Grid-based AAC Apps to Support Literacy: Case study with ASD

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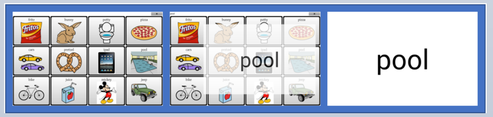
INTRODUCTION

- Due to intrinsic and extrinsic challenges, many individuals with CCN and ASD are unable to read or write at grade level (Koppenhaver & Yoder, 1993; Foley & Wolter, 2010) and these reading deficits then persist through adolescence into adulthood.
- Although literacy instruction (including sight word instruction) is imperative, improved features within AAC technologies could also be used to complement instruction and infuse literacy learning into daily communication.

There is an urgent need to better understand how design features in AAC systems can support improved literacy outcomes for individuals with complex communication needs.

Challenges with current systems:
Grid-based AAC systems commonly use paired text and graphic symbols to represent concepts that individuals communicate with. Previous research demonstrated that static pairing of print and graphic symbols, blocks word learning.

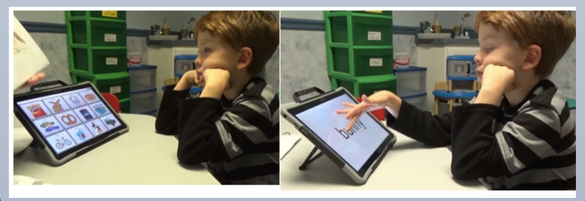
Potential Solution:
Changes to AAC system design, specifically dynamic text paired with speech output upon selection of a graphic symbol, could potentially lead to better literacy outcomes for individuals who use AAC (Light et al., 2014).



Example of the AAC system dynamically presenting the word "pool"

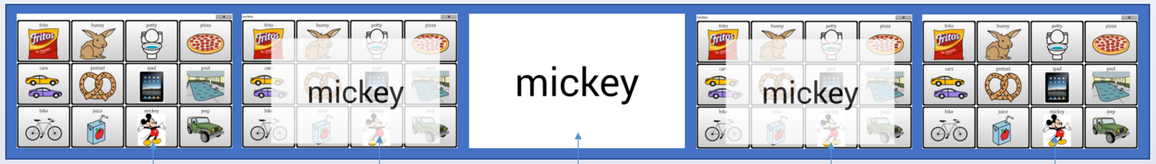
AIM

- Investigate the effect of the transition to literacy feature (T2L; dynamically presenting text, paired with speech output, upon selection of a specific graphic symbol in the device), on the sight word learning of 12 personally relevant words, for an individual with ASD and CCN



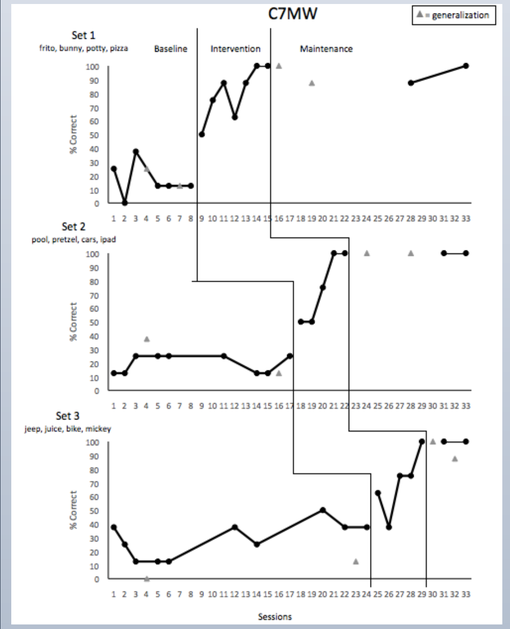
MATERIALS

- Transition to Literacy (T2L) software feature (Light et al., 2014) was used within a NovaChat 12 (Saltillo) with Grid-Based AAC Display of personally relevant and highly motivating words



1. The individual selects the graphic symbol (e.g., marsh)
2. The text dynamically appears from the graphic icon that was selected
3. The word is spoken from the device, the text replaces the grid and stays on the screen for 3 seconds
4. The word dynamically disappears back into the graphic icon that was selected
5. The grid is back to original view – with statically paired graphic symbol and text

RESULTS



Set 1: frito, bunny, potty, pizza
- *Baseline average: 12%*
- *Intervention criterion average: 96%*
- ***Gain: + 84%***
- *Post Generalization average: 94%*
- *Maintenance average: 94%*

Set 2: pool, pretzel, cars, ipad
- *Baseline average: 19%*
- *Intervention criterion average: 92%*
- ***Gain: + 73%***
- *Post Generalization average: 100%*
- *Maintenance average: 100%*

Set 3: jeep, juice, bike, mickey
- *Baseline average: 29%*
- *Intervention criterion average: 83%*
- ***Gain: + 54%***
- *Post Generalization average: 94%*
- *Maintenance average: 100%*

Dynamic text exposure summary:

Word Set	Total # of Sessions	Total # of Exposures to each word	Total exposure time to each word
1	7	84	252s (4 min, 12 s)
2	5	60	180s (3 min)
3	5	60	180s (3 min)

Total number of exposures per word, per session, was 12

PARTICIPANT

- 9 years old with Diagnosis of ASD (CARS-2: Severe) and CCN
- Attends charter school with services from Behavior Specialists and Speech-Language Pathologist
- At the time of the study commonly used physical communication, gestures (e.g., shaking head to indicate "yes" or "no"), idiosyncratic signs and speech approximations with prompting
- Has knowledge of 19 letter-sound correspondences and 10 sight words from the Dolch word list

METHODS

- Design: A single-subject multiple probe design across sight word sets was used. *Note: this participant is part of a larger study with 3 individuals with ASD*
- 3 sight word sets, with 4 words per set → total of 12 words
- Sight words used:
  - Set 1: frito, bunny, potty, pizza
  - Set 2: pool, pretzel, cars, ipad
  - Set 3: jeep, juice, bike, mickey

PROCEDURES

Baseline	Intervention	Generalization	Maintenance
-Sight word probes (assessment) -Present word & 4 image choices (Symbolstix icons)	-Sight word probes (assessment) -Sight word matching book -Device with T2L feature & 12 exposures per word, per session	-Sight word probes (assessment) with photographs that haven't been used in probes or intervention	-Sight word probes (assessment) -Present word & 4 image choices (photographs)

CONCLUSION

- Emerging research is demonstrating the effects of the transition to literacy (T2L) feature (Light et al., 2014) on sight word learning (Caron et al. 2018; Holyfield et al. 2018; Mandak et al., 2018). This study extends positive findings to sight word learning with one individual with ASD, despite past of limited literacy success.
- Implementing evidence-based adapted literacy instruction with older individuals with severe disabilities, ASD and CCN, can be an effective and efficient method of teaching personally relevant sight words.

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