

Garvin, L., & Woodward, A. L. (2015). Verbal framing of statistical evidence drives children's preference inferences. Cognition,138, 35-48

Novack, M., Goldin-Meadow, S., & Woodward, A. (2015) Learning from gesture: How early does it happen? Cognition, 2015, 142,138-147

Richland, L. E., Simms, N. (2015), Analogy, Higher Order Thinking, and Education, WIREs: Cognitive Science, 6(2), 177-192

Development of Social Cognition Lab

Dr. Katherine Kinzler
dsclab.uchicago.edu

Thinking about Social Identities

Social identities, such as racial, ethnic, and gender identities, emerge early in life and guide different types of behaviors. Yet, everyone—no matter what her gender or racial background may be—has multiple social identities: we are sisters, neighbors, and friends—just to name a few. Therefore, thinking about all of the identities someone has could have important implications for different types of behavior. In a recent study, researchers Sarah Gaither, Samantha Fan, and Katherine Kinzler looked at how encouraging children to think about their own multiple identities can urge them to think more flexibly about the world. They predicted that a "multiple-identities mindset" could lead to more creative thinking and activate more flexible thinking about social groups as well (e.g., gender, race, age).

The experimenters assigned 6-7-year-old children to either think about all of the multiple social identities that they themselves have (e.g., being a friend, a student, and a reader), the multiple physical traits that they themselves have (e.g., having legs, arms, and eyes), or all the multiple identities another child had (e.g., she is a friend, a student, and a reader). Next, our researchers played several games with the children to investigate how these different mindsets would affect their creative thinking abilities and how flexibly children socially categorize their social world. For instance, in one game pictured here, children were introduced to a frog puppet named Feppy, who was described as being from a place "far, far away where they do lots of things differently than we do." Here, Feppy showed children pairs of pictures of different types of animals, objects, and people that he thought were the same and children were asked if they agreed or not. If children viewed these paired pictures as the same this meant they viewed those categories more flexibly. Children also completed some problem solving tasks to measure creative thinking such as coming up with all the ways they could use a box in unique ways and in a task measuring how flexibly children saw object's uses. In that particular task, also pictured here, children were asked to come up with a way for the bear to get to the bee hive knowing that all the bear has was a bowl full of legos which did not contain enough legos for the bear to stack to reach the bee hive. The correct answer which marks flexible thinking was see the bowl as more than just a bowl and instead you could flip the bowl over and use it as a stepping stool on which you could stack the legos to then reach the bee hive. The results of this study show that reminding children about the multiple identities that they themselves have positively affects both how flexibly they view their social world and it boosts their performance on the creativity tasks as well. (continued on next page)

Development of Social Cognition Lab

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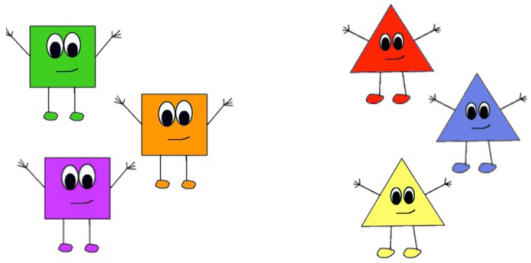
(Continued from previous page) More specifically, children who thought about their multiple identities thought about animals, objects, and people more flexibly and they also came up with more uses for a box and correctly solved the bear problem more often as well. Children who thought either about the identities of another child or about their own physical traits did not show these same increases in flexible thinking. This suggests that how children think about their own multiple social roles is one pathway that can help determine their flexible thinking abilities. Therefore, the outcomes of this study pinpoint an interesting avenue for thinking about how mindset can play a role in behaviors such as stereotyping and problem solving abilities for children. In the future, this team of researchers would like to address whether some children (e.g., bilingual, bicultural or biracial children) can more easily activate a "multiple identities mindset" because of how frequently they are reminded of their multiple language or racial identities in everyday life while also trying explore more specifically how this multiple identity mindset actually affects behavior.

What do Children think about punishment?

No child likes to be sent to time-out, but would children really like to live in a world without punishment? Do children think punishment will change the behavior of others? Researchers Jessica Bregant, Katherine Kinzler, and Alex Shaw tackled these questions in a recent study, examining what children think are the functions of punishment. As children age, the researchers hypothesized, their attitudes may evolve from regarding punishment as a "bad" thing to understanding punishment as a useful system for widespread protection.

In order to understand children's feelings about punishment, 5- to 8-year-old children were shown videos of two imaginary worlds: "Square World" and "Triangle World," in which human-like shapes interact and one shape steals from another. Children were told that in one world, the thief was punished for his crime, but in the other world, punishment does not exist, and the thief faced no consequences for his/her actions.

The researchers found that even young children rated a thief who was punished as significantly less likely to steal in the future than a thief who was not punished. The researchers also uncovered some evidence showing that how children think about punishment changes over development. When asked which world they would rather live in, younger children typically chose the world without punishment. Older children, however, favored the world with punishment, suggesting that while younger children see punishment as something to avoid, older children understand that punishment can be a good thing—as long as it happens to someone else!



The University of Chicago has a New Research Center!

Understanding how people learn, and developing real-world learning tools—especially for children from high-poverty communities, who tend to underperform in school—is the goal of the new University of Chicago Science of Learning Center. The overarching goal of the center is to bring cutting-edge research findings to bear on learning problems. The UChicago Science of Learning Center supports interdisciplinary team research on learning, drawing on expertise from across the University. The center also strives to increase collaborations between researchers and practitioners and to support educational outreach efforts at the University. **Learn more about the center here!**

Goldin-Meadow Lab

Dr. Susan Goldin-Meadow
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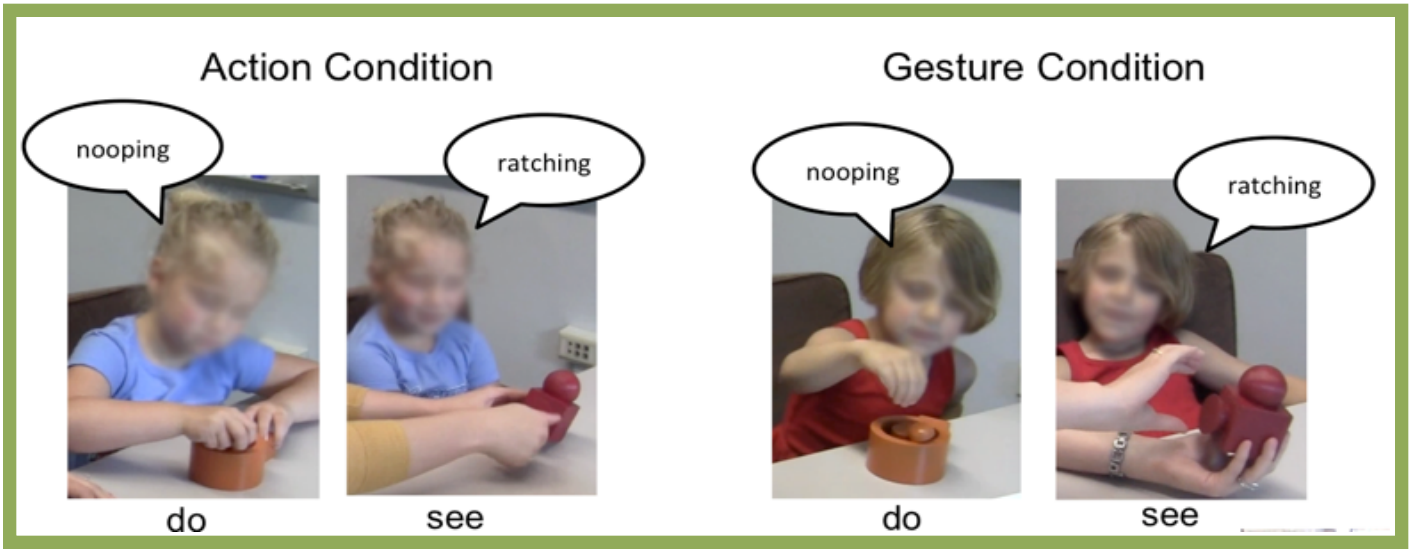
Experience during verb learning

The ability to learn words and generalize what they mean in various situations is an important skill. As adults, we know that the word 'twist' can refer to a movement we make when opening a jar of peanut butter, or the way we move a doorknob to open a door. Understanding how the word 'twist' can apply to a type of action we make with many different objects is not as straightforward for children. In fact, when young children learn new verbs, they often associate the verbs with the object on which they learn, rather than the act they are accomplishing. Thus, if a child learns to 'twist' the top off of a jar of peanut butter, they may think this word is linked to the peanut butter.

In one current study, we are investigating how different forms of experience during verb learning may affect children's ability to generalize. In our study, we ask whether children can learn verbs through actions on objects, or through gesturing the same actions (i.e., doing the same action near an object). We think that if children can learn verbs through gestures, this may help them understand that the verb is not tied to the object with which it was originally learned. We also ask whether children learn better by doing the actions or gestures themselves, or watching an adult do the movements: We think that children will learn best if they do their movements while learning. To test our hypotheses, children are asked to learn 2 new words like 'ratching' and 'tiffing' by saying a word while doing an action or gesture, and 2 new words through seeing an action or gesture. We see how long it takes them to learn the words through these experiences, and then once the words are learned, we test whether they can generalize the words to new situations. In other words, we see whether, after learned to 'ratch' on a particular object, they can recognize the same movement being performed on a different object as 'ratching'. Our results suggest that children can learn more quickly through doing their own actions or gestures than seeing actions and gestures of others. We also find that children are significantly better at generalizing what they have learned if they received gesture experience, compared to action experience.



Goldin-Meadow Lab

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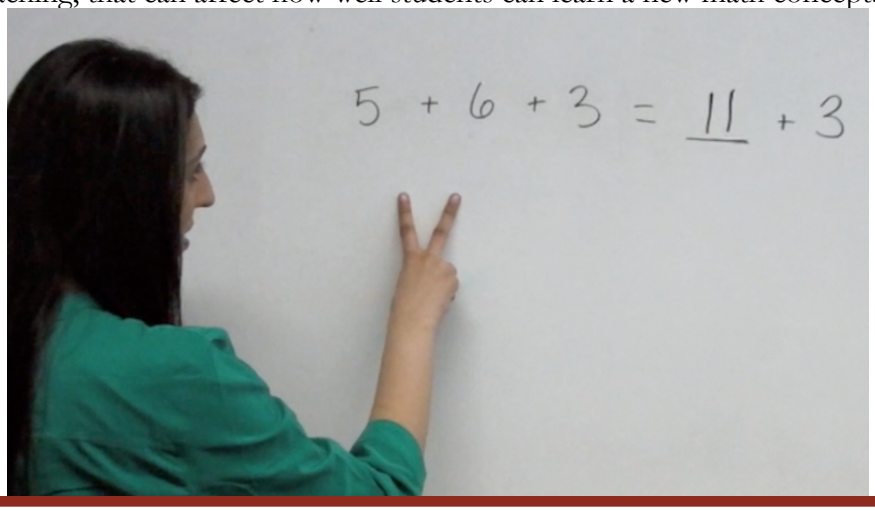
How do children learn a new math concept

How do children learn a new math concept? In this study, we were interested in figuring out what children pay attention to during a lesson about a brand new kind of math problem. We showed 8-9 year olds short instructional videos on an eye tracker, a computer monitor that allows us to see exactly where children are looking during a demonstration. The videos showed a teacher explaining a strategy for how to solve an equation such as 4 + 6 + 9= __ + 9. In half of the videos, the teacher used her hands to help her explain the strategy – she gestured. In the other half of the videos, the teacher just explained the strategy with words. We found that children were more likely to learn from the instructional videos that included gesture, than those that included only words. Why might that be? Using the data from the eye tracker, we discovered that children who saw the teacher explain the problem solving strategy while gesturing actually followed along better with the teacher's speech. These findings suggest that it is not just the words a teacher says, but also the gestures she produces with her hands while teaching, that can affect how well students can learn a new math concept.



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

Questions?
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