Dynamic text in visual scene displays: Supporting word reading in a preschooler with ASD

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**Rationale**

Literacy skills are critically important, especially for individuals with autism spectrum disorder (ASD) who have complex communication needs (CCN).
- Expand communication options significantly
- Increase perceptions of competence
- Increase self-esteem

**The Problem?**

More than 90% of individuals with CCN enter adulthood without functional literacy skills (Foley & Wolter, 2010). As a result, they are severely restricted in their participation in education, employment, healthcare, and society.

Typically, individuals with ASD & CCN who are non-literate use AAC systems/apps with picture symbols. Eventually, these individuals who use symbol-based AAC need to transition to an orthographically based system.

Currently no AAC apps support this transition from the use of graphic AAC symbols to the use of orthographic text.

**The Solution?** - AAC technologies to support the transition to literacy (T2L)
- T2L - a software feature for AAC technologies/apps
  - provides dynamic presentation of word with speech output when a picture symbol is selected
  - provides a first step in the transition from use of picture-based AAC technologies/apps to literacy

**Research Question**

What is the effect of the T2L app with dynamically displayed text on the acquisition, maintenance, and generalization of single word reading by a pre-literate preschooler with ASD?

**Methods**

Single-subject across participants multiple probe design
- Phases: baseline, intervention, generalization, and maintenance
  - a) baseline condition (prior to exposure to tablet technology);
  - b) exposure to tablet technology with the AAC app;
  - c) generalization (to new photographs of target words not used in intervention);
  - d) maintenance

**Participant**

Matthew, a 4 year old male, diagnosed with Autism Spectrum Disorder
- Pre-literate
- Attended a LEAP preschool
  - Each classroom has 4 children with ASD and 8 children who are typically developing

**Materials**

**Independent Variable (Intervention) Materials**
- Brown bear book displayed on the app on Samsung Tablet
- Dynamic text for each of the animals in the book
- Text appeared with speech output upon selection of the animal
- No other instruction during intervention

**Independent Variable (Probe) Procedures**
- DV: % accuracy reading single words (matching written word to picture)
  - Matthew was presented with four images (images from the Brown bear book)
  - 1 target sight word + 3 foils
  - He was told to read the word and match the word to the correct picture.
    - "Read the word, give me the picture that goes with this word"

**Procedure**

- Words were introduced in sets of 2 for a total of 5 sets
- Matthew began the intervention phase with introduction of the first pair of sight words
- Once the first pair reached criterion, the 2nd pair was introduced
  - Criterion: 2/2 target words during two consecutive sessions
  - Each intervention session took approximately 5 minutes and included two "read throughs";
    - 1st Read Through - participant activated the target sight words 2x
    - 2nd read through of book - participants returned only to the two target pages for an additional 3 activations/page

**Dependent Variable Materials**
- 10 words from Brown bear book
- Images from Brown bear book
- Words ranged from 3-7 letters (e.g., cat & teacher)

**Results**

Matthew acquired 10 target sight words after 26 intervention sessions (2 hours, 10 minutes of intervention)

**Discussion & Implications**

Matthew provides preliminary evidence that a software feature for AAC apps, including the dynamic presentation of text paired with graphics and speech output, positively impacts the single-word reading of a pre-literate preschooler with ASD.

The student acquired the written words successfully with only minimal exposure to the words via the app.

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