

INFANT LEARNING LAB

2022 Newsletter

June 10, 2022 | Issue 10



Dear Parents and Friends:

Thank you so much for participating in the language research studies at the UW-Madison Infant Learning Lab! Even though many of our participants are not yet talking (we have studies that include infants as young as 6 months of age), all of our participants are paying close attention to the sounds and sights that surround them. With your child's help, we are able to address important questions related to language acquisition. Answering these questions will help us better understand how infants and young children learn language, information that could lead to an enhanced awareness of what happens in cases where children face challenges in language learning.

Many families participated in one or more studies over the last year, either in person or over Zoom. As always, we have had some very interesting and exciting results. This newsletter is intended to highlight some findings from the studies we have conducted over the last year. We are especially grateful for your participation during this challenging time period in our community. Without your help, this important research could not happen.

With sincere gratitude,
Jenny Saffran, Ph.D

*Principal Investigator, Infant Learning Lab
Vilas Distinguished Achievement Professor of Psychology*

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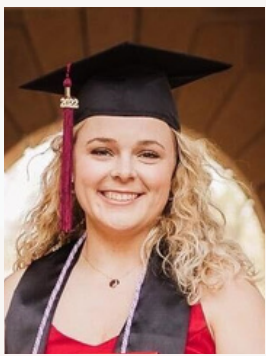
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Eye-Tracking Studies

We introduce babies to novel words and images on a screen before testing how well they learned and retained the new words.



- **Desia Bacon, M.S.**
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- **25-27 month olds**

DOES REDUNDANT INFORMATION FACILITATE WORD LEARNING?

Infants are born into a visually noisy world but must determine what visual information is important to attend to. Past research shows that adults can classify a single object faster or more accurately when redundant information is available. When considering our daily environment, it is much more typical that an object will differ from its surrounding objects in multiple feature dimensions rather than a single feature dimension; however, we do not yet know if infants key into this redundant information and are able to exploit redundant information along multiple feature dimensions to aid in learning.

In this in-lab study, we teach infants novel label-shape pairs that contain redundant visual information (i.e., 'Novel word 1' is a specific shape that will consistently be one color) or non-redundant visual information (i.e., 'Novel word 2 is a specific shape that will appear in many colors). We then test infants to see if they can accurately recognize the shape when asked for it, regardless of whether it appears in a previously familiar color (redundant) or in a color not previously seen (nonredundant).

Data collection is ongoing, but we expect that infants will demonstrate faster mapping of the label to the shape (learning) when that label-shape pair appears in a familiar color due to the presence of redundant visual information (same color/same shape). We also expect that infants will demonstrate better extension of the label when the shape is familiar but is presented in a new color if the infant previously saw that shape in multiple colors (same shape/different color). These findings will allow us to better understand how infants encode visual information during learning and tactfully exploit it when demonstrating learning.

Eye-Tracking Studies

DO CHILDREN FOCUS ON A TALKER'S MOUTH TO LEARN NEW WORDS?

• Jasenia Hartman, B.A. •
• jhartman3@wisc.edu •
• 16-18 month olds •

As babies learn their native language, they are able to see their caregiver's face. The face contains useful information that supports language acquisition. For example, the mouth provides redundant speech cues to the auditory signal. Using parental reports, many researchers have suggested that babies who pay more attention to the talker's mouth have better language outcomes. But, how do infants direct their gaze to a talker's face as they are learning words? Additionally, do infants who focus more on the mouth learn words better?

To address these questions, we will teach 16-and 18- month infants the names of novel objects. During learning, infants will see a video of a woman labeling an object (e.g., "Look at the pibu! Pibu!"). After learning, we will test infants on how well they associated the novel object with the novel label. Infants will see two novel objects on the screen and hear the name of one of the objects. For each infant, we will calculate two measurements: 1) the amount of time spent looking at the mouth, and 2) accuracy (the amount of time spent looking at the correct object in the test phase). We hypothesize that if attending to the mouth facilitates language acquisition, then infants who focus more on the mouth during learning should be more accurate in the test. This question is particularly important for the age group being tested because children show a vocabulary growth spurt at this age. Thus, our findings will show how children direct their attention to a talking face to facilitate language acquisition.

• Ellie Breitfeld, B.A. •
• breitfeld@wisc.edu •
• 36-48 month olds •

DO CHILDREN INCLUDE LOCATION INTO THEIR UNDERSTANDING OF WORD MEANINGS?

Children learn words for objects within rich surrounding contexts. These contexts are often not random, but related to objects in meaningful ways: children learn about foods in the kitchen, plants outside, and toys in the playroom, etc. We wondered if children include the location of objects into their understanding of new words. For example, if children are taught a label for an unfamiliar object pictured in a kitchen, are they likely to conclude that this new object might be a type of food?

We explored this question by teaching 3 to 4-year-olds new words for unfamiliar objects pictured either in a kitchen or outside. Afterward, they were shown pairs of images of the unfamiliar objects—one that they saw in the kitchen and one that they saw outside and heard a sentence labeling one of them. Half of the time, the sentence included a verb that was related to the location where the object was located (i.e., "I like to eat the bosa" for objects seen in the kitchen and "I like to throw the sibu" for objects seen outside). The other half of the time, the sentences included a neutral verb (i.e., "I like to see the bosa" and "I like to find the sibu"). We predict that, if children incorporate object location into their understanding of word meanings, then hearing a location-related verb will help them look at the correct object when they hear its label compared to when the sentence includes a neutral verb. Data collection is ongoing and we look forward to sharing our results soon!

KITCHEN SCENES



"This is a bosa!"



"Wow a bosa!"



"It's a bosa!"

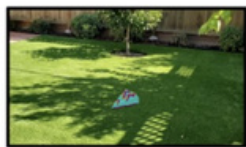
OUTDOOR SCENES



"This is a sibu!"



"Wow a sibu!"



"It's a sibu!"

Eye-Tracking Studies

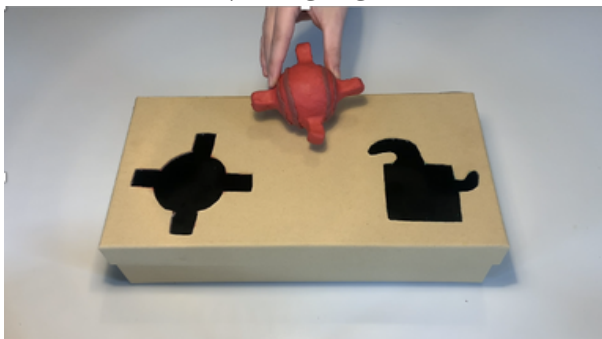
DOES INFORMATION ABOUT OBJECTS' SHAPE HELP TODDLERS LEARN NEW WORDS?

• Ellie Breitfeld, B.A.
• breitfeld@wisc.edu
• 21-24 month olds •

Toddlers have the opportunity to learn new words every day, but they do not learn every new word they hear. What makes toddlers more likely to learn some words than others? As toddlers learn words they have to figure out which words go with which objects in the world. Importantly, this means that they also have to figure out what is different between objects with different names. For example, toddlers have to learn that red, round fruits are called “apples,” but also that they are different from fruits we call “pears.” One thing that is often different between objects with different names is their shape—like the round, heart-shape of apples vs. the large bottom and narrowing top of pears. We were interested in exploring what might help toddlers identify these differences. We asked whether the environment around objects might play a role in highlighting the unique shape of objects with different labels.

To test this, we taught toddlers new words for unfamiliar objects in an environment that highlighted the objects' unique shapes and one that did not. To highlight shape, toddlers saw two objects being placed through holes in the top of a box that matched the shape of each object, similar to a shape-sorter toy. Toddlers saw another two objects being placed through a large circular opening in the top of a box, which did not match the shape of either object (and so did not highlight the shape of either object). Then, we tested how well the toddlers were able to learn words for each object. Our results show that toddlers learned words better when the unique shape of the objects was highlighted. This suggests that the environment around objects can influence how well toddlers are able to learn words for them. In particular, environments that highlight unique features of objects, in this case, their shape, may be beneficial for word learning.

Shape Highlighted



"This is a manu! Wow, a manu!"

Shape Not Highlighted



"Here's a wiso! Look at the wiso!"

**KNOW SOMEONE
WITH A BABY?**

We are always looking for babies to participate in our studies! Our current studies involve infants as young as 6 months and children up to 5 years of age. If your family just welcomed a new child and you would like to update your information with us, just give us a call at (608) 263-5876 or email us at infantlearninglab@waisman.wisc.edu. Also, if you know a friend who has young children or recently had a baby, feel free to pass along our contact information.

Eye-Tracking Studies

Undergraduate
Senior Thesis
Project

DO TODDLERS LEARN BETTER FROM ENGAGED OR UNENGAGED SPEAKERS?

• Anna Compton, B.A.
• amcompton@wisc.edu
• 27-29 month olds

Infants show preferences for learning from familiar adults, particularly their caregivers, and perform better on novel word learning tasks when taught by their mothers than by strangers. However, it remains unclear why infants learn more from their caregivers than from strangers. We hypothesize that adults who have previously demonstrated a high level of infant-focused engagement are more effective as teachers than adults who have demonstrated less infant-focused engagement.

The current study will test this hypothesis by investigating the effects of engagement prior to word learning. We plan to collect data from forty infants who will each be presented with the names of four novel objects by two different experimenters: one who previously demonstrated infant-engaging behaviors, and one who was previously unengaging. We predict that a higher level of engagement will facilitate more effective novel word learning. Data collection is still underway, but we hope that the final results will enhance our understanding of factors that promote successful infant language development.



Engaged speaker

Unengaged speaker



LOOKING FOR MORE RESEARCH OPPORTUNITIES?

THE LITTLE LISTENERS PROJECT

Studying language in toddlers with and without autism spectrum disorder

<https://littlelisteners.waisman.wisc.edu/>

THE SOCIAL KIDS LAB

Studying the cognitive and social development of young children

<https://socialkids.waisman.wisc.edu/>

CHILD EMOTION LAB

Exploring children's emotional development

<https://childemotion.waisman.wisc.edu/>

BINAURAL HEARING & SPEECH LAB

Studying how children learn to locate sounds in their environment

<https://bhsl.waisman.wisc.edu/>

Online Studies

Adapting to the pandemic, we moved our eye-tracking studies online!



DO TODDLERS ASSOCIATE FOODS WITH THEIR PROTOTYPICAL COLORS?

Past research suggests that toddlers associate specific colors with objects; however, not all objects have prototypical colors. We created a novel task to investigate whether toddlers are sensitive to differences in these regularities across categories (e.g., most foods have prototypical colors, but vehicles do not).

This study was one of our first to be administered via Zoom! Three-year-olds (36-48 months) saw pictures of familiar foods and vehicles and heard them labeled. Immediately after, we assessed their accuracy in encoding the food and vehicle colors. On each trial, toddlers heard one of the familiar objects named and saw two colored squares (one matching the color of the object from familiarization). When the named objects were foods with prototypical colors (e.g., peas), toddlers' accuracy in fixating the target color was significantly greater than chance. When the named objects were vehicles without prototypical colors (e.g., cars), toddlers' accuracy in fixating the target color was not significantly greater than chance. These findings suggest that toddlers attend to color differently across semantic categories.

In future work, we will use this method to investigate how toddlers learn to associate colors with novel objects from different semantic categories. This research will aid in understanding how toddlers use their prior knowledge (e.g., most foods have prototypical colors) to facilitate learning.



"Where are the carrots?"

- **Desia Bacon, M.S. & Ron Pomper, Ph.D.**
- **36-48 month olds**

Online Studies

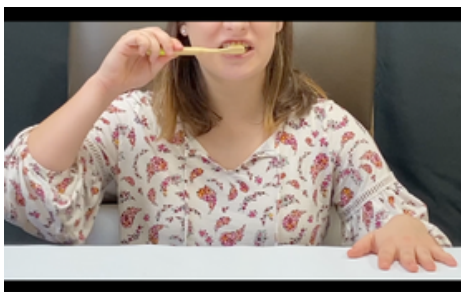
Haley Weaver, M.S.
hjweaver@wisc.edu
23-25 month olds

CAN YOU EAT A TOOTHBRUSH? TODDLERS' UNDERSTANDING OF FUNCTIONS AND WORDS

Toddlers' everyday experiences offer opportunities to learn about objects and the words we use to refer to those objects. For example, imagine a caregiver and child brushing their teeth together. A caregiver may say, "Grab your toothbrush! It's time to brush your teeth." In response, the child picks up the toothbrush, waits for toothpaste, and then begins brushing her teeth. In this brief interaction, the child has the opportunity to link the word toothbrush with the actual object and learn about how this object is typically used. These kinds of early and consistent routines are commonplace for toddlers, and research suggests that the words that occur in these contexts are learned earlier. Yet, what about the other information toddlers could be learning during these interactions? Do toddlers learn about objects' functions?



To test this question, we showed two-year-olds side-by-side videos of an actor demonstrating functions for an object. Crucially, in one of the videos, toddlers saw a function that is typical for the object (i.e., brushing your teeth with a toothbrush) while, in the other video, toddlers saw a function that is abnormal for the object (i.e., eating a toothbrush). If children are learning about how objects are typically used, then they should be surprised by, and therefore, look longer at these strange functions. So, we measured how long toddlers looked at the unusual function compared to the typical function. We found that toddlers looked longer at the atypical functions but only for instrument words (i.e., toothbrush and crayon). Yet, for words like apple and ball, which may have many different functions (i.e., you can roll, bounce, throw, or kick a ball), toddlers looked equally at both the typical and unusual functions. These findings suggest that young children may learn about functions when a single action is consistently linked to the object. So, toddlers understand that you don't eat toothbrushes because they are specifically made for brushing teeth, but they may have a more complex understanding of the many ways apples and balls are used.



Woman brushing her teeth with a toothbrush.



Woman eating a toothbrush.

THE INFANT LEARNING LAB ON

NETFLIX

Check out our lab on the Netflix docuseries, *Babies*, focused on child development! We are on episode 4, "First Words," and you can watch it for free (even without a Netflix account) here: <https://www.youtube.com/watch?v=BFtbXwnBRg8>.

Online Studies

DOES THE WAY WE TALK TO INFANTS REALLY MATTER?

Paige Bruggink, B.S.
pbruggink@wisc.edu
14-16 month olds

Infants comprehend language much earlier than people may realize. By six months old, infants can comprehend words and at 14 months old there is an explosion in their language skills. Despite knowing that infants are developing language skills early in life, we know less about what *type* of speech best helps children grow their language.

In this study, we explored two different types of speech: fully grammatical and telegraphic. We were interested in how these different types of speech impact language comprehension in 14- to 16-month-olds. Fully grammatical speech is the speech adults are most familiar with and typically use in their everyday life. It includes all the elements of speech and is not simplified or reduced (i.e., "Do you see the ball?"). On the other hand, telegraphic speech is speech that is simplified to only include the noun(s) and verb(s) (i.e., "See ball?"). These two speech types were compared because telegraphic speech is often used when talking to young children; however, little information is known about its effectiveness. We wanted to see whether telegraphic or fully grammatical speech helps toddlers recognize familiar words faster and more accurately.

During this Zoom study, toddlers sat on their caregiver's lap and were shown two images (a target image and a distractor image) while hearing the target image labeled in either the telegraphic speech or fully grammatical speech. In the example photo above, if the trial was telegraphic, the toddler would hear "See ball?", but if the same trial was fully grammatical, the toddler would hear "Do you see the ball?". Toddlers' eye gaze toward each of the objects was recorded over the course of the 32 study trials. Our findings suggest that grammatical speech is no more advantageous than telegraphic speech for toddlers' speed or accuracy of word recognition. Further, findings seem to suggest that across both types of speech, toddlers correctly identify the target object with similar levels of accuracy.

Undergraduate
Senior Thesis
Project



"See ball?" or "Do you see the ball?"

UPCOMING EVENTS IN THE COMMUNITY

JUNE 13

**9:30-10:00 AM
VERONA PUBLIC
LIBRARY**

Toddler Story
Time

JUNE 14

**10:00 AM
MONONA TERRACE**

Lakeside Kids
Educational Program

JUNE 18

**10:00 AM- 2:00 PM
2340 MANLEY DR,
SUN PRAIRIE**

Family
Fun Day

JUNE 19

**12:00-4:00 PM
HIGH NOON SALON**

Music of Bob
Marley for Kids

JUNE 21

**10:30-11:30 AM
WAUNAKEE
VILLAGE CENTER**

Kids Make Music
Day

Headturn Studies



Your baby sees images and hears sounds on three screens. We measure their attention by recording how long your baby looks at a particular screen.

HOW LONG DOES IT TAKE FOR INFANTS TO LEARN A NEW WORD?

• Desia Bacon, M.S. & Haley Weaver, M.S. & Martin Zettersten, Ph.D. •
• 6-9 month olds •

Some words occur more often in an infant's environment than others. It's very likely that the more often a word occurs, the easier it is to learn. In the lab, we try to measure learning and information recall in young infants using their preferential looking. One difficulty with this is that our understanding of the relationship between learning processes and looking behavior is limited. In this current study, we are trying to determine whether we can measure how well individual infants learned new words by studying their looking times.

To address this question, we are testing 6- to 9-month-old infants' recognition of novel auditory stimuli following a training phase while manipulating a factor that is expected to affect learning: frequency of exposure. During the training phase, infants hear a list of new "words" – words we have made up to make sure infants have not heard them before. While all infants hear the same total number of new words during familiarization, the frequency of target words varies. After the training phase, we measure how strongly infants prefer the target words, compared to words they did not hear during training. The central question is whether hearing the target words more frequently – words that we expect infants will remember better – results in stronger looking preferences. Data collection is ongoing. The findings will help us understand what our looking measures tell us about how well individual infants have learned.

Recent Publications

1. Zettersten, M., Pomper, R., & Saffran, J. R. (2022). Valid points and looks: Reliability and validity go hand-in-hand when improving infant methods. *Infant and Child Development*.
2. Ruba, A., Pollak, S. D., & Saffran, J. R. (2022). Acquiring complex communicative systems: Statistical learning of language and emotion. *Topics in Cognitive Science*.
3. Prescott, K., Mathée, J., Reuter, T., Edwards, J., Saffran, J. R., & Ellis Weismer, S. (2022). Predictive language processing in young autistic children. *Autism Research*.
4. Bacon, D., & Saffran, J. (2022). Role of speaker gender in toddler lexical processing. *Infancy*.
5. Mathée, J., Larson, C., Venker, C., Pomper, R., Edwards, J., Saffran, J. R., & Ellis Weismer, S. (2021). Use of mutual exclusivity and its relationship to language ability in toddlers with autism spectrum disorder. *Journal of Autism and Developmental Disorders*.
6. Bacon, D., Weaver, H. J., & Saffran, J. R. (2021). A framework for online experimenter-moderated looking-time studies assessing infants' linguistic knowledge. *Frontiers in Psychology*, September 24, 2021.
7. Pomper, R., Kaushanskaya, M., & Saffran, J. R. (2021). Change is hard: Individual differences in children's lexical processing and executive functions after a shift in dimensions. *Language Learning & Development*.
8. Pomper, R., Ellis Weismer, S., Saffran, J. R., & Edwards, J. (2021). Coarticulation facilitates language processing for toddlers with autism. *Cognition*, 214, 104799.
9. Benitez, V.L., & Saffran, J.R. (2021). Two for the price of one: Concurrent learning of words and phonotactic regularities from continuous speech. *PLoS ONE*, 16(6): e0253039.

Most Popular Baby Names in 2022 (so far)

MALE

Oliver
Asher
Theodore
Noah
Henry

FEMALE

Violet
Charlotte
Aurora
Amelia
Hazel

GENDER-NEUTRAL

Willow
Rowan
Sage
Avery
Quinn