

## Critical Review:

Are context-based intervention programs effective for the development of phonological awareness skills?

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This critical review examines the literature on context-based intervention programs and their effectiveness for developing phonological awareness skills in preschool and school-aged children. Studies evaluated include two single subject 'n-of-1' studies and two randomized control trials. Overall, available research findings support the use of embedding phonological awareness instruction within literacy to develop phonological awareness skills. Clinical implications and future research recommendations are also discussed.

### *Introduction*

*Phonemic awareness* and *phonological awareness* are similar concepts, referring to the conscious ability to analyze words by their sounds (e.g., producing the initial, middle, and final sounds in words) and manipulate sounds in words (e.g., adding or deleting sounds from words). Phonological awareness also entails rhyme detection and production (the ability to generate rhyme pairs), as well as associating letters by their sounds. These skills are notably important for literacy development (Richgels, Poremba, & McGee, 1996). Therefore, children who have a limited awareness of the language's phonetic components are likely to have difficulty learning the alphabet, learning sound-letter correspondences, and developing literacy (McFadden, 1998). Research has shown positive effects of phonological and phonemic awareness instruction for the development of early reading skills and literacy (Richgels et al., 1996; McFadden, 1998; Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000).

Previous clinical research supports structured "drill-like" programs to be effective in the development of phonological awareness (Richgels et al., 1996; McFadden, 1998). This typically involves direct instruction in analyzing and manipulating sounds in words and developing sound-letter associations, using isolated words (McFadden, 1998). However, an alternative to this approach is a text-based instruction program, which teaches phonological awareness in the context of interactive storybook reading. Its theoretical standpoint is based on the premise that literacy and phonological awareness skills can develop within children's meaningful and functional interactions with print (Richgels et al., 1996). Scaffolding can also be incorporated in this type of intervention. This allows for clinicians and educators to target differing skill levels because assistance can range from a high degree (e.g.

stressing a word before prompting a response) to a low one (e.g. repetition) (McFadden, 1998). Given its relevance, contextualized intervention should also be considered as a method for phonological awareness instruction, especially for pediatric and school Speech-Language Pathologists who typically target speech and language goals through interactions around children's literature. It is more effective to target multiple goals (e.g. phonological awareness and pronouns) using literacy materials. Further advantages include less dependence on specialized treatment materials and greater continuity with the classroom curriculum. (Richgels et al., 1996; McFadden, 1998; Ukrainetz et al., 2000).

### *Objectives*

This paper's primary objective is to critically review the existing literature regarding the effectiveness of context-based intervention programs for developing phonological awareness skills. This paper's secondary objective is to propose clinical implications and to suggest recommendations for future research.

### *Methods*

#### Search Strategy

Computerized databases including PubMed, JSTOR, ERIC, CINAHL and ProQuest Education Journals were searched. The following search strategy was used: (phonological awareness) OR (phonemic awareness) AND (context-based intervention) OR (text-based intervention) OR (intervention). No limitations on age, presence of a speech/language disability/delay, socioeconomic status or intervener type, were set. Reference lists of retrieved articles were also reviewed.

#### Selection Criteria

Studies selected for inclusion were required to examine

phonological awareness intervention programs embedded within literacy. One selected study compared both structured and context-based approaches, in order to highlight the latter's effectiveness. Intervention could be provided to either preschool or kindergarten populations, by either a professional or a parent. No restrictions were set regarding the speech or language abilities of the participants.

#### Data Collection

Results of the literature search yielded four articles that met the selection criteria. The articles included two single subject 'n-of-1' studies (van Bysterveldt, Gillon & Moran, 2006; Goldstein & Ziolkowski, 2008) and two randomized control trials (Ukrainetz et al., 2000; Raisor, Creaghead, & Yeager, 2006).

### **Results**

Ukrainetz et al. (2000) used a randomized control trial to examine the effects of teaching phonemic awareness embedded in holistic literacy activities (i.e. shared reading and writing). 36 children (aged 5–6;6 years) of varying literacy level abilities received intervention three times per week for seven weeks, at daycare. Four phonemic awareness skills were targeted every treatment session: initial and final sound identification and sound segmentation/deletion. Skills were assessed pre- and post-intervention using criterion-referenced measures. Controls received only the pre- and post-testing.

Appropriate statistical analyses using a repeated-measures ANOVA showed improvement in mean phonemic awareness for both groups over the seven weeks. The treatment condition demonstrated greater change, regardless of literacy level. Large effect sizes were also obtained. Improvement was specifically evident in three of the four targeted skills: initial and final sound identification and sound segmentation.

A limitation of this study included a lack of information regarding external sources that provided phonemic awareness instruction, within the children's school classrooms. These sources were not controlled, and might have inflated the children's outcomes. Additionally, the use of criterion-referenced measures limited the ability to generalize results. This study's strengths included its procedures being described in adequate detail for replication, therapist blinding, and the inclusion of children with various literacy levels. This demonstrated that young children, regardless of literacy ability could benefit from this type of intervention approach. The results were also encouraging because of the large and significant treatment effects. Thus, the evidence for teaching

phonemic awareness using this approach is highly suggestive.

van Bysterveldt et al., (2006) used a single subject 'n-of-1' study to investigate the effectiveness of a text-based phonological awareness intervention with seven 4-year-old children with Down syndrome. Parents implemented the intervention for six weeks (four sessions per week). The participants' performance on pre- and post-intervention measures was compared to a randomly selected group of seven age-matched peers with typical development. Controls received only the pre- and post-testing. Criterion-referenced measures assessed initial sound identification, letter name and sound knowledge, and print concepts.

Appropriate data analyses using a series of *t* tests revealed significant gains for five of the seven participants with Down syndrome on three of the four measures (letter sound knowledge, print concepts, and initial sound identification). Results were equal to or greater than those of their typically developing peers.

Similar to the previous study, a limitation included the use of criterion-referenced measures, which limited generalizability. The at-home intervention setting also entailed variability across participants. All parents aborted at least one session due to participants' defiant behaviours. However, this study's single subject design was appropriate, its procedures were described in adequate detail for replication, and its findings were encouraging. Additionally, treatment fidelity was reported, in which six of the seven parents provided consistent and accurate intervention, as per their training session. The child of the parent who did not implement consistent intervention, was one of the participants who also did not demonstrate treatment effects. This supports that the study's validity is compelling and that parent-implemented text-based instruction is effective for phonological awareness development.

Goldstein and Ziolkowski (2008) used a 'n-of-1' study to examine the effectiveness of phonological awareness intervention embedded in shared storybook reading, with 13 preschool children (aged 4;2 - 5;4 years) from low-income environments with language delays. The 13-week intervention targeted rhyming knowledge and alliteration or initial sound fluency.

Appropriate analyses of weekly measures using Percentage of All Nonoverlapping (PAND) calculations revealed statistically significant large effect sizes and improvements in initial sound fluency, alliteration and rhyming detection and production, for all 13 children. These results indicated that preschool children at a high risk for reading difficulties could benefit from explicit

instruction embedded within shared book reading. While these outcomes were encouraging, the findings would be more compelling if other foundational emergent literacy skills were targeted (e.g. final sound identification and sound segmentation), in order to observe their ability to be embedded in text-based instruction. However, the study's validity is still compelling, considering that its design was appropriate, treatment fidelity was reported, its procedures were described in adequate detail for replication, and a significant increase was found pre- and post-intervention with large effect sizes.

Raisor et al. (2006) used a randomized control trial to compare the effectiveness of both the traditional drill and the naturalistic text-based approaches for early literacy skill development with 44 preschool children (average age: 4;9) at risk for reading difficulties. For four weeks, intervention targeted: rhyme detection and production, word and syllable segmentation, and initial sound identification. Controls did not receive intervention, and children in the text-based intervention group received scaffolding. Progress was measured pre- and post-testing using informal measures generated from standardized language assessments.

Appropriate analyses using a repeated-measures ANOVA revealed that both interventions were successful (compared to the control group) for targeting rhyme detection, segmentation, and total phonological awareness. In comparison to the drill approach, naturalistic intervention proved more effective for increasing print concept awareness, likely because children received exposure to print.

This study's strengths included its design and its procedures being described in adequate detail for replication. Although the findings indicated that a text-based intervention was more beneficial, limitations included a short intervention period and targeting initial sound isolation. This may not have been an appropriate skill to target since treatment effects were not found for both groups and the authors reported that children under 5-years old experienced difficulties with this skill. Overall, this study's validity is suggestive considering it was retrieved as a presentation and its results are not published nor peer-reviewed.

### ***Discussion***

Collectively, the four reviewed studies provide highly suggestive evidence that intervention embedded within shared storybook reading can lead to positive gains in children's phonological awareness development. The results suggest that both preschool and school-aged children with and without language or literacy delays

demonstrate improvements in their phonological awareness skills, post-intervention. The experimental designs used in these studies all provide a higher level of evidence, which in turn increases their validity. Given the naturalistic and unstructured style of this intervention, its variability in implementation acts as a limitation to generalize findings across studies. Common methodological issues that arose in these studies and suggestions for future studies are discussed.

Small sample sizes were used in the randomized control trial studies, leading to less confidence in the results being accurate. Furthermore, small sample sizes are a strong indication of the need for further research using large-scale studies, particularly since this review's results are highly suggestive of a clinically useful approach to target phonological awareness development.

The measures used to assess performance post-intervention varied from criterion-referenced measures to standardized assessments. These variations in measurement made it difficult to determine the consistency of gains found across studies. Criterion-referenced measures have increased sensitivity to treatment specific changes, but results are limited in generalizability. In contrast, standardized assessments lack sensitivity but results can be generalized. Currently, the available standardized tools to measure phonological awareness are also age-specific, mostly for children five years and older. With a limited selection of tools available to assess children less than 5-years old, this impacts the ability to measure phonological awareness in a valid and reliable way that is responsive to change with younger populations. Hence, criterion-referenced measures are necessary. Furthermore, progress may be difficult to score using text-based approaches (in comparison to drill-based intervention) because students' responses are less controlled and less structured.

All four studies targeted different sub-skills of phonological awareness, making it difficult to generalize findings and to identify which phonological awareness skills text-based intervention is effective for developing. Phonological awareness typically follows a developmental sequence for skill acquisition, starting with rhyme detection/production (ages 3-4 years), syllable segmentation (ages 4-5 years), and phoneme isolation/deletion/substitution and blending at ages 5-7 years (McFadden, 1998). Interestingly, participants in the Goldstein and Ziolkowski (2008) and Raisor et al. (2006) studies did not demonstrate treatment effects for initial sound isolation, rather the authors reported that children under 5-years old experienced difficulties with this skill. In the Ukrainetz et al. (2000) study, children

aged 5 to 6;6 years old did demonstrate improvement in this target skill. Thus, in order for this method to be effective, clinicians should target phonological awareness skills that follow the sequence of skill acquisition and are appropriate for the child's age. Further investigation is warranted to examine if blending can improve from text-based instruction with older populations, considering the populations within this review were too young to target this skill.

The large variability in: measurement, targeted phonological awareness skills and sample sizes make it difficult to generalize findings across these studies. Future studies need to incorporate follow-up data to provide greater assurance of this intervention's effectiveness. Furthermore, the Raisor et al. (2006) study warrants further investigation to determine if text-based phonological awareness intervention programs are more or less effective than structured intervention, since their research has not yet been published.

### ***Conclusion/Clinical Implications***

Research examining the effectiveness of embedding phonological awareness instruction within meaningful literacy is limited. Despite the limited evidence, this critical review supports the effectiveness of this intervention approach because it strengthens the relationship between phonological awareness and literacy. Results revealed that this intervention lead to gains in phonological awareness development for both preschool and school-aged children, with and without speech or language delays/disorders. Ultimately, this review suggests that context-based intervention is an effective option for S-LPs to consider for phonological awareness intervention. Given that the results demonstrate an opportunity for successful intervention, it allows for speech-language pathologists to provide

learning situations that are continuous with classroom content and experiences.

### ***References***

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