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Language Development in Children with Fragile X Syndrome and ASD

by Kate Forster

As the leading inherited cause of intellectual disability, fragile X syndrome (FXS) affects about one in 4,000 people worldwide. Its wide array of characteristics can range from a mild learning disability and delayed speech development to severe social anxiety and inability to communicate. "Appropriate early intervention can make a big difference in the development of language and later academic success for those with FXS and other developmental disabilities," explains Sara Kover, Ph.D. Kover, an assistant professor of speech and hearing sciences and a CHDD research affiliate, has long been interested in how language learning comes about in children with developmental disabilities, and in those with FXS and autism spectrum disorder (ASD) in particular.

Sara Kover and members of her lab: Left to right (back row) Emily Wu, Kelleen Dunley, Kover, Natasha Arora, Donna Lee; Left to right (front row) Kerry Lam, Caroline Vandewater

Kover seeks to understand how children with developmental disabilities approach language learning tasks and what factors in the language learning environment provide the most benefit to these populations. To research this further, Kover is building the Neurodevelopmental Disorders Language and Learning (NeuDLL) Lab at the UW, where she plans to study how children with developmental disabilities learn language by providing them with various types of language input and measuring how this input influences their ability to learn language.

The NeuDLL Lab

When the NeuDLL Lab opens this spring, it will focus specifically on the behavioral aspects of language learning in children with FXS and ASD. Kover plans to observe and measure what these children focus on and remember in various language learning contexts. She plans to study how these cognitive behaviors are influenced by such external factors as language input in order to better understand how language develops in these populations.

In addition, Kover wants to identify sources of variability among children with the same developmental disability. "We can look at children who have the same disorder, and the outcomes might be very different," she explains. "We want to tease apart the factors that contribute to this variability." Understanding these disparities will help Kover and her team predict language-learning outcomes across individuals. Ultimately, Kover hopes to identify the types of input that support successful language learning in children with FXS and ASD, which, in turn, can help families and practitioners who work with these children.

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>
> *Sara Kover*

Data collection - natural language sampling and eye-gaze tracking

To determine more about language development in children with neurodevelopmental disorders, Kover aims to build a body of data that she plans to collect in the lab. For natural language sampling, she plans to record children with FXS and ASD in a variety of contexts, such as having conversations with an examiner or telling a story from a book and producing a narrative. Language sampling in multiple contexts will provide a more informed picture of a child's language ability. Members of her lab will use a special transcription program to analyze these language samples and assess the children's abilities. Some of the data the program can help gather includes counts and averages of behaviors or communicative acts as well as use of specific words or grammatical structures. Kover also plans to collect language samples from typically developing children, which will provide another important source of comparative information.

For children who are more severely affected and may not have strong expressive language skills, the method of natural language sampling as a way of gathering data has its limitations. To address this, Kover plans to use eye-gaze tracking as a way to measure how well these children process words—a method that is not dependent on expressive language or fine motor skills. Kover and her team will show children images on a screen and record their eye movements. For example, the screen might display a picture of a cup and a dog, and the child may be asked to look at the dog as the child's eye movement is recorded. If the child looks at the side of the screen that has the dog on it, the examiner can know that the child understood the task and knows the word.

Members of Kover's lab will review these video recordings and code frame by frame whether the child was looking left or right. They will time-lock each frame back to what the child was presented during the experiment, and then make conclusions about what the child understands using this eye-gaze tracking methodology.

NeuDLL
Neurodevelopmental Disorders Language & Learning Lab

Logo for the NeuDLL Lab

Looking ahead

With the NeuDLL Lab, Kover is building a program of research that is dedicated to children with neurodevelopmental disorders. "I really see us as laying the groundwork for successful methods of intervention when it comes to language learning for children with disabilities," says Kover. "There's a lot of potential."

CHDD is an interdisciplinary center dedicated to the prevention and amelioration of developmental disabilities through research, training, clinical service, and community outreach. CHDD includes the University Center of Excellence in Developmental Disabilities and the Eunice Kennedy Shriver Intellectual and Developmental Disabilities Research Center.

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Center on Human Development and Disability, University of Washington, Box 357920, Seattle, Washington 98195-7920

For more information please contact us at chdd@uw.edu