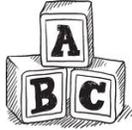
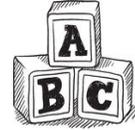


Infant Learning Lab Newsletter



2015 In Review



Dear Parents and Friends,

Thank you so much for participating in the language research studies being conducted at the University of Wisconsin's Infant Learning Lab!

Even though many of our participants are not yet talking (we have studies with children as young as 6 months of age), all of our participants are paying close attention to the sounds, syllables and words that surround them. With your and your child's help, we are able to address important questions related to language acquisition. Answering these questions will help us to better understand how typically-developing infants process and learn language, information that could lead to a better understanding of what happens in cases where children don't acquire their first language as readily.

Many families participated in one or more studies over the last year, and we have been busy collecting data for all of these studies! As always, we have had some very interesting and exciting results. This newsletter is intended to highlight the findings of some of the different studies we have been conducting over the last year. In addition to the study highlights, you can find a list of recently published work at the end of this newsletter.

We hope that you and your child had an enjoyable visit to the Infant Learning Lab. Thank you again for your participation! Without your help, this important research could not happen. If you would like copies of any of the papers we are writing or have any additional questions or comments, please feel free to call us at (608) 263-5876, or email us at babies@waisman.wisc.edu.

Thanks again!

Jenny Saffran, Ph.D. – Principal Investigator

Tatiana Thonesavanh, B.S. – Laboratory Manager



Our 2015 Studies

What drives babies' preference for speech?

Human beings, like other animals, prefer vocalizations from our own species. This preference seems to start at the very beginning of our life. Babies treat human speech as a special sound, and they love to listen to people speaking to them or others. But what makes spoken language such an interesting sound? We want to know whether the sound properties driving this preference are unique to human speech or whether these properties are shared with other animals' vocalizations.

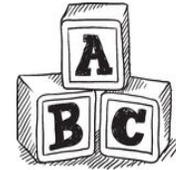


We are currently working on whether 6- to 8-month-old infants prefer to listen to human vocalization (Mandarin-Chinese, an unfamiliar language) or non-human vocalization (birdsong). Songs produced by birds represent an interesting type of sound because they retain some patterns and rules typical of the human language, but produced by a different vocal tract.

We measure if babies prefer to listen to Mandarin, to birdsong, or if they do not show any preference. By measuring the presence or absence of a preference, we can understand

whether the typical preference for the speech exhibited by infants is the result of a general interest for sounds produced by all animals, or whether it reflects a preference for vocalizations produced by primates (people, monkeys, etc.).

Chiara Santolin, M.S.
chiara.santolin@gmail.com



How do infants learn multiple languages?

Most children learn the words of their first language rapidly, within the first few years of their life. Many children can even master more than one language, especially if they have been exposed to multiple languages from a young age. When growing up in a multilingual environment, how does a young baby keep track of each language separately to learn the different rules and patterns of each?

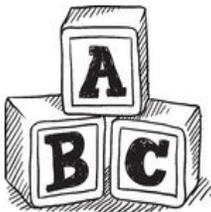
To answer this question, we had 8- and 9-month-olds listen to two “artificial” languages. These “artificial” languages are short languages that contain made-up words that sound like English. Both languages have their own words and patterns that make them different from each other. But, when we played the two languages for babies, they heard them back to back, coming

from the same person, and without any pauses in between or any other sound cues to signal that there were two different languages being heard.

After they listened to both languages, we measured babies' listening preferences to either the words in the first or second language, and compared these preferences to made-up words that were not present in either language. If babies have a difference in listening preference between words in the first (or second) language compared to words that were not in either language, this would suggest to us that babies were able to separate out the two languages and learn the words in each language separately.

So far, we have found that young babies actually have a hard time separating out the two languages to learn. Currently, we are following up on this finding by having infants listen to only one of the languages at a time, and testing if babies can learn the words from listening to the single language. If babies are successful here, this would suggest that when we play both languages back to back, it becomes difficult to separate the two language out and learn. The study is currently ongoing, and with the findings, we hope to better understand how young babies may learn multiple languages.

Viri Benitez, Ph.D.
vbenitez@wisc.edu



When do children understand the meaning of “who” and “what”?

During the early stages of language development, children hear a lot of questions. For example, parents frequently ask wh-questions like “who do you see?” or “what is that?” These “wh” words might be difficult for young children to learn because the same word can refer to so many different things. In a single interaction, a child might hear “who” used to refer to several different people: himself, a sibling, and even people who are not in the room. However, if the child knows the meaning of “who”, he should know that it does not refer to the ball he is playing with, the book mom is holding, or any other inanimate object in the room.

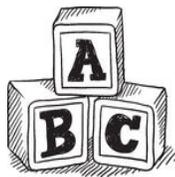


We still do not know when this understanding emerges. Children generally do not ask wh-questions until after their second birthday, but we believe that they understand them earlier than they produce them. Therefore, we designed a study to find out when children first start to understand the distinction between words like “who” and “what”. We invited children between 13 and 17 months of age into the lab and showed them pairs of pictures depicting animate and inanimate objects (e.g., a

person and a car). We then asked them either “who do you see?” or “what do you see?”, to find out if they looked more at the person for “who” questions and the vehicle for “what” questions.

We examined the results separately for each age group and found that they all showed similar looking patterns. After hearing “who do you see?”, children tended to look more at the person than the car. However, they also looked more at the person than the car when they heard “what do you see?” While difficult to interpret, this pattern of results suggests that even 17-month-old children have not yet developed a firm distinction between the meaning of “who” and “what”.

Anthony Goodwin, Ph.D.
agoodwin@waisman.wisc.edu



Putting words in their place:

*Early word knowledge is not just
the what, but also the where*

Many of the nouns that infants hear are linked to specific places. We talk about spoons in the kitchen, toothbrushes in the bathroom, and swings at the playground. Nevertheless, we usually think of nouns as referring to objects, and not the places where those objects are typically seen. However, if babies consistently hear the word “toothbrush” in the bathroom, their knowledge of that word may include not only the tooth-cleaning implement, but also the

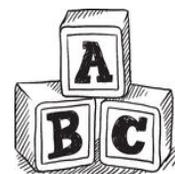
surrounding bathroom scene. In other words, early word knowledge may be tied to specific contexts, not just specific objects.

To test this hypothesis, we examined 18-month-olds’ eye-movements as they heard sentences directing them to look at pictures on a screen. For example, a baby would see a picture of a toothbrush and a bar of soap side-by-side while hearing the sentence “Find the toothbrush”. While many researchers have shown that infants at this age are able to quickly look at the correct picture in this type of study, we made one crucial change: before being asked to locate specific objects, infants were briefly shown a picture of a particular context. This context either matched the object (e.g., a picture of a *bathroom* was shown before asking the baby to find the toothbrush), or did not match the object (e.g., a picture of a *kitchen* was shown before asking the baby to find the toothbrush). If infants’ word knowledge is linked to specific contexts, they should be faster to look to the correct object when they first see a matching context, compared to a mismatching context.



Indeed, this is what we found. Eighteen-month-olds were faster and more accurate at looking to the correct object if it was preceded by a matching context. This study is the first to show that early words are not just linked to the *what*, but also the *where*. Future work will investigate whether older toddlers’ word knowledge is also context specific, or if words become more abstract across development.

Erica Wojcik, Ph.D.
Wojcik.Erica@gmail.com



Can babies understand words in an unfamiliar accent?

It can be hard to understand people that speak with different accents. Even adults, who know a lot about the way their language sounds, often have difficulty understanding speakers from different countries. They have a much easier time, though, when they have had practice either with that person, or another person who has a similar accent.

We know that babies, who are just beginning to understand their native language, find it easier to understand words when the situation is familiar. For example, they find it easier to recognize words that are spoken by someone that they know than a stranger. Given that accents can sound quite different, we thought it might be even harder for them to understand different accents, and we want to know how children eventually learn to understand different speakers.

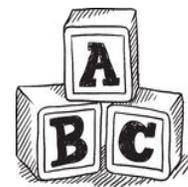
Specifically, we want to know if babies who are growing up in Wisconsin and have little or no experience with different kinds of accents, are able to understand British speakers. To do this, we are asking whether babies can recognize words that ought to be relatively familiar, such as *daddy* or *diaper*, when they hear them spoken by someone from England. We also want to know if giving babies some practice with new speakers who have different accents makes it easier for them to recognize these words.

So far, we've seen that younger babies (around 15 months) are able to recognize words spoken in a Wisconsin accent, but not when the speaker is British. Even after the babies listen to other people that have British accents, they don't

seem to recognize that they are hearing words they know when the words are pronounced differently.

Next, we wanted to see if slightly older babies, who know more words and know them better, might be able to understand the British speaker. Like the younger babies, 18-month-old toddlers don't seem to recognize familiar words that are spoken in a British accent when they have never heard British speakers before. However, practice does seem to help them. After toddlers have a chance to listen a story read by British speakers, they are more likely to recognize familiar words spoken by a different British speaker, suggesting that a little experience with new accents can teach them that words can be pronounced differently, but still be familiar. We are continuing to test toddlers and now want to know if they need to hear the particular accent that they will be tested on, or if experience with any unfamiliar accent helps them understand that even when speakers sound different, they are using the same words.

Chris Potter, M.S.
cepotter@wisc.edu



Are babies active learners when hearing new words?

Babies hear millions of words during their first years of life. How do babies sift through all of this new information to figure out what words mean? In this study, we ask how

infants go about collecting new information about words they have only just begun to learn.

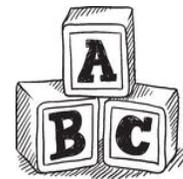
Usually, in our studies, we study word learning by having infants passively watch a video of unfamiliar objects paired with new words. But in their day-to-day lives, babies have much more control over what they learn about: they make choices about what to look at, what object to play with, when to reach out to their parents for help, among many other decisions. In this study, we were interested in how babies seek more information about new words by allowing them to actively choose what they hear.



studies, we plan to test whether giving babies the chance to choose what they hear actually helps them learn words better than when they have no control over what they hear. If this turns out to be true, it would support the idea that babies learn words best when they have are active participants in their learning. These studies help us understand how babies actively seek to make sense of the incredible number of words they hear used all around them.

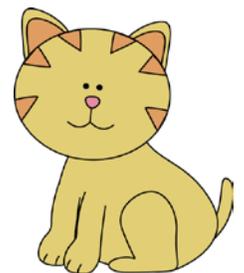
Martin Zettersten, B.A.

zettersten@wisc.edu



Cute kittens and word learning

When children learn the name of a novel object it is often surrounded by other familiar objects. Sometimes these familiar objects are salient and interesting (e.g., a kitten) and other times they are bland and boring (e.g., a cardboard box). Do distracting familiar objects make it more difficult for children to learn the name of a novel object?



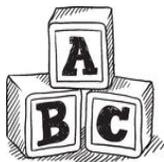
What we have found so far is that babies first prefer to collect more information about the objects they hear labeled less often. When given a choice, babies prefer to learn words for objects that they don't know as well yet. In future

When is a ball a *walk?*

In order to answer this question, we taught 3-year-olds the names of 4 novel objects. When shown a novel and a familiar object and asked to 'Find the modi,' children spent less time looking at the novel object if the familiar object was salient (e.g., kitten) rather than boring (e.g., box). We then tested whether children remembered the name of each novel object. When shown 2 novel objects and again asked to 'Find the modi,' children were only successful if they had been previously taught the name of the novel object in the presence of a boring familiar object. As a group, children did not remember the names of the novel objects that were taught in the presence of salient familiar objects. Individual children who were less distracted by the salient familiar object during teaching, however, were able to remember the names of the novel objects.

These results indicate that not all word learning opportunities are equal. Children are less successful in learning the names of novel objects when there are more salient, distracting objects in their environment. Children differ, however, in how much they are distracted by salient objects and how successful they are in word learning. Future work will examine how children are able to ignore distracting objects to succeed in word learning.

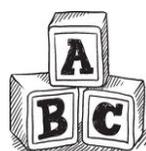
Ron Pomper, M.S.
ron.pomper@gmail.com



The environment in which children learn words influences what they learn. Recent research in our lab has found that the volume of background speech heard when learning words impacts whether or not two-year-olds were able to learn. We taught two different groups of children made up words. While learning the words, the children also heard two-talker babble speech—a scenario that would be similar to two people talking over one another. Children who heard the louder babble speech when they were taught the words did not learn the words, however, children who heard background speech that was slightly quieter learned the novel words. What remains to be seen is whether the words that children learn in a noisy environment are as stable as the words they've learned in a quiet environment. For instance, are children willing to accept that the object ball could also be a "vall" if they've learned the word ball in a noisy environment?

To test this hypothesis we are teaching 22- to 24-month-olds a completely made-up word, *boskot*. For this study, children are taught the word *boskot* either with background speech or without any background speech present. They are then tested on whether they recognize the picture of a *boskot* when the word *boskot* is mispronounced as either *toskot* or *voskot*. Data collection is ongoing, but if children in either the noise or the quiet condition look to the picture of the *boskot* when they hear *toskot* or *voskot*, we will have additional evidence to show that background noise in a child's environment influences how they learn words.

Brianna McMillan, M.S.
bmcmillan@wisc.edu



How does attention affect children's learning?

In most homes today, there are many potential distractions, such as television, radios, and multiple people talking. How do these distractions influence how young children learn the patterns in their environment, such as the sounds and words of their native language, or the rhymes in a storybook? This question is important for understanding how young children learn, since their attention is still developing, and they may not be as good as adults at filtering out distracting information.

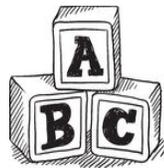
To try understanding the role that attention plays in children's ability to learn patterns, we have been developing a task where young children will listen to two stories at the same time. Each story includes a list of word pairs that children can learn. Their attention will be directed to one of the two stories, and the other story will act as background noise. After listening to the stories, we will ask them to identify the word pairs from the story to which they were supposed to pay attention. Additionally, we will also ask them to identify the word pairs for the story that was supposed to be the background noise, to see what they might have learned without having paid attention to it.

To help develop this task, we have been recruiting 4- to 6-year-old children at the Madison Children's Museum to participate in a version where they only hear one story, so that we can make sure that the patterns in each story are easily learnable without any distractions. One of the stories is about food and the other about animals. In this first study, children listen to one of the stories and hear repeated pairings of animals (e.g., mouse—pig) or food (e.g., corn—milk). We then test whether the children learn the word pairings. This study is currently ongoing, and with the findings, we hope to better understand how young children's developing attentional skills influence the patterns that they can learn.



**Brianna McMillan, M.S. &
Viri Benitez, Ph.D.**

bmcmillan@wisc.edu & vbenitez@wisc.edu



🌿 Looking for more research opportunities? 🌿

Here are some other labs in the Waisman Center that are looking for families with kids to participate!

- ✓ **Little Listeners Project** - Studying language in toddlers with and without autism spectrum disorder
 - Sign up online! <http://littlelisteners.waisman.wisc.edu/home>
 - Or call today at (608) 262-9308
- ✓ **The SPACE Lab** - Studying the development of children's memory for visual features and locations of objects
 - Sign up online! www.spacelab.psych.wisc.edu/parents
 - Dr. Vanessa Simmering: spacelab_psych@wisc.edu
 - Coming soon... a new website for the SPACE Lab!
- ✓ **The Social Kids Lab** - Studying the cognitive and social development of young children
 - Sign up online! www.waisman.wisc.edu/socialkidslab/socialspacelabs/Sign_Up.html
 - Dr. Kristin Shutts: socialkids@psych.wisc.edu
- ✓ **Child Emotion Research Laboratory** - Exploring children's emotional development and the relationship between early experience and mental health
 - Sign up online! www.waisman.wisc.edu/childemotion/parents.html
 - Barb Roeber: childemotion@waisman.wisc.edu
- ✓ **Binaural Hearing & Speech Lab** - Studying how children learn to locate sounds in their environment
 - Visit the website for current studies!
 - http://www.waisman.wisc.edu/bhl/patients_participants.html

🌿 Recent Publications 🌿

Please visit our website for direct links to these and other lab publications:
<http://www.waisman.wisc.edu/infantlearning/Publications.html>

Potter, C.E., & Saffran, J.R. (2015). The role of experience in children's discrimination of unfamiliar languages. *Frontiers in Psychology*. doi: 10.3389/fpsyg.2015.01587.

Mahr, T., McMillan, B. T. M., Saffran, J. R., Ellis Weismer, S., & Edwards, J. (2015). Anticipatory coarticulation facilitates word recognition in toddlers. *Cognition*, 142, 345-350.

Wojcik, E. H., & Saffran, J. R. (2015). Toddlers encode similarities among novel words from meaningful sentences. *Cognition*, 138, 10-20.

Hay, J. F., Graf Estes, K., Wang, T., & Saffran, J. R. (2015). From flexibility to constraint: The contrastive use of lexical tone in early word learning. *Child Development*, 86(1), 10-22. doi: 10.1111/cdev.12269

Wang, T., & Saffran, J. R. (2014). Statistical learning of a tonal language: The influence of bilingualism and previous linguistic experience. *Front. Psychol.* 5:953. doi: 10.3389/fpsyg.2014.00953.

Willits, J.A., Seidenberg, M.S., & Saffran, J.R. (2014). Distributional structure in language: Contributions to difficulty differences in infant word recognition. *Cognition*, 132(3), 429-436.

~ Know someone with a baby? ~



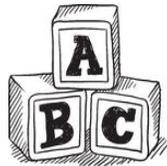
We are ALWAYS looking for more babies to participate in our studies!

Our current studies involve infants between 6 months and 42 months of age. We will soon begin a new study for children, ages 5 and 6 years old!

Please pass on our phone number (608-263-5876) and/or email address (babies@waisman.wisc.edu) to any parents who might be interested in participating in our research studies.

If you are involved in programs with infants or expectant parents, including child care programs, play groups, or childbirth classes, and would be willing to post a flyer or distribute articles describing our research, please let us know!

~ Lastly, we always welcome new babies! If you would like to update your information with us, we are more than happy to do so! Just call or email us! ~



Thank you for your continued interest in and support of our research! We could not do it without you!

