Welcome to the Lab!

This is a review of the developmental research conducted in the Cognitive Development Lab of Dr. Linda B. Smith for parents of our participants. Our lab has been located in the Psychological and Brain Sciences Department since 1985. Our research is funded continuously and generously by the National Institute of Mental Health, by the National Institute of Child Health and Development, by the National Science Foundation and by Indiana University.

What Our Research is About

Long before babies talk, they look and smile. Then sometime around their first birthday, children begin to use words. A one word sentence soon becomes a three word sentence -- and suddenly standing before you is a tiny three year old who is excitedly telling stories about what they see and what they want. How did they become such expert word learners?

Over the years one of our most important discoveries --one with implications for children with developmental delays --is that language learning is not just about language. It is about perception, action, emotion, play and learning categories. We are funded by three federal grants to understand how all your child’s everyday activities make them the amazing learners that they are and how to help children who are having difficulties in these areas. Most of our research is with typically developing children between 12 months and 4 years of age. Much of our research concerns children growing and learning in different cultures and learning different languages. By comparing children learning different languages in the context of different everyday activities we get a better idea of how it all works. And, it is just plain interesting! When your child comes into the laboratory, they are often doing a task that children in India or Japan or Mexico will also do!

Many of our tasks ask children to learn new words -- in games, on the computer, or by viewing slides. We do this to understand how learning works and how it can be made easier.

We are also interested in real world, everyday learning in naturalistic settings. In the past, we (and lots
of other researchers) followed young children around with cameras and clipboards, trying to understand their every day learning experiences. But these techniques just allow us to see the child in the world, they don’t show us the child’s world in the sense of what the child sees. In very exciting new research, we are putting lightweight head-cameras on children, a first attempt to see the world as they do.

Every baby and child is a valued contributor to science and understanding the miracle of development. As you read about the different studies we are conducting, we hope you recognize the one (or ones!) you participated in and hope you find participating a rewarding experience. Thank you!!

Dr. Linda B. Smith, Director

Verb Learning Picture Task
Ages: 2 and 3 year-olds

What does “pushing” mean? When we push objects in the world, there is a bodily action, an object, an outcome, a movement. Our work suggests that children first understand verbs by integrating over all this information, through their own actions, and the actions of others. In a current study, we are examining what components of actions are important by asking children to indicate which pictured scenes depict an action. We leave out or put in components to find out what matters to young learners. Researchers: Josita Maouene, Amy Chase, Nicole Mannia, Natale Manes, Joe Amaral

Plurals, Puzzles and Teddy Bears
Ages: 20 - 36 month olds

Cars, trucks, dogs --- words that refer to the plural. Learning the plural requires an understanding of number and set size. Language provides lots of ways of talking about number that all relate to each other. Think about all the language cues in the sentence “Where are the two bunnies?” First, there is the use of the word “bunnies.” There is also the verb “are” which is used when referencing multiple things (compared to “is” which is used when referring to one thing) and the word “two!” Which cues do very young learners learn first? How does knowing one quantity word help learn others? In one task, children are asked to put puzzle pieces in a puzzle using a variety of different types of sentences that give lots of information, as in the sentence above, give less information, such as “Where are the bunnies?”, or even less information “Bunnies?” Children are sensitive to all cues, but they seem to use what they know about each cue to work out the meaning of the others. English provides one set of overlapping quantity cues; Japanese provides different ones, making learning about quantity in the two languages fundamentally different tasks.

We also ask children to play a game with a teddy bear who, when blindfolded, can only hear, not see! Children are asked to “Tell teddy what to get” out of an array of toys placed in front of him. Would two-year-old children say the plural form of the words (e.g. “dogs”) when they are to tell teddy to get more than one dog? Our new --and exciting finding -- is that children work out the range of sets that get the plural slowly -- for sets of identical things (two identical poodles) than for sets of merely similar things (poodles and collies) and for larger sets (4 things) than for merely sets with two things. Jen Zapf who was the doctoral student leading this research is now a professor at the University of Wisconsin - Green Bay (Congratulations Jen!), and will continue to collaborate with us on this work. Researchers: Jen Zapf, Leah Dudderar, Alex Lavallo
**First the blocks, then the turtles**  
**Ages: 11 - 20 month olds**

Have you ever watched your two-year-old inspect all the toys in a toy box, then systematically remove all the cars, or the blocks before touching the dolls? Little is known about this spontaneous sorting behavior other than that it is a strong predictor of language learning. Our goal is detailed understanding of how and when it emerges, and why it is related to language learning. Children were simply asked to play with the objects fixed to a board by springs. What controls the sequence of touches? Closeness in space, sameness in appearance? We found that children’s sequential touching of objects is first controlled only by location, not by whether the objects look alike. But by 15 months if two objects are nearby, children touch the one that is the same as the object they just touched. Older children consistently attend to and touch like objects, one right after the other. Thus 15 months appears to be when there is a change in the attentional processes which direct exploratory play. New research will look more closely at this transition in order to gain insight both into the development of the sorting behavior and into how this behavior relates to changes in categorization abilities that occur during year two. **Researchers:** Adam Sheya, Aditi Deodhar, Andrea Lindner, Jaclyn Feather

**Look, there’s Elmo!**  
**Ages: 10 - 17 month olds**

Babies as young as 9 months comprehend such words as “ball” and “bottle” and even “doggy.” How do they learn these words --merely from hearing them used --given that the world is a highly cluttered place, with many different objects in view at any time. If a baby sees a dog chasing a ball in the grass and the mother says “doggy,” how can the baby know that “doggy” is about the dog and not the ball? Well, the next time babies hear “doggy,” it might be in the context of a dog and a girl with no ball in sight. If babies could statistically combine information over many different scenes, they could figure it out. In new and exciting work in collaboration with Chen Yu, we have found out they can. Babies watch a video of objects projected on a big screen. We present multiple objects at a time and multiple words with no cues as to which word goes with which object. But babies combine the information across trials and learn the words! We are now studying how their trial-by-trial attention to objects enables this learning. Elmo, Big Bird and Cookie Monster are used as attention-getters between the training slides. **Researchers:** Char Wozniak, Amara Stuehling

**Paying Attention**  
**Ages: 36 - 48 month olds**

One of the most important school readiness skills is an ability to selectively attend to some information while ignoring other information, and an ability to shift attention to new sources of information when the task demands it. Although most of our research is concerned with the front-end of language learning, this late preschool achievement of flexible attention is of interest because language learning appears to be a critical factor in its development. We want to know how and why, and what we can do to foster attentional control in children with language delay or other developmental delays. Right now, we are just studying in detail the normal developmental transition from less flexible to more flexible attention. In these studies, mostly conducted in local preschools, we ask 3 and 4 year-olds to sort cards or group cards together based on color alone or shape alone, and measure their ability to do so under different conditions --with and without words and other cues. In our continuing project, we hope to get a better understanding of how and why well-learned words promote attentional control. **Researchers:** Rima Hanania, Sasha Broustovetskaia, Cody Stitzel
Head Camera gives first person point of view!

An exciting new technology, a tiny camera attached to a headband, now allows the researcher to see the world as your child sees it! The possibilities are limitless! Our lab is currently using the head camera to explore how children play with toys, the strategies children use to sort objects and how children categorize objects when playing. A parent’s common first reaction upon hearing that their toddler will be wearing the head camera is very doubtful. But the success rate of the child tolerating the head camera is quite high. In fact, most toddlers forget they are wearing it!

Play is fun work!

Ever wondered why children love to play for hours on end? We want to know HOW children play with toys, namely how they choose to explore and look at them. Do they linger here and there watching and holding the object? How do they hold things and what is interesting for them to look at? To study this we ask parents for help in placing a tiny camera mounted on a sports headband onto the head of their toddler. The child is given toys to play with and no extra instructions or script, we simply record all the activity and from this first person view video compile all the object views the child has seen and for how long. We already found that toddlers around 18 to 24 months start to develop the beginnings of a pattern of exploration similar to the adult one (that we know is important for learning about objects more effectively). We wish to study this period more intensely and better understand different patterns of active toy exploration.

Researchers: Alfredo Pereira, Katie Nordhoff, Teresa Snider, Cystal Romy, Gabrielle Baehl

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Child Scientists Needed
Birth - 7 Years Old

Do you want to participate in a study? Moved? New phone number? New baby? Have a question or concern? Call 855-8256 (ask for Char), or email us at cogdev@indiana.edu or visit and enroll your child on our website at www.indiana.edu/~cogdev/

Late Talkers Needed - Does your child talk less than other children the same age? We invite you to call us here at the Cognitive Development Lab, 855-8256, for participation in a study. Ask for Char.

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THANK YOU parents for your ongoing support and dedication to our research! By agreeing to participate in studies, our understanding of early language development continues to grow. We are very grateful!

We kindly thank the following day cares for allowing us to visit and conduct our research: Kid Angles, BDLC, Penny Lane, St. Marks, Jack and Jill, Growing Hearts, Faith Lutheran, the Prep School, Christian Carousel and Harmony school. We also thank Chocolate Moose and Brusters for donating free ice cream coupons to participants in many of these studies.