The Language and Cognitive Development Lab
Fall 2019 Newsletter

Letter of Thanks

Dear Families, Teachers, and Directors,

Thank you very much for participating in our research this past semester! Our research is made possible by the generosity of families and communities like yours, and we greatly appreciate your support.

Our research focuses on how children learn different aspects of language, what this might tell us about the nature of cognitive and social development, and how these different aspects of development interact. This newsletter highlights some of the studies that your child or student may have participated in over the past year and gives an overview of our current findings.

If you have any questions about our projects, please feel free to contact us at (510)-664-4494 or lcdlab@berkeley.edu.

Best wishes,

Mahesh Srinivasan, Ph.D.
Associate Professor
Department of Psychology
University of California, Berkeley

Berkeley
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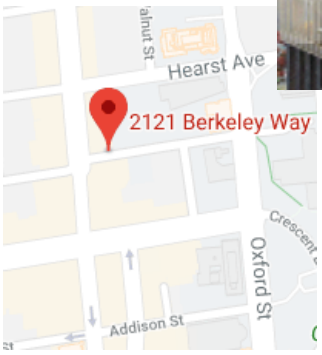
As of June 2018, the Language and Cognitive Development Lab is in a new building in downtown Berkeley!



We are located at

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Berkeley, CA 94704

Berkeley
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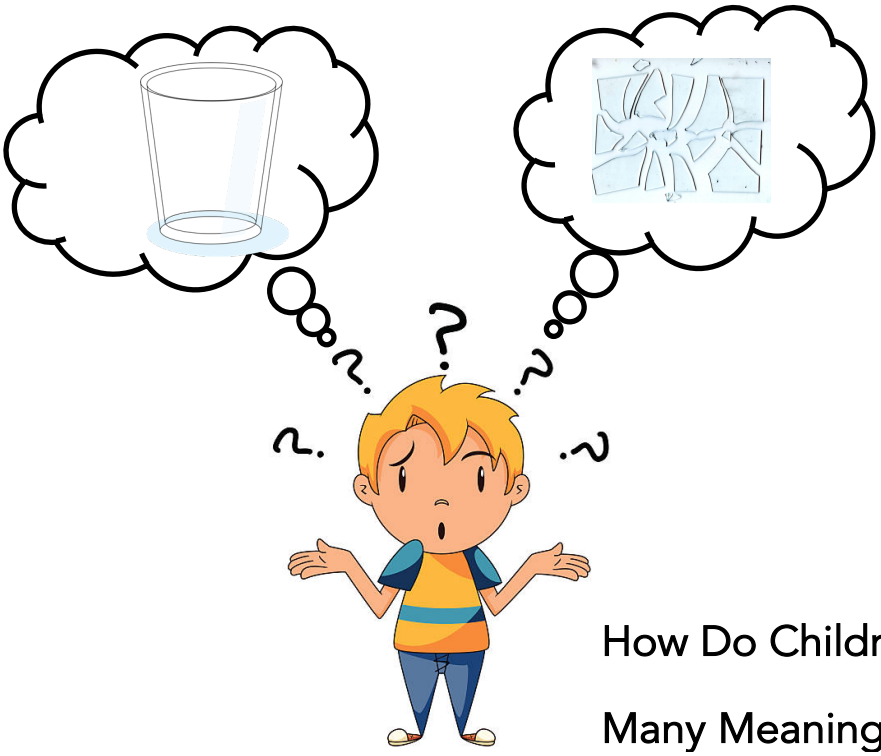
Mahesh Srinivasan, Ph.D.

I am an Associate Professor in the Department of Psychology and a member of the Cognitive Science Faculty at the University of California, Berkeley. Previously, I was a post-doctoral researcher in the Department of Psychology at the University of California, San Diego. Before this, I received a Ph.D. in Developmental Psychology from Harvard University in 2011, and received a B.S. in Symbolic Systems from Stanford University in 2005. Using empirical methods from developmental psychology and psycholinguistics, our lab's research explores how linguistic, cognitive, and social abilities arise and interact with one another during human development and across different cultures.

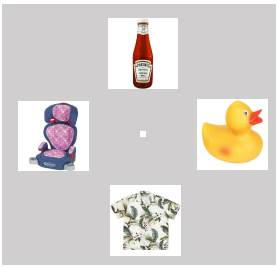


How Do Children Learn Words That Have Many Meanings?

Polysemy is the coexistence of multiple meanings or 'senses' for a word. For example, a word like 'glass' could refer to the material (a "glass window") or the container ("glass of water"). However, if you simply heard the word "glass" with no context or without full understanding the context, it would likely be hard to know for sure which sense is being used. This problem, of sense disambiguation, is a central challenge in natural language processing. This study focuses on analyzing a large database of parent-child conversations and aims to provide insight into how children acquire polysemy, how they address this issue of sense disambiguation, and at what stages they begin to use multiple senses for a single word.

Word Flexibility and Word Learning

A feature of languages, such as English, is the ability to use a single word in multiple related ways. For example, the word “glass” can refer to the material “glass” and can also refer to “a glass” that one can drink out of. Our study explores whether children use this relationship between word meanings to structure their understanding of a new word and object categories. Children are introduced to a novel material (some “dax”) and a new object that either shares the material name (a “dax”) or does not (a “wug”). We explore whether sharing the material name leads children to categorize the object with other objects made from the same material, and whether knowledge of the relationship between word meanings help children remember the meaning of novel words.



Memory Development in Children

How does children's existing knowledge shape what they remember? In these projects, we are investigating memory development in children and the situations in which memory is biased towards familiar or unfamiliar objects. Children play short games on the computer in which we ask them to remember colors, common objects, and unfamiliar objects. Children may also be asked to name the pictures or taught new facts about the objects to investigate how labels and factual knowledge influence memory. By learning more about what children remember, we hope to improve learning both inside and outside the classroom.

Ariel Starr, Ph.D.

I am currently an assistant professor at the University of Washington in the Department of Psychology. I was previously a postdoctoral researcher in the LCD Lab and in Dr. Silvia Bunge's Building Blocks of Cognition Lab and continue to work with them to finish ongoing projects. My research investigates how children create new knowledge from existing representations. I’m particularly interested in how language interacts with other cognitive abilities over development to give rise to uniquely human abilities. My lab uses behavioral and eye-tracking methodologies with infants and children to answer questions about the development of memory, language, numerical cognition, abstract concepts, and other topics.

Monica Ellwood-Lowe

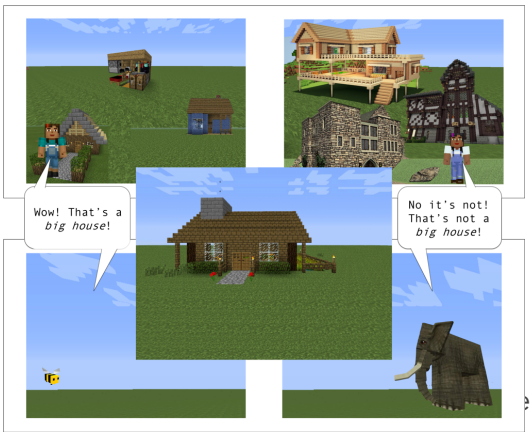
I am a third-year doctoral student in the Language and Cognitive Development Lab. Before this, I received a BA in Psychology from Stanford University. As a graduate student, I explore how variation in children's early social environments contributes to individual differences in their language use. I'm particularly interested in the ways that observed language differences might lead to worse academic performance for some children – particularly those of lower SES and/or racial/ethnic minority status – and how existing social structures may reinforce these patterns over time. I use cognitive, behavioral, and neuroimaging methods to help answer these questions. My graduate research is generously supported by the NSF GRFP and the UC Berkeley Chancellor's Fellowship.

How Do Children Adapt to Their Environments?

Some children grow up in noisy homes with lots going on around them; others grow up in quiet homes with plenty of direct instruction. In this study, we are interested in the ways children might adapt their learning strategies to best meet the demands of their early environments. Using eye-tracking to measure children's attention in real time, we explore whether kids who grow up in more noisy or chaotic homes develop a broader attentional style, allowing them to learn from multiple noisy sources at the same time.

How Do Children Learn from Overheard Speech?

This study focuses on the ability of children to learn novel words from overheard speech between a speaker and a non-present other. In this study, children are introduced to a set of four objects they've never seen before. They are left to explore the objects freely at a table while the experimenter sits off to the side and "works" on her computer without engaging the child. A short while later, the experimenter's phone rings, and she feigns a conversation with a friend, casually describing the names and functions of the objects she brought with her. After hanging up, she tests whether the child learned the names and information about the objects from the overheard conversation.



Disagreeing About Relative Meanings

Children understand that some words are objective like "red," and "spotted." If two people disagree about whether an object has one of these qualities, one of the people is objectively wrong. However, for words like "pretty," disagreement should be permitted because it is based on personal opinion. Similarly, disagreement may be permitted for words like "tall" which can depend on one's whether children allow two puppets to disagree about whether something is "spotted", "pretty" and "tall", if the puppets have had different previous experiences. We find that preschool- and early-elementary-aged children struggle to recognize that two people could both be right about entirely subjective opinions like what counts as "pretty" and tend instead to believe that people asserting the opposite of their own beliefs are "wrong." We are currently investigating what might cue them into the subjectivity of different statements, and the idea that different people can have different aesthetic preferences and opinions.

Ruthe Foushee

As a graduate student in the LCD Lab, I am interested in what language learners can tell us about the composition of meaning, what their performance on linguistic tasks reveals about their conceptions of language itself, and the implications of those developing linguistic assumptions for methodologies in the field. Many of my projects explore how we negotiate the meaning of vague or subjective language in conversation, and how children leverage their implicit social and statistical knowledge to understand these terms. I am also interested in qualitative differences in linguistic input, experimental methods in linguistic fieldwork, sociolinguistic development, and applications of cognitive science in museums. I am grateful to be funded by the NSF GRFP and the Center for Childhood Creativity.

How Do Children Learn to Understand and Use Modal Verbs?

This study researches the development of children's ability to map epistemic modal verbs (i.e. verbs like can and should that indicate a speaker's beliefs about events in the world) to probabilistic situations and what the nature of this mapping is. Comparable research done with adults has found people tend to have categorical as opposed to continuous representations of these verbs in relation to the likelihood of events. That is, adults group "strong" modals (e.g., will, must, or should) together and "weak" modals (e.g., might, may, could) together. Interestingly, adults don't see any difference within these groups. That is, they see events that "will happen" as being just as likely as events that "should happen." In our research with adults, strong modals were chosen more often when shown high probability events (e.g., 90% probability) and weak modals were chosen more often when shown low probability events (e.g., 10% probability). Given that young children are also developing an understanding of probability and inference skills, the simultaneous development of an understanding of modal verbs is expected to help support these other skills in complex ways. While the question of how children think about modals will hopefully be informed, the current focus is establishing what understanding of these words exists at each age, as there has been little work on this so far.

Jonathan Wehry

I am the lab manager at the Language and Cognitive Development Lab. I received a B.A. in Psychology from the University of Pennsylvania in 2018. I am interested in studying word flexibility in the language of young children: how word flexibility influences children's understanding of words that label objects and their construal of those object categories. I am also interested in studying how our perception interacts with our language comprehension and development. That is, how does what we perceive relate to the words we use to describe and label objects and events.

Alex Carstensen, Ph.D.

I'm a postdoctoral researcher in the Language and Cognition Lab at Stanford University. I completed my PhD in psychology at UC Berkeley and postdoctoral research at Radboud University in the Netherlands, focusing on the nature of category systems across languages: how these semantic structures vary, evolve, and influence thought. My current research examines the joint roles of language and culture in the development of abstract reasoning. I'm collaborating with the LCD lab to study contributions from language to children's changing conceptualizations of space.

How Do Children Think About Space?

Our study looks at the strategies children use to think about the world around them–how they locate objects in space, relative to themselves and to landmarks and cues nearby. In the study, children play a memory game where they study the locations of toys and then recreate the scene they studied after a short delay. We're interested in what strategies children use to remember the toys' locations, and how these strategies change over development.

What is 'Math'?

While we may talk about 'math' as if it were a universally well-defined subject, different people have different conceptions of what counts as 'math.' which we've already observed with adults, young children, and middle school-aged children in India. In this study, children sort a variety of activities according to whether or not they 'involve math.' We are interested in how individuals' definitions of 'math' may relate to their anxiety about it, and their willingness to approach activities in the world that explicitly involve math.

Rachel Jansen

I am a Ph.D. student in the Computational Cognitive Science Lab, advised by Tom Griffiths and Anna Rafferty. I am passionate about employing methods from machine learning and probabilistic modeling to the study of mathematics cognition and education. I am specifically interested in understanding more about how people learn math so that I may work towards improving both teaching practices and online educational tools. One branch of my research is centered around math learning in adults using an online algebra tutor developed by me and my advisors. I am using this tool to explore ways in which we can influence motivation and alter students' perceptions of mathematics, to ultimately remove emotional and psychological barriers so that more people may appreciate and excel at the subject. I am fortunate to be funded by the UC Berkeley Chancellor's Fellowship and NSF GRFP.

Antonia Langenhoff

I am fascinated by the development of causal, normative and linguistic cognition and by how these cognitive abilities interact with our uniquely humane social reasoning skills. As a graduate student, I explore the role that engaging in social discourse and argumentation plays for children's developing cognitive skills. Specifically, I investigate the role of disagreement as a potential mechanism for cognitive development. I am gladly funded by the Berkeley Fellowship for Graduate Study.

When Do Children Begin to Distinguish Between Different Types of Rules?

In their everyday life, preschool aged children already encounter a lot of different rules and also begin enforcing them on their own. But how nuanced is their understanding that not all rules are the same? We are doing this study to learn more about when young children begin to distinguish between moral rules, like rules that prohibit harming other people, and arbitrary social rules, like what one should wear in school. Children play a game with a puppet "Max" who breaks an explicit rule. We then explore the level to which children judge Max's actions to be wrong, and whether they consider Max's knowledge (or lack of knowledge) about the rule when deciding how bad Max's action is. So far, we've found that preschoolers judge Max's rule breaking as worse when he breaks a moral rule than when he breaks an arbitrary rule.

How Do Children Learn About Which Words Are Known by Others?

When engaging in a conversation, we have to monitor which of the words we could use are known by our conversational partner. This is to make sure that he or she understands us properly. Some words, like 'chair' or 'dog', are likely to be known by almost everyone, whereas others are only familiar to specific groups of people. For example, if you tell your friend that you are going to 'the city' and both of you live in the Bay Area, she will probably know that you are talking about San Francisco. A person who is not from here, however, might not understand which city you are talking about. In this study, we teach children new words like 'dax' and look at the circumstances under which they think that others will share their new linguistic knowledge.

Language and Cognitive Development Lab
Research Assistants

Grace Horton*	Julian Faust	Melody Mann	Karina Fong-Hirschfelder*
Aaron Ayala	Betty Birbo	Isabel Groth	Carmela Martinez
Estelle Berger^	Akil Ismael	Alexis Juarez	Cyrus Barringer
Erjing Zhang	Clara Chung	Jessica Mankewitz	Jordan Eng
Lily Huang Chen	Elizabeth Greynolds	Lucy Schuler	Leigh Levinson
Saya Sivaram	Viva Freedman	Sanjeev Vinodh	Erica Shin
Allen Ciancaglini	Hariklia Frangos*	Mercedes Sosa Cordero	
Melissa Jauregui*	Xiaoyuan (Claire) Zhang	Dee Dong^	
Stanley von Ehrenstein-Smith			

* Honors Project Research Assistants

^ Postbacc Research Assistants

We greatly appreciate all of the museums and preschools that continue to support our research. Our work would not be possible without your generosity and commitment to furthering the field of psychology!

University Village Child Development Center

Bay Area Discovery Museum

Lawrence Hall of Science

Clark Kerr Campus Child Development Center

Haste Street Child Development Center

The Discovery School

Habitot Children's Museum

The Berkeley School

Harold E. Jones Child Study Center

Ecole Bilingue de Berkeley

Recent Publications and Conference Posters

(Publication abstracts and poster titles below. See lcdlab.berkeley.edu/publications for full versions and to see more of our work.)

Publications:

Williams, A., **Srinivasan, M.**, Liu, C. & Zhou, Q. Why do bilinguals code-switch when emotional? Insight from immigrant parent-child interactions.

Previous research has found that bilingual speakers' first (L1) and second languages (L2) are differentially associated with their emotional experiences. Moreover, bilinguals appear to code-switch (alternate between two or more languages in a single conversation) during emotional episodes. However, prior evidence has been limited to clinical case studies and self-report studies, leaving open the specificity of the link between code-switching (CS)and emotion, and its underlying mechanisms. The present study examined the dynamic associations between CS and facial emotion behavior in a sample of 68 Chinese-American parents and children during a dyadic emotion-inducing puzzle box task. We found that negative facial emotion predicted higher subsequent CS in both L1àL2and L2àL1 directions, with stronger associations for the L2 -> L1 direction. On the other hand, positive facial emotion was associated with lower contemporaneous L2 -> L1 CS. CS did not predict later facial emotion behavior, suggesting language switching may not have an immediate effect one motion. The present findings are consistent with the idea that emotional arousal, especially negative arousal, reduces cognitive control and may trigger spontaneous CS. Together, these findings provide insight into why bilingual speakers switch languages during emotional episodes, and hold implications for clinical interventions serving bilingual individuals and families.

Posters:

Langenhoff, A., Dahl, A., **Srinivasan, M.** Preschoolers' and adults' understanding of novel moral and conventional violations.

Wehry, J., Rabagliati, H., Skarabela, B., Saouri, A., **Srinivasan, M.** Daxing with a Dax: The relationship between artifact-function polysemy and the design stance.

Foushee, R., Xu, Y., **Srinivasan, M.** How do we talk to children? Leveraging speech corpora to quantify how we simplify speech to children

UC BERKELEY
Developmental Labs

For more information about our research and how to get involved, please go to our website

http://lcdlab.berkeley.edu

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