Other Ongoing Projects

Deciding What is Helpful to Teach
Do children try to make learning easier for another person by teaching what's hard? In this game, children play with different toys that vary in both difficulty and "coolness," and pick which toy should be taught to a learner who knows nothing about the toys but will play with them later on her own.

Sophie Bridgers
Graduate Student

Shared Preferences
What does it mean to like the same things that someone else likes? We are curious about whether children prefer people with rare shared preferences over those who share common preferences.

Natalia Velez
Graduate Student

Robot minds
Do children think robots get hungry, have feelings, or think? We examine what 4- to 9-year-olds believe about robots' mental capacities, and how their beliefs about robots' "minds" affect their moral reasoning about robots.

Kara Weisman
Graduate Student

Understanding Effort: Time and Difficulty
How do children reason about effort? Children view initial states and final states of people building with blocks and are asked which structures are easier and quicker to make.

Disclosing Information about the Self
Do young children strategically communicate with others about the self? We examine whether 3 to 5 year-olds attempt to correct or maintain others' impressions of them in a card game and a balancing game.

Mika Asaba
Graduate Student

Children's Sensitivity to Rarity
As adults, we often assign greater value to items that appear less frequently in the world—those that are rare. To see whether children are also sensitive to rarity, we show children sets of marbles where there are many more of one color than another color, and ask them to choose one.

Grace Bennett-Pierre
Lab Manager

Social Learning Lab

Stanford University

August 2016 Newsletter

Members of the Social Learning Lab are interested in how children learn about the world and communicate what they know. Young children are powerful learners - they face a daunting task of figuring out "how the world works", and they do so seemingly effortlessly in just the first few years! Even the most advanced artificial intelligence algorithms have not come close to matching how quickly infants and children learn about the world.

As scientists, we study how young children achieve this remarkable feat to better understand how the human mind works. We are especially fascinated by social learning - how humans learn from others. To study children, we bring carefully designed studies to JMZ that address scientific hypotheses about children's decisions and judgments in social contexts, such as how children interpret information from others around them, and how they share information with others. We hope this newsletter will give you a glimpse of our specific questions and the answers children at JMZ have offered.

Lab Director
Hyowon Gweon

Assistant Professor
Dept. of Psychology
Stanford University
PhD in Cognitive Science, MIT (2012)

The lab has been doing research at the Palo Alto Junior Museum and Zoo since December 2014. We've had a great time getting to know the families who frequent the museum, and thank the staff who have helped us conduct our research over the last year and a half!

If you have any questions, please feel free to contact us!
Email: sll.stanford@gmail.com
Phone: (650) 498-7832
For more information, visit our website:
sll.stanford.edu

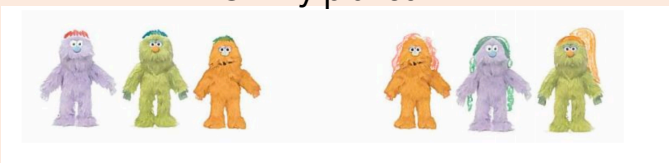
Featured Projects: *Sentence structure--how you say it matters!*

Let's consider two statements: first, "Zebras are like horses," and "Horses are like zebras." These mean the same thing, right? Yet, children consistently prefer to say, **"Zebras are like horses."** This is because statements in this subject-complement structure frame the the subject (Zebra) as the "less typical" variant and the complement (Horse) as the "more typical" or "important" reference point. When statements contain made-up words, this actually serves as a learning mechanism. Upon hearing, "The **zum** is like the **gax**," for example, children infer that the **gax** is more important or more typical than the zum.

At JMZ, we have been exploring another important implication of these statements. One common way of encouraging girls and women to enter STEM fields is to say, for example, "**Girls are as good as boys at math.**" While this comes from the best intentions, for children who do not yet know math-related gender stereotypes, such statements may actually suggest several things about boys and math: that they are more typical or of higher status than girls in this domain, or even that they might have greater raw math talent. This has important implications for how we should talk about comparisons between groups in STEM classrooms and beyond. In our study, we showed children some statements about what boys and girls on another planet could do, and then asked them about boys' and girls' ability on those skills.

"On my planet…"

(a) "Boys are as good as girls at whistling."



(b) "Girls are as good as boys at whistling."

Who has to work harder to be good at whistling?
Who is naturally better at whistling?

Across all the skills presented, when boys were compared to girls (a), 59% of children stated that girls have more natural ability, and 73% stated that boys have to work harder to be good. However, when girls were compared to boys (b), 44% stated that girls are naturally better, and only 38% stated that boys have to work harder. Thus, subject-complement sentences expressing equal ability can nevertheless instill beliefs about gender differences. The statement, "Girls are as good as boys at math," though well-intentioned, could actually backfire and teach children that boys have greater raw math ability.

Eleanor Chestnut, Graduate Student

Featured Projects: *To take or not to take (another person's perspective), that is the question!*

Let's face it: Seeing the world through another person's eyes is no easy task. Children often struggle to accurately report what an object looks like from another person's viewpoint, and even adults make mistakes or take longer to answer. But even when we "can" take others' perspectives, a critical challenge remains:

When should I take another person's perspective?"

Now consider the situation in this photograph, where the girl sitting across the table from you looks at a "9" (from your perspective.) She says one of two things to you:

I know **nothing** about numbers, and I want to **learn** about numbers!

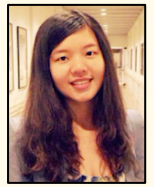
I know **everything** about numbers, and I want to **teach you** about numbers!

"Now I have a question for you: **what is the number on the table?**"

You might feel more compelled to take her perspective and tell her "6" when she **doesn't know** about numbers and **wants to learn** than when she knows about numbers and wants to teach; if you say "9" from your view, she might end up thinking "6" is "9". As adults, we understand how important it is to take the student's perspective to teach new information! Our research shows even 4-year-olds also share the same intuition (Xuan, Bertram, & Gweon (2016): http://sll.stanford.edu/publications.html). Indeed, our own view works for most daily activities, such as driving or picking up a cup on the dinner table. However, there are times when it is helpful or even critical to take others' viewpoints (e.g., "what does the pedestrian see?"). Our work is taking the first steps to understand how and when we decide to take others' perspectives!

Try it at home! If your child knows numbers, try this at home with your children! Show them the picture above, and say "This is Emma! She says, [either the left or the right bubble, and then the blue box]." Share what you find with us at sll.stanford@gmail.com!

Xuan Zhao, Graduate Student



Children as Scientists, Engineers, and Teachers: Importance of informal STEM education

Hyowon Gweon, PhD (Director of the Stanford Social Learning Lab)

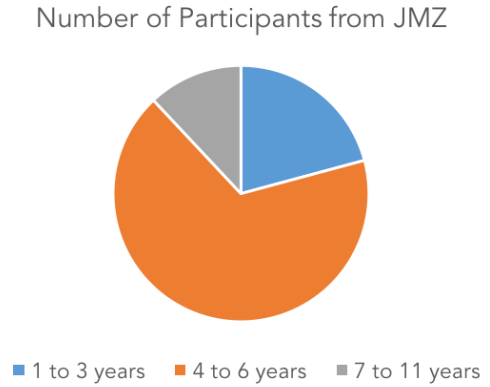
Decades of cognitive development research has shown that infants and children are much smarter than previously thought. Even infants know a lot about people, objects, numbers, and abstract concepts such as mass and weight, goals and beliefs.
But it's not just that children ***know more*** than we thought; they ***learn*** in smart ways. While infants and preschoolers show behaviors that might seem like "random playing", carefully designed studies can reveal the remarkably systematic ways in which children explore their environment. They test causal hypotheses, isolate confounded variables, and draw surprisingly rich inferences to learn about how the world works. This body of work (including work done in the SLL!) shows that the ***foundations for STEM and formal scientific inquiry are present early in life***, adding support for the value of early informal STEM learning to foster these abilities from early on.

At the Social Learning Lab, we are also interested in how young children's reasoning abilities support their understanding of the inherently **social, collaborative, and economic nature of STEM domains**. Scientists and engineers learn from (and build on) others' discoveries and technologies, while communicating their own. They create teams to collaborate with people with different expertise and knowledge and they create new tools and technologies to achieve their goals more efficiently. We believe that the foundations of such abilities are also present early on, and our research at JMZ will aim to better understand how these STEM skills develop in early childhood.

SLL's research on **"children as budding scientists, engineers, and teachers"** will help foster school readiness and meaningful engagement in STEM classrooms. Our studies usually target pre-K children. The age range of our studies complements JMZ's Science Outreach Program, which offers science classes at no cost to schools in underserved communities.

The research partnership between the SLL & JMZ has been a wonderful experience so far. Children have a fabulous time participating in our "fun games", and parents enjoy hearing more about our research. Next time you visit, look for our researchers who regularly staff our research space – they're not only looking to collect valuable research data, but also to tell you about the science of early childhood cognition. We are all very excited about the upcoming transformation of JMZ, with its potential to further our research efforts and to include research-inspired exhibits in the new space!

Who is in our studies?



1,346 children have played research games with us at JMZ **in the last year** (July 2015 to August 2016). Of those children, most were between the ages of 4 and 6 (952), with 295 children between the ages of 1 and 3 and 170 children between the ages of 7 and 11.

Selected Presentations and Papers with Data from JMZ:

Asaba, M. & Gweon, H. (2016). Who should I tell? Young children correct and maintain others' beliefs about the self. Proceedings of the 38th Annual Conference of the Cognitive Science Society.

Bridgers, S., Jara-Ettinger, J. & Gweon, H. (2016). Children consider others' expected costs and rewards when deciding what to teach. Proceedings of the 38th Annual Conference of the Cognitive Science Society.

Chestnut, E. K., & Markman, E. M. (accepted). Are horses like zebras, or vice versa? Children's sensitivity to the asymmetries of directional comparisons. Child Development.

Jara-Ettinger, J., Gweon, H., Schulz, L. E., &Tenenbaum, J, B. (2016). The Naïve Utility Calculus: Computational Principles Underlying Commonsense Psychology. Trends in Cognitive Sciences, 20(8), 589 - 604.

Vélez, N., Bridgers, S. & Gweon, H. (2016). Not all overlaps are equal: Social affiliation and rare overlaps of preferences. Proceedings of the 38th Annual Conference of the Cognitive Science Society

Zhao, X., Malle, B., & Gweon, H. (2016). Is it a 9 or a 6? Prosocial and selective perspective taking at age four. Proceedings of the 38th Annual Conference of the Cognitive Science Society