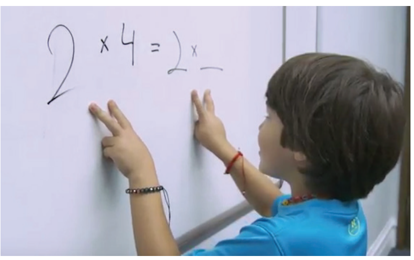
THE UNIVERSITY OF CHICAGO | Center for Early Childhood Research

Newsletter



Check out the new video about our Center at babylab.uchicago.edu!

Calling all 5 month-olds!

We have a brand new eye-tracking study examining how young infants think about other people's movements. If you have a child who is 0-5 months old, we would love to hear from you!

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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

Susan Goldin-Meadow
Beardsley Ruml Distinguished Service Professor of Psychology; Goldin-Meadow Lab, Goldin-Meadow-Lab.uchicago.edu

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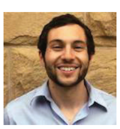


Daniel Yurovsky
Assistant Professor of Psychology
Communication and Learning Lab, callab.uchicago.edu

Calendar of Events

Members of the Center for Early Childhood Research presented findings at the following conferences in 2017:

- Budapest Central European University (CEU) Conference on Cognitive Development, Budapest, Hungary, January 5-7
- Society for Research in Child Development (SRCD) Bi-Annual Meeting, Austin, TX, April 6-8
- Association for Psychological Science (APS) Annual Convention, Boston, MA, May 25-28
- Human Behavior and Evolution Society Annual Conference, Boise, ID, May 31-June 3
- Cognitive Science Society Annual Meeting, London, UK, July 26-29
- Incernational Conference for Cognitive Neuroscience (ICON), Amsterdam, Netherlands, August 5-8.
- Cognitive Development Society (CDS) Bi-annual Meeting, Portland, OR, Oct.12-14
- Minnesota Symposium on Child Psychology, Minneapolis, MN, Oct. 19
- Boston University Conference on Language Development (BUCLD), Boston, MA, November 3-5

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 range of studies for infants and children between the ages of 5-months through 11-years-old.

Please pass on our contact info or sign up online:

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

Exploring the Development of Social Cognition at the Museum of Science and Industry

For the past few years, the Center's Developmental Investigations of Behavior and Strategy (DIBS) Lab, supervised by Dr. Alex Shaw, has maintained a research partnership with Chicago's Museum of Science and Industry (MSI). At the MSI, we examine how social cognition develops in children between the ages of four and eleven. Our studies at the MSI focus on three major topics:

1) **Friendship**: In this line of research, we are interested in finding out how children understand friendship. What sort of expectations do children hold for friends but not acquaintances? For instance, do children expect individuals to be partial towards their friends? In one of our current MSI studies, we explore this by telling children a story in which someone's best friend does not take their side in a conflict. We hypothesize that not only will children view such a lack of partiality as bad, but they will also view it just as negatively as a situation in which their best friend sides with the other person.

2) **Morality**: One of our lab's main lines of research is focused on morality. At the MSI, we are specifically examining children's developing understanding of concepts such as punishment and law. One of our studies is interested in children's valuation of honesty and how this might impact their views on punishment. For instance, do children think that someone should be punished less if they confessed to wrongdoing? Another study examines how children think about others' moral evaluations. In this study, children are told about two individuals, one of whom condemns stealing. We hypothesize that children will judge an individual more harshly for committing a moral violation if that individual has explicitly condemned such behavior.

3) **Fairness**: The DIBS Lab also has several studies focused on the topic of fairness. In our research on fairness, we're interested in examining the development of children's understanding of fairness as well as the factors that influence their fairness judgments. For instance, how do children come to consider voting as a "fair" decision-making tool? Additionally, how do certain factors, such as merit and empathy, influence whether or not children judge different resource distributions as being "fair"? These, along with many other questions, are being explored in our research with children at the MSI. While many of these studies are still on-going, read on for the results from two of our studies below.

Do Children Use Hunger to Guide Resource Sharing?

How do children make decisions about who to share with or how to divide a resource (such as stickers or a snack) among friends? Research suggests that young children care a lot about fairness and equality, going so far as to even throw a resource in the trash rather than create inequality between others. In this project, a collaboration between Talia Berkowitz, Dr. Alex Shaw, Dr. Susan Levine and Dr. Katherine Kinzler, we were interested in whether children's perceptions of an individual's particular need for a resource would influence how they chose to divide that resource between others. Specifically, we wanted to know whether children view hunger as a good reason to distribute a resource unequally.

Children between the ages of 4- to 8-years-old participated in this study at the Museum of Science and Industry. Each child saw a picture of two kids and was told that one of the kids was really, really hungry, while the other kid was only a little bit hungry. They were then given 4 cookies and asked to divide the cookies between the two kids however they wanted. On average, the children chose to give more of the cookies to the hungrier kid, meaning children appreciate that hunger is a legitimate reason to distribute a food resource unequally.

By the age of 7, children understand that hunger justifies dividing resources unequally.

We then asked children to choose between giving a single cookie to either someone who was very hungry, or someone who simply really liked cookies. Seven- and eight-year-old children consistently opted to give the cookie to the hungry person, while four- to six-year-old children allocated the cookie at random. Further, when the resource being distributed was unrelated (a sticker), the older children also distributed the resource at random, suggesting that by the age of seven, children understand that hunger justifies dividing resources unequally when it relates to hunger, but wisely do not distribute non-food resources in an unequal manner.

What Inferences do Children Make About Moral Condemners?

Moral condemnation is universal across cultures and across lifespan, and recent research has suggested that adults can use condemnation to inform their expectations of others' future behaviors. However, when can children make inferences and judgments about behavior using condemnation as a cue? Researchers Hannah Kim, Zachary Trail, and Dr. Alex Shaw investigated this question in this project by tapping into the intuitions of children 4- to 9-years old.

Children were told a story about two characters in a classroom. One of these characters condemns stealing by saying that, "stealing is really, really bad" and the other character says a non-condemnatory statement by saying that "broccoli is really, really gross". Children were then asked who they thought would steal more between the two characters. After children made their predictions, children were informed that, actually, both these characters had stolen after school. They were then asked who they thought should be punished more for stealing.

By around age 7, children predicted that the character who condemned stealing was less likely to steal, but desired harsher punishment for the character who condemned stealing. That is, children were using the act of condemnation to predict likelihood of stealing, and additionally to judge stealing as a misdeed.

Interestingly, by age 7, children additionally predicted a condemner was less likely to steal even when compared to characters who make moral claims. For example, a condemner was thought to be less likely to steal than someone who praised a good behavior ("sharing is really, really good") and even someone who denied ever stealing in the first place ("I never steal"). This suggests that condemnation may be a particularly strong cue of future behavior.

What Affects Children's Ability to Reason Analogically?

When you ask a child, "How is a plant stem like a drinking straw?", they could respond in a couple of different ways. Some children, especially younger children, might focus on the appearance of the objects, and will say that both plant stems and drinking straws are long and skinny (and in this case, green). Other children might focus on relational similarities: both are used to deliver liquids, and both use pressure to move liquid up the shaft.

This is known as an analogy, which is a kind of similarity in which the same system of relations holds across different objects. The ability to reason analogically is important for thinking and learning; children can use analogies to infer and apply new knowledge. As children get older, they shift from paying attention to perceptual/object features to relational features.

This project by the Learning Lab, under supervision by Dr. Lindsey Richland, asks how children's executive functions—the ability to regulate their own thinking—influence their ability to reason analogically. This relationship could have important implications for children's learning, because recent work has shown that executive function skills can be improved by training, which may in turn strengthen children's ability to learn and reason from analogies.

In this study, 5- to 11-year-olds' executive function skills were measured using computer games in which they had to control their responses to conflicting information (inhibitory control), hold and manipulate information in their mind (working memory), and flexibly shift from one task to another (task switching). Then they completed an analogical reasoning game that asked them to find the relational match across two pictures (e.g. in Figure 1, the experimenter would ask the child what in the bottom picture is the same part of the "pattern" as the cat in the top picture). Some of scenes had more complex relations than others, and some of the pairs had perceptual similarities that were irrelevant to the relational similarities (e.g. the cats appearing in both top and bottom).

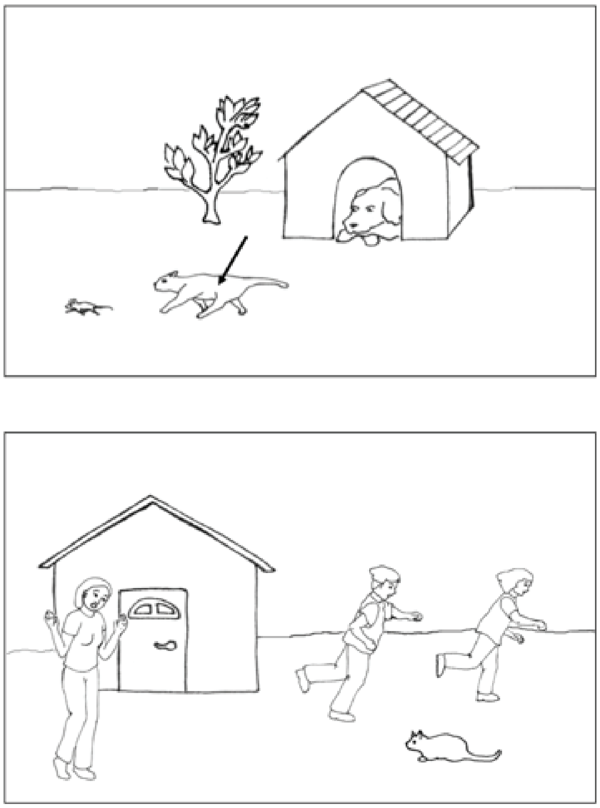


Figure 1. Young children reliably notice that the cats in the two pictures are alike (perceptual similarity), but often miss that the two chasers, the cat and the boy, are alike (relational similarity).

We found that accounting for children's executive functions explained more of the variation in how children performed on the analogical reasoning task than just accounting for age alone. In addition, the aspect of children's executive functions that most strongly predicted their analogical reasoning ability was their working memory. This was particularly pronounced for problems with more complex relationships (for example, another version the problem in Figure 1 depicts the dog chasing the cat chasing the mouse in the top picture, and the mom chasing the boy chasing the girl in the bottom picture). This might be because in order to solve the task, children have to be able to hold all the relations in mind before responding; children low in working memory might not be able to correctly map between "cat" and "boy."

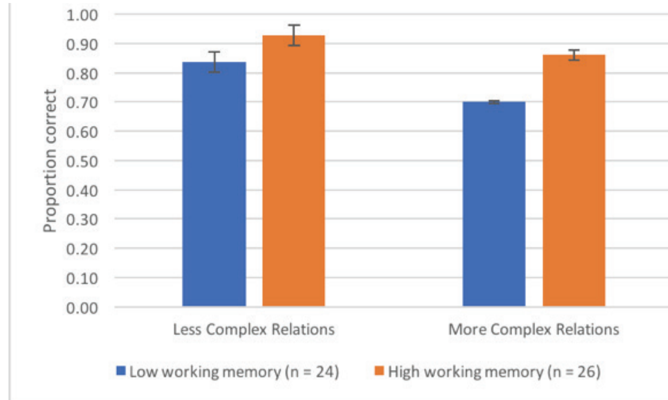


Figure 2. Children high in working memory performed better on the analogical reasoning task than children low in working memory, particularly for problems with more complex relations.

An additional part of this project was to look at how children's social experiences, especially with their primary caregivers, influence whether children are more likely to pay attention to relational or perceptual information. In another task, parents and children looked at problems similar to Figure 1, and talked about what they saw that was the same between the top and bottom pictures. We found that child age didn't impact total number of similarities generated by either parents or children, but 5-6-year-old children generate fewer similarities related to the main relation compared to older children. This suggests that as children age, they become more inclined to notice relational similarities.

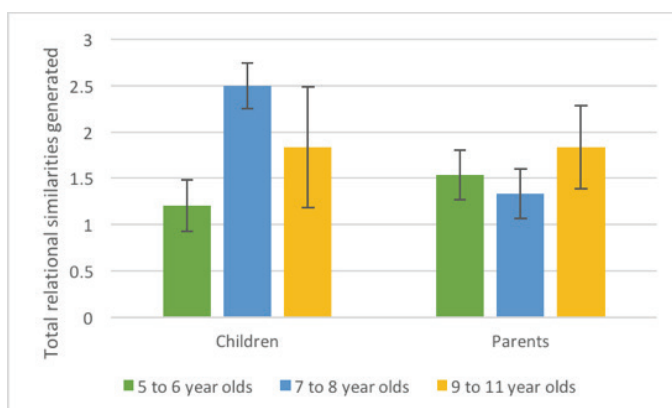


Figure 3. 5-6-year-old children notice fewer relational similarities than older children or parents, while child age doesn't impact number of relational similarities generated by parents.

We also found that total number of similarities about the main relation (over, say, perceptual similarities) generated by the child significantly predicted their performance on the analogical reasoning task, but not main relational similarities generated by the parent. Thus, children who tended to focus on relational similarities also tended to be better at reasoning analogically, but children hearing their parents talk about relational similarities did not relate to performance. This pattern also held after controlling for working memory; in fact, both working memory and child relational talk significantly predicted children's analogical reasoning ability.

Taken together, these findings suggest that several components predict children's development of analogical reasoning. One component is children's working memory—their capacity to do analogical reasoning. Another component is children's relational talk—their proclivity to do analogical reasoning. Both are important for researchers, teachers, and parents to bear in mind when encouraging child attention to relations and analogies.

Word Learning in US and Mayan Infants

Child-directed interactions, one-on-one interactions that directly engage a child, have long been considered optimal for children's early social learning, especially for early language development. There have been many naturalistic studies that show how children's everyday directed input (speaking directly to a child) influences their later vocabulary development and language outcomes. Given these positive language outcomes, child-directed interactions are thought to be universal and necessary for early language learning; however, previous studies have only considered cultures where we know children receive a lot of directed input and there are many cultures around the world where children are rarely directly addressed by caretakers. For instance, children growing up on the Yucatec Mayan peninsula do not receive much directed input and spend most of their time in observational interactions. Therefore, it is interesting to consider: are child-directed interactions universally important for early language learning or does a child's socio-cultural context influence the value they place on these interactions?

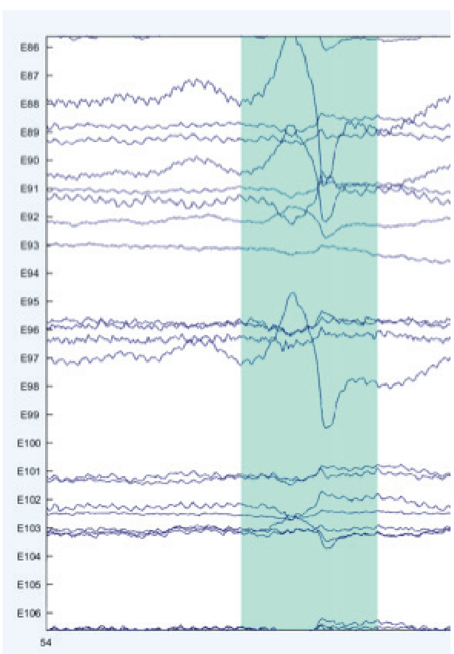
In this study by the Infant Learning and Development Lab, supervised by Dr. Amanda Woodward, 18-month-old US and Mayan infants were taught two novel words across two lab visits; they were taught one word in a child-directed interaction and one word in an overheard interaction. Infants were tested immediately after training and at a one-week follow-up. Importantly, infants did not receive additional training at the one-week follow-up.

Results show that for US children, they can learn words equally well in the child-directed and observed interactions when they are tested immediately after training; however, at the one-week follow-up US infants only remembered words they were taught in the child-directed interaction. Interestingly, Mayan infants show an opposite pattern. Immediately after training, Mayan infants do not show learning for either the child-directed or observed word; however, at the one-week follow-up Mayan infants show learning for the child-directed and observed words. While US children seem to prize child-directed interactions (they only remembered the child-directed word after a delay), Mayan infants did not value child-directed input above and beyond the observed input. These results suggest that the value child-directed interactions play in early social learning is influenced by infants' socio-cultural context.

Common Questions about EEG

What is EEG?

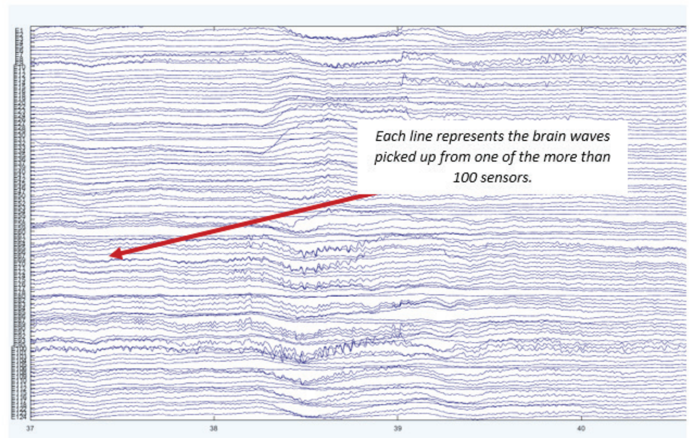
EEG (electroencephalograhy) is a passive, baby-friendly method to record brain activity. Babies wear a special EEG hat like the one in the picture. More than one hundred extremely sensitive sensors on the hat allow us to measure the brain activity while babies play or even just look at what is happening around them. EEG helps us to study how babies' brains work and is a great way to learn more about the development of babies and young children. The EEG signal is able to pick up not only brain activity but even when babies move their eyes.



Example: Brain activity during eye movement

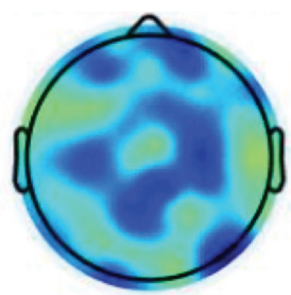
How does it work?

Our brain consists of around 100 billion brain cells from birth. These brain cells are also called neurons. Neurons communicate and send information across the brain by passing on tiny bits of electricity. Each of the sensors on the EEG cap can pick up these small brain waves produced by the many neurons.

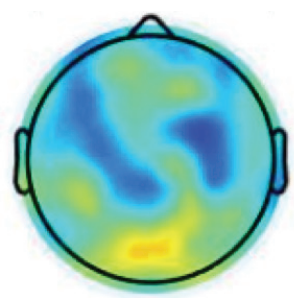


Why do we use EEG?

In an ongoing study at the Infant Learning & Development Lab, we are especially interested in babies' brain activity while they do and see simple actions, like grasping a toy. Here is an example of how babies' brains can look when they grasp a toy themselves and when they observe someone else grasp a toy.



Example:
Brain activity when babies reach for and grasp a toy



Example:
Brain activity when babies observe another person reach for and grasp a toy.

This gives us insights into the developing brain network involved in understanding others' actions and its relationship to social development.

ManyBabies: Collaborating With Infant Researchers Around the World

We don't talk to infants the same way we talk to adults: almost automatically, we shorten our sentences, stretch out words, and exaggerate our pitch. This 'baby talk', or child-directed speech, appears across languages and across cultures. Why do we talk to children like this; does child-directed speech play a role in helping babies to learn language?

To answer this question, the Communication and Learning Lab (CaLLab) is taking part in a multi-university, multi-national research project called ManyBabies. Here in Chicago, we are working with infants between 9 and 14 months old, and the group is studying an even wider range. Collaborating with over 50 labs in more than 10 countries, this new study promises to be one of the largest ever to address how babies learn language.

This kind of scientific collaboration is an important tool that allows researchers to pool resources to answer really big questions, and to understand how these answers generalize across languages and cultures. By working with so many children all over the country (and globe!), this project will help us figure out how babies of different ages and backgrounds listen to and learn from child directed speech. Many different labs had a voice in the development of the study and now we will all come together, using the same images and sounds with a few different study methods.

Participating in this study also helps us to improve the science that we do here at the Center for Early Childhood Research. Discovery and change are fundamental to the scientific process, and as such, there is always room to do even better science! This new collaborative project will help us answer questions about how science works and how people try to answer the same question in different ways. Teamwork has always been an important part of science and this project is one of the first in Developmental Psychology to take that idea even further to implement large-scale teamwork.

If you have a child who is 9-14 months old and are interested in participating, we would love to hear from you!

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 of our research program!

Questions?

Please contact us or find more information on our website: **babylab.uchicago.edu**

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