

Using Eye Gaze Technology to Assess Cognitive Status in Individuals with Motor Impairments and Complex Communication Needs



Angela L. Smith, PsyD and Laura M. Bohnenkamp, MA, CCC-SLP

Center for Disabilities and Development at University of Iowa Children's Hospital Iowa City, Iowa

Background/Objectives

Frequently cognitive assessments have not been reliably completed in individuals with motor impairments and complex communication needs. Advances in technology allowing reliable access have provided new means to assess cognitive status.

Objectives: To describe a reliable means for assessing cognitive functioning in anindividual with motor impairments and complex communication needs through eye gaze technology. To describe the need for early communication intervention and the impact on assessment and academic programming.



Description

Cognitive testing is possible in children who have limited motor and communication abilities, when early intervention regarding a communication system has been introduced. A 6-year old individual previously described by her Neurologist as demonstrating "global developmental delay that is mostly focused on motoric issues. Her cognitive status cannot be fully assessed due to limited communication abilities," was found to have average verbal cognitive abilities. Her school and family believe her to be bright, yet they have also expressed uncertainty regarding what she knows or is able to learn given her difficulty communicating.

Medical history is significant for hypoxic-ischemic encephalopathy (HIE), cerebral palsy (secondary to HIE), dysarthria, and dysphagia. Cognitive testing was completed using select subtests from the WISC-V and WISC-IV Integrated version with use of the Tobii I-15 Speech Generating Device with Eye Gaze Module. At the time of the assessment, the child had received two years of speech therapy addressing functional communication through eye gaze. She was communicating in a grid of 70 items, navigating independently, and creating 3-4 symbol utterances.

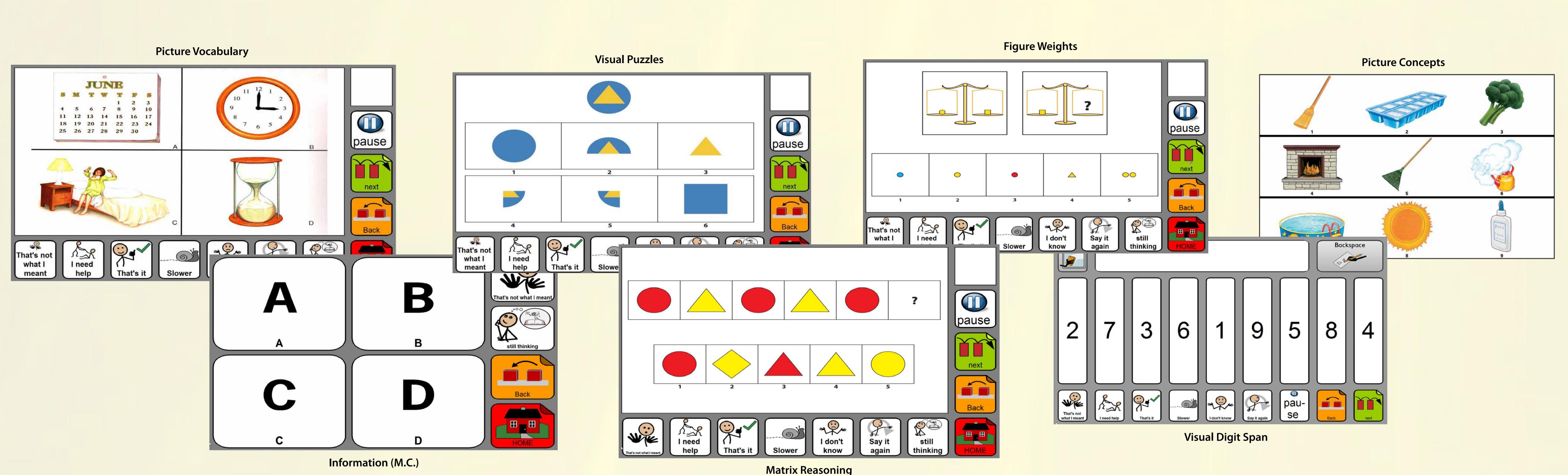
Procedure

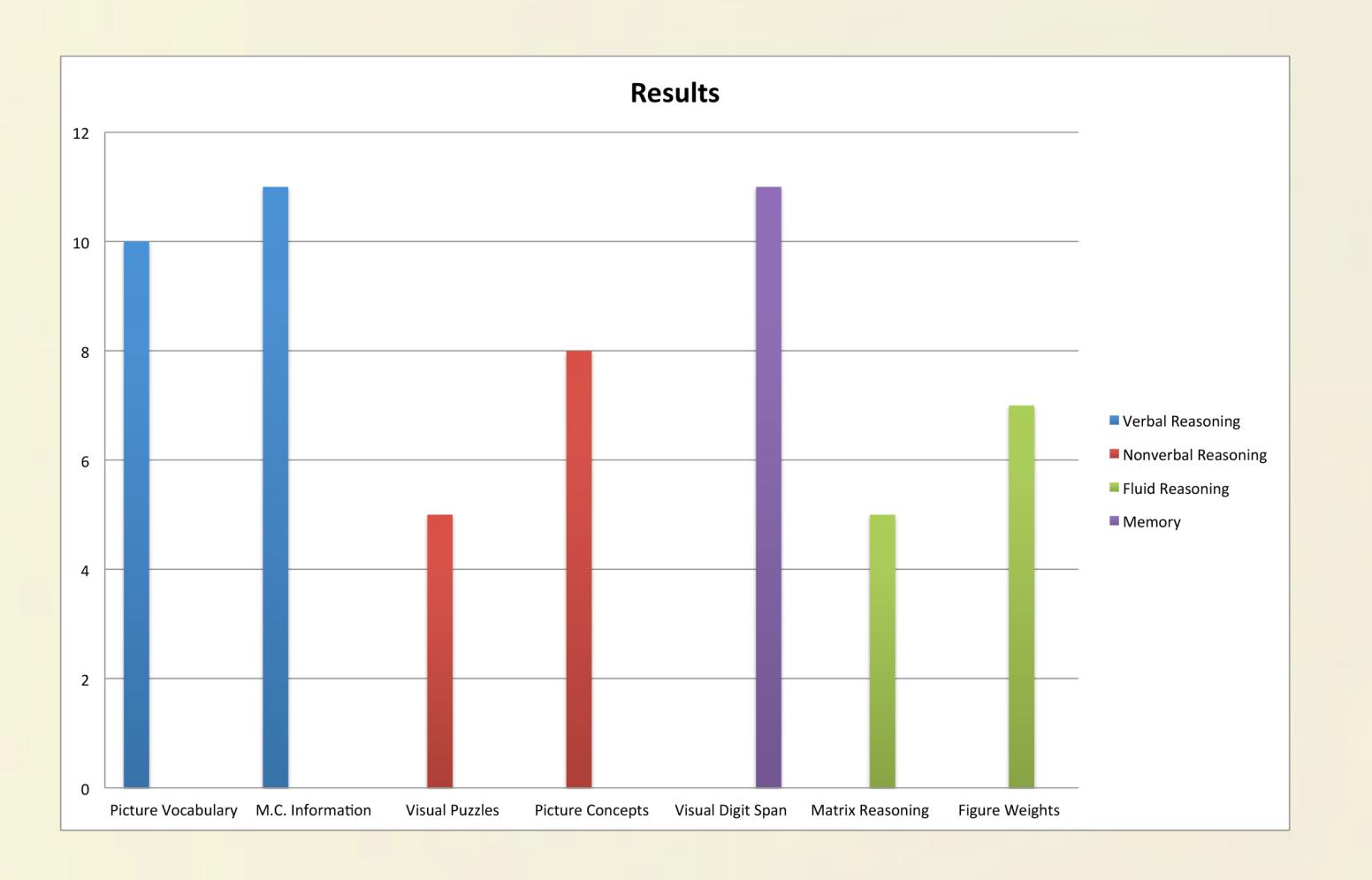
The Wechsler Intelligence Scales for Children-5th Edition (WISC-V) and Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV), Integrated Version were used to assess the patient's current level of cognitive functioning. Given the patient's motor and speech impairments very select items were administered. All testing was completed with use of the Tobii Eye Tracking communication system. Test items were scanned into a Tobii. The following subtests were administered from the WISC-V: Matrix Reasoning, Figure Weights, Visual Puzzles, Picture Concepts, and the following subtests from the WISC-IV Integrated: Digit Span, Picture Vocabulary, and Information. Norms used would not be normed on this population, but are felt to give descriptive information regarding the patient's cognitive abilities. Test results are felt to be an accurate reflection of her cognitive abilities. When she was sure of her response she would signal to the speech pathologist (who was also present for all testing) to unpause her Tobii so that she could provide the response. She would activate "I don't know" when she was unsure but was encouraged to guess.

With better understanding of cognitive strengths, weaknesses, and ability level, one can assist in providing recommendations to help facilitate learning, and improve quality of life. When parents, teachers, and therapists have a better understanding of cognitive abilities, more appropriate and realistic expectations can be achieved. Early implementation of communication systems allow children to functionally interact in their world, better communicate with others, socialize with peers, reduce behavioral frustration, and enhance their ability to learn in an academic setting.

Significance

For a young child, early augmentative communication intervention and introduction to alternative access methods (i.e. eye gaze) can lead to early functional communication. Proficient and functional communication through augmentative communication can offer a more valid assessment of cognitive functioning to further assist with programming and academic development; all of which can lead to improved quality of life.





Contact Information:

Angela-L-Smith@uiowa.edu Laura-Bohnenkamp@uiowa.edu