Infant & Child Studies

At the University of Maryland

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INFANT & CHILD STUDIES

2012 Edition

AT THE UNIVERSITY OF MARYLAND

Lots of exciting changes have been happening at Maryland in the past year! First, we welcome a number of new faculty researchers to our group! We have grown from an original group of three researchers to a group of nine researchers across four different departments. We begin with introductions of our new colleagues.

Elizabeth Redcay is an Assistant Professor in the Department of Psychology. She received her Ph.D. in Psychology and Cognitive Science from the University of California San Diego and completed her postdoctoral work in the Department of Brain and Cognitive Sciences

at the Massachusetts Institute of Technology. Her research examines how changes in our brain organization can affect how we think about, learn from, and interact with other people. For example, how and when do we begin to think about other people's thoughts (or have a theory of mind)? What motivates us to share the object of our attention with others? She examines these questions using behavioral paradigms as well as functional magnetic resonance imaging (fMRI) both in children who are typically developing as well as children with autism spectrum disorders.

Jonathan Beier is a new Assistant Professor in the Department of Psychology. He received his Ph.D. in Developmental Psychology at Harvard University in 2008, and then completed a post-doctoral fellowship at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. Dr. Beier's research investigates the developmental origins of social cognition, through studies with infants, toddlers, and young children. This work centers on two broad questions. First, how do children come to recognize both the mental causes and social consequences of other people's behavior? Second, how does this understanding influence children's own participation in their social world? Some of Dr. Beier's recent research projects have examined infants' reasoning about the role of mutual eye gaze in social interactions, toddlers'

predictions for helping among friends versus strangers, and preschoolers' motivations to help others communicate more effectively. To address issues such as these, Dr. Beier uses a variety of age-appropriate research methods, from analysis of infants' looking patterns within social scenes to more active measures of older children's helping and communicative behaviors.

Geetha Ramani is an Assistant Professor in the Department of Human Development and Quantitative

Methodology. She received her doctorate in Developmental Psychology from the University of Pittsburgh and then was a Postdoctoral Research Associate in Cognitive Development at Carnegie Mellon University. Dr. Ramani is interested in how children's social interactions promote their cognitive development, in the areas of mathematics, problem solving, and planning. One specific area she is interested in is how children learn through play and the informal activities they engage daily with their parents and peers. Dr. Ramani has conducted projects that have looked at how playing informal numerical activities, such as board games, can promote young children's number skills. She is also interested in how parents talk to their children about numbers while playing together, as well as how children explore math concepts during play.

Meredith Rowe is in her third year as an Assistant Professor in the Department of Human Development in the College of Education. She received her doctoral degree in Human Development from Harvard University in 2003 and then spent six years as a postdoctoral fellow in Developmental Psychology and Sociology at the University of Chicago. Dr. Rowe is interested in the role of early experiences in child development with a specific focus on how young children learn language through social interactions with others, particularly parents. She conducts observational studies, which involve observing and videotaping typical interactions between parents and children, as well as experimental studies that explore various methods of enhancing word learning. Dr Rowe teaches courses in language and literacy development and has two young children herself.

Yi Ting Huang is a new Assistant Professor in the Department of Hearing and Speech Sciences. She received her Ph.D. in Developmental Psychology at Harvard University in 2009 and has most recently spent her time as a post-doctoral fellow in Cognitive Psychology at the University of North Carolina at Chapel Hill. Dr. Huang is interested in many topics within language acquisition but the bulk of her work focuses on how young language learners acquire the ability to coordinate linguistic representations during real-time comprehension. She explores this question by using eye-tracking methods to examine how the moment-to-moment changes that occur during processing influence the year-to-year changes that emerge during development. She has applied this approach to examine a variety of topics including word recognition, application of grammatical knowledge, and the generation of pragmatic inferences. Other questions that Dr. Huang has studied include the relationship between language and concepts, comprehension and production, and oral language development and literacy.

Naomi Feldman joined the Linguistics Department as an Assistant Professor last January after completing her Ph.D. in Cognitive Science from Brown University. Her research looks at which strategies children use to learn about the sounds and words of their language. For example, babies learn to segment words from fluent sentences around the same time that they learn about the sounds of their language (between six and twelve months). Could this attention to words actually be a strategy that helps children learn which sounds are important in their language? At what age does children's knowledge of words begin to help them interpret the sounds they are hearing in real time? Dr. Feldman uses experiments and computational models to tackle these questions. Computer models help identify strategies that could lead to successful language learning, and experiments help reveal which of these strategies children actually use.

What possible meanings do children consider when learning new words?

Learning new words involves several steps, because children have to figure out both what part of speech the new word is and what it means. We already know that very young children know that *blick* is a noun in a sentence like *This is a blick*, and that *blicky* is an adjective in *This is a blicky one*. But once they figure this out, how do they determine what *blick* or *blicky* means? For example, if children shown a Dachshund are told that in a new language it is called a *blick*, the new word could mean anything that is consistent with the properties of a Dachshund (Dachshund, dog, mammal, animal, brown thing, etc). Previous work has shown that in this case children tend to think *blick* means Dachshund.

In our first study we have replicated this finding, and also learned what children do when learning new adjectives in the same context. Children are shown an array of pictures that includes two kinds of dogs (Dachshunds and Yorkies), several other animals and several vehicles, with both spotted and striped versions of each animal. A snail puppet teaching the children 'snail language' labels three of the spotted Dachshunds *blicks* or *blicky ones*. Then the child is asked to find more *blicks* or more *blicky ones* from another array. Children learning nouns tend to only pick Dachshunds, showing that they think that *blick* means Dachshund. Children learning adjectives tend to pick everything spotted, showing that they think *blicky* means spotted, and isn't dependent on the spotted thing being a dog or a Dachshund.

In our second study we taught children separate words for the spotted and striped varieties of both dachshunds and police cars. We taught another group of children adjectives for striped and spotted that took different suffixes depending on whether the item was a Dachshund (*blick-sa*) or a police car (*blick-do*). This allowed us to look at how children learn word classes (like grammatical gender in Spanish) in addition to word meanings. Children learning nouns showed the same pattern as in the previous study. Children learning adjectives tended to think *blicky* only describe spotted Dachshunds. Children learning word classes showed a different pattern, where *blick-sa* could describe any animal.

These results show that despite being shown exactly the same examples, the meanings children consider differ depending on the kind of word they are learning. We think that when learning nouns and adjectives, children may be basing these decisions based on what they already know about the kinds of meanings nouns and adjectives tend to have. When learning word classes, children may be relying on general learning principles.

An example of the array of pictures used in these studies.

What is 'doking'? What possible verb meanings do children consider?

How do children learn the meanings of verbs? What is the range of meanings they consider for a new verb that they haven't heard before? To address these questions, we have been examining 14-, 16- and 18-month olds' acquisition of novel verbs.Imagine a scenario where an animated penguin is spinning, and you hear someone say, "Look, it's doking!" What does "doking" mean? Adults generally think that "doking" means "spinning." But the same situation could also be described as "moving", "being a penguin," "being a moving penguin", "being a spinning penguin," etc. We are interested in whether children's guesses about meaning are less constrained. The first step of this research is to determine when children learn that verbs refer to events (spinning) but not to objects (penguins). We present children with a short movie that consists of two parts – a habituation phase and a switch phase. In the habituation phase, an animated penguin is either spinning or cartwheeling; when it is spinning, a child-friendly voice says "Look, it's doking! Do you see it doking?" When it is cartwheeling, the voice says "Look, it's pratching! Do you see it pratching?" These two pairings are repeated until the child's attention to these videos decreases. At this point, the experiment goes into the switch phase, where the pairings are switched: the spinning penguin is now paired with "Look, it's pratching!" whereas the cartwheeling penguin is paired with "Look, it's doking!" If the child notices this switch, he/she will be interested in the video again and looks more at it. Because we switch the pairing between the event and **the** novel verb, if children notice the switch, then we have reason to believe that they have learned that verbs refer to events.

Our results show that as early as 14 months, children are able to detect this switch. This result suggests that long before they are producing verbs in their own speech, children may know something about the connection between verbs and events. Further research will explore the specificity of this connection. Are only verbs associated with events? How specific of an event does a new verb pick out?

Who did the mouse bump? How kids understand questions?

Understanding questions requires several kinds of knowledge. First, it requires knowing the meanings of the question words (*who, what, where…*). Second, it requires knowing that the order of words in questions is different from the order of words in statements. For example, the object typically follows the verb in English statements (*The elephant washed the monkey*), but precedes the verb in questions (*Which monkey did the elephant wash?*) When do children understand questions and how do they learn these properties of questions?

Previous research in our lab has discovered by that by 15-months, children know that *"who"* refers to an animate object, whereas *"what"* refers to an inanimate. For example, we showed babies images of one box containing a truck and one box containing a cat. When we asked "*who is in the box?*" babies chose the cat. When we asked *"what is in the box?"* they chose the truck.

We have also been exploring what children of this age know about the word order of questions. We showed children videos in which first a brown monkey washes an elephant and then the elephant washes a black monkey [images?]. We then show them the two monkeys [image?] and ask, "*which monkey did the elephant wash?*" The same type of changes in word order happen in relative clauses, *"show me the monkey that the elephant washed."* The results were surprising. Whereas 15-month-olds correctly chose the black monkey (by looking more at that monkey than the other), 20-month-olds looked equally at the two monkeys. Why do children seem to get worse at understanding questions as they get older?

To understand this pattern, we hypothesized that 15-month-olds' success with these sentences was illusory, that their understanding mimicked adults' without being based on the same structure. We suspected that they use what they know about verbs to get them to the right answer. For example, when they hear *wash* in a question like *which monkey did the elephant wash*, they know that there are two participants in a washing event (a washer and washee) and they know from the sentence that the elephant was the washer, so they chose the monkey that got washed by elephant. In this way, they get the right answer without having to process the question fully the way adults do.

We are testing this hypothesis by using their knowledge of the question words. We show children a video in which several bumping events happen. For example, a mouse bumps both a truck and a boy, and a girl bumps a mouse. We then ask children "*Who did the mouse bump?"* If children at 15 months are not fully processing the question, they will know that the right answer is something that got bumped, but in this context, either the truck or the boy will do. On the other hand, if they are able to fully comprehend the sentence like an adult would, they will use all the relevant parts of the sentence (both the bumping event *and* the question word *who*) and recognize that the question can only be about the boy. If they can do this, they will correctly choose only the boy.

Linguistics

Learning to count: Can syntax help?

It takes children longer to learn how to use counting words than quantifier words like "most" earlier. We are interested in whether knowledge of words like "most" helps kids learn counting words.

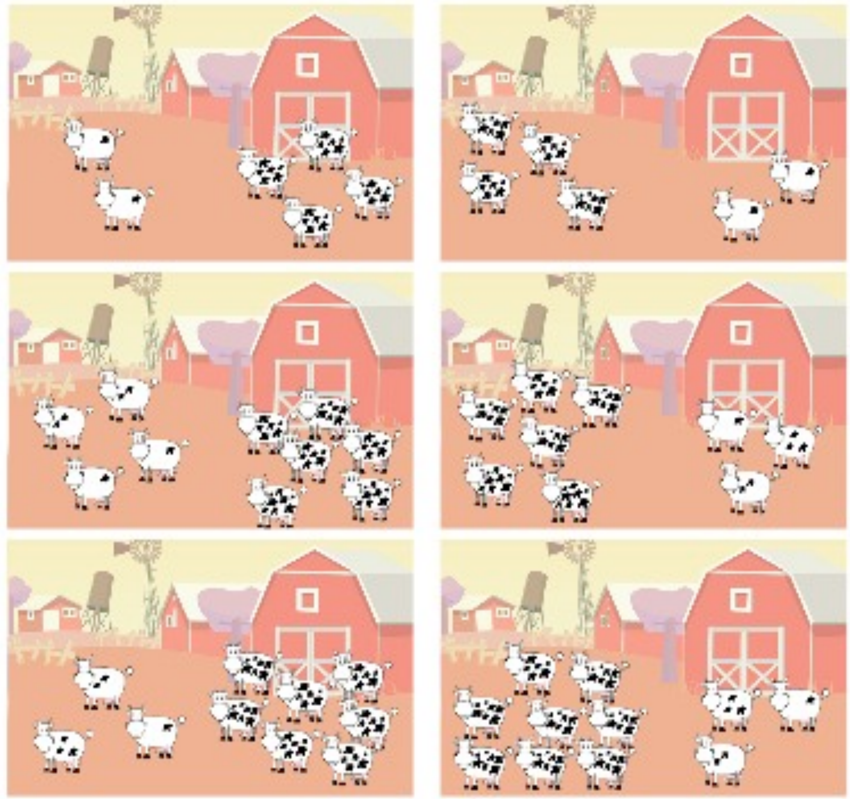
Why might the counting words be difficult? Quantifier words, like counting words, are pretty abstract: we can tell that a group of cows is "spotty" by looking at each cow and checking if it is spotty, but of course we can't tell the number of cows by looking at any one of them.

Many studies have looked at how children learn new words by using the structure of the sentences they occur in. As adults, the sentence in (1) tells us a lot about what "gleebest" can and can't mean, even without a context: we know that it can't mean "spotty" or "spottiest", because "spottiest of the cows are by the barn" is not a good sentence. We know it must mean something about the number of cows, as only quantifier words can appear in this structure, e.g. "some/many/most of the cows are by the barn". In contrast, in the sentence in (2), we don't know whether "gleebest" refers to number or something like spottiness, because such a structure supports both types of meaning.

(1) Gleebest of the cows are by the barn.

(2) The gleebest cows are by the barn.

Our studies have revealed that children know a lot about what types of meanings different sentence structures support. Most studies have looked at how children learn nouns and verbs, not at whether they can use structure to learn number words. Studying this aspect of language may help us understand why counting words are learned later than words like "most".



TRUE FALSE

In our study, we used sentences like (1) and (2), and gave children cards with groups of cows that differed in numerosity and their degree of spottiness. After showing some cards where the sentence is true and some where it is false, we can see how children understand "gleebest" by how they sort new cards as true or false.

We have found that children overwhelmingly understand "gleebest" to refer to the numerosity of a group of cows when given the sentence in (1), but they understand it to refer to the spottiness of the group when given the sentence in (2). So, young kids can use sentences to decide whether a novel word is about number. But, since number words can appear in sentences like (2) ("the two/many/most cows"), why do children overwhelmingly prefer "gleebest" to mean "spottiest" here? Is it because number is so abstract? We are developing studies to explore this question further.

Where are they now? Some of our lab graduates and what they are up to!

Linguistics: **Briana Shatzel** at the University of Pittsburgh getting a masters degree in Speech-Language Pathology. **Stacey Maresco** is working for SIL International, a non-profit that does language development work in over 100 countries, as well as studying for the GREs to prepare for grad school. **Katrina Connell** is at the university of Hawaii in a Second Language Studies masters program with a specialization in Second Language Acquisition.

Hearing & Speech

Understanding people with a foreign accent

An interesting topic in recent research is children's ability to learn new words and the aspects of those words children store in memory. Spoken words are rarely produced the same way between and across speakers. One speaker may change the way he or she says a word based on tone of voice or where the word falls in a sentence, while another speaker's gender, voice, or accent may impact how the same word is produced.

This is particularly the case when listening to a person with a nonnative accent. Adults are able to adjust for this relatively quickly. However, given toddlers' limited vocabulary, it is reasonable that they may treat a variant of a known (or newly learned) word as an entirely different word.

Recent research has shown that older toddlers (30 months) have succeeded in recognizing newly learned words across different speakers, where younger infants (24-months-old) have failed. A study conducted in the Language Development Laboratory looked at whether 30-month-old children were able to accommodate accent differences when learning new words.

The children were taught two new words by a Spanish-accented speaker and later tested by a native English speaker. One of the trained words ("fim" or "nutch") had a sound change in the vowel when produced with an accent ("fim" pronounced as "feem", or "nutch" pronounced as "notch"). This type of sound contrast ("ih" versus "ee") is called a phonological change since the use of either one would cause a change in word meaning in English ("bit" versus "beat"). The other trained word did not have a sound change ("shoon" or "mef") when produced across the two speakers. These sound changes were also evident in the phrases used to teach the children, which gave toddlers the opportunity to learn about those changes. Participants were tested not only on the trained word, but also a novel (untrained) word.

If children had learned the trained objects, they would treat the novel words as indicating a novel object. That is, if children had learned that "feem" refers to object 1, then they should not only look at object 1 when told to look at the "fim", but should look at object 2 when told to find the "shoon".

The results showed that toddlers looked to the correct object significantly longer than chance only when the label did not cause a sound change across accented and native talkers ("shoon" or "mef"). However, toddlers did not look longer to either the easier target (e.g. the mef) than the harder target object (e.g. the fim).

This suggests that toddlers at this age can accommodate some talker differences when recognizing newly learned words; however, this flexibility is limited to non-phonological sound changes, even with brief exposure to the accent. Children's performance on each task varied between participants. A question remaining for future research is whether providing more exposure (lengthier training) and/or experience (daily exposure to accents) would make toddlers more successful in this task.

Are You Speaking To Me?

You've probably noticed that people talk differently to infants and young children than they do to adults. Indeed, if we spoke to an adult the way we spoke to an infant, we would probably be treated as if we were crazy! We don't simply "talk down" to infants – we use an extremely "happy" tone of voice, with high pitch and extreme pitch variation.

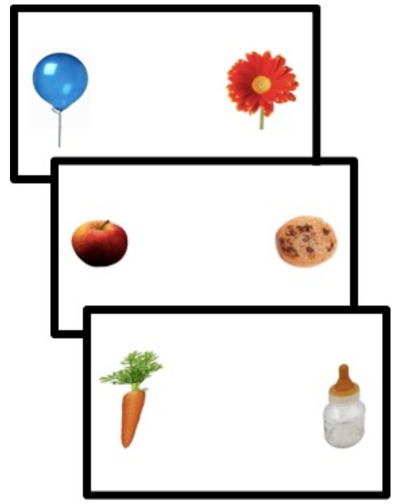
These types of speech changes are almost universal, prompting the question of what their benefit might be. Over the past two decades, researchers have shown a number of benefits to this speech type, at least for young infants. Four-month-olds listen longer to this infant-directed speaking style, giving them more opportunities to learn from it and to bond with their parents. In particular, young infants seem particularly drawn to the pitch changes of this speaking style.

But these preferences have primarily been demonstrated with very young infants. Indeed, research from our lab and from others suggests that older infants (between 8 and 12 months of age) no longer show this preference for wide pitch changes; yet parents continue to use this speaking style.

This led us to ask what aspects of the speaking style might attract the attention of these older infants. We hypothesized that infants in their second year of life might prefer listening to the grammatical aspects of this speaking style. Speech to infants not only differs from speech to adults in terms of its pitch, but also involves simpler, shorter sentences, with less complicated syntax. This might make sense for older infants, who are learning language, but probably has little advantage to 4-month-olds, who are too young to understand what is being said anyway. But for older infants, these simpler grammatical constructions might make it easier to understand and learn from the language around them.

We therefore tested 14- and 12-month-old infants' preferences for speech that either had the pitch changes of an infant-directed speaking style, the grammatical structure of an infant-directed speaking style, or both. Surprisingly, infants in their second year of life did not show any preference for the simpler sentences that were more representative of the speech they typically hear. However, they did show a renewed preference for the pitch changes of infant-directed speaking style (something not found previously with 8-month-olds). Future research will be exploring this developmental change in more depth.

Word comprehension across dialects



Around the world, children are exposed to different accents and dialects of their language very early on in life, due to existing and expanding multicultural contacts and multilingualism. Understanding how it is that young language learners process regional variations is therefore a topic of great interest. As part of a collaboration with the Infant Language Center at the National University of Singapore, our lab has been exploring young children's ability to understand familiar words when they are produced by speakers of different dialects of English.

Variations across dialects such as American, Australian, and British English have been mainly characterized by differences in how vowels and consonants are produced. A unique aspect of Singaporean English is that it also differs from American English in rhythmic class. This current project is examining the extent to which 19-month-olds' language comprehension is influenced by variations in the rhythm of their language, and whether children's previous linguistic exposure influences their ability to generalize across dialects.

A group of children in Singapore (where different languages and accents are heard on a daily basis) has been tested to date. The goal is to compare this data with that of a group of American children in Maryland (where the amount of exposure to other languages and accents is considerably less). During this study children are presented with pairs of images of familiar objects on a screen, and hear a sentences asking them to look at one of the objects. On each trial the sentence is produced by a female speaker of American, Singaporean or Australian English.

Data from the Singaporean group suggests that accuracy when identifying familiar words (e.g., *balloon, apple, flower*) is comparable across the three dialects. That is, children are looking at the correct object significantly above chance, regardless of regional variations in the speech. It is possible that children's exposure to the multiple languages and accents in their environment allows them to more easily generalize across acoustic changes (including rhythm) in their language. It is also possible that the American children might show greater difficulty understanding the non-native dialects, given that the linguistic environment that they are exposed to contains less variation. We are continuing to collect data with the American group. These findings will help us to better understand the type of components (included in the speech signal) that are necessary for early language comprehension.

Where are they now? Some of our lab graduates and what they are up to!

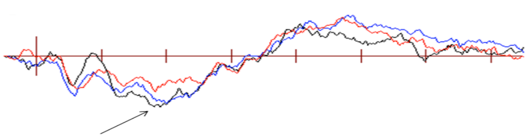
Hearing & Speech: **Sabrina Panza** and **Lisa Tuit** completed their MA degrees in Speech-Language Pathology, and are now working as clinicians in the area. **Laura Horowitz, Lauren Fischer, Eileen McLaughlin, Elise Perkins, & Sara Edelberg** all graduated with their bachelor's degrees and have started graduate programs in speech-language pathology or audiology. **Katrina Ablorh**, a high-school intern from Eleanor Roosevelt who was in the lab last year, is now attending college at Cornell.

Psychology

How many details can children remember?

What is my teacher's name? What did she tell me to do? Where did she tell me to go? Children remember many details in their daily lives. Research in the Neurocognitive Development Lab is designed to examine how their developing brains help them remember these details. Our previous research has shown that recordings of children's electrical "brain waves" appear different when they view objects they have seen before and objects they have not seen before. In our current study, we wanted to know if how many details children remember about an event influences their brain's activity.

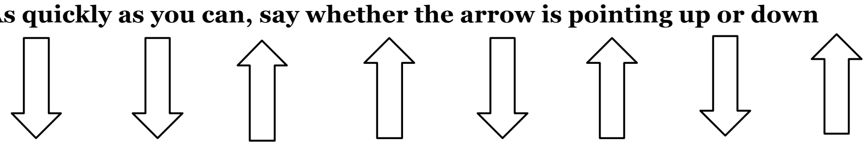
Children 3 to 6 years of age visited the lab on two different days. The first day they played with toys in two different rooms with a researcher who asked the child to imitate silly actions she performed on the objects. For example, she would put a toy dinosaur on her head or hug a toy car. On the second day, children's memories were tested. We asked them what room they saw the toys in and what actions went with each toy. We also recorded electrical brain responses as children viewed pictures of the toys from the first session and toys they had never seen before.



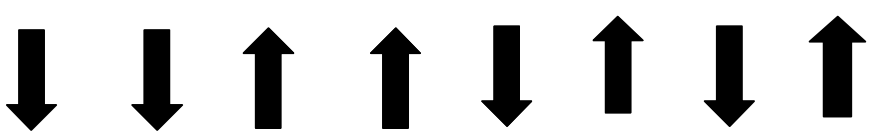
Our findings suggest that children are much better at remembering the actions they performed on the toys than which room they played with the toy in. Recordings of children's brain activity show different responses to old and new toys (consistent with our previous research), but appear to be similar for old toys regardless of the number of details remembered (see the picture!). Some of the 3- and 6-year-old children that helped us learn about memory are coming back to the lab for a third visit, during which children complete tasks involving executive function. (the brain processes that are responsible for planning, organizing, thinking flexibly, and inhibiting inappropriate actions. We are curious whether executive function is related to children's memory for details (like which room or action went with a particular toy). For example, one of these tasks examines if 3-and-6-year-old children will wait 5 minutes for 10 M&M's or if they would rather choose to have 2 M&Ms with no waiting. Another task asks children to name as many different animals as they can in 1 minute. Like in the game Simon Says, some tasks ask children to follow tricky rules (see example below). In the next newsletter we will report on how executive function is related to memory

Have your child try this brain teaser!

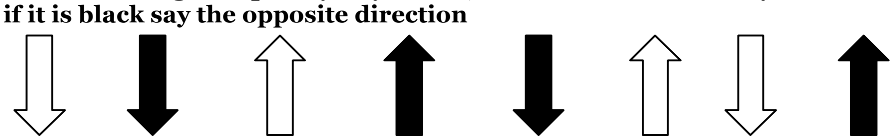
Level 1: As quickly as you can, say whether the arrow is pointing up or down



Level 2 - Opposites: As quickly as you can, say the opposite of the direction the arrow is pointing



Level 3 – Rule Switching: As quickly as you can, if the arrow is white say the direction it is pointing, if it is black say the opposite direction



How does emotion influence memory?

Research has shown that when adults are asked to recall events from their past, emotionally significant ones are remembered best. One study in our lab is asking whether this phenomenon is also present in children and adolescents. Specifically, we ask children and teenagers to view emotional pictures (such as the bear below) and non-emotional pictures (such as the clock). After a short delay, children are asked to recall information about these pictures. Our results showed that 8-year-old children remembered emotional pictures better than non-emotional pictures and this was more true for girls compared to boys. We are still running adolescent participants to see if this pattern is similar at older ages. If you know of any 12-14 year olds who may want to take part in a study like this, please contact us at MarylandNCDL@gmail.com.

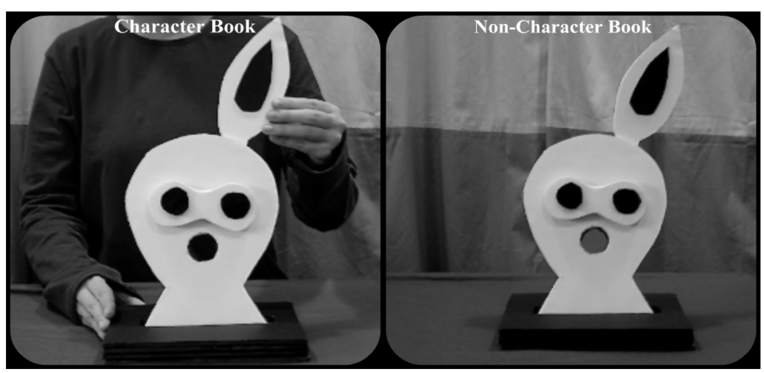
Which would you remember better?

What helps children remember an event?

One study in our lab examined how children learn and remember social versus non-social events. Previous research tells us that adults are better able to remember events that involve people or other living beings, and that older children (around 7 or 8 years) share this bias. However, there is little research on how events involving people affect memory in preschoolers, most likely because children at this age are not verbal enough to tell us what they remember.

In this study, we asked 2-3 year olds to read picture-books with an experimenter. These books showed *either* a character (Sally) putting a set of pieces together to create objects *or* showed the pieces going together by themselves (without a character). After reading the books, children watched a series of pictures on a computer screen, some of which they had previously seen in the books and some which they had never seen. Brain activity recorded during this phase showed that children who read the character books showed different patterns of brain activity to the old and new pictures. Those who read books without a character did not show differences in brain activity. This suggests that those who saw a person putting the objects together may be better able to remember the event!

We tested this question by giving the same children objects they had previously seen in the books and asked them to physically reconstruct the objects. As expected, children who had read the books involving a character were able to put together more pieces than those who had read books without a character. Altogether, this means that young children remember more about an event when a person is involved, even when this event is in the form of a book! In the future, we hope to examine whether even younger children (18-24 months) show this memory bias and to investigate why learning from people is so important.



Where are they now? Some of our lab graduates and what they are up to!

Psychology: **Meghan Riley-Graham** graduated with her Masters in Psychology and is now teaching English as a second language to school-aged children in Cambodia. **Liz Woytowicz,** our former lab manager, is now back in school full time attending the University of Maryland School of Medicine graduate program in Physical Therapy and Rehabilitation Sciences

Children's National Medical Center

Do you have a child with autism?
Are you expecting, or do you have, a baby?

The Infant Studies consortium at the University of Maryland and the Center for Autism Spectrum Disorders at Children's National Medical Center are conducting a research study on infants who have autism in their families. We are looking to identify early predictors for whether a child is at higher risk of developing autism.

This is a longitudinal study, meaning we will be following your child over time in order to track his or her development. Our studies take place in a comfortable, home-like setting, in which we observe how your child responds to new objects or events. For example, your child may be shown images on a video monitor, or be played sounds of people talking, and we will record how long he or she pays attention to different items.

For more information, please call Tess Wood at the Infant Studies Lab, at 301-405-4233, or email AutismSiblingStudy@umd.edu

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New Research Projects

With all of our new faculty, we also have several new research projects!

How do children understand friendship?

Consider two people, Karen and Michelle. If we learn that they are best friends, we immediately hold many expectations about their likely behaviors towards one another. For instance, they will choose to play together more than with others. They will also help each other more and be more sensitive to one another's feelings than would two people who do not know each other very well.

Do children also hold these kinds of expectations? Studies conducted by Dr. Jonathan Beier have asked when children first understand that people with different relationships will act differently towards one another. In one recent study, two-year-old children first observed a group of people whose actions indicated that some were friends while others were not. Later, one of the people carried a tray of tin cans behind a curtain. When she was heard dropping the cans loudly and asking for help, children looked longest to her friend, presumably anticipating that this person was most likely to help her.

This finding suggests that two-year-old children understand that people who have interacted in a particular way (i.e., as friends) are more likely to exhibit particular behaviors towards one another (i.e., to help out). Ongoing research in Dr. Beier's lab looks at children's early notions of friendship and other relationships in more detail. For instance, what do children think are the defining features of friendship? How are these different from other relationships a person might have, such as with family members or authority figures, such as teachers? With your support, we are excited to continue this work!

How do changes in our brains change the way we think?

Using functional magnetic resonance imaging (fMRI), the Developmental Social Cognitive Neuroscience lab (DSCN), led by Dr. Elizabeth Redcay and the Neurocognitive Development lab (NCDL), led by Dr. Tracy Riggins, are teaming up to investigate how changes in the connections between different regions of our brains allows us to get better at thinking about other people's minds and at memory for details.

Children who are 4 or 6 years of age will visit the lab for a behavior testing sessions in which they will play games with an experimenter. These games are designed to examine aspects of social and cognitive development

On a second visit, children will visit the new Maryland Neuroimaging Center (MNC) at the UMD campus and participate in an MRI training session and MRI scan. During this visit, children will first get comfortable with lying still in an MRI machine by practicing in our 'mock' scanner. Children will then move to the real MRI scanner and watch a video while the scanner takes pictures of their brain. MRI is a non-invasive method that uses magnetic fields and natural properties of molecules in the brain to take pictures of the brain.

These findings will help us to understand how brain organization contributes to social and cognitive development and inform us on how disorders with atypical brain organization (like autism) lead to difficulties with understanding others.

Infant & Child Studies

At the University of Maryland

Thank you for your participation!

Feel free to visit our web page at www.InfantStudies.umd.edu

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