The effects of manipulating symbol location on aided AAC displays: Implications for display design

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Background

Not all children develop spoken communication abilities. Augmentative and alternative communication (AAC) offers these children a way to convey their message and get their needs met. One common approach to AAC is to display a variety of pictures in an array. The child then points to the picture that represents the concept she or he wishes to convey.

Speech-language pathologists (SLPs) have reported a clinical practice of designing displays in a way that holds symbol location consistent, even when new vocabulary is added to that display (Thistle & Wilkinson, 2015). This practice is founded in theories of procedural learning that contend motor execution of a task requires less cognitive effort with repeated practice of that task (Fitts & Posner, 1967; Gentile, 1972).

Our study explored the relationship between symbol location and preschool children's response time to locate a target symbol. We were specifically interested in the possible development of motor learning as it relates to use of an AAC display.

Based on previous research providing evidence of motor learning in adults engaging in visual search tasks (Dukhovny & Gahl, 2014; Dukhovny & Zhou, 2016; Wilkinson et al., 2015), we hypothesized that preschoolers would achieve faster response times when locating symbols on an array where the symbol locations were in consistent locations compared to when symbol locations were variable.

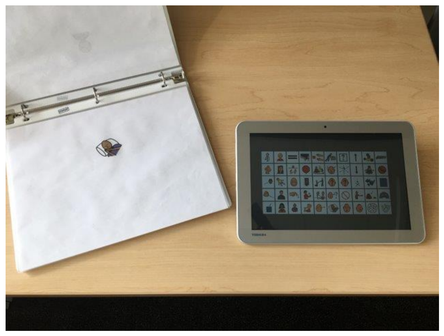
Methods

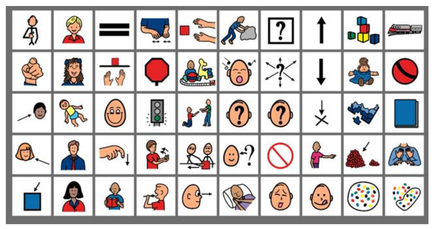
Participants

- 24 preschoolers, ages 3-5½ years old
- Half were in the variable group, half were in the consistent group
- Participants were matched by age and gender
- 18 participants were female, 6 were male
- No known sensory or language impairment

Procedures

Preschoolers completed an AAC matching task under one of two conditions (consistent, variable) over the course of 5 data collection sessions with 8 items to match per session.

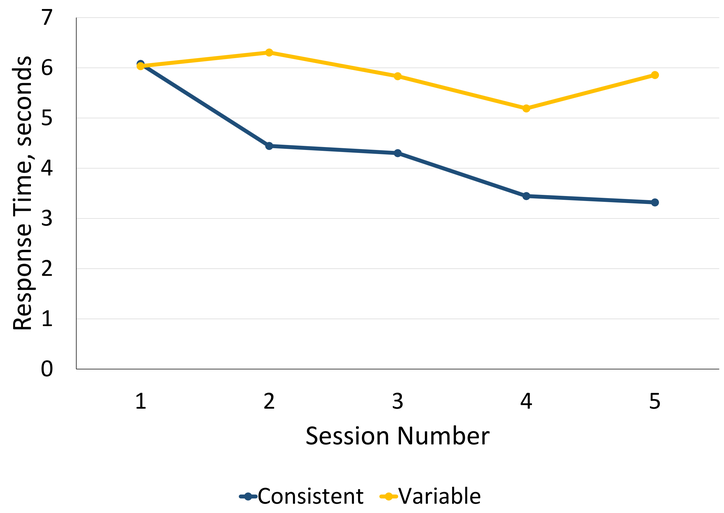




Results

The two groups were significantly different across time (p=.001) with a large effect size (η=.407).

On average, participants in the consistent group were nearly 3 seconds faster on the 5th session. The variable group showed some improvement, but at best, only a 1 second improvement.



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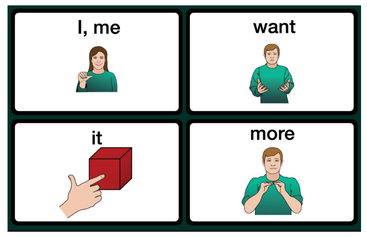
Clinical Implications

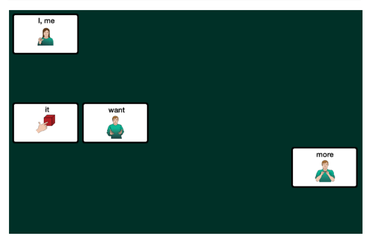
Why did they get faster?

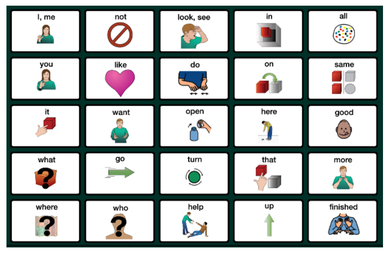
- Gaining familiarity with the task in general
- Development of motor memory

Location, location, location!

- Keep vocabulary in the same location on each page





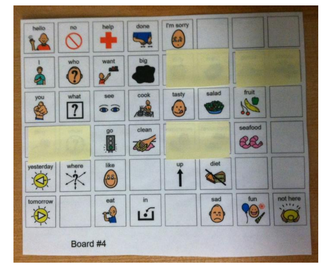


Plan ahead for vocabulary growth

- Small icon size with blank space and then add icons
- Allows for procedural learning and reduces the search time
- Have an idea of how many icons the individual will have to plan the displays

Visual masking

- Cover/hide symbols to reduce visual distraction
- Uncover/unhide new symbols as needed
- Easy to do on low tech
- Possible on many high tech devices/apps



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