THE UNIVERSITY OF TEXAS AT DALLAS

DEVELOPMENTS

THE INFANT LEARNING PROJECT

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Inside this Issue!

THE UNIVERSITY OF TEXAS AT DALLAS

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WELCOME!

TO OUR NEW RESEARCH ASSISTANTS

Haley Davis

Praniya Jakkamsetti

GESTURE DEVELOPMENT IN INFANCY:EFFECTS OF GENDER NOT BILINGUILISM

PRANIYA JAKKAMSETTI

Gesture is an important tool of communication for both children and adults as it is a method that speakers can use to add definition to their communication. Gestures used by babies are one of the first steps to learning language. One area of research focuses on the differences in gesture development when comparing bilingual and monolingual individuals. Such research in the past has mainly focused on school-age children and adults and has suggested that, in comparison to monolinguals, bilinguals gesture more often. A possible explanation for this difference could be that bilinguals use gestures to support weaker language skills, especially in their non-dominant language. Such studies on the differences between monolingual and bilingual gesturing raise the possibility of early differences in gesture development as well. A study conducted by Germain et.al (2022) investigated whether differences in monolingual and bilingualism in gesture use could be discoverable in babies.

Germain et.al (2022) investigated differences in the number of different gestures infants produced between French and English infants at 14 months. Parents were required to attend a structured interview for the researchers to gather information on infants' language exposure background. With a sample size of 150 infants, the researchers created 3 different groups to compare. The first group of 74 infants were monolingual and were defined with 90% or greater exposure to either English or French. The second group of 54 infants were bilingual and were defined with a 25-75% exposure to both English and French. The third group of 22 infants were defined with some exposure of 11%-24% to a second language (either English or French). Using this information, researchers predicted that bilingual infants would be able to produce significantly more of a variety of gestures relative to monolingual infants. Thus, predicting that early gesture development occurs at an earlier age for bilinguals than monolinguals. Researchers also predicted that the number of gestures produced by infants minimally exposed to a second language would be greater than

that of monolingual infants but less than that of bilingual infants.

To measure the number of different gestures produced (or gesture repertoire), the researchers required parents to use the MacArthur-Bates CDI, a reporting system where caregivers report the actions and gestures their infant produces. Using this method, infants would then receive scores that represent their gesture repertoire. The parents of bilingual infants completed a CDI in both languages (English and French) and parents of monolingual infants completed a single CDI in their infant's native language. Data collection was mainly focused on part two of the CDI which included subscales for communicative gestures (shaking the head, nodding, and pointing) and non-communicative behaviors (eating, drinking, and imitation of others). Researchers predicted that bilingual and minimally exposed infants would have a larger gesture repertoire in the communicative gestures sections. The experiment also included one additional factor, gender, as past research has suggested that gender could have possible effects on gesture production. This plays a key role later in the analysis of this study's data.

Gesture reports were collectively scored for each child using only one CDI form, regardless of their language background because responses from one CDI form in one language proved to be consistent with responses from the second language. Scores for each section were calculated separately and as a total endorsement score (the total percentage) across all sections). To test whether language groups (bilingualism, monolingualism, and exposure to a 2nd language) can be linked to early gesture production, researchers analyzed the results of the communicative and noncommunicative gestures. Results showed that there was no significant difference in the number of different gestures used between the language groups as they all had similar results. For example, scores for communicative gestures like nodding remained similar across the three language groups. However, analyses found a significant effect between gender and the number of gestures produced; girls performed approximately three more actions than boys on an overall average. The total endorsement score was calculated and girls overall scored approx. 7% higher than boys.

The only effect that was consistently observable was the gesture repertoire difference between boys and girls. This suggests that at the age of 14 months, gender is a factor that can contribute to the differences in gesture use. This finding was consistent with previous studies that included only monolingual infants. However, the question remains as to why there were no observable differences in gesture use among monolingual, bilingual, and minimally exposed 14-month-olds. One possible explanation is that infants may not show differences in gesture use at this age as a function of monolingual and bilingualism. At later ages, infants can acquire richer vocabulary sets and experience higher cognitive abilities that in turn can lead to differences in gesture use.

Germain's research highlights that while bilingualism neither acts as an additive nor reduces gesture repertoire for infants at 14 months, this study can have important implications for assessments of infants from bilingual and multilingual households. From past studies, gesture use has been proven to be an indicator that could helpful for assessment and observation by parents and educators. This signifies the importance of observing gesture use over time in monolingual and bilingual contexts and educates parents to understand the factors that influence the emergence of early language skills.

Citation:
Germain, N., Gonzalez-Barrero, A. M., & Byers-Heinlein, K. (2022). Gesture development in infancy: Effects of gender but not bilingualism. Infancy, 27(4), 663-681. https://doi.org/10.1111/infa.12469

WHY TALKING TO CHILDREN MATTERS

HALEY DAVIS

Language developmental levels widely vary among children. One factor affecting language outcomes is socioeconomic status (SES); Children from disadvantaged socioeconomic status (SES) backgrounds often show significantly different verbal and cognitive abilities than more advantaged peers by kindergarten. The achievement gap has continued to grow from socioeconomic inequities, prompting Weisleder and Fernald (2013) to look into the significant impacts of experiences and the environment on shaping language development.

One experiential factor that affects language learning is how much communication a child gets to participate in with their caregiver. Some parents use richer vocabulary and gestures, which promotes better language learning, thereby partially explaining differences in language development. Additionally, infants' language development is affected by their ability to process language and speech. Infants better at recognizing and discriminating between speech sounds had earlier vocabulary growth. Therefore, research suggests that children's language outcomes are influenced by both early experiences with language as well as their early speech-processing skills.

However, there's little information about how children's speech-processing abilities and verbal experiences may influence each other. One possibility is that these are separate factors—language-processing abilities and verbal experiences—each contributing to development independently. This possibility suggests that children's vocabulary development results either from differences in children's exposure to speech or from pre-existing cognitive differences in children's speech-processing abilities. Another possibility is that early experience influences the development of real-time language processing. Hearing language may sharpen an infant's speech-processing skills, improving their ability to learn from future language exposure. Research from Weisleder and Fernald (2013) explores the potential relationship between early experiences with language and the development of language processing skills.

Weisleder and Fernald (2013) gathered information about how language exposure affects development of infants from low-SES Latino family households using detailed recordings of speech and various sounds the child is exposed to. Low-SES Latino households include a growing population of children at risk for academic disparities in the U.S. A recorder was placed in the chest pocket on specialized clothes worn by the 19-month-old children enabling non-invasive recordings of their speech interactions. These home recordings were then analyzed to estimate various aspects of the infant's language environment, such as the number of adult words and child expressions. Trained individuals also listened to each home recording and identified which speech segments were mostly either overheard speech or speech directed at the child.

Researchers also had the infants undergo a task to measure their language-processing abilities and investigate how this impacts their language outcomes. This was done by showing infants a pair of images while playing audio naming one of the images. Children tend to shift and maintain their gaze towards the image they understand the audio to be referencing, and researchers measured how quickly and long they looked at the image. Children's eye movements and looking patterns were used to assess their understanding of the words and how fast they recognized them, providing information on how fast the children are processing the speech sounds.

Results revealed impactful differences in how caregivers directly interacted with their infants. Improved vocabulary was not related to levels of education or overheard speech but instead to the caregivers' amount of direct verbal engagement with their infant. Children who heard more child-directed speech at 19 months had larger vocabularies by 24 months, whereas differences in the amount of overheard speech did not affect later vocabulary size. This supports that directly talking to a child helps shape their vocabulary better than exposing them to overheard speech. Children who heard more child-directed speech were also better at processing language at 24 months than those who heard less. More exposure to child-directed speech contributed to improved language processing, supporting that directly talking to children primarily fuels the development of language-processing skills.

The main findings of this study reveal that differences in infants' experiences with language exposure predicted children's later vocabulary outcomes. Those who experienced more speech directed at them had better vocabulary development. Specifically, speech addressed directly to the infant, not speech that was overheard, facilitated learning. These findings also support that the ability to process speech is developed by a children's exposure to child-directed speech. More experiences with child-directed speech enable infants more opportunities to familiarize themselves with the language, sharpening their processing efficiency and enabling quicker learning.

Results from this research prompt exploring the factors contributing to the significant disparities in verbal stimulation and outcomes among children and how to address them. Studies comparing advantaged and disadvantaged families reveal how SES differences affect language outcomes and have attributed various factors like access to resources, family stress, education, etc. Regardless, amounts of child-directed speech and language outcomes in the low-SES samples varied greatly, with some parents speaking to their child as much or more than others in the higher-SES comparison group and attaining improved outcomes. These results imply that although SES-related factors affect parental behaviors, there is also considerable variability in parental verbal engagement independent of social class. Thus, regardless of SES, children can reap the benefits from increased verbal interaction. Interactive speech experiences sharpen infants' emerging language processing abilities, promoting vocabulary development. Interventions aimed at increasing parental verbal engagement with their infants have the potential to change the course of vocabulary development and, in turn, reduce inequitable language outcomes, particularly for disadvantaged children.

Citation:
Weisleder, A., & Fernald, A. (2013). Talking to children matters: Early language experience strengthens processing and builds vocabulary. Psychological Science, 24(11), 2143–2152. https://doi.org/10.1177/0956797613488145

TO SIGN OR NOT TO SIGN

LASYA MANNE

Parents begin communicating with their infants from the day their infant is born. In recent years many parents and researchers have been wondering whether or not gestural learning can be beneficial towards an infant's language development. While past studies have concluded that exposure to gestural language does, in fact, advance an infant's spoken language development, these studies have been found to be inaccurate. Due to the weak methodology in these studies, scientists and investigators have been warned not to make any firm conclusions. In addition to the weak methodology, those experiments did not have randomized controlled trials nor did they have concrete information of how conditions were assigned. Thus, Kirk, Howlett, Pine, and Fletcher (2013) set out to investigate whether or not exposure to gestural language actually advances an infant's verbal language development and if it has an effect on the mother-infant relationship/interactions.

In study 1, the researchers focused on infant language development by conducting a randomized, controlled longitudinal study over a 12 month period. Because infants start producing deictic gestures (reaching, showing, pointing, grasping) at 10 months, this experiment recruited 8-month-old infants to ensure that the infants wouldn't already be able to produce spontaneous gestures (Kirk et al. 2012, p. e574). After recruiting 40 mother-infant pairs, the researchers assigned them to one of the four conditions: nonintervention control condition, verbal therapy control condition, symbolic gesture training, British Sign Language training. In all four conditions, the mothers and infants were given the same set of target words. The mothers in the experimental groups were given specific instructions on how to effectively communicate the gestures to their infants, like making eye contact and saying the word as they sign or gesture. The researchers used a semistructured interview process over the phone twice a month to assess infant language development. They also used the Oxford CID, GAPP, and Preschool Language Scale-3 (UK Edition) to check for receptive and

productive vocabulary development. The researchers also did home visits at the 10, 12, 16, and 20-month marks, where they observed the infants expressive and responsive language through conversations and free play. Although there were a few cases where gestural language improved an infant's language development, they were not significant enough to conclude that gestural language advances language development. The researchers believe that gestural language may be helpful to those who have weaker language abilities or language impairment.

Study 2 focused on the effects of gestural training on maternal mind-mindedness (a mother's ability to acknowledge and tune into their infant's independent thoughts and emotions) by assessing the interactions between 18 mothers and infants from the first study. Over the 12 month period, the mothers and infants were filmed during free play and mealtime for 20 minutes (the same data from study 1). The researchers then used an observer system called Noldus to code the accuracy, duration, and frequency of maternal utterances to measure whether or not mothers understood and perceived how their infants felt during those times. The utterances were organized into five categories: appropriate mind-related comments, inappropriate mind-related comments, encouraging autonomy comments, imitation, and others. Although mothers in the experimental group (the ones that use symbolic gestures and British Sign Language) scored higher on certain behaviors, it still was not enough to conclude that gesture training increased maternal mind-mindedness. However, they did find that mothers with gesture training encouraged their infants to be more independent and were more likely to be responsive towards their infant's needs; researchers believe the reason for that is because these mothers were forced to pay more attention to their infant's non-verbal cues (Kirk et al. 2012, p. e584). Because of the small sample size, the researchers cautioned people not to generalize the results of this study.

The researchers in this experiment concluded that it's unrealistic to assume that people can manipulate the path of language acquisition (Kirk et al. 2012, p. e585). While gestural language can be indicative of verbal language development, it's important to acknowledge that both

gestural and spoken language are dependent on a myriad of factors such as cognitive abilities, the child's environment, the child's ability to process language, etc. Therefore, it's difficult to manipulate a child's language development because of the complex social and developmental components.

Citation:
Kirk, E., Howlett, N., Pine, K.J., & Fletcher, B.C. (2013). To sign or not to sign? The impact of encouraging infants to gesture on infant language and maternal mind-mindedness. Child Development, 84(2), 574-590. https://doi.org/10.1111/j.1467-8624.2012.01874.x

SPECIAL THANKS AND RECOGNITION!

We are especially grateful for all Ginni Strehle's contributions in the lab since January 2020. Ginni has served as a Lab Manager since 2021, but in 2023 she will focus on her graduate program research of face processing in the lab of Dr. Alice O'Toole. Ginni was the recipient of several awards during spring 2022, including the BBS Student Leadership Award and Office of Research & Innovation's HIVE award. The HIVE award recognizes positive Habits, Ideals, Values, and Ethics in human subjects research. Ginni graduated with BBS Honors and her honors research was supported by a UTD Undergraduate Research Scholar Award. We will miss Ginni and wish her all the best!

thank♡you

LAB NEWS

Congratulations, 2022 graduates!

Kaitlin Lawler

Kaitlin graduated from UT Dallas in the Spring of 2022 with a master's degree in developmental psychology. Currently, she is working as a Registered Behavior Technician in Austin, using ABA therapy to help children with autism.

Ginni Strehle

Ginni graduated with a BS in psychology in the Spring of 2022. She is currently a master's student in the applied cognition and neuroscience program at UT Dallas. After graduating from her master's program, she hopes to pursue a Ph.D. in cognitive neuroscience.

Haley Davis

Haley is graduating in the Fall of 2022 with a BS in psychology and a minor in cognitive science. She is currently applying to doctoral programs in clinical psychology to become a licensed clinical psychologist. As a clinician, she hopes to provide comprehensive assessment and treatment to improve social, emotional, and cognitive functioning.

CURRENT STUDIES

Currently, the lab is working on four online projects: Infant Response to Faces and Speech, Face Perception, Infants' Perception of Humor, and Infants' Perception of English and Spanish.

INFANT RESPONSE TO FACE AND SPEECH

This is a study intended for 4-, 5-, and 7 month-old-infants. It will be conducted on the Lookit platform. In this study, we're interested in examining if infants can tell apart baby talk from adult talk and if both auditory and visual components are needed to differentiate the two kinds of speech. This would give a clearer insight into how babies develop language-learning skills!

Face Perception Research

PARTICIPANTS NEEDED!

PURPOSE:

- This experiment investigates the effects of different levels of processing on face recognition accuracy in adults

YOUR ROLE:

- Complete a face recognition tasks remotely via Microsoft teams (Estimated time of experiment about 1 hour)
- Students registered in the Sona system recieve 1 Sona credit for participation

INTERESTED IN JOINING US?

You can contact the contact below for more information.

- Ginni Strehle: ves180000@utdallas.edu
- Infant Learning Project: infantlearningproject@utdallas.edu

UTDALLAS - INFANT LEARNING PROJECT

Infant's Perception of Humor

In this study we're interested in studying how babies perceive humor and social interactions between others. Your baby will be exposed to a combination of video stimuli involving social interaction between researchers.

INFANTS BETWEEN 5 AND 10 MONTHS OLD ARE ELIGIBLE TO PARTICIPATE IN THIS STUDY.

Go to this link to complete the study! Make sure to register for a free account on Lookit.

Please note that this study must be completed on a computer or laptop, and a webcam is required to participate.

https://lookit.mit.edu/studies/c3f6561f-8171-4fb7-aa63-c935337ce67b/

For more information, contact Naureen Amjad at nka210000@utdallas.edu, or the Infant Learning Project lab at InfantLearningProject@utdallas.edu

UT DALLAS
THE INFANT LEARNING PROJECT

Participants Needed!

HELP US LEARN ABOUT BABIES AND THEIR NATIVE LANGUAGES

This study aims to understand the difference in preferences of monolingual infants when they are presented with English and Spanish.

WE INVITE YOU TO PARTICIPATE IF:

- Your baby is around 6 months or 10 months
- Your baby is exposed mostly to English **OR** mostly to Spanish
- Parent has access to a laptop

SCAN FOR STUDY LINK!

OR

VISIT

https://lookit.mit.edu/studies/0213ece6-e682-421c-a79a-66c4c9741905/

For more information, contact **Isa Hernandez** (isa.hernandez@utdallas.edu) or **the Infant Learning Project** (infantlearningproject@utdallas.edu)

RESEARCH OPPORTUNITIES FROM HOME!

Children Helping Sciences

ChildrenHelpingScience.com

Dr. Candice Mills from UT Dallas is one of six scientists from six universities who joined forces to launch the Children Helping Science project. This website has studies you and your child can participate in from your home. There are studies for all families, and each study indicates who it is for, so you can find the perfect one for your child to help science.

Lookit

the online child lab

Your family can contribute to research about how children learn by doing fun activities together, right in your web browser. You can participate with your child from any computer with a webcam.

Visit: https://lookit.mit.edu/ to get started!

THANK YOU!