



# **Are Phonological Awareness Intervention Programs Effective for Children with Disabilities? A Systematic Review**

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## **Abstract**

*The purpose of this study was to find out the effectiveness of phonological awareness intervention programs. Computerized databases, including ERIC, PubMed, ProQuest Education Journals, and SCOPUS, were searched using the following search strategy: ("phonological awareness") AND (impairment OR intervention OR training programme). The search was limited to English journal articles. No limitations were set on date of publication. Studies selected for inclusion in this review were required to examine phonological awareness intervention programs for children with disabilities including those with Autism Spectrum Disorder, Visual Impairments, Down syndrome, Speech and/or Language Impairments, Intellectual Disabilities, Hearing Loss, and Learning/ Reading Disabilities. Overall, available research findings support the use of phonological awareness intervention programs designed for children with disabilities as an effective tool to improve phonological awareness skills. Implications and recommendations for future research are discussed.*

## **Introduction**

Phonological awareness can be defined as the ability to define and manipulate the sound structure of oral language (Layton & Deeny, 2002). Phonological awareness acquisition involves the learning of two things. First, it involves learning that words can be divided into segments of sound smaller than a syllable. Second, it involves learning about individual phonemes themselves (Torgesen, 2000). The awareness of phonological structure of a word helps children to draw connections between the spoken form of a word and its written representation (Gillon, 2004).

According to Oktay & Aktan (2002), phonological ability is not accompanied by an innate ability, which allows children to manipulate phonological elements intentionally. In addition, Cassady and Smith (2004) suggest that children should be trained to blend body-codas first, then to progress to more phonologically difficult blending tasks such as onset-rimes and phonemes. Study by Cheung et al. (2001) also suggests the important role of phonological training in reading acquisition. They point out that bilingual children develop phonological awareness earlier, but in the end, monolingual children reach the same level once they receive phonological skill training in reading development. However, Durgunoğlu (2002) argues that children can gain insight into phonological skills if they have had exposure in their L1. Given the ample amount of existing research indicating the importance of phonological awareness training, the notion of beginning treatment for phonological awareness for children who lack these skills as soon as possible is consequently intuitive.

### *Objectives*

The first objective of this paper was to review the existing literature regarding the effectiveness of phonological awareness intervention programs for children with disabilities. The second objective was to propose some implications and evidence-based recommendations for professional practice and to suggest areas for future research.

## **Methods**

### *Search Strategy*

Computerized databases, including ERIC, PubMed, ProQuest Education Journals, and SCOPUS, were searched using the following search strategy:

("phonological awareness") AND (impairment OR intervention OR training programme ). The search was limited to English journal articles. No limitations were set on date of publication.

### *Selection Criteria*

Studies selected for inclusion in this review were required to examine phonological awareness intervention programs for children with disabilities including those with Autism Spectrum Disorder, Visual Impairments, Down syndrome, Speech and/or Language Impairments, Intellectual Disabilities, Hearing Loss, and Learning/Reading Disabilities.

## **Results**

### *Phonological Awareness in children with Autism Spectrum Disorder*

Children with Autism Spectrum Disorder show delays in Phonological awareness. Heimann et al.'s study (1995) has explored the effectiveness of Phonological Awareness intervention for children with Autism Spectrum Disorder. In Heimann et al.'s study(1995), 11 children with Autism Spectrum Disorder, 9 children with cognitive development, and 10 typically developing children showed an increase in vocabulary skills and word reading after participating in an interactive computer program aimed at teaching basic reading and writing vocabulary. Phonological awareness scores also improved, as measured by a Swedish standardized test that assesses phoneme segmentation, synthesis, and deletion.

In this study, the authors experienced considerable missing data on some measures (due to teachers not carrying out all the tests they had been asked to do). They also lost some subjects after the final selection process. Tjus et al. (1998) targeted only students with ASD. In this study, students received fewer sessions (15) conducted over a briefer time frame (1–2 months). Similar to the earlier study, students mastered the computer-assisted task and achieved generally positive gains with some demonstration of maintenance in phonological awareness. The findings from both of these studies (Heiman et al., 1995; Tjus et al., 1998) are encouraging, yet ambiguous. Because of the small sample size, age range of included participants, absence of information describing participant reading ability prior to the intervention, and the variable reading skills associated with ASD (Nation et al., 2006), mean scores can obscure findings (Kelly , Stephanie, and Monica, 2010).

Adel Abdulla Mohammed&Amaal Ahmed Mostafa (2012) described an action research project designed to improve word recognition ability of children with Autism Spectrum Disorder. A total of 47 children diagnosed as having Autism Spectrum Disorder using Autism Spectrum Disorder Evaluation Inventory (Mohammed, 2006), participated in this study. The sample was randomly divided into two groups; experimental (n= 24; 16 M ,8 F) and control (n= 23; 18 M, 5 F). ANCOVA and Repeated Measures Analyses were employed for data analysis. Findings from this study indicated the effectiveness of the program employed in word recognition ability in the target children. On the basis of the findings, the study supports the idea of PA as a powerful intervention for children Autism Spectrum Disorder.

The results of this study indicated that children with autism Spectrum Disorder and had not received any formal reading instruction are capable of improving their Word Recognition Ability in preparation for their future reading .This study

demonstrated that phonological awareness skills can be effectively instructed to children with autism Spectrum Disorder better positioning them for reading success. On the basis of the findings, the study supported the idea of PA as a powerful intervention for children Autism Spectrum Disorder.

#### *Phonological Awareness of Young Children with Visual Impairments*

Research on sighted children has suggested that "phonological awareness develops along a continuum from awareness of large and concrete sound units (i.e., words, syllables) to awareness of small and abstract sound units (i.e., phonemes)" (Lonigan et al., 2009, p. 347). Research has also indicated that the development of phonological awareness in children who are blind or have low vision is similar to that of children who are sighted (Barlow- Brown & Connelly, 2002; Gillon & Young, 2002). The findings from a sample of 22 young children with visual impairments and no additional disabilities suggest that potential readers of braille or dual media had better syllable-segmentation, sound-isolation, and sound segmentation skills than potential readers of print. Potential readers of print seemed to have slightly better letter-identification and letter-sound identification skills than potential readers of braille or dual media (Deborah, Karen, and Donna, 2010).

Many children who are visually impaired may not be exposed to print or braille until they reach preschool or kindergarten—a huge disadvantage. By the time that most sighted children begin school, they can recognize approximately 15 print letters, whereas most preschool children who are visually impaired know none (Deborah, Karen, and Donna, 2010).

#### *Phonological Awareness of Young Children with Intellectual Disabilities /Down syndrome.*

In children with Down syndrome, linguistic aspects, especially in the field of phonology and morphosyntax (Cinthia, Cacilda and Leonor, 2012), are more impaired than other aspects of their development. The literature is not extensive regarding the development of phonological awareness in children with Down syndrome, but it indicates that when it is worked out previously, it may benefit the literacy process. Few educators know the importance of phonological awareness as a prerequisite for literacy of children with typical development. Children with Down syndrome have measurable levels of phonological awareness, although they are lower when compared to those of individuals with typical development (Cinthia, Cacilda and Leonor, 2012).

Kennedy and Flynn's research study (2003) examined using a phonological awareness based intervention programme with three children with Down syndrome (aged 7;2, 8;4, and 8;10). A multiple baseline across behaviours design was selected. The intervention programme focused on the key skills of alliteration detection, phoneme isolation, spelling of orthographically regular words and rhyme detection. Two tasks (comprehension of passive structures and spatial structures) were selected as control behaviours. Phoneme segmentation and speech intelligibility were selected to investigate generalisation of intervention targets to other related skill areas. The results indicated that the participants improved the phonological awareness skills targeted in the intervention programme. the results indicate that children with Down syndrome can benefit from a phonological awareness based approach to literacy.

Children with intellectual disabilities typically manifest some degree of phonological deficit (Reed, 1994) that may interfere with their realization of the meaning of print (Swank & Catts, 1994). Notwithstanding, some authors recounted successful phonological awareness interventions for children with intellectual disabilities. For instance, Eissa (2013) explored the effectiveness of a phonological awareness training intervention on pre-reading skills of mentally retarded children. A total of 47 children with intellectual disabilities participated in this study. The sample was randomly divided into two groups; experimental (n= 24, 19 boys, 5 girls) and control (n= 23 , 20 boys and 3 girls ). ANCOVA and Repeated Measures Analyses were employed for data analysis. Findings from this study indicated the effectiveness of the program employed in improving pre-reading skills in the target children.

This study depended on the composite score of Pre-reading skills , and this was not as strong as it might have been if further sub skills were discussed in details statistically .Nevertheless, the findings of the study suggest that using phonological awareness intervention programs in classrooms for children with speech and/or language concerns can be effective for trained phonological awareness activities.

#### *Phonological Awareness of Children with Hearing Loss*

Werfel and Schuele (2014) investigated whether phonological awareness training would result in increased initial sound segmentation skills in two preschool children with severe to profound hearing loss. They used a single subject multiple baseline design across three behaviors (initial phoneme /m/, /d/, /b/ identification). The authors concluded that initial phoneme awareness training led to an increase in initial sound segmentation skill, though consistent performance was not observed during the maintenance period. This study examined only a small number of children (i.e., two children).

Sue, Brittany, and Sherry (2017) examined the feasibility of a telepractice intervention to improve phonological awareness skills in children with hearing loss as compared to a conventional in-person intervention. Twenty children with hearing loss participated in this study. Two groups of ten children each received a supplemental phonological awareness intervention either via telepractice or an in-person service delivery model. Within each of the two groups, five children were enrolled in preschool or kindergarten and five children were enrolled in first or second grade. The two groups of children demonstrated similar phonological awareness, non-verbal IQ, and vocabulary skills during pre-tests. After a 12-week intervention children with hearing loss showed improved phonological awareness skills as measured by a standardized post-test. No significant differences were found between the performance of the telepractice group and in-person group. Nor was a significant interaction found between the two age groups (PreK/K vs. 1st /2nd grade) and the two types of service delivery models (in-person vs. telepractice). The results suggest that a telepractice service delivery model is feasible for young children with hearing loss, and that telepractice may be as effective as in-person intervention in improving phonological awareness skills.

This study employed a small number of children in wide age ranges. It would be better if they could narrow age ranges to verify their findings. The intervention included many phonological awareness tasks. It would be better if they could examine one or two phonological awareness tasks. That study did not employ a control group that received no study-based intervention.

### *Phonological Awareness in children with Speech and/or Language Impairments*

Sixteen preschool children with speech and/or language disorders in Kleeck, Gillam & McFadden's study (1998) received phonological awareness training for a period of 9 months. Eight children attended a preschool classroom, and 8 children attended a pre-kindergarten classroom. The classrooms were located in a private school for children with speech and language disorders. A group of older children with speech and/or language disorders served as a non-treatment comparison group. Children in the treatment groups received 15 minutes of small-group lessons twice each week for two semesters. Classroom-based treatment focused on rhyming the first semester and on phoneme awareness the second semester. Rhyming and phoneme awareness activities were adapted from the literature on the development of phonological awareness in typically-achieving children. Results revealed that preschool children with speech and/or language disorders made significant improvement in rhyming and phoneme awareness. Comparisons with the non-treatment group indicated that gains in phoneme awareness were likely a result of the treatment rather than maturation or other aspects of the curriculum.

Michaela et.al (2013) conducted utilizing a quasi-experimental pre- and post-group design to examine the effects of a phonologically based intervention aimed to improve phonological awareness (PA) and reading abilities in school-age children with language impairment (LI) in Grades 1 through 3. The intervention included instruction in PA and sound-symbol correspondence. Sixty-four school-age children with LI (Grades 1-3) were assigned to either an experimental (n = 34) or a control group (n = 30). Eleven kindergarten-age children with LI were then included as a comparison grade group to investigate whether the magnitude of treatment effect changed across grade level in the experimental group (K-3). Participants in the experimental group (Grades 1-3) made significantly greater gains in PA and reading (e.g., decoding and text comprehension) than the control group. Similar gains were observed across the varying grade levels (K-3). These results suggest that, despite being at risk of reading failure, school-age children with LI in Grades 1 through 3 have the potential to make accelerated gains in their reading development and in the PA skills that are essential to successful literacy acquisition. This study had small sample sizes for each grade level, which led to limited statistical powers. The results are also likely limited by the lack of follow-up of the participants' performances on PA and reading skills.

### *Phonological Awareness of Children with Learning/ Reading Disabilities*

Rehab (2013) described an action research project designed to prevent early reading skills of children at-risk for future reading disabilities. A total of 47 children diagnosed as having poor pre-reading skills by teacher's nominations were invited to participate. The sample was randomly divided into two groups; experimental (n= 24, 16 boys, 8 girls) and control (n= 23, 18 boys and 5 girls ). ANCOVA and Repeated Measures Analyses were employed for data analysis. Findings from this study indicated the effectiveness of the program employed in improving the pre -reading skills in the target children. On the basis of the findings, the study supports the idea of PA as a powerful predictor of early reading achievement. Though this study proved the effectiveness of the program employed in improving the pre -reading skills in the target children , but did not say much about children's characteristics , and 15 session lasted 20 minute each was not an adequate period. Additionally, though the authored



implemented her experiment using boys and girls, she did not compare between the two sexes nor she gave an explanation for why she chose both sexes.

### **Conclusion and Implications**

Although children with Autism Spectrum Disorder show delays in Phonological awareness, studied aforementioned were suggestive of the positive effects of phonological awareness intervention in classrooms dedicated to children with autism and the results were promising. Research has also indicated that the development of phonological awareness in children who are blind or have low vision is similar to that of children who are sighted, nevertheless, much less is known about the effectiveness phonological awareness training for children with visual impairments.

Studies, although limited, on phonics based instruction for children with Intellectual Disabilities/ Down syndrome, have shown promising results. Research shows that children with Intellectual Disabilities can perform all of the same tasks related to phonics based instruction as their peers without disabilities (Al Otaiba & Hosp, 2004). when children with Down syndrome were instructed in an inclusive setting and presented with the same sequence of reading instruction as their peers without disabilities, children with Down syndrome showed similar progress to that of their peers in phonological awareness, phonics, vocabulary, comprehension, and fluency (e.g., Browder, Ahlgrim-Dezell, Courtade-Little, & Snell, 2006; Cupples & Iacono, 2002; Michael & Marie, 2016; Snowling, Hulme, & Mercer, 2002).

Webb and Lederberg (2015) suggest that phonological awareness training is necessary for children with hearing loss to help them develop their literacy skills. Even though research typically shows that they demonstrate delayed phonological awareness regardless of the degree of hearing loss (Kyle & Harris, 2011; Miller, 1997; Moeller et al., 2007; Most, Aram, & Andorn, 2006; Sterne & Goswami, 2000), a supplementary phonological awareness intervention should be beneficial to children with hearing loss. This might be delivered by a speech-language pathologist or another professional familiar with the development of these skills (Sue, Brittany, and Sherry ,2017; Werfel and Schuele, 2014).

Evidence indicated that children with speech and/or language disorders are significantly slower than their age matched peers in developing PA skills placing them at an additional disadvantage for developing successful reading skills, the results of the herein studies were suggestive of the positive effects of phonological awareness intervention in classrooms dedicated to children with speech and/or language disorders.

As for children with learning/ reading disabilities, a study (Rehab, 2013) supported the idea of PA as a powerful predictor of early reading achievement. These aforementioned studies may be foundational for further research.

### **Future Research Recommendations**

Further research is still required to explore the potential benefits of phonological awareness intervention for children with disabilities. These studies ,ay include larger sample size, age range of included participants, much information describing participant reading ability prior to the intervention, and the variable reading skills associated with the disabilities.

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