



Effects Of Adapted Instruction on the Acquisition of Letter-sound Correspondences and Sight Words by Older Learners with CCN and ASD

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Acknowledgements

We are especially grateful to the individuals who participated in this project. Thank you for allowing us to be a part of your lives.

This research was supported in part by

- The Hintz Family Endowed Chair in Children's Communicative Competence in the Department of Communication Sciences and Disorders at Penn State University
- Grant #H325D110008 (The Penn State AAC Leadership Project) from the U.S. Department of Education.
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Reading is often identified as the most critical skill taught in schools

- Reading and writing skills are especially important for learners with CCN, as these skills provide opportunities to:
 - Increase AAC options; generative communication
 - Participate in a variety of communication environments (e.g., online, email, text)
 - Different educational outcomes
 - Change expectations and goals

"There is the attitude out there like "What's the need for education for this child?" I could see someone saying, nobody can understand them, so what difference does it make... I think society has no expectations for these kids. People with severe disabilities [with CCN] are often labeled as not being able to do many things cognitively, even though many people with these disabilities...are able to learn to read. It just has to be presented in different methods." (Zascavage & Keele, 2004, p. 231)

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(Zascavage & Keele, 2004, p. 231)

- ❑ People characterized as having severe disabilities, including those with CCN and ASD, have historically been viewed as incapable of developing literacy skills (Morgan, Cuskelly & Mori, 2011).
- ❑ Yet, literacy instruction has often either been denied to them or provided in ways that did not meet their learning needs (Light & McNaughton, 2009; Ruppert, Gaffney & Dymond, 2015; Zascavage & Keele, 2004).
- ❑ These two factors are likely the biggest contributors to poor outcomes and low expectations

Gaps in the current literature:

- ❑ A growing body of literature has documented the benefits of adapted reading instruction for learners with CCN. For example:
 - ❑ Blischak et al., 2004
 - ❑ Fallon et al., 2004
 - ❑ Johnston et al., 2009
 - ❑ Millar et al., 2004
- ❑ Yet, limited research has focused on teaching phonics skills or sight words to older learners with severe disabilities, CCN, and ASD who have had limited literacy success (Benedek-Wood, 2010; Browder, et al., 2006; Koppenhaver & Erickson, 2009; Spector, 2011).
- ❑ Furthermore, rarely both types of instruction are provided to learners.

Where do we start for these learners?

- ❑ When considering starting points for formal reading instruction, researchers have consistently found that explicit instruction, in both phonics and phonemic awareness (Adams, 1990; Carmine et al., 2010; Chall, 1996) and developing automatic and robust sight word vocabularies (Gallig, 2009), play critical roles in becoming a skilled and successful reader.

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STUDY 1: Effect of adapted instruction on the acquisition and maintenance of letter-sound correspondence

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STUDY 2: Effect of adapted instruction on the acquisition, generalization, and maintenance of sight words

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What does this look like?
Differences for individuals with CCN?
Considerations for older learners?

Components of effective evidence-based literacy intervention

1. Sufficient time allocated for instruction
2. Appropriate instructional content
3. Appropriate instructional procedures
4. Adaptations to allow active participation of individuals with CCN
5. Positive rapport & motivating instruction

Checklist for effective literacy instruction

❑ Make instruction meaningful

- Target important literacy skills
- Include motivating words & topics
- Make connections to personal experiences

▪ Example:

- LSC & Sight word books include words and pictures that are personally relevant and motivating

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❑ Modify the activity to support participation

- Utilize familiar content /task formats
- Provide pictures or signs as response options
- Select foils carefully
- Provide oral scaffolding support as required

▪ Examples:

- Matching task in the folder activity is a common format of instruction
- Provided 4 options
- Scaffolding – phonological recoding for the individual with CCN

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❑ Provide effective instruction

- Model task
- Provide guided practice to promote success/ minimize error
- Provide feedback on responses
- Promote independence by fading support

▪ Examples:

- Reduce field to ensure success
- feedback on responses

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❑ Ensure multiple opportunities to practice skills

- Provide focused instruction at least 3-5 times per week
- Practice new skills and review previously learned skills in meaningful activities
- Provide 10 or more opportunities to practice each skill

▪ Examples:

- Increased the number of trials (~20 per session)
- Extension activities to move beyond "drill"

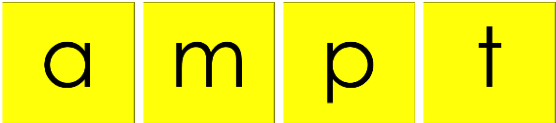


Study 1:

Letter-sound correspondences

Overview

- Letter-sound correspondence knowledge is a strong predictor of beginning reading, yet it is recognized as a challenging skill to acquire (Ehri, 1983; Adams, 1990).
- Letter-sound knowledge is traditionally taught by presentation of a printed letter and the learner labeling (through oral production) the sound the letter makes (Barker, Saunders, & Brady, 2012)



Current research

- A small number of researchers have investigated different methods for teaching early literacy skills, including letter-sound knowledge, by adapting instruction for persons with ASD and CCN.
 - Ahlgrim-Dezell et al., 2014: 3 individuals, 2 pre-adolescents with ASD and CCN
 - Bailey et al., 2011: 4 individuals, 3 adolescents with ASD and CCN
 - Benedek-Wood et al., 2015: 3 children with ASD and CCN, ages 3-5
- Overall, current letter-sound correspondence research for individuals with ASD and CCN ranged in:
 - age (e.g., 3 years old to 15 years old)
 - the number of letter-sound correspondences targeted during the instruction (e.g., 6, 18, 24)
 - components included in the instruction (e.g., voice output, other pre-literacy activities like phoneme segmentation)
 - outcomes (e.g., overall differences from baseline after initiation of instruction ranged from a decrease of 1% to 81%, with the three younger individuals with ASD and CCN demonstrating the highest overall positive gains).

Gaps in current research

- There remains little information as to whether current interventions would translate to effective, efficient, and appropriate interventions for older individuals with severe disabilities, ASD, and CCN.
- There is paucity in the research focusing on phonics in reading instruction for individuals with severe disabilities, despite the fact that research on reading points to the importance of these skills (NRP, 2000).
- The research on teaching students with CCN phonics skills is even sparser, this lack of research is especially apparent for older learners with moderate or severe disabilities and ASD.

Aim/Research Question:

- Question: **What is the effect of adapted instruction on the acquisition and maintenance of 12 letter-sound correspondences by pre-adolescents/adolescents with severe disabilities, autism spectrum disorders, and complex communication needs?**

Participants

- 3 males with ASD and CCN**
 - Age range: 9;7 to 18;7
 - Limited literacy progress in school
 - All had challenges in producing the sounds to participate in common LSC interventions – e.g., shown a letter, say the sound
 - Participate in substantially separate classrooms, with 1:1 supports
 - Range of Letter-sound correspondence knowledge (0-2)
 - Challenging behaviors: head banging, screaming, avoiding

Method:

- Study 1 utilized a **single subject multiple probe** design, with replication across letter sound sets to evaluate the effectiveness of an adapted literacy instruction (Hamer et al., 2005).
 - Letter Sound Set 1: a, m, p, t
 - Letter Sound Set 2: l, r, c, g
 - Letter Sound Set 3: o, i, h, d
- Independent variable:** adapted letter-sound correspondence instruction
- Dependent variable:** participants' accuracy of identifying a letter sound (when presented with a target letter sound orally and four letter card choices).
- The study involved three phases in order to measure the participants' performance: **(a) baseline, (b) intervention, and (c) maintenance.**

Procedures:

- Baseline:** LSC probes
 - A LSC Probe included two trials for each of the 4 targeted letter-sound correspondences, which provided an opportunity of 8 correct responses.
 - Chance level was 25%

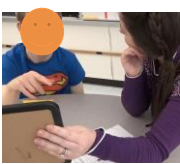
Procedures:

- Intervention: LSC probes (10 mins.) + Instruction (20 mins.)
 - Probes:
 - Probes for current LSC set were completed prior to instruction began each session. The treatment criterion was defined as correctly identifying LSCs with a minimum of 75% accuracy (6 out of 8 letters) on probe tasks for three consecutive sessions.
 - Instruction:
 - 1. Explicit instruction on the target letter-sound correspondence (10-20 trials)
 - 2. Letter-sound book (5 trials)
 - 3. Letter-sound folder activity (5 trials)

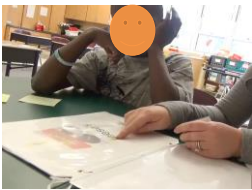
Letter Sound



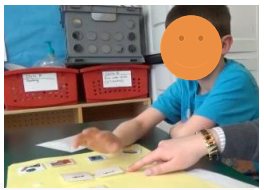
Explicit Instruction



Letter Sound Book



Letter Sound Folder



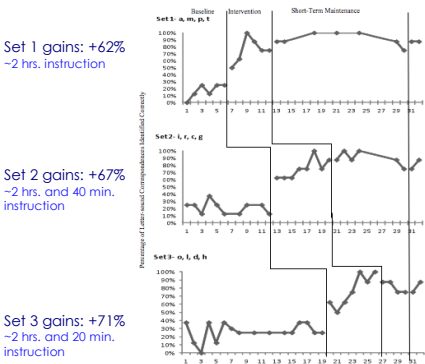
Procedures:

- Maintenance: LSC probes
 - Same as baseline
 - 8 trials (2 per letter-sound), probes for all 3 sets
 - Chance level was 25%
- Maintenance data were collected at two points in time, documenting short term and long-term maintenance after the intervention for the letter sound set was completed.

NS: Intervention Example

Results:

- Each participant demonstrated changes in level and increases in trend from baseline to intervention, for the total percent of correct responses on the LSC task.
- This change in level and trend occurred across the letter-sound sets where intervention occurred for each participant (e.g., LSC Sets 1, 2, and 3 for Chad and Nate, and LSC Sets 1 and 2 for Collin).
- NAP calculations: high effect of the LSC intervention for all participants, across sets



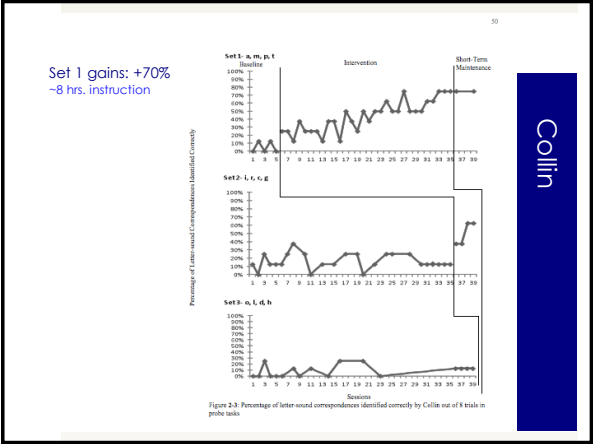
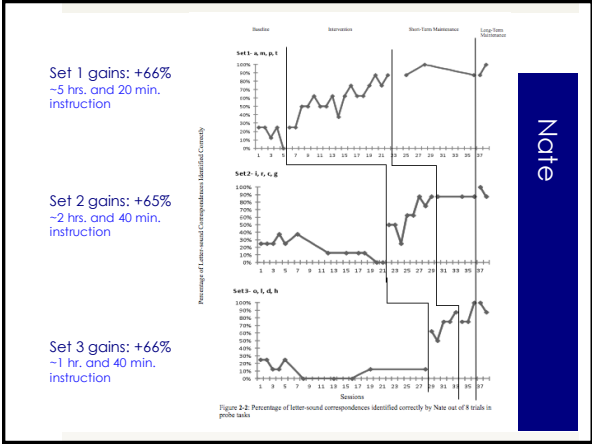
Chad

CC- Baseline Sessions 2 & 5

(January 2015)

CC- Probe before final intervention session

(March 2015)



Social Validity

- All respondents marked *strongly agree* for all Likert-type statements related to intervention and improvements.
- Results indicated that overall, the intervention was valuable, practical, and could potentially be generalized to other providers.

Error Analyses

- Two out of three participants demonstrated the most errors and greatest difficulty with the non-continuous sounds (e.g., /t/ and /p/) and least difficulty with continuous sounds (e.g., /m/ and /a/).
- For one participant, Nate, the error patterns potentially more closely aligned with location errors (items in the second position) and personal relevance. For example, the lowest percentage of errors occurred with letter-sounds that are associated with his name or family members names: (a) LSC Set 1 was /m/, (b) LSC Set 2 /g/, and (c) LSC Set 3 /h/.

Discussion

- The study contributes new information for a population that commonly experiences low expectations (Ruppar et al, 2011; Zascavage & Keefe, 2004) and lack of appropriate instruction (Light & McNaughton, 2013).
- With adapted instruction in letter-sound correspondences, all individuals that participated in this study were able to make positive gains from baseline.
- Two out of three participants met criterion for acquisition of 12 letter-sound correspondences and maintained the skills they learned intervention.
- Despite intrinsic and extrinsic challenges that older individuals with severe disabilities bring to the literacy context, with very limited instructional time, the participants in this study were able to increase foundational literacy skills (e.g., letter-sound correspondences) with access to adapted instruction.



Study 2:

Sight words

Overview

- Sight word reading is the process of reading words, automatically at a glance, without analysis of the individual letters and sound correspondences in a given word (Adams, 2011; Carnine et al., 2010).
- Sight words are important because:
 - Many words in the English language cannot be decoded
 - The student may not know all letter-sound correspondences yet
 - it may provide a mechanism for teaching the communicative intent of print and therefore expanding communication options
- The predominant form of reading instruction for students with moderate and severe intellectual disabilities is sight word instruction (Browder et al., 2006; Browder & Xin, 1998).
- Limited research exists in relation to sight word instruction for older individuals with severe disabilities, ASD and CCN.

Aim/Research Question:

- Given the importance of sight words, research is needed to better understand the effects of adapted instruction in sight word reading for older individuals with severe disabilities, ASD, and CCN.
- Question: **What is the effect of adapted instruction on the acquisition, maintenance, and generalization of single sight word reading by older learners with severe disabilities, ASD and CCN?**

Participants

- 4 males with ASD and CCN
 - Age range: 9;7 to 18;11
 - All individuals used forms of AAC to communicate (GoTalk Now, sign approximations, PECS)
 - Limited literacy progress in school
 - Participate in substantially separate classrooms, with 1:1 supports
 - Range of Letter-sound correspondence knowledge (10 – 26)
 - Dolch Word screening with Pre-Primer list (2 – 15 correct)
 - PPVT-IV scores ranged: 2.3 to 3.11 age equivalent

Materials- Sight Words:

- 12 target sight words
- The words had to be:
 - (a) 4-6 letters in length,
 - (b) imageable (e.g., "horse" not "the"),
 - (c) motivating and personally relevant.

Personalized word lists, per participant, for sight word instruction

	Sight Word Set 1	Sight Word Set 2	Sight Word Set 3
Chad	<ul style="list-style-type: none">mariomoviejuicecookie	<ul style="list-style-type: none">swingsnackipadjump	<ul style="list-style-type: none">ballbookgameluigi
Nate	<ul style="list-style-type: none">dogdrumcatipad	<ul style="list-style-type: none">swingsnackmusicbook	<ul style="list-style-type: none">walkwaterpianotype
Jason	<ul style="list-style-type: none">fieldfencehaycoop	<ul style="list-style-type: none">pailplowrakecalf	<ul style="list-style-type: none">gategymatvradio
Cory	<ul style="list-style-type: none">parkponykitebagel	<ul style="list-style-type: none">snakeslidefarmtype	<ul style="list-style-type: none">barnbirdcandytrain

Procedures:

- Baseline: Sight Word probes
 - A sight word Probe included two trials for each of the 4 targeted sight words, which provided an opportunity of 8 correct responses.
 - Chance level was 25%
- Intervention: Probes (10 mins.) + Instruction (20 mins.)
 - Probes
 - Instruction:
 - 1. Explicit instruction on the target sight words(10-20 trials)
 - 2. Sight word book (5 trials)
 - 3. Sight Word folder activity (5 trials)
- Generalization:
 - Procedures same as baseline, but with different images (photographs instead of Symbolstix)
- Maintenance:
 - Same as baseline
 - 8 trials, probes for all 3 sets
 - Chance level was 25%
 - Short-term & Long-term measures

JE: Intervention Example

CW: Intervention Example

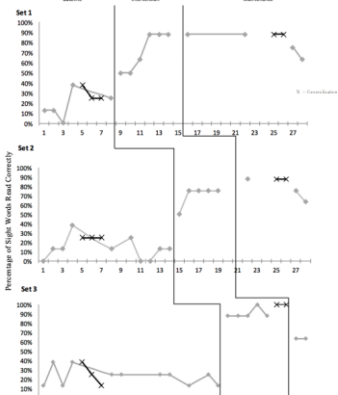
Results:

- Results supported the hypothesis that adapted instruction would result in improved sight word learning, despite a past of limited literacy success.
- The intervention resulted in strong effects (greater than .85) (Parker & Vannest, 2009) for all participants, with 98% to 100% non-overlapping data
- Across sets and participants intervention time ranged: three to nine sessions to meet criterion, or 1 hour to 3 hours of instruction to reach criterion -- translates to approximately 3 to 6 hours of instruction to acquire the 12 sight words.

Set 1 gains: +70%
~2 hrs. instruction

Set 2 gains: +62%
~1 hour and 40 min. instruction

Set 3 gains: +67%
~1 hour and 40 min. instruction

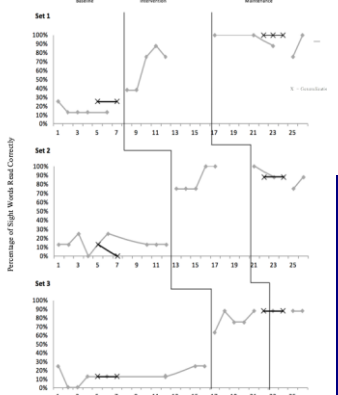


Chad

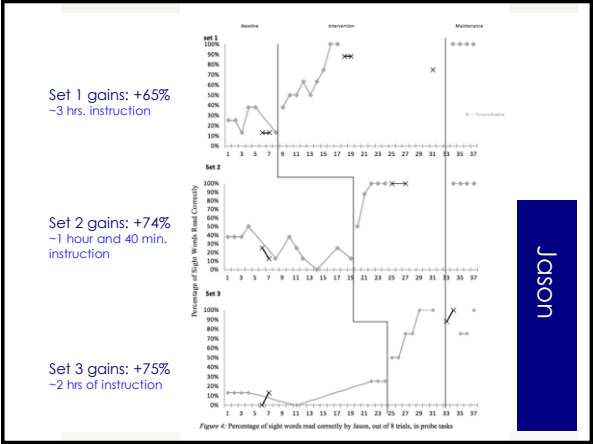
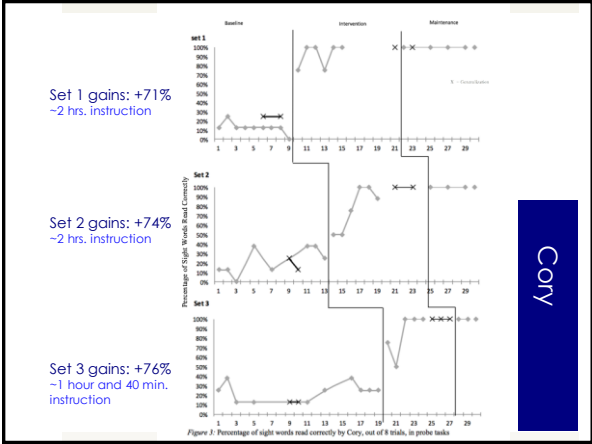
Set 1 gains: +64%
~1 hour and 40 min. instruction

Set 2 gains: +78%
~1 hour and 40 min. instruction

Set 3 gains: +78%
~1 hour and 40 min. instruction



Nate



Discussion

- All participants improved sight word learning, despite a past of limited literacy success.
- In addition, the intervention resulted in generalization of sight word reading to a novel representation (i.e., Symbolstix to photographs).
- The participants' teachers also viewed the intervention as practical, appropriate, and effective.

Limitations (Study 1 & 2)

- Small number of participants
- Packaged interventions consisting of explicit instruction and extension activities.
- The interventions implemented in this study can only be viewed as the foundational skills for early literacy.
- The interventions did not address other areas that have been found to improve word recognition (e.g., sound blending, phoneme segmentation activities)

- The findings of Study 1 and Study 2 suggest that older learners with severe disabilities, ASD, and CCN who have previously struggled to make progress with early literacy skills (including letter-sound correspondences and sight words) can indeed make progress.
- All learners made progress from their individual baseline levels of performance

The major benefit of the interventions was seeing instruction that actually worked. This gave me hope and ideas....I am seeing a dramatic increase of on task behavior during instruction....and LEARNING!

It is critical that literacy expectations change for individuals with severe disabilities and CCN and that these individuals are provided with quality adapted instruction to maximize their participation and communication.

Conclusion:

- All individuals have the fundamental right to become successful readers to support maximization of their educational outcomes, future occupational opportunities, and individual leisure pursuits (Machalicek et al. 2010).
- Research must continue in the area of literacy instruction so all individuals have the opportunity to develop functional literacy skills in order to participate in an increasingly text-based society.

QUESTIONS?

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