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Reading-Related Phonological Processing Interventions for Individuals who use AAC

Aim: This paper presents the results of a systematic review to determine the effectiveness of various reading-related phonological processing interventions (including phonological awareness and single word decoding) for individuals with Complex Communication Needs (CCN).

Problem: Literacy is a key component to success in many areas of life. For individuals who rely on AAC, the literacy is exponentially more important. It unlocks full access to true self-expression and creativity (Light, McNaughton, Weyer, & Karg, 2008). Unfortunately, an estimated 90% of individuals who use AAC are entering adulthood without functional literacy skills (Foley & Wolter, 2010). This paper compiles information regarding effective phonological processing into one systematic review in an effort to help change these outcomes.

Methods: An extensive review of the literature published from 1980 to 2015 was conducted that included intervention on reading-related phonological processing interventions including phonological awareness and single word decoding.

Results: A total of 13 studies (15 experiments) were identified involving 42 individuals (ages 4-22) with a wide range of diagnoses. Studies utilized direct instruction in phonological awareness, storybook methods, or discovery learning instruction. Highly effective interventions that met criteria for conclusive evidence utilized direct instruction in specific phonological processing skills to improve phonological awareness and decoding.

Conclusions: Individuals with a wide range of disabilities who use AAC can learn reading-related phonological awareness and decoding skills. There is a small amount of conclusive evidence that using direct instruction approaches to teach phonological processing skills are highly effective. Further research regarding reading-related phonological processing skills is urgently needed.

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Aim: This paper presents the results of a systematic review to determine the effectiveness of various reading-related phonological processing interventions (including phonological awareness and single word decoding) for individuals with Complex Communication Needs (CCN).

Problem: Literacy is a key component to success in many areas of life (educational, social, employment, religious activities, leisure, and management of one's personal business-paying bills, keeping a schedule, etc). For individuals who rely on AAC, the literacy is exponentially more important. If an individual is not literate, he/she must rely on pictures, line drawings, or other symbols for communication. Often this means that someone else must think in advance to program the system with the pictures or other symbols or the individual simply does not have access to that vocabulary. However, with literacy 26 letters plus a few punctuation markers unlock the gateway to anything the individual can generate (Light, McNaughton, Weyer, & Karg, 2008). Unfortunately, an estimated 90% of individuals who use AAC are entering adulthood without functional literacy skills (Foley & Wolter, 2010). There is a drastic shortage of quality programs for teaching literacy to this population (Fenlon, McNabb,

& Pidlypchak, 2010). This paper compiles information regarding reading-related phonological processing interventions into one systematic review in an effort to help change these outcomes.

Background: Adams (1990) provided a theoretical model for reading. She explained that reading involves four processors: 1) The orthographic processor- which takes text chunks it into familiar sequences (single letters, syllables, words) according to familiarity, 2) the phonological processor- which takes sequences of letters and locates the sounds for that letter, string of letters, or word, 3) the meaning processor- which finds the meaning of the word from the orthographic text or from the phonological processor. All three of these processors work together relaying information efficiently two and from one another. Finally, 4) the contextual processor connects to the meaning processor to help gather information from visual context, phrase, sentence, or paragraph the sentence is written in.

Methods: An extensive review of the literature published from 1980 to 2015 was conducted that included intervention on reading-related phonological processing interventions including phonological awareness, letter-sound correspondences, and single word decoding. This included peer reviewed publications as well as unpublished doctoral dissertations. A combination of database, table of contents searches, ancestral searches, and author searches were conducted. Studies were coded for design, participant information (gender, age, disability), independent variable (intervention procedures), dependent variable (specific skills targeted), intervention time, and outcomes in terms of PND (PND; Scruggs, Mastropieri, & Casto, 1987) and gain scores. Studies were also coded for certainty of evidence based upon the Certainty Framework (Simeonsson & Bailey, 1991) combined with Quality Indicators Within Single-Subject Research (Horner, Carr, Halle, McGee, Odem, & Wolery, 2005).

Results: A total of 13 (15 experiments) studies were identified involving 42 individuals (ages 4-22) with a wide range of diagnoses. Primary diagnoses included: Down syndrome (n=4), autism spectrum disorders (n=9), cerebral palsy (n=17), severe speech impairment (n=3), multiple disabilities not otherwise specified (n=1), brain injury from a stroke (n=1), mental retardation (n=5), and (h) rare disorders (n=2; one with Holt-Oram Syndrome, and one with a rare genetic disorder causing many developmental delays). A total of 18 individuals had intellectual disabilities as a primary or secondary diagnosis.

Studies utilized direct or organized instruction in phonological awareness, storybook methods, discovery learning instruction, or combinations of these methods. Highly effective interventions that met criteria for conclusive evidence utilized direct or organized instruction. These included the organized instruction approach utilized by Johnston et al. (2009) to teach letter-sound correspondences; the direct instruction approach utilized by Fallon et al. (2004) to teach initial phoneme segmentation, blending, and decoding; and the organized instruction approaches to teaching decoding skills using the Nonverbal Reading Approach (NRA) in Coleman-Martin et al. (2005); Heller et al. (2002); and Swinehart-Jones and Heller (2009).

Storybook methods were often included with discovery learning methods, which taught a range of skills indirectly related to the dependent variable. These combination approaches were unreliable or questionable in effectiveness with no significant outcomes pertaining to phonological awareness.

Conclusions: These results and the fine differences between the direct and organized instruction approaches will be discussed with regards to Adam's (1990) model of reading.

Results provide further evidence that individuals with a wide range of disabilities who use AAC can learn reading-related phonological awareness and decoding skills. There is a small amount of conclusive evidence that using direct or organized instruction approaches to teach phonological processing skills are highly effective. Further research regarding reading-related phonological processing skills is urgently needed.

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