

SPRING 2018

INFANT & CHILD STUDIES CONSORTIUM



IN THIS ISSUE

Hearing & Speech

**Human
Development**

Psychology

Linguistics

CONTACT US



childstudies@umd.edu



childstudies.umd.edu



301.405.6302



@InfantStudiesUMD

1401 Marie Mount Hall, UMCP
College Park, MD 20742

YOUR GUIDE TO CHILD DEVELOPMENT RESEARCH!

This issue of our newsletter highlights some current studies from our various offices, as well as recent findings. None of our research would be possible without families like yours! Our research group, comprised of UMD faculty, graduate students, post-doctoral fellows, undergraduate students, post-baccalaureate researchers, and lab managers hopes you enjoy reviewing the exciting progress we've made this year.

We always welcome new families!

The Infant and Child Studies Consortium always welcomes new families to participate in research. Spread the word to friends and colleagues!



The goal of the HESP Department is to advance the science behind speech, language, and hearing through continuous research efforts.



"kids' developing attentional skills play an important role in their ability to understand speech in noise"

- Language Development Lab

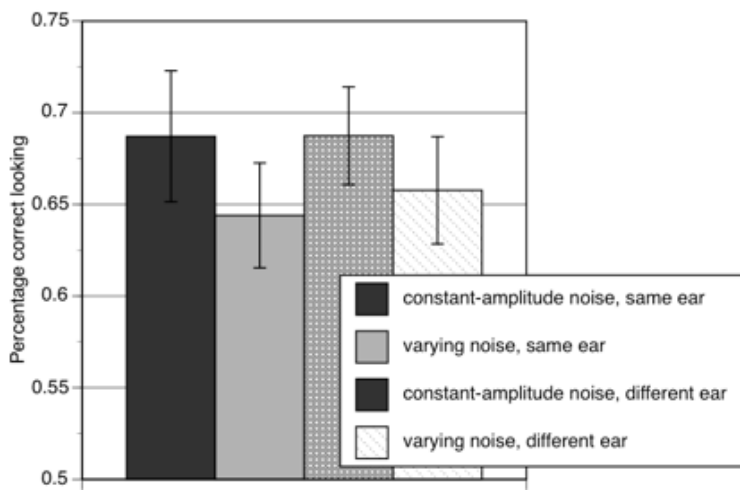
Why is listening in noisy environments so difficult?

Hello, from the Language Development Lab, directed by Dr. Rochelle Newman! A lot of our previous research has focused on children's understanding of speech in noisy environments - which are typical environments for most kids, most of the time! We have found that infants and children consistently have more trouble than adults, and their ability to understand speech in noisy conditions develops over time.

Now, we are working on finding out why young children have more difficulty, and what drives this developmental change. One possibility is that children have a harder time recovering from signal degradation (parts of the speech signal being covered up by noise), and that as they learn language, it becomes easier to fill in what they missed.

Another possibility is that kids are just easily distractible, and as their attentional skills develop, they get better at focusing on the speech and ignoring the noise. In an ongoing study, we're looking at the relative impacts of signal degradation and distractibility on children's ability to understand speech in noise.

In this study, children between 2- and 3.5-years-old watch a video while wearing headphones. They see two images, like a cat and a dog, and through only one ear of the headphones, a speaker directs their attention to one of them. Sometimes white noise (constant or varying in intensity) is presented to the same ear, overlapping with the speech, and sometimes it's presented to the other ear, so that the noise doesn't cover up anything, but it's still potentially distracting. We then measure how long the children look at each image; if they understood that the speaker said "look at the cat," they should spend more time looking at the cat than at the dog.



The graph on the left shows the percentage of correct looking in different noise situations.

Adults find it easy to ignore noise in the opposite ear from the speech. But so far, toddlers are having just as much difficulty with noise in the opposite ear as they do with the overlapping noise, suggesting that kids' developing attentional skills play an important role in their ability to understand speech in noise. Noises that don't bother you may still be distracting for your child, so be aware of them - they might make it a lot harder for your child to listen and learn!

Ready, set, segment! The earliest moments of foreign language learning

If you're ever tried learning a foreign language as an adult, then you know it's tough! At first, all of the words just mush together. We experience this because we haven't yet learned how to efficiently segment or break down the speech into individual words. Infants, in contrast, make language learning look like a breeze!

We know that learning a foreign language at an earlier age has an impact on later linguistic competence. However, what does foreign language learning look like on day 1? Prior research shows that after only a few minutes of listening to a foreign language, both adults and infants already started to segment the speech into individual words.

Upcoming studies in the Language Development Lab will study how infants, toddlers, and adults approach foreign language learning, focusing on word segmentation. As children age and their brains are wired up to more efficiently process English, their ability to segment foreign speech may decrease.

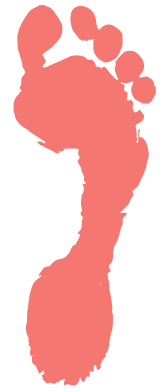
We're also interested in the situations where word segmentation is best, and where it is more difficult. For example, when we speak to infants, we use a special type of register called infant-directed speech, which is different than the kind of speech used between adults, called adult-directed speech.



Infants are sensitive to the slow speaking rate and variable intonation typical in infant-directed speech, which results in better language learning.

As infants grow older, the prevalence of infant-directed speech decreases, until adult-directed speech is the only kind of speech used around them. This means that for an adult learning a foreign language, the information rich infant-directed speech is no longer available and they must instead learn a foreign language from adult-directed speech. We will investigate whether infant-directed speech can also facilitate language processing in a foreign language from infancy to adulthood.

HUMAN DEVELOPMENT



The core mission of the Human Development Department is to advance our knowledge on the growing human across all stages. This can range from an individual's genetic makeup to the overarching society.



In order to build reliable impressions of the world and the things in it, children must have some level of skepticism about the information they receive.

- Cognition and Development Lab

How do children evaluate the reliability of claims?

Children are inundated with all kinds of information, from a variety of resources, from the time of birth. In order to build reliable impressions of the world and the things in it, children must have some level of skepticism about the information they receive—a task which presents a serious challenge for children, given that they rely heavily on others to convey accurate and legitimate knowledge.

Researchers in the Cognition and Development Lab, headed by Dr. Lucas Butler, have examined children's ability to arbitrate reliability, on the basis of several epistemic cues available to them (e.g., knowledge access). In a series of several studies, we presented 3- to 7-year-old children with digitalized puppet shows depicting informants making claims on the basis of either sufficiently or insufficiently verified evidence. The puppets elected to check all four of four unknown decorated boxes, one of four boxes, or none of the boxes, and made claims about the contents within (e.g., "There are marbles inside!").

Full Verification



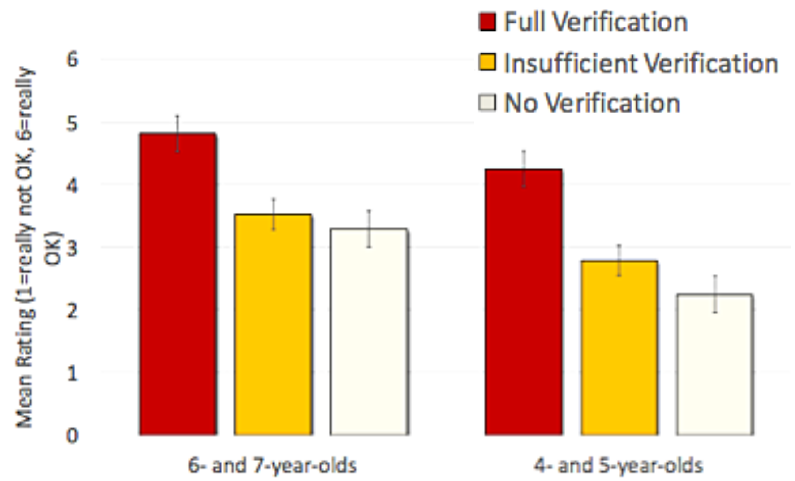
Insufficient Verification



No Verification



Children were then asked to evaluate the extent to which the puppets' claims were "ok" and to give justifications for their evaluations. We found that even as young as preschool age, children evaluate verified claims as more acceptable than either unverified or insufficiently verified claims. Further, their ratings of acceptance were related to the extent to which they referred to verification of evidence in their justifications.



These findings add to the body of literature exploring the roots and development of the skill of evaluating knowledge transmission reliability. This work is particularly important given that young children are native to a digital world, in which information can be made available to them from a variety of sources in an instant. The ability to think critically about knowledge and to navigate masses of empirical claims will be the central dilemma of generations to come. Ongoing work in our lab also seeks to understand how this skill intersects with other aspects of children's early social cognition, for instance, their use of social or linguistic information.

Introducing a new study!

Virginia Salo, a graduate student in the Child Development Lab, is wrapping up her dissertation project in which she is looking at the link between brain activity and infants' developing ability to communicate with others during the first year of life.

Specifically, Virginia is interested in how a specific type of brain activity, known as the mu rhythm, is related to the development of gestures and vocabulary in infants. The mu rhythm is captured using electroencephalography (EEG) and is a measure of activation of the motor cortex, the part of the brain that controls our actions. Studies using the mu rhythm have shown that the motor cortex is also active when we are watching other people perform actions. This brain activity in our motor cortex when we watch other people do things is thought to be related to our ability to understand the goals and intentions that drive other people's actions.

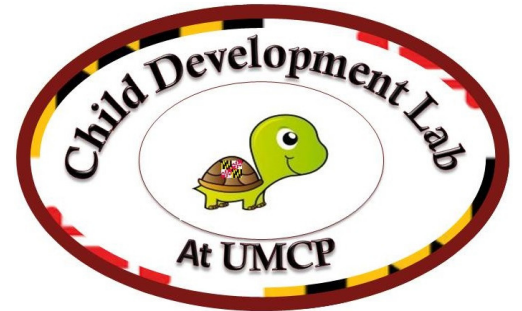


In her study, Virginia is examining whether the motor system is also active when infants watch other people use gestures, and if so, how individual differences in this type of activity is related to communicative development.

The results from this study will give us insight into a possible neural pathway for the development of language in infancy. Stay tuned for the results of this study in the next newsletter!

We're looking for families with new babies!

The Child Development Lab at the University of Maryland has partnered with the National Institutes of Health (NIH) to launch a new study on infant development! In this study, we're examining how brain development is related to infant temperament and social behavior. To do so, we are conducting a longitudinal study using a variety of behavioral and brain measures. This allows us to track changes in infant behavior and brain development over the first year of life. Currently, we're recruiting infants as young as 3 months but we encourage families to reach out as early as possible because scheduling fills up fast.



In the first visit, we use functional MRI to take pictures of babies' brains while they are sleeping. These pictures help to tell us about brain development and they are completely non-invasive. Our MRI process is safe, voluntary, conducted only when your baby is sleeping, and does NOT involve any form of sedation, radiation, or contrast. If a baby wakes up during the MRI, we stop the scan and ensure they are comfortably asleep again before resuming. Brain imaging visits occur at the NIH in Bethesda. The compensation for this visit is \$130. Additionally, we provide each baby with an infant-sized t-shirt for participating and a copy of his or her brain scan, which makes a fun keepsake for a baby book!

After the first visit, we invite families to participate in several follow-up visits to either NIH or UMD campus in College Park. Families can participate in as many or as few of the follow-up visits as they'd like. Follow-up visits include: using EEG to measure infants' brain waves when they hear novel sounds, observing infants' responses to new toys and people, questionnaire measures or phone interviews about your infant's development. When we contact you for a follow-up visit, you'll be told exactly what that visit entails. All of these measures inform us about how brain development is linked to social and emotional development.

If you are interested or have any questions, please contact us!



301.405.2835



infantstudy@umd.edu



Researchers in the Psychology Department are committed to understanding the mind and behavior of humans, especially children!



Why do our earliest memories go missing?



"early memories are often fragile and less detailed compared to later memories"

- Neurocognitive Development Lab

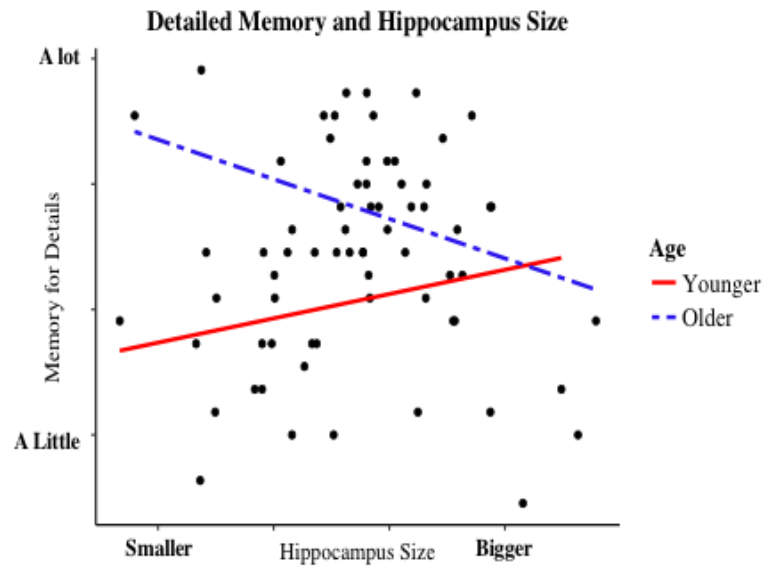
Think back to your own childhood. What's the earliest thing you remember? How old were you? Most adults only remember a few events from 3-6 years of age and virtually no adults remember events from when they were 0-2 years of age. While striking, this phenomenon, called infantile or childhood amnesia, is poorly understood. Recent work in the Neurocognitive Development Lab, led by Dr. Tracy Riggins, has explored a potential explanation for why adults do not retain memories from early in life. In short, whether early memories are different from later memories. Specifically, we examined whether young children's memories lacked details (or were coarser) compared to older children.

To do this, we used both brain imaging techniques and memory games in the lab in 4- to- 8-year-old children. We obtained scans of children's brains and asked them to play a memory game that required them to remember details of pictures (see bottom left corner of this page). For example, children might see a red plane in a set of learning pictures. Then, in a surprise memory test, children would need to use their memory for the first red plane to determine if a similar blue plane was the same or different. Children should identify second blue plane as new if they successfully formed detailed memories of the first picture.



Our study showed that remembering details relates to the size of a part of the brain called the hippocampus, and that the relationship changed depending on children's age. In younger children "bigger was better," but the association shifts to the opposite pattern "smaller was superior" in older children. Although counter-intuitive, smaller structures are considered better in adults as well, so this is consistent with research in adults.

Overall, this study supports the idea that early memories are often fragile and less detailed compared to later memories, with improvement coinciding with the maturation of the hippocampus.



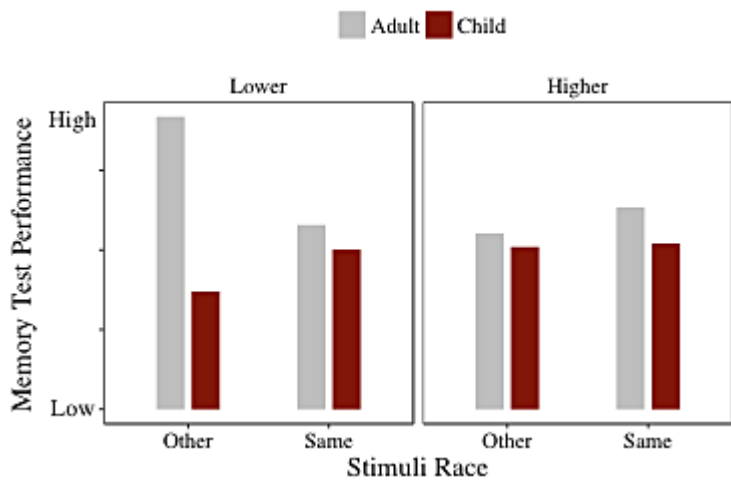
Both age and experience contribute to our ability to remember details!

Memory improves with age and experience. For example, adults usually perform better than children and experts perform better than novices. However, age and experience interact. For instance, a child who has a high amount of experience with Pokémon may outperform an adult in a memory task that involves remembering and differentiating between Pokémon, which suggests experience aids in remembering details. Contributions of age and experience are difficult to distinguish during development because both contribute to memory improvement.

A recent study in the Neurocognitive Development Lab aimed to address the contribution of age and experience to forming detailed memories. Adults and 9- to 11-year-old children viewed a set of faces and made judgments on whether faces looked more or less like a male or a female. We then gave participants a surprise memory test and asked them to identify faces they made judgements on and highly similar faces.

For example, participants would see the Original Face during the judgment task, then, during memory testing, see Face 1 or Face 2. Successfully determining Face 1 and Face 2 are new would indicate a detailed memory of the Original Face. By using faces that individuals had more or less experience with (e.g., faces of their own race or faces of another race) we examined how both age and experience relate to forming detailed memories.





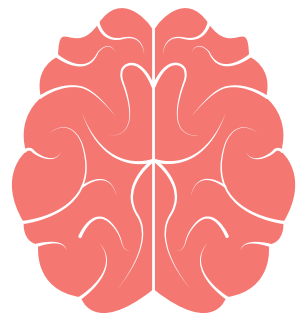
Our research suggests adults are better than children at forming detailed memories, which is consistent with previous work. Interestingly, we also found that level of experience may influence age-related differences in forming detailed memories, as adults and children performed similarly on the memory task when experience with stimuli was high.

How does the brain engage in social interaction?

From birth, the human experience is largely defined by our interactions with others, yet scientists are only just beginning to understand how the developing brain functions during social interactions. Furthering this understanding will help uncover what might be different about the brains of children with autism spectrum disorder (ASD), who have difficulties with social interaction.



To this end, the Developmental Social Cognitive Neuroscience Lab, led by Dr. Elizabeth Redcay, has developed two novel tasks that allow for real-time social interaction inside the MRI scanner. These tasks are specifically designed for middle childhood (ages 8-12), a dynamic yet understudied period for social and neurocognitive development.



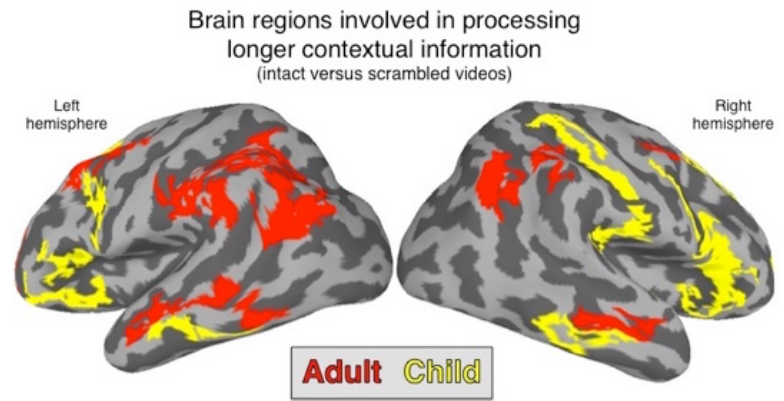
Participation in the study involves three visits to the University of Maryland. In the first visit, children individually complete computer-based tasks and surveys that measure how they perceive and think about other people. In the second and third visits, children chat remotely with another child their age while undergoing an MRI scan. During one of these scans, children share their likes and hobbies and learn whether their chat partners share the same preferences. During the other scan, children learn about their partners' beliefs, desires, and emotions, then use this information to make predictions about their partners' choices.

Together, these tasks are designed to capture two important aspects of social functioning: social motivation, as reflected by activation of the brain's reward system during social interaction, and mentalizing (also called "theory of mind"), or the ability to think about the mental states of others. We are currently contacting families of typically developing children aged 8-12 years who will serve as a comparison group for children with ASD.



Context and the Social Brain in Middle Childhood

In our day-to-day lives, we use multiple types of information to understand other people. For example, if a friend says that she is happy, we can combine her facial expression, contextual clues, and our memory of her personality to conclude whether she is actually happy or expressing sarcasm. While we seem to effortlessly assemble these pieces of information, previous research in adults shows that this process may result from a complex coordination between multiple brain systems.



Certain parts of our brain respond to quick changes in the environment (for example, a change in facial expression) and other brain regions respond to information that requires knowledge over a longer time period (for example, remembering that your friend likes to be sarcastic). However very little is known about how these brain networks change throughout development.

Researchers from the Developmental Social Cognitive Neuroscience Lab collected fMRI brain scan data from 6-12 year old children and adults while they watched two episodes of a television show. One episode was presented intact and one had been scrambled. The scrambled episode made it so that only the contextual information for short periods of time could be understood.

How do children evaluate social excluders?

Young children experience a wealth of social interaction in their every day lives and often adopt strategies to cope and recover from interactions that have undesirable outcomes, such as social exclusion. One direct way of limiting the harm of exclusion is to keep track of those who have excluded children previously and form social decisions on the basis of this interaction history.



Researchers at the Lab for Early Social Cognition examined whether preschoolers recall who excluded them, how they evaluate includers and excluders, and whether children's play experiences influence subsequent interpersonal behavior. In these studies, children were introduced to pairs of mice puppets and learned to play catch on a stage, as well as how to give items (e.g., a block of cheese) to a separate pair of puppets. Then, children played catch with each mice pair, where they were included in the game in one trial and excluded in the other trial. Afterward, children were asked questions about which mouse was the better sharer, nicer, who played with them more, and who a third-party puppet should play with.

Our results showed that children do not always remember who excluded them. However, if they do, 4- and 5-year-old children view excluders as meaner than the includers, 5-year-olds view includers as nicer than the excluders, and both ages recommend that others play with prior includers over excluders. Interestingly, not all children recalled which mouse played with them more. We are following up on this study by exploring why this might be and coding children's behaviors to gain further insight on the influences of social exclusion and inclusion in children's play.

LINGUISTICS

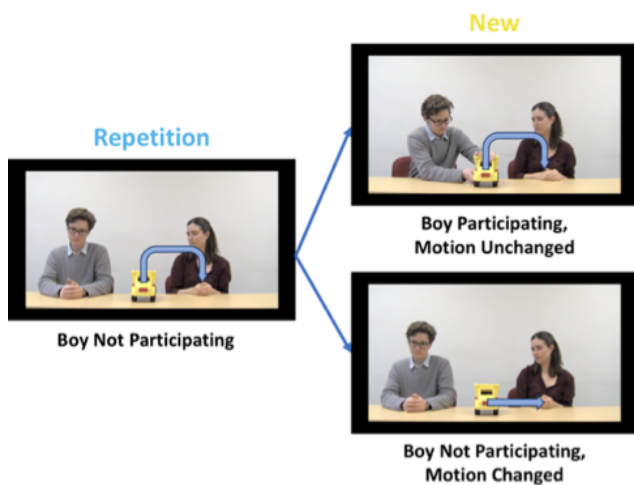
Research in the Linguistics Department focuses on the human capacity for language. To study this, researchers are looking at children's language development and the mental processes that support it.

Hello!



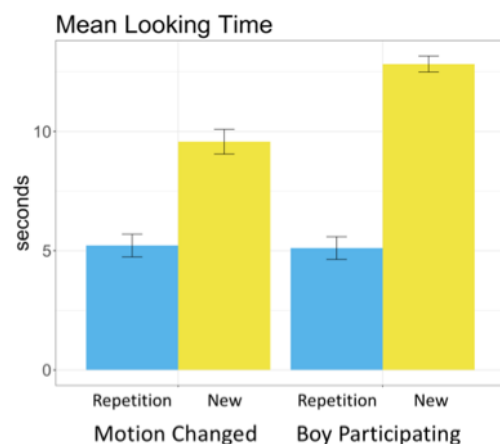
How do children perceive events and what does this have to do with learning words?

In order to learn new verbs, children need to figure out what events in the world they refer to. The context of the sentence can be helpful: even if you don't know what take means, you know that "she took the truck from him" must at least refer to an event with a girl, a boy, and a truck. This kind of evidence can help children narrow down the space of possibilities for what a new verb means. In order to determine how children match new verbs to events they see in the world, we need to know whether they see those events the same way that adults do. Researchers from the Project on Children's Language Learning, directed by Dr. Jeffrey Lidz, are examining this activity.



If adults see a girl taking a truck from a boy, they view the girl, the boy, and the truck as the three participants in that event. To see if 9- to 12-month-olds view this event in the same way, we first show them a video of a girl picking up a toy truck, with a boy sitting nearby but not participating in the event (the "repetition" phase). When children become familiar with that event, their attention drops. Then, in the "new" portion of the task, we measure whether their attention is recaptured by making a slight change in the video: either the girl starts taking the truck from the boy (top), or the girl picks up the truck in a different way (bottom).

We find that children are more surprised by adding the boy than they are by changing the motion. This is shown in the graph on the right, where the two bars on the left correspond to children who saw the motion change as their new video and the two bars on the right correspond to children who saw the boy added in their new video. We think this difference in attention arises because children, like adults, consider the boy a participant in the "taking" event but not in the "picking up" event.



Children learn new words through context!

As toddlers learn more words, they can understand more of what's being said around them. Knowing more words can even help children predict what's going to come next in the sentence. For example, if they know what 'pulling' means, then when they hear a sentence starting with 'She's pulling...' they predict that the next thing in the sentence will name whatever is being pulled. If the sentence was continued by adding an unknown word like '...the tig,' they can even learn that 'the tig' names whatever is being pulled. These kinds of expectations about what's coming next help them learn even more new words – but what happens when their expectations about what's coming next in the sentence end up being wrong? A study in the Project on Children's Language Learning examines what happens when children have expectations about what's coming next that aren't met, and what happens when they don't have any expectations at all.

In this study, 16-month-old children watched short videos of a woman playing with toys. In the first part of each video, they saw her use one toy to manipulate another toy (for example, using a toy fishing rod to pull a toy train around). During the video, they either heard sentences like 'She's pulling with the tig' or 'She's pulling the tig.' If they heard the first sentence, we expected them to learn that 'the tig' is referring to the toy fishing rod. If they heard the second sentence, we expected them to think that the tig refers to the toy train.

Then, in the second part of the video, both the toy fishing rod and the toy train appear on opposite sides of the screen, along with the sentence, 'Where's the tig?' Children look more toward the train or the fishing rod, depending on what they learned that 'the tig' means. Children at this age who don't know many words yet don't have any expectations about what will come after 'pulling'. When these children heard sentences like 'She's pulling with the tig' they learned that 'the tig' refers to the toy fishing rod. When they hear 'She's pulling the tig', they learned that 'the tig' refers to the toy train. This tells us that children are able to learn new words – just like adult speakers would – just based on how the words are used in a sentence!

However, children who know lots of words at this age learn something different from the videos: they learn that 'the tig' refers to the toy train, even when it comes after 'with' in the sentence. This is because children with higher vocabularies expect that the thing being pulled will come after 'pulling' in the sentence, and they stick with their prediction, which makes them learn that 'the tig' refers to the train no matter which sentence they actually heard. The sentences using 'with' are tricky, but most of the time their prediction will be right, and they'll use their knowledge to learn even more words.



"knowing more words can even help children predict what's going to come next in the sentence"

- Project on Children's Language Learning



Examining how children learn more about verbs and sentence structure

The monkey should hug the frog!



Adults know that some verbs (action words) can only occur in certain sentence structures. For example, English verbs like hug need to be used with both a subject and an object. We can say “The monkey should hug the frog,” but it doesn’t sound right to say “The monkey should hug” without an object after the verb specifying who is being hugged. Interestingly, we don’t use an object after the verb when we ask a question about the individual being hugged. We can ask “Which frog should the monkey hug?”, with no object after the verb. But it doesn’t sound right if we try to put an object after the verb, as in “Which monkey should the frog hug him?” This is due to how we understand the structure of that question: the phrase “which monkey” is acting as the object of the verb, even though it doesn’t occur afterwards.

In this study in Project on Children’s Language Learning, we’re interested in how children learn which sentences in English should have objects after the verb. We play children sentences with different structures, and see which sentence structures children find surprising. Some children hear simple sentences with and without objects after the verb, like “The monkey should hug the frog” and “The monkey should hug.” Other children hear questions with and without objects after the verb, like “Which monkey should the frog hug him?” and “Which monkey should the frog hug?”

We measure children’s attention towards an abstract video on the screen while the sentences are playing, which allows us to determine how much they are paying attention to the sentences, and which ones they are surprised to hear. If children understand the structure of these sentences like adults do, they should be unsurprised to hear an object after the verb in a simple sentence, but surprised to hear an object after the verb in a question. We’re looking at children between the ages of 14 and 19 months, because we think that this understanding is developing as children learn more about verbs and sentence structure between those two ages. **Stay tuned!**

A new study on word learning!

English speakers use words

like maybe, could, can, etc., to express thoughts about what might happen, or what’s possible. For example, imagine a video where Elmo opens a big jar of cookies. At that moment, you can express thoughts of uncertainty about what comes next by saying “Elmo could eat all the cookies!” or “Elmo might not eat any of the cookies!”

Thoughts about what has to happen, or what’s necessary, can be expressed with words like must, have to, etc. For example, imagine the same video skipped ahead to the end, and there was only an empty cookie jar on the table. You could express thoughts of certainty

about what happened to the cookies by saying, “Elmo must have eaten all the cookies!” None of the sentences about Elmo match up with what’s happening in the video at the moment they were spoken – Elmo isn’t even in the scene for the last sentence about him! When do children figure out that these words contribute meaning to the sentence that doesn’t have to match what they see in the world around them? We’re interested in when children learn about these kinds of words, and whether or not some of these words are easier to learn than others.

In this study, we show children between 3 and 5 years old some short stories similar to the example with Elmo. However, the sentences in these stories are partially covered up by the sound of a barking dog. We ask children to help us finish the stories by telling us what got covered up by the bark, so that we can see what children at this age think would fit well in the sentence. **Stay tuned for our findings!**

Announcements from Infant & Child Studies

- Two post-doctoral researchers, Katie Von Holzen and Karen Mulak, have joined the Language Development Lab!
- Catie Penny and Caroline Kettl, graduate assistants in the Language Development Lab, graduated with Master's degrees in Speech-Language Pathology in Spring 2017 and are now working in schools in Montgomery County!
- Congratulations to Dr. Brandon Terrizzi, graduate student from the Lab for Early Social Cognition in the Psychology Department, on a successful dissertation defense. He will be starting a post-doctoral position with the Cincinnati Children's Hospital this summer!
- Rachel E Dudley, a recent PhD alumna from our lab, is now a post-doctoral researcher at the École Normale Supérieure in Paris, in the Department of Cognitive Studies!



Kate Von Holzen (top) and Karen Mulak (bottom) from the Language Development Lab



Brandon Terrizzi from the Lab for Early Social Cognition

The Infant & Child Studies Consortium welcomes a new lab!



Canine Language Perception Lab

The Canine Language Perception Lab is a new lab founded by researchers from the Language Development Lab in the Hearing and Speech Sciences department. In the CLPL, dogs can participate with their humans in some of the same language studies we have previously conducted with infants and toddlers!

We are interested in learning more about how dogs perceive human speech and learn new words, in order to improve training for service dogs and to discover similarities and differences in the auditory processing systems of dogs and young children.

To learn more or to participate with your dog, contact us!



dogs@umd.edu



dogs.umd.edu

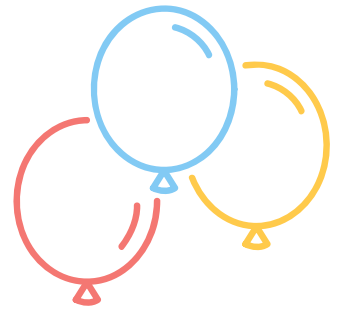


[@umddoglab](https://www.facebook.com/umddoglab)

Find us at events in the community!



The Infant & Child Studies Consortium loves interacting with the local community! Find our table or booth at local events in the DMV!



Thank you to the following local businesses and organizations, and many more, for their support in our community outreach efforts!



Interested in participating in fun and interesting studies like the ones you read about here? Contact us!



childstudies@umd.edu



childstudies.umd.edu



301.405.6302



@InfantStudiesUMD

1401 Marie Mount Hall, UMCP College Park, MD 20742