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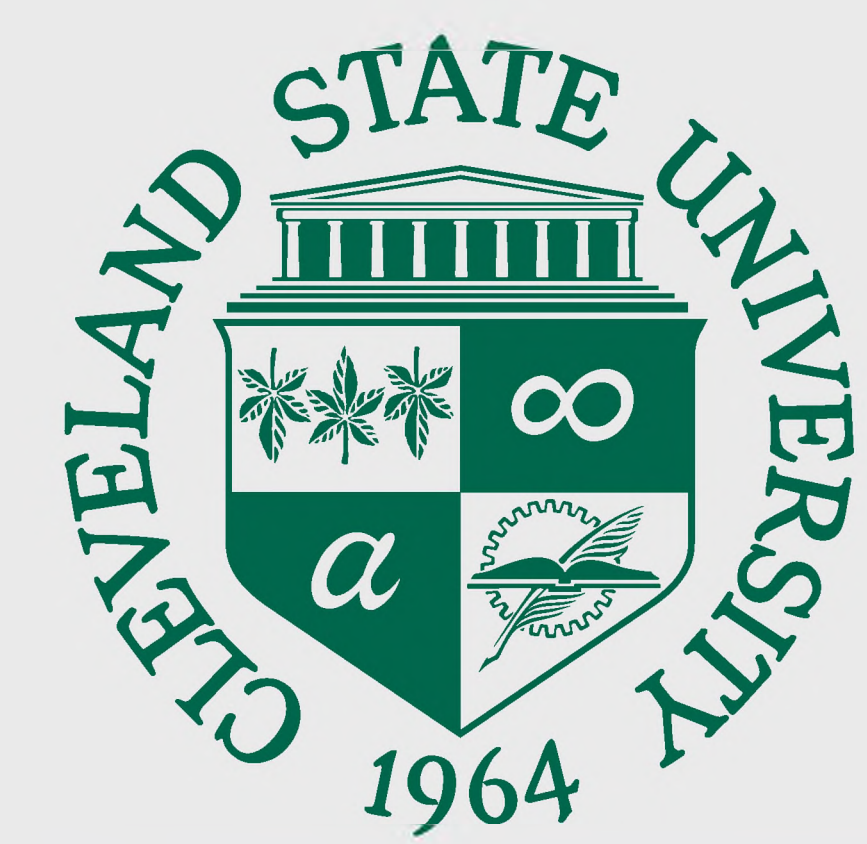
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Reading-related Phonological Processing Interventions for Individuals who use Augmentative and Alternative Communication (AAC): A Systematic Review of the Research



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Abstract

The purpose of this investigation was to conduct a systematic review to determine the effectiveness of reading-related phonological processing interventions designed to meet the needs of individuals with complex communication needs (CCN) who require augmentative and alternative communication (AAC). An extensive review of the literature including phonological awareness, letter-sound correspondences, and single-word decoding was conducted. A total of 22 intervention studies (24 experiments) met criteria for inclusion and advanced to the full coding and analysis phase of the investigation. Results reveal that individuals who use AAC with a wide range of disabilities and ages can learn phonological processing skills for reading. Studies utilized interventions that were modeled after the Accessible Literacy Learning curriculum, the Early Reading Skills Builder, the Nonverbal Reading Approach, storybook reading with focus on reading-related phonological processing skills, combinations of storybook reading with other approaches, and other approaches.

Methods

Inclusion Criteria: Studies published between 1980 - June 2018 in peer review journal or as a dissertation, published or translated into English, provided intervention with a stated goal to improve reading-related phonological processing, reported data on phonological processing skills before, during, and/or after intervention, utilized a recognized research design or were descriptive case studies, involved individuals who required AAC or utilized an AAC-based intervention.

Exclusion Criteria: Unpublished studies and studies which provided intervention exclusively to individuals who do not use AAC.

Search Procedures: Database, item-by-item table of contents, and author searches.

Intervention Studies were Coded for: Study identification, study design, participant information, independent and dependent variables, outcomes, and certainty of evidence.

Participants

A total of 93 participants were included in these studies
Ages ranged from 3 years; 6 months to 54 years

Participant's had the following primary diagnoses:

- autism spectrum disorder (32)
- down syndrome (6)
- cerebral palsy (22)
- Other diagnoses (31)
- developmental delay (8)
- At least 53 participants had a primary or secondary diagnosis of intellectual disability

Results Summary

Results revealed that individuals who use AAC with a wide range of disabilities and ages can learn phonological processing skills for reading.

**Also importantly, successful studies taught in intervention the same skills later assessed. **

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Intervention Studies

Accessible Literacy Learning (ALL) Curriculum

ALL Curriculum (Light & McNaughton, 2009)

Fallon (2001)
Light, McNaughton, Weyer, & Karg (2008)

ALL Curriculum with Extension Activities

Benedek-Wood (2010)
Caron (2016)

ALL Curriculum with Pairs of Children

Ainsworth (2014)
Yorke (2017)

ALL Curriculum Taught to Instructional Assistants

Westover (2010)

Nonverbal Reading Approach (NRA)

Nonverbal Reading Approach

Heller, Fredrick, Tumlin, & Brineman (2002)
Leytham (2013)

NRA provided by teacher vs computer

Coleman-Martin, Heller, Cihak, & Irvine (2005)

NRA with Motoric Indicators

Swineheart-Jones & Heller (2009)

Early Reading Skills Builder (ERSB)

GoTalk Phonics

Ahlgim-Delzell, Browder, & Wood (2014)

Early Reading Skills Builder

Ahlgim-Delzell, et al. (2016)
Lucas (2015)

Other Approaches

Direct Instruction

Johnston, Buchanan & Davenport (2009)

Computer-Based Jolly Phonics

Trinh (2016)

Shared Reading: Phonic Faces vs. Alphabet Stories

Banajee (2007)

Taught One Skill and Evaluated an Other

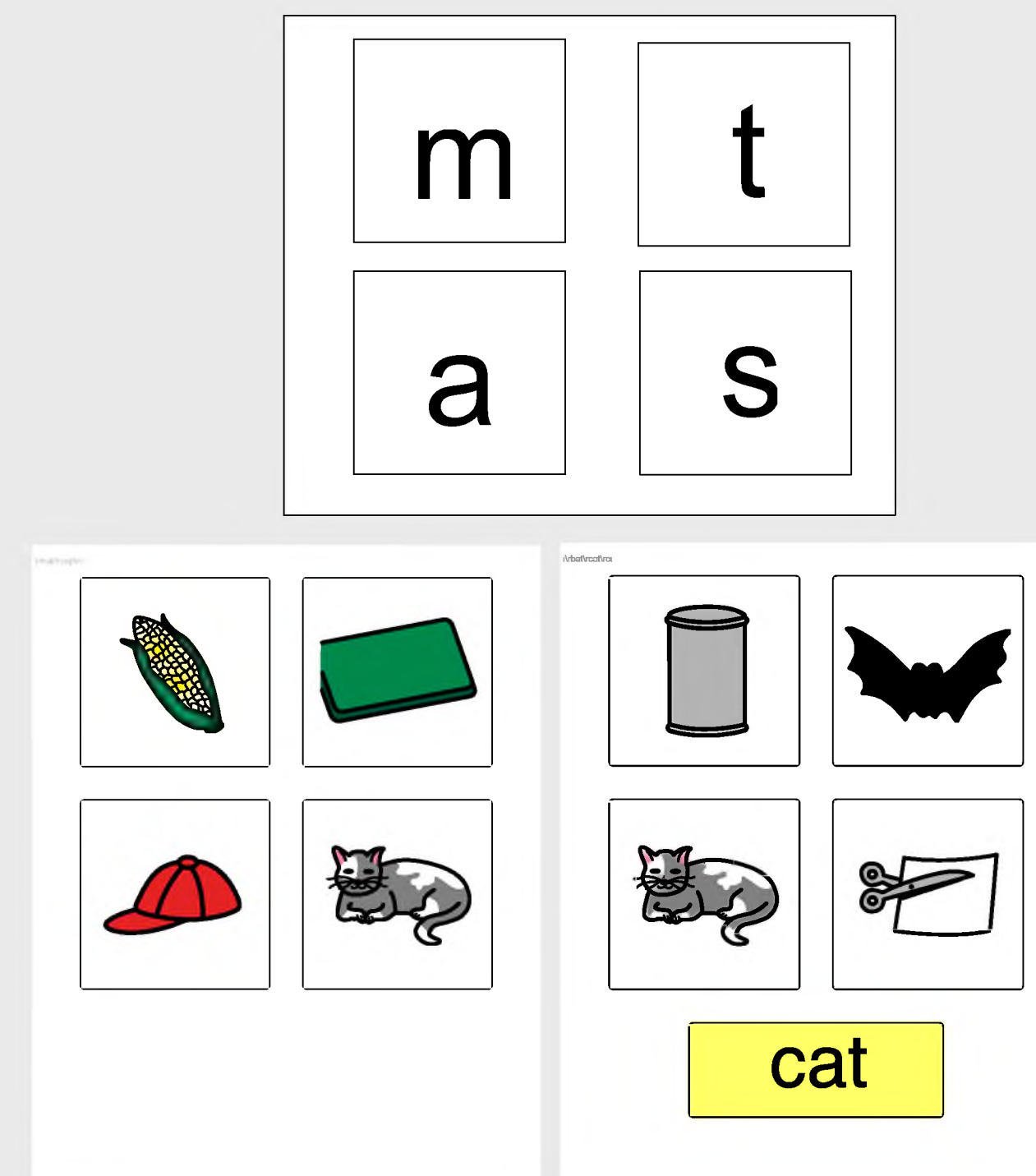
Truxler & O'Keefe (2007)
Bailey, et al(2011)
Bailey, et al(2012)
Clendon et al (2005)
Naylor (2013)

Accessible Literacy Learning (ALL) Curriculum

The Accessible Literacy Learning (ALL) Curriculum utilizes explicit instruction methods to promote errorless learning through the use of:

1. Introduction,
2. Modeling,
3. Guided practice,
4. Independent practice
5. Positive or corrective feedback.

The ALL Curriculum provides guidance for teaching a number of reading-related phonological processing skills including: **letter-sound correspondences, blending, segmentation, and decoding** as well as sight words and shared reading. Each evaluates an individual's learning through pointing to the target item from a field of four.



Nonverbal Reading Approach (NRA)

The Nonverbal Reading Approach (NRA) teaches children to decode by:

1. Producing each sound in their head
2. Blending the sounds back together in their head

It uses many of the same explicit instruction principles as the ALL curriculum (guided practice).



<https://www.youtube.com/watch?v=PaQro6yMlyg>

| PowerPoint Slide | Computer voice output | Steps |
|------------------|---|---|
| man | "Let's look at this word together. Say this word with me slowly, mmmmm." | Step 1: Active participation |
| m | "Now, in your head, say this sound, mmm." | Step 2: Saying each sound using internal speech |
| ma | "...aaa..." | Note: There is no break between sounds on these slides. |
| man | "...nnn..." | |
| man | "Now in your head, say this word slowly. Don't stop between the sounds. mmmmaaaa" | Step 3: Saying the word slowly using internal speech |
| man | "Now, in your head, say this word fast. Man." | Step 4: Saying the word quickly using internal speech |
| Excellent! | "Excellent!" | Step 5: Reinforcer slide |

Early Reading Skills Builder (ERSB)

The Early Reading Skills Builder (ERSB) started as GoTalk Phonics and then moved to the iPad as GoTalk Now with ERSB.

ERSB teaches the following skills:

1. Letter-sounds
2. Blending
3. Decoding
4. Encoding
5. Comprehension



Storybook Reading

Storybook Reading uses *Phonic Faces* and *Alphabet Stories* to teach:

1. Letter-sound correspondences
2. Initial Phoneme Segmentation

Phonic Faces provides guidance on how to produce the sounds and their oral formation. *Alphabet Stories* emphasizes only a given letter. As a result, the use of *Phonic Faces* is more effective than the use of *Alphabet Stories*.



Jolly Phonics

Jolly Phonics is a computerized intervention program popular in the UK that aims to teach the following skills:

1. Letter-sounds
2. Blending
3. Segmentation
4. Decoding



This program implements a game system to engage participants in the given tasks.

Other Approaches

With the exception of Banajee (2007), Johnston, et al. (2009), and Trinh (2016), other approaches for teaching these skills involved various combinations of instructional methods. These studies evaluated phonological processing skills that were not explicitly taught during the intervention and were almost universally unsuccessful.