

Infant & Child Studies

At the University of Maryland

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RECENTLY MOVED?

NEW BABY?

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INFANT & CHILD STUDIES

AT THE UNIVERSITY OF MARYLAND

Lots of exciting changes have been happening at Maryland in the past year! First, we welcome Elizabeth Redcay, who will be joining our group in January. Dr. Redcay's research focuses on the neural bases of early language skills and nonlinguistic communication, in both typically developing children and those who have been identified as having an autism spectrum disorder. On a sadder note, we also are saying goodbye to one of our primary researchers, Dr. Amanda

Woodward, who has taken a position at the University of Chicago. A letter from her can be found on page 9. We wish her the best as she sets up her new laboratory. The Maryland Infant Studies Group has a new and exciting multi-laboratory research project that we are starting, comparing children who are at greater risk for developing autism spectrum disorders with those who are not. More information on this project can be found on page 9. We also have a large number of other ongoing

research projects, many of which are summarized on the next few pages. These studies have all been made possible through the help of interested parents like yourselves. We are extremely grateful for your generous participation in our infant and child studies.

We hope you find these studies as interesting as we do, and we look forward to seeing you and your child again soon.

NEW: University of Maryland Researchers Search for Earlier Signs of Autism

The CDC estimates that 1 in 110 children have an Autism Spectrum Disorder (ASD). ASDs are developmental disorders characterized by impaired social interaction and communication. Rates of diagnosis of ASD have increased rapidly in recent years, and studies have shown that early intervention can be extremely effective; however, many children are not diagnosed until age 3. This results in an urgent need for research, especially on early identification of ASD. Researchers in the Linguistics, Hearing & Speech, and Psychology departments are responding to this need with a new study comparing the development of two groups of infants: those with a sibling or parent with ASD, and those without this family history. Infants who have an immediate family member with an autism spectrum disorder are at increased risk of receiving an ASD diagnosis themselves. By comparing the development of these two groups, we hope to identify early indicators of autism, improving understanding of the causes of the disorder and enhancing the potential for early intervention.

The study will follow infants during their first year. Over the course of three visits to our labs, they will participate in several different tasks and assessments. We are expecting to find differences in performance between the two groups of children on four potential

indicators of ASD: difficulties with integrating information from different sources; difficulties choosing to focus attention on one source of information over another; difficulties understanding social interactions; and lack of responsiveness to one's own name.

At the first visit, between 2 and 6 months, we will be observing how infants match auditory with visual information and whether they follow the direction of gaze of a human face. At the second visit, between 4 and 9 months, we will look at an infant's ability to distinguish his or her own name from other names, as well as the ability to pay attention to speech in the presence of background noise. At the final visit, between 9 and 14 months, we will be using eye-tracking to examine infants' understanding of goal-directed actions, an important element of developing social cognition. The second and third visits will also include play sessions to allow us to look at how infants interact with parents and others.

With the prevalence of autism on the rise, new research is critical for understanding and treating ASD. Through this study we hope to identify behavioral signs of ASD that can be used to diagnose the disorder at an earlier age.

If you have questions or if you are interested in participating in our research, please contact us at (301) 405 4233 or autismsiblingstudy@umd.edu.



Linguistics

Noun Learning: When other words help and when they don't

Children learn new words very quickly as they experience the world around them. A key interest of linguistic studies in children's development is research on how children identify meanings of new words as they hear them used by others.

Many research projects have looked at how children learn verbs by looking at the structure of the sentences they occur in. One of our current studies is looking instead at how children learn nouns in this way.

For example, in the sentence 'I blicked that I ate a delicious sandwich,' we may not know exactly what 'blick' means from that sentence alone, but we could predict it to mean something like 'dream' 'think' or 'believe.' In the same way, in a sentence like 'I ate a big steak with a blonk,' a blonk is probably a

kind of utensil used for eating.

Our studies have found that children at the age of 16 months seem to understand this type of sentence, and use the 'with' to figure out the meaning of a new noun being used in a video that they are watching. However, when the children are three months older, at the age of 19 months, they seem to not pay attention to the use of 'with' in the sentences, and assume that the next noun refers to a different object in the video. They have a stronger knowledge of the verbs that are being used in the sentences, and they seem to be predicting the

structure of the sentence, and end up ignoring the 'with.'

To explore this, we used sentences that have both a new noun and a new verb, such as 'She's bleaking with the blicket.' Indeed, when 19-month-olds don't know a verb and have expectations about the type of sentence it is used in, they pay close attention to the whole sentence, and correctly figure out the meaning of the noun.

As we have been discovering, children pay attention to how a verb is typically used, and expect them to be used that way the next time. Our current study is looking at this more closely by using a recording to introduce a new verb, and use it multiple times in one way, before the child watches the video with the verb and new noun. We are studying how hearing the new verb ahead of time can affect how they interpret the sentence in the video.



What is a possible sound pattern? Testing the limits of language

There are some sound patterns that occur often across the world's languages, such as "put stress on the last syllable of a word." There are other patterns that never seem to occur, such as "put stress after the sound 'b'." We are interested in finding out why this is, and whether infants are aware of this.

If infants are aware that some kinds of patterns are never used in languages, they could simply never consider those rules as possibilities

as they learn a language. If this is true, then there is a limit on the ways that human language can vary, and we can explore the ways that babies learn the sound patterns of language. In this study, infants hear words from a made-up language. The words they hear let them consider a variety of possibilities for the rule that this language is using. Then, the words change, and start to follow either only a common rule, or only a rule that does not seem to be

possible for languages. We record whether the babies listen longer to one pattern over the other.

At the age of 8 months old, babies show that they listen longer to the kinds of rules that are common around the world, after only two minutes of hearing the made-up language! This shows us that well before babies are starting to talk, they already have a sense of what kinds of patterns are possible for language.

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

Linguistics: Akira Omaki successfully defended his PhD thesis "Commitment and Flexibility in the Developing Parser" and graduated in Summer 2010. Dr. Omaki is spending one year as a postdoctoral fellow at the University of Geneva and has been hired as an Assistant Professor in the Department of Cognitive Science at Johns Hopkins University starting in Fall 2011. Allison Cheng just started medical school at George Washington University. She is interested in pediatrics, and will be shadowing a pediatric emergency room physician for the next few years.

Who's "She"? What It Takes to Understand Pronouns

- (1) She's patting the dog.
 (2) She's patting Katie.

Just as important as learning what a sentence means is learning what a sentence *can't* mean. In a sentence like (1), the pronoun *she* can refer to anyone at all. In (2), however, the pronoun is more restricted in who it can refer to; specifically, it can't refer to the person mentioned at the end of the sentence (in this case, *Katie*). As adults, our understanding of this restriction explains why we know sentence 2 can't mean "*Katie is patting herself*," and so it can't correctly describe Picture A.

Previous research showed that

Picture A



children begin to show an understanding of this restriction at around 30 months. At this age, children hearing sentence 2 begin to look significantly more at Picture B than at Picture A, showing that they understand that only Picture B correctly depicts the meaning of the sentence. Currently, we're exploring what developmental characteristics are most influential to children being able to demonstrate their understanding of pronouns and their meanings.

One thing that may affect children's ability to show they understand what (2) can mean is vocabulary size. Because this restriction on what the pronoun can

Picture B



refer to depends on the structure of the sentence, the amount of knowledge of sentence structure children have is crucial to whether or not they understand it. Since vocabulary size has been shown to be an indicator of syntactic development, we are investigating whether children's vocabulary size at the time of their participation is connected with the amount of time they spend looking at the correct pictures during the study.

A second possible characteristic that could influence children's ability to show their knowledge of how this pronoun is restricted is processing speed. It could be that all children at this age have enough knowledge of sentence structure to understand the restricted meaning of the pronoun in (2), but some individuals are able to process the sentence more quickly, meaning that they will be able to redirect their attention and look at the matching picture longer than those who take more time to process the sentence. Our current experiment is designed to determine whether vocabulary size or processing speed has more of an effect on how long children look to the picture matching the correct meaning of sentences like (2).

Talking about Thinking

We're interested in the relationship between *theory of mind* and *sentential complementation*. Theory of mind is the ability to understand that other people have desires, intentions, and beliefs that may be different from our own beliefs or knowledge. A child's development of an adult-like theory of mind may rely on language development. In particular, the use of sentential complementation, where one sentence is embedded inside another sentence, may be crucial. For example, "Unicorns live on Mars" is embedded in the sentence "John thinks that unicorns live on Mars." Even if I believe that unicorns do not exist, I can evaluate the truth of the whole sentence about John, referring to his beliefs rather than my own.

Previous studies have found that children begin to appropriately

evaluate the false beliefs of others at around the same time that they start to use the verb 'think' with sentential complementation, about 5 years of age. Our current study investigates the relationship between the development of these two different abilities in preschool-aged children. 3-, 4-, and 5-year-old children see various stories involving hide-and-seek. For example, in one story, Boots hides behind a door. Swiper comes to look for him, and guesses that he is under the bed. A puppet then comments on what happened in the story with one of three sentences: "Swiper thinks that Boots is under the bed," "Swiper said that Boots is under the bed," or "According to Swiper, Boots is under the bed." The child tells the puppet whether he was right about what happened. In this case, a child with an adult-like understanding of the

sentences would say that the puppet was wrong. However, if a child is not able to attribute a false belief to Swiper, then she might say that the puppet was right. By comparing children's interpretations of these different types of sentences in different situations, we hope to learn more about the link between theory of mind and sentential complementation.



Hearing & Speech

Understanding speech in noisy environments

A primary focus of our lab's research is to understand infants' and young children's ability to understand speech in noisy or distracting environments. Most of our work has been focused on very young infants, under one year of age. Lately we've begun exploring the abilities of toddlers, as well.

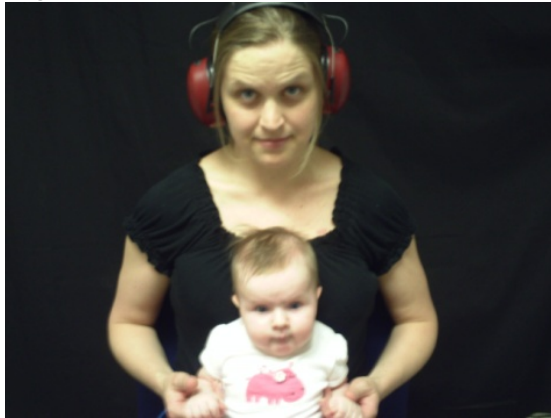


Toddlers are frequently in day-care settings or preschool programs, and these settings are rarely perfectly quiet. We've been interested in how well young children can understand what is said to them in these potentially-distracting environments.

In one recent study, 24-month-old toddlers faced two television screens. Each screen showed a different animal. On each trial, a voice would tell them which animal they should find. For example, they might hear the voice saying, "Look at the kitty!" or "Do you see the doggy?" At the same time that the main voice was heard, however, there was also some background noise of other people talking - the type of babble sounds you might hear in a restaurant, where lots of other voices are talking in the background, but none of the other voices are particularly loud individually. We expected that if infants can understand what was being said to them by the target voice, they should look longer at the

appropriate image than at the other image. That is, if they're told to "Look at the kitty!", they should look longer at a picture of a cat than at a picture of a dog.

Whenever the primary voice was louder than the sum of all the other voices, children did just that: they looked longer at whatever image the voice told them to look at. However, when the sum of all the other people talking became louder than the target voice, children failed to understand what the target voice said. This is very different from adults, who can understand speech even when the noise level is substantially louder than the voice to which they are trying to attend. Noise appears to be a more significant problem for toddlers than it is for older children. Interestingly, how well children did at listening in noise depended on their vocabulary level overall. Even though all of the children knew the words we tested,



some had much larger expressive vocabularies than did others. Those children who knew how to say more words did better at this task than did children who knew how to say fewer words - that is, they showed longer looking to the correct object, despite the noise. Or, to put it another way, when the background noise was quite soft, all children succeeded at the task. But when the background



noise and the target voice were equally loud, those children that had smaller expressive vocabularies were less likely to look at the correct picture, while children with larger vocabularies were more likely to look at the correct picture. One possibility is that, as children learn to speak, they learn which information to pay attention to (the words), and which information to ignore (the noise). If so, children may become better able to handle noisy environments as their own knowledge of the language grows.

Another possibility, however, is that some children are simply better able to listen in noise than are others - and those that are better have more opportunities to learn (and thus show larger vocabularies). While the direction of the effect is not clear, the finding suggests that noise may be more of a problem for some children than for others - it may be less of a concern for children whose language skills are already more advanced for their age.

We're continuing to look at this issue more deeply in our current studies, which explore other types of noise (such as single voices, such as that of a sibling, rather than multi-talker "babble") and other ages (to explore how this skill develops). These current studies will help us to better understand both the limits of children's ability to perceive speech in noise, and the factors that might make this task easier or more difficult for them.

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

Hearing & Speech: **Judy Segal**, and **Mara Steinberg** completed their MA degrees in Speech-Language Pathology, and are both working as clinicians in the area. **Allison Temple**, **Erica Levinson** and **Jenesia McCammon** all graduated with their bachelor's degrees and have started graduate programs in speech-language pathology; Allison is at Northwestern University, and Erica and Jenesia stayed here at Maryland. **Megan Askew** also graduated, and is working as a full-time research assistant at the Children's Hospital of Philadelphia.

How well do children understand speech through a cochlear implant?

Cochlear implants, or CIs, are surgically-implantable devices that can provide partial hearing to individuals who are deaf; they are sometimes thought of as “bionic ears”. But real speech is too rich with information for cochlear implants to handle - CIs can only provide a “rough outline” of what the original speech signal sounds like. In a cochlear implant, the incoming speech signal is first separated into different frequency regions, or channels. Then the total amount of energy within each frequency range is summed, and this is what the listener hears. This preserves the “gist” of the signal, but many of the fine details are lost.

Because so much information is lost in a CI, a great deal of research has examined adult recognition of noise-vocoded speech, a signal that mimics that produced by a cochlear implant. These types of stimuli can be played to normal adults, to determine how well listeners can interpret signals that have been processed in slightly different ways. These studies have provided data used for designing the processing strategies used with cochlear implants.

But these studies have only been done with adults and older children. Advances in cochlear implant technology have led to the frequent implantation of toddlers - indeed, over 25,000 children have received cochlear implants, according to the National Institutes of Health. Yet young children’s ability to interpret

speech that has been processed by a cochlear implant remains unclear.

One of the primary aspects that researchers have investigated is the minimum number of channels people need for recognition of speech. As you subdivide the signal into fewer and fewer channels, more of the fine details are lost, and speech recognition is poorer. Adults who are native speakers can do well with as few as 3-4 channels, but nonnative listeners usually need 6-8.



We have been investigating how many channels young children require.

Typically-developing children aged 27 months see two images on each trial (e.g., a cat and a dog), and they hear a voice instructing them which image to look at (“Find the cat!”). On some trials, the instructions are presented with natural speech, and we expect that children will look at the appropriate object. On other trials the children hear speech that was processed as if through a cochlear

implant - the speech has either 24 or 8 channels. (You can hear what some of this speech sounds like at <http://www.mrc-cbu.cam.ac.uk/people/matt.davis/vocode/>).

We initially thought that this type of speech might sound frightening to young children, or might be difficult for them to understand. To our surprise, the children in our study seem amazingly adept at understanding this type of speech. When we examine their accuracy (the amount of time spent looking at the correct image when it is named), we have been finding that children are equally accurate with the cochlear-implant speech as they are with normal speech. This is the case even in the very first trial of the study (the first time they hear this type of speech). The only difference we have been finding has been in reaction times - children are slower to recognize cochlear-implant speech, suggesting that it is more difficult to interpret.

These results suggest that 2-year-olds have a surprising ability to interpret vocoded speech, even without practice. We are currently using this technique to explore speech processed with fewer channels, and speech processed in slightly different ways to better determine what the limits might be on children’s ability to benefit from cochlear implants. This information could have important implications for the way that cochlear implants are designed for children in the future.

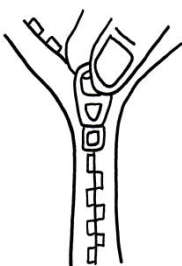
Verb comprehension and use in Down Syndrome

Some of the studies in our lab are starting to compare children who have language disorders with those that are developing typically, in the hope of clarifying the source of language deficits. It has been well-documented that individuals with Down Syndrome (DS) have a specific deficit in expressive grammar. Their

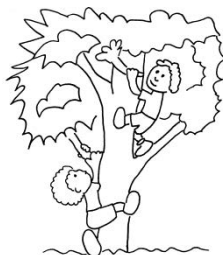
language has been described as telegraphic, with many words missing. Verbs are likely to be omitted. However, individuals with DS do not produce significantly fewer different verbs than do typically-developing (TD) individuals. This indicates that individuals with DS have an

adequate number of verbs stored in their brain, but that they are not accessed well during production tasks.

Different English verbs require different amount of arguments. Verbs such as *laugh* require only one argument, a subject (e.g., *She*



Zipping



Climbing



Erasing

laughed.); they are considered one-place verbs. In fact, insertion of more than one argument results in an ungrammatical sentence (e.g., *She laughed the joke**.) Two-place verbs, such as *carry* require two arguments, a subject and an object (e.g., *She carried the bag*). In contrast, a verb such as *give* requires three arguments: a subject, direct object, and indirect object (e.g., *She gave the letter to the boy*). One possibility is that verbs that require more arguments may be harder to access than verbs that require fewer arguments.

This study aimed to investigate how well individuals with DS access verbs and the arguments that go with them from the brain. Inability to access a verb and/or its arguments from the brain could result either in omission of the verb or other necessary words in an utterance. This could be one

explanation of the telegraphic characteristic of DS language profiles. Another explanation could be that individuals with DS don't store adequate knowledge about verbs and their meanings.

Individuals with DS had no difficulty understanding verbs- but they did have difficulty producing them, and this difficulty increased as the number of arguments increased. For example, they were more likely to leave out verbs from their stories when the verbs required three arguments than when they required one. This suggests that individuals with DS have a specific deficit in verb retrieval that is affected by the number of arguments.

One especially interesting finding was that the individuals with DS omitted subject significantly more often than the TD individuals (e.g., "Zips jacket"). One possible explanation is that as the number of

arguments associated with a verb increases, so does sentence processing difficulty; to reduce demands on the language system, individuals with DS "opt" to eliminate the subject because it is most easily recovered from the context that was provided in the elicitation task. The two-place and three-place narratives in this study all followed the activities of one character, and therefore the listener could easily recover the subject.

This study has brought us a little closer to understanding how individuals with DS acquire and use language, and how this differs from other children.

Psychology

Do 11-month-olds predict the goals of others?

In our center, one overarching question guiding our work is, what do babies understand about other peoples' actions? We know that within the first year of life, infants understand that people act in purposeful ways. That is, actions are typically planned in order to reach particular goals. In the current work, we used an eye-tracker, which can tell us exactly where the infants are looking, to investigate whether infants can actually *predict* the goals of others.

We showed 11-month-olds a video in which a person's hand reached and grasped one of two toys. They viewed this action three times. The hand always moved to the same toy in the same place.

Then, the toy placement was swapped. The hand reached straight, in between the two toys. At that moment, we wanted to know if babies would make consistent

predictions about where the hand would move next. Would they look to, or *predict*, the same location they previously watched it move to? Or, would they look to the actual toy it had previously reached for, even though it was now in a location they have never seen the hand move to? It turns out, the infants consistently predicted the toy in a new location!

However, it could be that exposure to anything moving toward one toy could bias infants into paying more attention to that toy. To test this possibility, we showed a separate group of infants a less familiar moving object: a black claw-like tool. Infants watched the same type of events, except this time the

claw reached for a toy. When the toy placement was swapped, and the claw moved in between the two toys, in this case, infants predicted the previous location it had moved to, not the toy!

We think babies, by 11-months of age, are using their knowledge about people to inform their predictions of others' behavior in real time. 11-month-olds are intentional beings, who often reach and grasp for toys they want. By drawing upon their own experiences, they appear to interpret the initial hand reach as someone's intentional reach to a particular toy. They probably have never seen a claw move on its own before, and know nothing about its intent, or if it can move in other ways. Given this ambiguity, infants draw upon the consistencies found in the earliest phase of the video, claws move to the same location, and use this interpretation to predict its next move.



Where do babies think it will move to?

As adults, we interpret the actions of those around as directed at goals and derive the intentions behind others' actions seemingly automatically. Several studies in the Maryland Infant Studies Lab in the Psychology Department examine how infants develop this understanding of others' actions.

In one series of studies, we are examining how infants come to understand actions involving a tool. In order to understand the goal behind a tool-use action, we have to understand that the person using the tool aims to retrieve a goal-object and that the tool is just a means to this end. Understanding this multistep action is a difficult achievement for infants, and they do not usually understand the goals behind actions involving tools until approximately twelve months of age. In this work, we are examining what cues infants can use to learn about tool-use a little bit earlier.

In these studies, we use a goal imitation paradigm. From previous

work in our laboratory, we know that when seven-month-old infants see an experimenter perform a familiar action, they will imitate the goal of the action. For example, if infants see an experimenter reach for one of two toys, they are more likely to choose that same toy themselves. When infants of this age see the experimenter act on a toy with an unfamiliar action, however, they do not systematically choose the same toy as the experimenter. Therefore, we expect that infants at seven months of age will not imitate an experimenter's toy-choice when the experimenter uses a tool, because they do not yet understand the goal of tool-use actions.

In order to help infants understand and imitate tool-use events (see C and D), we gave different groups of infants different kinds of cues. One group of infants (A) were passed a series of toys by a claw. These infants had the chance to see that the claw reached for the same goal as the infant while the infant was reaching for each toy. Infants who

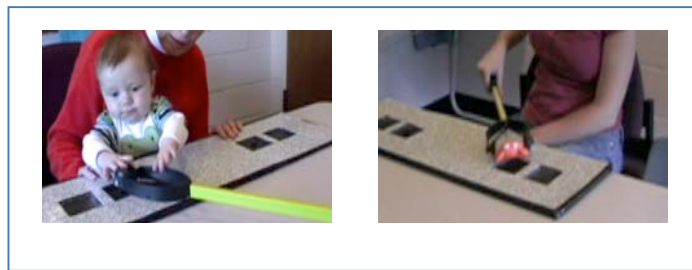
received this training then imitated the experimenter's goal when she used a tool to choose between toys. We believe that these infants learned about the goals in the tool-use event by simultaneously comparing their own reach for the toys with the tool's reach for the toys.

Infants in two control conditions (B1 and B2) had the chance to engage with the claw and see how it opened, closed, and moved toys. These infants, however, never had the chance to reach for a toy at the same time as the claw. Infants in the control conditions did not imitate the experimenter's goal when she used a tool to choose between toys, indicating that these other cues were not sufficient to help infants learn about the goal behind the experimenter's actions with the tool. Instead, we think that comparing their own reach for the toys with the tool's reach was critical to learning about the tool's goals.

Familiarization Trials



A.



B1.

B2.

Test-Trials



C.



D.

Memory development

The Neurocognitive Development Lab examines how memory changes during early childhood. We are especially interested in understanding how improvements in memory abilities are related to brain development.

When adults are asked to think back in time and recall their earliest memory, the vast majority cannot recall events that occurred prior to their third birthday.

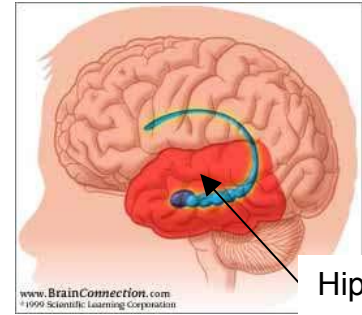
Try it – what is your earliest memory? How old were you when the event occurred? This lack of memories from the first few years of life is called “infantile or childhood amnesia.” Following this period is a remarkable transition. Research has shown that the number of memories from childhood that adults are able to retrieve increases sharply between 3 to 7 years of age. These findings fit well with reports of laboratory studies examining children’s memory. Between 3 and 7 years of age, the



Neurocognitive Development Lab

number of life events children can recall increases dramatically and the amount of information they can recall doubles. Together these results suggest that early childhood (3 to 7 years) is a period of significant developmental change in memory.

The hippocampus is a neural structure in the brain (located directly in from where your ears are) that is known to be important for memory in adults. This part of the brain undergoes significant development from 3 to 7 years, the same period during which improvements in memory abilities are observed. Our current research studies are designed to address the link between brain



Hippocampus

development and memory by systematically investigating changes in memory performance and associated neural activity during early childhood. We use a unique combination of behavioral measures (asking kids to show us or tell us what they remember) and recordings of brain activity (EEG or “brain waves”) to examine memory and activity of the brain (and the hippocampus) in young children.

It’s all in the details...

One of our current studies examines how children remember the contextual details surrounding an item or event. For example, it is important for kids not only to be able to remember that they played a cool new video game, but also who they played it with (their cousin) and where they were (their cousin’s house). (Without this information they wouldn’t be able to tell their parents who to ask about where to buy it, right?!) To look at this type of memory in the lab, we asked children to play with two sets of toys in two different rooms. After



a delay, children return to the lab and we asked them to remember what toys they played with and in what room each of the toys belonged. This is a pretty difficult game, but 5-year-old children actually remember quite well. In fact, recordings of their brain activity showed differences between toys they played with before and new toys that

they had never seen before. Brain activity even differed based on whether the child remembered or forgot which room it was supposed to be in. These recordings of brain activity show us that the child’s brain is differentiating between toys based on their previous experience with them. It’s a “neural signature” that shows us they remember!

We are now asking younger children (3 and 4 year olds) to complete the memory game to see how their memory abilities (and brain activity) compare. Please stay tuned! We will update you in the next newsletter about our findings. If you know of any 3 or 4 year old children who may want to take part in a study like this, please contact us at MarylandNCDL@gmail.com. Thanks!



Is children’s ability to remember “where” similar to their ability to remember “when”?

We are now asking the first group of kids who participated in our context memory study (described above in “It’s all in the details...”) to join us for a follow-up study looking at whether their memory in our two-room study is related to other types of memory. One question we are addressing is whether children’s ability to remember “where” things belong is related to their ability to remember other details like “when” things happened. To look at this in the lab, we created a “Play in Order” game. In this game, a researcher plays with a set of toys in a specific order and after a short delay on the child is asked to play with the toys in the same order.



For example, in the “play camping” sequence we 1) put a can of food in a cooler, 2) cook over a (pretend) fire, 3) put a lantern in the tent, 4) set a tray on the picnic table, 5) put a towel in a raft and 6) get into a sleeping bag.

Children’s ability to remember the order will be recorded and compared to their ability to remember the location of items in the original study.

Other games children play at this visit include asking children to name as many different kinds of food as they can within one minute or a shape naming activity with a twist in which we ask them to say square when they see a circle and circle when they see a square. These games will help us answer questions about what kinds of cognitive abilities and parts of the brain are related to different types of memory. Stay tuned for the next newsletter for our findings!

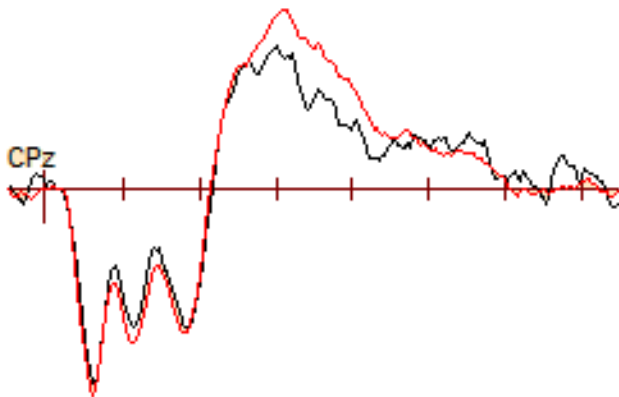
Predicting What Will Become a Memory

Another issue we are interested in learning more about in our lab is whether we can tell what information children will later remember (or forget) based on their brain’s activity the first time they encounter it. To find out, we have been asking 6-year-olds to make either animacy (living/nonliving) or size judgments (big/small) about pictures on a computer screen while we record their brain activity. A few minutes later children see the same “old” pictures as well as some “new” pictures they have never seen before. We then ask the children if the picture is “old” or “new”. If the child says the

picture is “old” we ask them whether they made the animacy or size judgment. Kids are doing pretty well remembering what pictures they saw *and* what they said about them. Even more exciting is that it appears that children’s brains do show a different neural signature to items they subsequently remember and those they forget (see picture – one “brain wave” shows activity to pictures children remembered, the other shows activity to pictures children forgot). In other words, their brains responded differently based on whether they would remember the picture in the future. This is an



exciting new finding as it will help us understand why kids remember some things but not others!



Left: An example of the “neural signature” showing the difference between later remembered toys (red) and forgotten toys (black)”



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

Changes in Faculty Research

The Maryland Infant Studies Consortium is a group of 4 different research labs at Maryland, all of which focus on infant and child development. One of the four core faculty members has recently relocated to the University of Chicago; her goodbye letter follows. We're very sorry to see her go. But even as we say good-bye to Dr. Woodward, we're also looking forward to several new faculty members in developmental science joining us at Maryland over the course of the next two years. Despite these changes, we want to assure you that research at Maryland is continuing to provide new insight into how children develop – and that your help is crucial to making that happen. We hope you will continue to join our efforts to explore children's language, memory, and cognition.

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### ***Dear parents,***

*In our newsletters we not only keep you informed about our research developments, but also let you know when the student and post-doctoral researchers whom you have gotten to know move on to new jobs in new places. This time, the list of "departures" includes me. Since 2005 I have been the director of the Maryland Infant Studies Laboratory in the Department of Psychology. This summer, I began a new faculty position at the University of Chicago, and, over the course of this year, my laboratory's operations will shift to Chicago.*

*I am excited about the opportunities for my work and my family in Chicago, but it is certainly not easy for me to say good-bye to the University of Maryland. I have been enormously proud of the Maryland Infant Studies Laboratory and, in particular, the accomplishments and contributions of the students and post-doctoral researchers who have made it their scientific home. I am also deeply grateful for the contributions of the parents, infants and children who have enabled the research to thrive and grow. We have been very fortunate to do our work in such a supportive, diverse and fascinating community. I will miss you all.*


*Finally, I will very much miss my fellow laboratory directors, Rochelle Newman, Jeff Lidz and Tracy Riggins. Their laboratories will continue thrive and to offer you the opportunity to be involved in state of the art developmental science. I am asking them to keep me on the mailing list, so I can keep track of all the wonderful work yet to come.*

***Best wishes,  
Amanda Woodward, Ph.D.***



**Thank you for your participation!**  
Feel free to visit our web page at [www.InfantStudies.umd.edu](http://www.InfantStudies.umd.edu)

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