One of the most astonishing features of human development is how children acquire so much knowledge within such a brief period of time. For example, at an age when they still struggle to tie their shoes, most children have already gained relative mastery of their native language(s). This is particularly striking because learning a language requires developing exquisitely complex and subtle knowledge and intuitions. Consider how we use words as English speakers. One could "pound" something without a hammer, but it would be strange to "hammer" anything without one. Although a "cup" could be made out of a variety of different materials, it would be odd for a "glass" to be made out of anything other than glass. And while "buttering" bread entails applying butter to bread, "milking" a cow does not involve pouring milk onto a cow. Children need to learn all of these facts (and thousands of others), and construct appropriate generalizations from limited data, largely without any explicit instruction from adults.

Understanding the mechanisms that drive linguistic and cognitive development is the primary goal of my research. My work integrates across disciplines and methodologies to engage fundamental questions in developmental science, including (1) how children develop knowledge of linguistic meaning and (2) how children's language environments vary and influence their learning. Other branches of my research, into (3) how children learn about social groups and norms, have also yielded important insights. Below, I review my recent research in each of these areas, and discuss some ongoing and future directions for each area.

1. The development of semantic intuitions

What is the nature of children's early intuitions about linguistic meaning? To address this question, prior research has focused primarily on "simple" cases in semantic acquisition, such as how children learn concrete nouns, because learning even the simplest of words presents a challenging inductive problem (Quine, 1960). I have recently argued that this has led to theories that readily explain how children learn a single, concrete meaning for a new word, but which have little to say—or even make incorrect predictions—about the acquisition of words with more complex semantics (Srinivasan & Rabagliati, 2021). For example, under current theories, children assume that a new word will have a single meaning, and apply to items of the same taxonomic category (Markman & Hutchinson, 1984). Such theories predict that most words in natural language should carry only a single meaning, because words labeling multiple meanings would be difficult to learn and transmit across generations. Yet, in fact, most words in English and in other languages are *polysemous*, expressing multiple related, but distinct meanings. For example, the English word *chicken* can label a kind of animal or meat (thirsty/tasty *chicken*), *glass* can label a kind of material or artifact (broken/drinking *glass*), and *book* can label an object or its intellectual content (heavy/interesting *book*).

My approach is distinct from the mainstream in that I jump into the deep end and focus on and theorize from the "hard"—and I believe, more representative—cases in semantic acquisition, like polysemy. Contrary to existing theories, my past and current research shows that children are not confused by polysemy, but are instead able to learn multiple meanings for words from early in development, and represent them similarly to adults. Instead of confusing children, I find that polysemy may actually facilitate language learning—providing a functional explanation for why it is so widespread (Winter & Srinivasan, 2022; Xu, Duong, Malt, Jiang & Srinivasan, 2020)—by allowing children to use their knowledge of one meaning of a word to infer its other meaning(s) (e.g., Skarabela, Srinivasan & Rabagliati, under review; Starr, Cirolia, Tillman & Srinivasan, 2020). A new view of children's semantic development emerges from this body of work: rather

than expecting a word to label a single category of meaning, children may expect words to be used flexibly, and label a family of distinct but related meanings (Srinivasan & Rabagliati, 2021).

My current and planned projects extend this research program in several ways. First, I am moving beyond experimental approaches to understand the real-world conditions in which word meanings are learned. While many corpora of parent-child conversations exist, none have been annotated for the specific word meanings used (e.g., when a parent or child uses the word "chicken" it is unclear whether they are referring to the animal or meat), making it impossible to conduct large-scale analyses. In response, my lab has hand-annotated nearly 180,000 word tokens from two longitudinal corpora, creating a dataset that will yield new insights into semantic development (Meylan, Mankewitz, Floyd, Rabagliati & Srinivasan, 2021). Our preliminary analyses find that parents do not avoid using multiple meanings for words when speaking to their children, and that children use words with multiple meanings from the earliest stages of word learning. Second, I am interested in understanding the origins of children's semantic intuitions, and the degree to which they are constructed from linguistic experience or emerge from children's concepts themselves. One of several projects in this direction explores how Deaf children who have not been exposed to a language model (because their parents have not introduced them to a sign language) use gestural forms in the "home sign" systems they *create*. Might these gestural forms exhibit something akin to polysemy? Finally, I wish to move beyond demonstrating the deficiencies of existing models toward providing new formalizations of how word learning proceeds. Accordingly, my colleagues and I will work on developing and testing a computational model to help explain how children are able to 1) determine that a word has multiple, distinct meanings, and 2) leverage their knowledge of one word meaning to make inferences about its other meanings.

2. Variation in children's language environments and learning strategies

The research described above illustrates a general principle: when we simplify an object under study to bring it into the lab—e.g., by treating word learning as a problem in which children need only learn one meaning for each word—we risk over-simplifying, and developing incomplete or misleading theories. With this in mind, another branch of my work—on how children learn language from their environment—aims to take seriously the diverse circumstances in which children develop linguistic knowledge.

An emerging consensus among developmental psychologists is that children are best able to learn language from speech that their caregivers direct toward them, as opposed to speech that they overhear (e.g., speech that a parent directs to another adult, or to another child). Moreover, research suggests that variation in the quantity and quality of speech that children receive has important consequences for children's language development and school readiness, and may even help account for the "academic achievement gap" among children from higher and lower socioeconomic status (SES) backgrounds (since, on average, parents from lower-SES backgrounds have been found to direct less speech to their children; Hart & Risley, 1995). These findings have spurred interventions that provide parenting training and coaching for low-income parents, with some even likening the importance of speaking to one's child to providing them with adequate nutrition.

My recent work has critically examined the notion that there are "optimal" methods for speaking to one's child and that parents from lower SES backgrounds sometimes lack knowledge of these

methods, thus warranting parenting training. For example, contrary to the idea that deficiencies in parenting knowledge explain why lower-SES parents might direct less speech to their children, my students and I have argued that the experience of financial scarcity itself (a defining feature of low-SES) may place cognitive and affective demands on lower-SES parents, in turn suppressing their speech to children. We show, for example, that the same parent speaks less to their children at the end of the month—when Americans of all backgrounds report experiencing more financial scarcity—than at other times of the month (Ellwood-Lowe, Foushee & Srinivasan, 2022). These findings—which have received significant media attention—speak to the psychological consequences of poverty (which I am reviewing in a new paper; Park, Kaur, Zhao, Hallesz & Srinivasan, in preparation), and suggest that interventions to increase parents' speech to children should focus not simply on coaching parents to speak more, but on alleviating the structural barriers that low-SES parents face.

To test this idea more directly, we are currently conducting a study (funded by the Russell Sage Foundation and J-PAL) to assess whether receiving a $400 one-time cash transfer impacts low-income parents' mental health and engagement with their children (to measure the latter, children in treatment and control households will wear LENA recording devices that record up to 14 hours of their home language environment). Relatedly, in another ongoing study (funded by the Center for Effective Global Action), we have used the COVID-19 pandemic—a once in a century event—to explore how adversity impacts parents' engagement with their children. Here, we have taken an experience sampling and citizen science approach (Li, Germine, Mehr, Srinivasan & Hartshorne, in press), asking parents over the course of 30-60 days, to: 1) audio-record a daily activity with their child using their smartphones (allowing us to analyze the richness of their linguistic interactions), and 2) fill out a daily survey reporting their experienced hardships (e.g., financial or health changes), emotions, worries, sleep quality, and more. This dense, longitudinal dataset promises to provide insight into how adversity impacts parenting, and whether it does so in different ways across different families.

A complementary line of my research in this area interrogates the assumption that directing large quantities of speech to one's child—though a common practice among Western middle- to higher-SES parents—is indeed "optimal". There turn out to be dramatic differences across cultural contexts in how children are socialized to language, with parents in some communities rarely speaking directly to children in the first years of life when children cannot yet talk back. Yet, irrespective of this variation, children in all communities ultimately master their native language(s), and even appear to reach major milestones (babbling onset, production of first words, etc.) at similar ages. In my recent work, I suggest that this equifinality of outcomes could arise because children from different communities may develop different learning strategies that are each adapted to the environments in which they are raised. For example, an infant raised in a higher-income household in the US may come to expect to be spoken to directly and thus ignore interactions around them; in contrast, a toddler who receives little child-directed speech may learn to attend to and learn from speech that they overhear. Consistent with this proposal, we find that infants from an indigenous Mayan community in Mexico, who are rarely spoken to directly, exhibit implicit knowledge of nouns (resembling their Western peers), and of honorific terms that could only have been learned through overhearing (Foushee & Srinivasan, 2021, in prep). To better understand the informational value of overheard speech, we are now coding naturalistic video corpora to quantify the degree to which samples of overheard and child-directed speech are accompanied by features that are likely to support learning (e.g., whether the referent of an

utterance is in view or pointed at by the speaker). Although children are often conceptualized as the passive recipients of language, learning from overheard speech provides one of many examples of the active role they may play in their own language development (a proposal my collaborators and I have made in several recent papers; Foushee, Srinivasan & Xu, 2020; Foushee, Srinivasan & Xu, under review).

3. Learning about social groups and norms

In acquiring their native language(s), children also begin to assimilate the knowledge and beliefs of the cultures and societies in which they live. For example, children learn a great deal from adult testimony that employs generic language (i.e., language that predicates something of a category), including knowledge of the natural world (e.g., "Robins lay eggs"), artifacts (e.g., "Watches tell time"), and social groups (e.g., "Boys like trucks"; Rhodes, Leslie & Tworek, 2012). My recent work has explored how children develop knowledge and beliefs about the social world.

By at least first grade, children come to endorse negative stereotypes about social groups, e.g., associating intellectual ability more with men than women, and believing that women are bad at math (e.g., Bian et al., 2017). One line of my current work investigates the role that language may play in the transmission of such beliefs. Children may be unlikely to learn these beliefs from explicit negative claims about groups (e.g., "girls are bad at math") given social norms of politeness, and given prior evidence that adults do not typically express biased attitudes explicitly, even if they hold them implicitly (Baron & Banaji, 2006). Yet such beliefs could be transmitted indirectly, when speakers selectively praise one social group while omitting others: e.g., a teacher who remarks that "the boys are good at math" in a classroom that includes both boys and girls. Indeed, my students and I find that even preschoolers are able to "read between the lines", and reason pragmatically about what a speakers could have said—but chose not to say—about a social group (Baharloo, Vasil, Ellwood-Lowe & Srinivasan, under review). Specifically, after hearing a positive statement about the abilities of one group, preschoolers infer that an unmentioned group's abilities are worse. Critically, we also find that children are sensitive to the context in which such statements are made: inferences about an unmentioned group do not arise when the speaker lacks knowledge of that group's abilities.

Building on these findings, our ongoing and planned work explores whether children learn stereotypes about the relative competence of different social groups from the ways in which members of those groups are spoken to. We find, for example, that 8- and 9-year-olds (but not 5- and 6-year-olds) infer that a group that is spoken to with less complex language (e.g., using common, early-acquired words), is less "smart" than a group that is spoken to with more complex language. We are currently extending this line of inquiry to explore whether children are sensitive to other dimensions of linguistic interactions that might yield information about social groups: e.g., when members of a group are provided with explanations of phenomena that they already ostensibly understand, as in 'mansplaining'.

In addition to exploring children's developing beliefs about social groups, I have also been examining how children conceptualize and reason about social norms. Social norms can come in many different forms, including social conventions (norms that coordinate social interactions; e.g., dress codes at school), moral norms (norms that protect the welfare and rights of others; e.g., prohibitions against violence or stealing), and religious norms (norms deriving from religious

authorities that do not inherently protect others' welfare and rights; e.g., daytime fasting during Ramadan for Muslims). My recent work has shown that children reason about violations of these different kinds of norms in fundamentally different ways (Langenhoff, Dahl & Srinivasan, 2022; Srinivasan, Kaplan & Dahl, 2018). For example, we find that although religious youth in India children generalize moral norms (e.g., prohibitions against hitting) across followers of different religious groups, they restrict the norms of one religion to followers of that religion, and expect members of another religious group to follow their respective norms (e.g., it's okay for a Hindu to eat during Ramadan, but not a Muslim). However, children also judge that when a follower from one religion enters the context of another religion, they should adhere to the norms of the latter religion (e.g., a Hindu should not eat during Ramadan in a Muslim home; Dahl, Berner, Jesuthasan, Wehry & Srinivasan., in press). This research—which points to the conditions that promote vs. hinder peaceful co-existence—has been covered by media outlets, both in the United States and in India.

Our recent work in this area moves beyond exploring children's judgments of violations of norms, toward asking how children view the norms themselves. This is important because a person can think that it is bad to violate a norm while simultaneously thinking that the norm is bad and should be changed: e.g., a person may reject patriarchal norms while also thinking it is a bad idea for a woman to disobey their husband, out of concern for the woman's safety. Indeed, we find that children do not accept wholesale the norms of their society but instead develop nuanced evaluations, and even challenge some norms (Srinivasan & Dahl, in prep). I am currently expanding on my work on religious cognitive development via an award from the Templeton Foundation, which supports research in Israel, India, and the United States.

Finally, my other ongoing and planned work in this area explores how children acquire epistemic norms, such as principles for how to respond to disagreement. In one study, we find that even preschoolers respond 'reasonably' to disagreement: they stick to their original belief when they have more evidence than the other person, adopt the other person's belief when they have less evidence, and search for more information when the evidence is equal (Langenhoff, Engelmann & Srinivasan, in press). Other ongoing and planned studies explore whether experiencing disagreement reduces children's overconfidence (Langenhoff, Srinivasan & Engelmann, in prep), and how children balance following epistemic norms with concerns for their epistemic reputation (e.g., searching for additional knowledge when doing so requires them to admit their ignorance).

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(* = Postdoctoral mentee; ** = Graduate or Postbac mentee; * = Undergraduate mentee)**

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