

New test to study language development in youth with Down syndrome

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Expressive language sampling (ELS) is a useful tool for measuring communication development in youth with Down syndrome, a new multi-site study has found.

The study, co-led by Angela Thurman and Leonard Abbeduto from the UC Davis MIND Institute and the Department of Psychiatry and Behavioral Sciences, focused on language as an outcome measure to detect meaningful changes in communication skills of individuals with Down syndrome. It successfully tested and validated ELS as a reliable set of procedures for collecting, measuring and analyzing the spoken language of participants interacting in a naturalistic setting.

Down syndrome and language delays

Down syndrome is the leading genetic cause of intellectual disability. Approximately one in every 700 babies in the United States is born with Down syndrome. Individuals with Down syndrome frequently have speech and language delays that might severely affect their independence and successful community inclusion.

"Interventions leading to improvements in language would have great impacts on the quality of life of individuals with Down syndrome," said Abbeduto, director of the UC Davis MIND Institute, professor of psychiatry and behavioral sciences and senior author of the study. "To develop and evaluate such interventions, we need a validated measurement tool and ELS provides that."

The ELS procedure

During the ELS procedure, researchers collect samples of participants' speech during two types of natural interactions: conversation and narration.

In conversation, trained examiners engage participants on a variety of topics in a sequenced and standardized manner. They start the conversation with a subject the participants find interesting then

introduce a topic from predetermined age-appropriate lists. In their interactions, they follow a script to minimize their participation and maximize the participants' contribution. On average, the conversation lasts around 12 minutes.

In narration, the participants independently construct and tell the story in a wordless picture book. This process usually takes 10 to 15 minutes.

The researchers analyze the collected conversation and narration samples. In a previous ELS application involving participants with fragile X syndrome, the researchers derived five language outcome measures: talkativeness, lexical diversity (vocabulary), syntax, dysfluency (utterance planning) and unintelligibility (speech articulation).

Validity and reliability of the ELS measures in Down syndrome studies

For this study, four university testing sites recruited 107 participants with Down syndrome (55 males, 52 females). Participants were between the ages of 6 and 23 (mean age of 15.13 years) and with IQ levels under 70 (mean IQ of 48.73).

The participants came for a first visit to complete the ELS procedures and to take assessment tests of their IQ, autism symptom severity and other measures. Four weeks later, they revisited for a retest of the ELS procedures. This retest was to assess practice effects over repeated administrations and to check the reliability of ELS measures.

The study found that the ELS measures were generally valid and reliable across ages and IQ levels. It showed that the vocabulary, syntax and speech intelligibility variables demonstrated strong validity as outcome

measures. Also, the ELS procedures were feasible for the majority of participants who successfully completed the tasks. Youth who were under 12, had phrase-level speech or less, and had a 4-year-old developmental level or lower found it more difficult to complete.

"Spoken language is the primary way we interact with the people around us, making language a frequent target of treatment. However, we have not had tools sensitive and accurate enough to confidently measure change in language treatment studies," said Thurman, associate professor of psychiatry and first author on the study. "The data from this study provide a critical first step indicating these procedures can be used to effectively measure language for people with Down syndrome."

The study, published April 8 in *Journal of Neurodevelopmental Disorders*, is available online. The researchers provided online manuals to help other investigators with the administration, training and assessment of fidelity of ELS procedures.

More information: Thurman, AJ et al. Spoken language outcome measures for treatment studies in Down syndrome: feasibility, practice effects, test-retest reliability and construct validity of variables generated from expressive language sampling. *Journal of Neurodevelopmental Disorders*, 2021. [dx.doi.org/10.1186/s11689-021-09361-6](https://doi.org/10.1186/s11689-021-09361-6)

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