

Cognitive Development Lab

University of Houston

Volume 2

Newsletter Fall 2010

Welcome to the Cognitive Development Lab!

Our lab is affiliated with the University of Houston, Department of Psychology. The lab is conducting various studies concerning how children's understanding of the world changes over time. We study infants' and children's language learning as a way to deepen our understanding of neurological development and learning processes. We welcome children who are themselves growing scientists to help us gain more insight into these processes!

It has been 3 years since our Cognitive Development Lab was established in the fall of 2007. We genuinely appreciate the support we've received from individual parents and caregivers and the community, including preschools, churches, libraries, and school district personnel, and of course all the child scientists who have participated in our studies. Needless to say, without all this support the Cognitive Development Lab would not be functioning as successfully as it does. Our findings based on your participation from 2009-2010 are briefly reported in this issue, and some have been presented at inter-

national conferences. We hope we can continue to productively study how children's understanding of the world develops and to communicate our findings to you and the scientific community. We are grateful for your willingness to continue to contribute to our science program.

Dr. Hanako Yoshida

Lab Director



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New Studies

“Stoof” Study

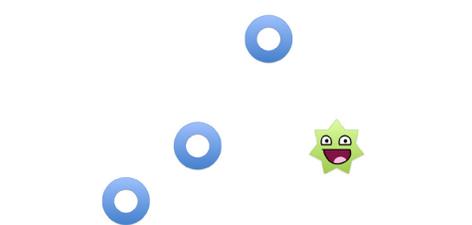
Age 2 to 3 years old

Research over many decades has suggested that children learn nouns first and fast relative to other types of words (e.g., verbs and adjectives), and thus children’s knowledge of nouns has been thought to play an important role in the learning of other types of words—specifically, in the learning of adjectives. We are interested in the idea psychologists call competition, where words and meanings compete in the process of how people map words to meaning. The competition framework proposes that what children know about nouns—that a word (e.g., cup) goes with a meaning (e.g., something to drink from)—can enable them to map an adjective to some property other than the shape of an object, and from there, to map an adjective (e.g., shiny) to its meaning (e.g., shininess). This concept may conflict with the alternative theory that the role of a noun is less about conveying the meaning of a word and more about conveying the word type. This theory postulates that children know that nouns come after adjectives, so when asked to find the property referred to by a novel adjective (e.g., can you get me the shiny one?), they can figure out what to look for when the adjective is presented in front of the noun. To investigate the effect of word order, we ask what role competition plays when an improper word order is used. In this study, children are presented with a new adjective and a known noun, but with a scrambled word order (e.g., look, this is a cup stoofy brown). Do children still make the link between stoofy and the “stoofy” property?



Left: An example of the stimuli used in the “Stoof” Study.

Right: An example of the Contextual Cueing Stimuli for the infant experiment.

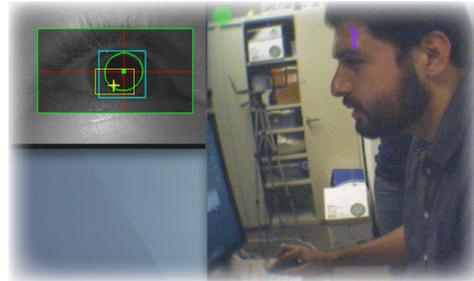


Eye Tracking Study

6 to 20 months old & 3 to 5 years old

Children learn words in real time as they and their social partners move and act in the world. The dynamic coupling of the children’s and their social partners’ attention is crucial to word learning, and many have suggested that eye-gaze direction helps establish joint attention. However, recent studies putting small head cameras low on the forehead of toddlers to measure the first-person view of social interactions with an adult have revealed that typically developing children look at hands—their own and their parents’—more than previously expected. The present study attempts to examine the attentional strategies of older (3-5 years) typically developing children and children with autism spectrum

disorders (ASD), but by using an eye-tracking setup to learn what children are looking at as they figure out how to interact with the world around them. We hope to understand what prompts early attention to shift and how children and infants coordinate their gaze with their moment-to-moment input (e.g., parental speech, gestures). We have also started a longitudinal study following a set of children from the ages of 6 to 20 months to see how these young children adapt to their own developmental changes.



Above: An example of the view through our Yarbus Eye-tracking system

Contextual Cueing - Infant

10 to 15 months old

When a child attempts to determine names for things in the world they have never seen before, they will typically disregard word-object pairings that they are familiar with and instead try to match a new word to the new object. This helps prevent the child from getting confused trying to map multiple words to one object. To better understand how infants may rely on their visual searching in this manner, we have developed a brief animation that children watch while we record where they look on-screen as they try to efficiently search for a special target object. Other researchers have found this ability in toddlers and we hope to be among the first to observe it in infants.



Above: A Vietnamese child (in Vietnam) participating in the “Hungry Fish Game,” used as a measure of attention.

Below: A screenshot from the Training Study showing the Froggy Character enthusiastically teaching about “Daxes.”



Training Study

20 to 36 months old

As children learn words they see that cues of all kinds are emphasized by our parents, schools, culture, and even our language. Evidence of this emphasis is easy to find cross culturally when we look to the different rates at which children develop awareness of various “kinds” in the world and the traits they commonly carry. For instance, a child may learn that a “Dog” is an animal with four legs, eyes, ears, a mouth, and fur but somehow learns to distinguish this animal from a “Cat” despite the similar traits. This study seeks to show how training children to recognize correlating cues in language can help them become aware of these differences and learn how to relate a label (like “cat” or “dog”) to unique examples experienced later.

New Studies continued

Observing the Development of Attention

Age 3 to 5 years old

Attention to relevant information is central to all learning. Selectively attending to appropriate information enables quick learning, generalization to new situations, and successful decision-making; attending to irrelevant information, on the other hand, can lead to error and failure to learn. The remaining question is how such attention is developed in early childhood— whether the changes are gradual or abrupt through the course of development. In order to address this question, the present study aims to include participants from different language learning backgrounds to document how the effect of attention changes over time in early development across cultural groups. Children will participate in a child-friendly interactive game called “The Hungry Fish Game,” in which children are asked to feed the middle (hungry) fish by touching the direction of its mouth among other fish on a touch-screen computer. With the continued help from parents, children, and institutions in the community, the current study can provide new insights into early developmental shifting of attention in monolingual and bilingual children and how such early learning/exposure to more than one language is related to the development of executive control and attentional shifting over time.

Participant Spotlight *Grandparents of DeeDee & Rosie*

Participation with the University of Houston Cognitive Development Lab has been a very enjoyable experience for both of our children. We are happy to be a part of studies which help further the understanding of childhood psychology and development. We believe such studies will lead to better recognition of how children learn and that awareness will lead to improved educational techniques.

As concerns the specific experiences of our children during visits to the UH Cognitive Development Lab, we can say both our girls love the place and the people. The Lab team is friendly and professional. At each visit, they clearly explain what the study involves and the activities required. They work hard to make the children comfortable. As with anyone, there has to be “trust” and “value” in a situation before anyone really fully engages. This happens every time for us and for our girls.

Both girls enjoy playing in the “kid-friendly” waiting area. When called to participate in the study exercises, they are very willing to work with the lab associate. When the activity ends, the girls want to stay longer and do more. The “parting gifts” like stickers and stuffed animals are wonderful, but our girls love the encounter more than the reward. This says a lot for the staff and for the program. We can highly recommend participation in this outstanding program.

-Thom and Nancy Clark



Current Studies

Bilingual Immigrant Study

Longitudinal, 3 to 6 years old

In the Bilingual Immigrant study, we are interested to see how differences in language-learning environment and culture affects performance in Executive Function (EF) tasks, and by doing so, its effect on early academic achievement and the development of attention. In the present study, children participate in various fun and interactive games like the card sorting task, the hungry fish game, and the Simon task. Every six months for three years we will be following up with the participants with the same games to learn how their performance has changed over time. Recently, we expanded our study to include China to further study the effects of culture on children's performance on EF tasks. As of 2010, our researchers have made their first visit to China to collect data in August, their fourth visit to Argentina in June, and their fifth visit to Vietnam in July.



A Vietnamese participant performing the Simon Task in Vietnam.



Researcher Crystal in Vietnam with class of participants.

Highlighting Study

Ages 12 months to 13 years old

Throughout our daily lives, we are always connecting new information with what we have already learned. The Highlighting study is concerned with what happens when someone is forced to make decisions based on fuzzy information. Also, how does the order in which we learn things influence this decision making process? Our lab studies the cooperation between attention, memory, and early knowledge which are crucial components that help us make important day-to-day decisions. What we have been finding is that children are very in tune with their surroundings, and have a tendency to focus their attention on information that will help them reduce

errors during those times when they need to make decisions given unclear information. This type of behavior has normally only been studied in adults, and suggests that there exists a general learning trend across development that aids us in those instances when we are not so sure on how to choose.



A child participates in the Attention and Saliency Study in the UH main campus Lab

Quantity Study

30 to 60 months old

How do children make quantity judgments in the absence of linguistic supports? This study explores the quantity judgments of native English speaking children and native Japanese speaking children in the absence of any supporting linguistic markers. As per the Whorfian Hypothesis, the differences in the grammatical environment of each language has an effect on the cognitive organization of the world such that a child's quantity judgments will vary based on different types of objects and across language groups. During the task, the children are asked to identify which of two characters has more of the object or substance presented on screen. Japanese data collection was conducted this summer and English data collection continues.

Attention and Saliency

17 to 21 months old

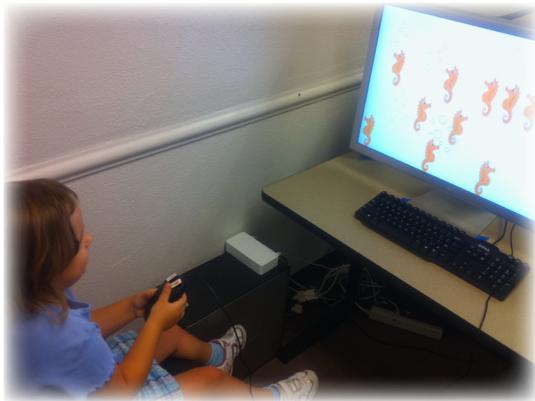
As children develop and their vocabulary grows, we begin to ask how exactly a child knows to what object a word refers. Research in the field suggests a multitude of factors that help guide a child's attention to correctly map a word and object together, such as pointing to the object or an objects' own distracting features. We term these "salient factors" and examine the ways in which such individual factors influence word learning as well as competition between multiple factors. Coupling these with an adult's intention (in this case, the experimenter's use of pointing or asking questions), we hope to get a clearer picture of early word mapping in children.

Current Studies

Contextual Cueing

3 to 5 years old & 7 to 13 years old

The contextual cueing study investigates how repetition in the visual field can influence looking behavior, and how this ability develops across three age groups: infants (5-16 months), toddlers (3-5 year olds) and school-aged children (7-13 year olds). Adults benefit from repeated visual information in many situations, such as when finding street signs or pedestrians while driving. Researchers do not know, however, when this ability develops, or whether children use this form of learning in a similar or different manner relative to adults. The task involves sitting at a computer and finding a target object on the screen. Preliminary results suggest that children in all age groups may be able to benefit from repeated visual information.



Left: A child participates in the Contextual Cueing Toddler Study

Below: An example of stimuli used in the Perceptual Similarity study.



Perceptual Similarity Study

Ages 36 to 59 months old

How do young children learn adjectives? Research suggests that adjective learning is facilitated when children are presented with objects that have familiar properties such as color or shape. This also suggests that perceptual information is key to early adjective learning. This theory proposes that children focus on surface similarities of objects rather than their functionality and so to improve adjective learning we must use objects that are perceptually similar. Our research seeks to compare these theories. Results so far suggest that 3 year olds rely on perceptual information to learn novel adjectives while 4 year olds rely more on categorical information. We hope that through this study we will find ways to make adjective learning easier for young children.

Recent Awards & Presentations

The Cognitive Development is constantly challenging all of our research assistants and graduate students to present research and compete in the field! In the Spring, research assistant Jaymie Allen received a Provost's Undergraduate Research Scholarship, and Kevin Darby and Maria Arredondo completed Senior Honors Theses related to Contextual Cueing and Bilingual Immigrant respectively. For his efforts, Kevin Darby was rewarded by an "Outstanding Thesis" award from the University of Houston. These two diligent research assistants also presented outstanding posters at the Undergraduate Research Day related to their thesis work.

Other poster presentations included "Implicit Learning of Spatial Context by School-Age Children" at the 32nd Annual Conference of the Cognitive Science Society in Portland, Oregon, and a poster entitled "The role of different cultural practices on early development of self-regulation" at the 40th annual meeting of the Jean Piaget Society (JPS) in St Louis, MO. Graduate Student Crystal Tran also contributed to a talk, "Attentional Control and Early Word Learning" given by our Lab Director at the Cog Sci conference in Portland. This is just a small selection of the great work our lab continues to produce with the help of the local community!



Above: Kevin Darby presents "Implicit Learning of Spatial Context by School-Age Children" at the Cog Sci conference in Portland, Oregon

Below: The Cog Dev Lab team!



Would you like to help
us further our research?
Then join our lab today!

Give us a call:
713-743-4876

Or Sign up on our website:
www.class.uh.edu/psyc/cogdev

We welcome children from all developmental backgrounds, including those who are deaf or who have autism, and appreciate your participation.

Your child will receive a small gift for each study in which he or she participates. Families will receive a \$5 gift card per visit to the lab for your time. Families with deaf children or children with autism will receive an additional gift.



Special Thanks

Thanks to all of the parents, educators, and institutions that have helped make our research possible!

Clear Lake City-County Freeman Branch Library
The Nehemiah Center - Houston
Houston Community College Lab School
The UH Child Care Center
The Houston Chinese Community Center
The Monarch Childcare Center -Houston
Sugar Creek Baptist Preschool - Houston
Silverline Montessori -Houston
Parker Williams Library- Houston

四川省成都市实验婴儿院 - P.R.China
Agape Learning Center -Houston
The Chinese Community of Đồng Nai, Vietnam
Casa Carlos Mugica -Argentina
Centro Vecinal -Argentina
Duendes Magicos -Argentina
Guarderia Policial -Argentina
Guarderia Bajitos -Argentina
Hogar Tapia -Argentina
Nakano Preschool -Japan
Nakano Nursery School -Japan
Yuukikai Preschools -Japan
Trường Hoa Cúc -Vietnam
Trường Hoa Phượng -Vietnam
Sojiji Preschool - Japan
Mitsuike Kindergarten - Japan