



The Effectiveness of a Phonological Awareness Training Intervention on Pre-reading Skills of Children with Mental Retardation

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Abstract

Phonological awareness is the ability to manipulate the individual speech sounds that make up connected speech. Little information is reported on the acquisition of phonological awareness in special populations. The purpose of this study was to explore the effectiveness of a phonological awareness training intervention on pre-reading skills of mentally retarded children. A total of 47 children mental retardation 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.

Keywords. Phonological awareness, pre-reading skills, mentally retarded children

Introduction

Phonological awareness refers to the ability to perceive and manipulate the individual speech sounds, known as phonemes, that make up connected speech (Yopp & Yopp, 2000). Skill in phonological awareness entails the analysis of speech sounds as they appear in isolation and/or in the context of words, phrases, and sentences (Neuman, Copple, & Bredekamp, 2000). Speakers generally do not attend to individual phonemes as they listen to or produce speech; rather, they process phonemes automatically while giving direct attention to the meaning of the message conveyed (Adams, Foorman, Lundberg, & Beeler, 1998). Phonological awareness involves the acquisition of a variety of metalinguistic insights that relate to understanding the sound structure of language, including (a) identifying phonemes in the context of syllables and words; (b) blending phonemes to form syllables, words, and sentences; (c) segmenting wholes into parts (i.e., sentences into words and words into constituent syllables or phonemes); (d) analyzing word parts (e.g., if /b/ is deleted from bat, the resulting word is at); and (e) analyzing sound correspondences within groups of rhyming words (DiSanto, Kraft, Lentini, & Sivitz, 2000; International Reading Association [IRA], 2000; Stone, Merritt, & Cherkas-Julkowski, 1998; Yopp & Yopp, 2000).

Phonological processing involves a certain kind of knowledge about words- that they are made up of individual speech elements, which can be divided into segments of sounds smaller than a syllable. It is one aspect of the spoken language system which is important to early reading . Phonological processing is an insight about oral language, in terms of understanding that words are composed of sequences of small sounds called phonemes. In other words, phonological processing is a linguistic awareness that enables the individual to make use of information about speech and sound structure of the language (Mourad Ali , 2007) .

So, present research study seeks to explore the effectiveness of a phonological awareness – based program in improving pre-reading skills in children with mental retardation. It addresses the following questions:

- 1- Are there differences in post – test scores mean between control and experimental groups on pre-reading test ?
- 2- If the programme is effective, is this effect still evident a month later?

Literature review

Phonological Awareness

Definition of Phonological Awareness

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).

Level of Phonological Awareness

Phonological awareness is a general ability that has multiple dimensions varying in difficulty (Smith, Simmons & Kameenui, 1998). Gillon (2004) describes phonological awareness in terms of three different levels. They are onset-rime awareness, syllable awareness and phoneme awareness.

Onset-rime Awareness

Adams (1990) describes the rime as the obligatory part of the syllable consisting of its vowel and any consonant sounds that come after it, whereas onset consists of any consonant sounds that precede the vowel. Children are considered to have awareness of onset-rime if they can analyze syllables into onset and rime units in an oddity tasks (Treiman, 1992).

Syllable Awareness

Adams (1990) defines syllable awareness as the ability to detect the smallest unit of speech that can be produced in isolation. Some linguists suggest that children develop syllable awareness before the development of other phonological skills such as on-set rime and phonemic awareness (Adam, 1990; Tingley, Dore, Parsons, Campbell & Bird 2004; Treiman,1992).

Phonemic Awareness

Gillon (2004) defines phoneme as the smallest unit of sound that influences the meaning of a word. Adams (1990) states that the awareness of phonemes includes the abilities to segment, rearrange, and substitute them one for the other. Many researchers claim that awareness of phonemes is critical for learning an alphabetic writing system (Sawyer & Fox, 1991; Treiman, 1992; Adams, 1990; Cook & Bassetti 2005). In addition, Torgesen (2000) suggests that although phonemic decoding skills should never be considered the end goal of reading, research now shows that, for most children, these skills are a critical step along the way toward effective reading skills. Share & Stanovich (1995) point out that phoneme awareness performance is a strong predictor of long-term reading and spelling success and can predict literacy performance more accurately than variables such as intelligence, vocabulary knowledge, and socioeconomic status.

Phonological Awareness Training

According to Oktay & Aktan (2002), phonological ability is not accompanied by an innate ability, which allows children to manipulate phonological elements intentionally. In addition, Cassidy 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, Durgunoglu (2002) argues that children can gain insight into phonological skills if they have had exposure in their L1.

Assessment of Phonological Awareness

Treiman (1992) states that, onset/rime tasks are easier than other kinds of phonological awareness tasks. On the other hand, onset clusters cause substantial difficulty in the phoneme deletion task. Moreover, the analysis of syllables into phonemes is also difficult. Daly et al. (2005) arrange phonological awareness skills according to their level of difficulty. Skill with rhyming or identifying similar word beginnings or endings is much easier than the skill that requires greater, or more explicit, manipulation of sounds such as segmenting, blending and deleting sounds. Torgesen (2000) suggests three different tasks for assessing phonological awareness. They are sound comparison tasks, phoneme segmentation tasks and phoneme blending tasks. Sound comparison measures are easier and are sensitive to emergent levels of phonological awareness, whereas segmentation and blending measures are sensitive to differences among children during later stages of development involving refinements in explicit levels of awareness. Measures of sensitivity to rhyme are less predictive of reading disabilities than those measures that ask children to attend to individual phonemes.

Relationship between Phonological Awareness and Reading Acquisition

Reading requires two different skills: children need to know how to identify printed words and how to comprehend written material (Torgesen, 2000). Torgesen summarizes the importance of phonological awareness in acquiring accurate word reading skills. First, phonological awareness helps children understand the alphabetic principle. Second, it helps children realize the regular ways that letters represent sounds in words. Lastly, it makes it possible to generate possibilities for words in context that are only partially sounded out. Moreover, as Koda (2005) states, poor readers uniformly are handicapped in a wide variety of phonological tasks. Furthermore, Metsala & Ehri (1998) state that comprehension is a meaning-construction process, which involves integral interaction between text and reader. Extracting phonological information from individual words constitutes one of the first and most important steps in this endeavor. Also phonological skills have a direct, and seemingly causal relationship with reading ability knowledge of letter patterns and their linkages to sounds facilitates rapid automatic word recognition; such knowledge evolves gradually through cumulative print-processing experience; and limited word-recognition skills tend to induce over reliance in context (p.254).

The failure of children to develop early reading skills that contribute to academic and social success has turned out to be a national concern. Poor reading skills result in lower overall academic achievement.

The phonological awareness plays a crucial role in reading and literacy. As the key component that makes the difference between good readers and poor readers, it is often referred to as a predictor to subsequent reading achievement. Although training in phonological awareness skills facilitates positive gains in phonemic awareness, decoding, and spelling, it requires activities characterized as explicit, comprehensive, intensive and supportive.

Phonological Awareness and children with mental retardation

Mental retardation is defined as an intellectual functioning level at or below 70–75 as measured by standardized IQ tests, such as the Wechsler Intelligence Scale for Children—Third Edition (WISC, Wechsler, 1991) or the Stanford Binet Intelligence Scale, Fourth Edition (Thorndike, Hagan, & Sattler, 1986), plus significant limitations in communication, self-care, home living, social, leisure, and health and safety skills; self-direction; functional academics; community involvement; and/or work (Cegelka & Prehm, 1982). Children with mental retardation typically manifest some degree of phonological deficit (Reed, 1994) that may interfere with their realization of the meaning of print (Swank & Catts, 1994).

Identifying and analyzing phonemes are abstract metalinguistic processes that may be difficult for children with mental retardation for several reasons: (a) producing and listening to individual speech sounds may be unfamiliar, (b) phonemes produced in isolation may not sound similar to phonemes coarticulated to form words, (c) some children with mental retardation may not understand instructional terms such as “sounds” or “word parts” (Hoogeveen et al., 1989), (d) they may have difficulty encoding phonological information into memory, and/or (e) they may have difficulty retrieving phonological codes from memory (Catts, 1986). Notwithstanding, several authors recounted successful phonological awareness interventions for children with mental retardation.

These include Conners (1992), who discussed sound discrimination and blending sounds; Hoogeveen et al. (1989), who reported on the isolation of final sounds in words and segmenting sounds in words; Hoogeveen and Smeets (1988), who explored blending sounds to form words; and Kabrich and McCutchen (1996), who inquired into the skills needed for detecting phonemically similar words.

Method

Participants

Children participants selected from two schools for children with mental retardation, called Al Tarbya AL Fekrya schools. Participants' IQ scores were obtained by the school's administration of either the WISC (Wechsler, 1991). The sample was randomly divided into two groups; experimental (n= 24; 17 boys and 7 girls) and control (n= 23; 18 boys, 5 girls).

The two groups were matched on age, IQ ,and Word Recognition Test Scores . Table 1 shows means, standard deviations, t- value, and significance level for experimental and control groups on age (by month), IQ, and pre-reading Test Scores (pre-test)

Table 1. *Pre-test Means, standard deviations , t- value , and significance level for experimental and control groups on age (by month) , IQ, and pre-reading Test Scores.*

Variable	Group	N	M	SD	t	Sig.
Age	Experimental	24	108.1	2.96	-.189	-
	Control	23	109.26	3.01		
IQ	Experimental	24	78.34	4.45	-.221	-
	Control	23	79.89	4.24		
PR skills	Experimental	24	6.82	2.65	-.539	-
	Control	23	6.54	2.32		

Table 1 shows that all t- values did not reach significance level . This indicated that the two groups did not differ in age , IQ , and pre- reading Test Scores (pre-test) .

Setting

The study took place in two schools for children with mental retardation, called Al Tarbya AL Fekrya schools.

Measure

Pre-reading skills scale for children (Mourad Ali , 2008). The scale consists of six sub-sales as follows:

Letter Identification (4 items) . This test requires children to identify the letter from a group in each card that the instructor points to (e.g . what is this letter ; Setc).

Rhyming word Recognition (4 items). This test requires children to identify the two words that rhyme from three word (e.g. cat- dog- sat).

Blending Body-Coda (4 items). This task assesses the ability to form a word when it has been segmented into the body and coda. Body is the part of the word starting from the beginning and carrying through the vowel, while coda is the part of the word that comes after the vowel (e.g. sho/p).

Phoneme substitution (4items). This subtest requires children to replace the first phoneme sound of a given word with a new sound (e.g. jeep to /k/).

Sound comparing (4 items). This subtest requires children to identify the to words that sound the same (eg. Man – sun – can).

Sound – blending (4 items). This task requires children to synthesizes or blend each sound in the word (e.g. /k/ /i/ /t/ /e/).

Test reliability

The first issue of reliability was ensuring that The scale total score was a reasonable assessment of one broad construct of pre- reading skills despite the use of six subtests. To test this, Cronbach's alpha statistics was first employed . The result demonstrated the scale produced patterns of responses that were highly consistent, $\alpha = 0.90$.

Test validity

Ten professors of psychology were given the scale to rate the items. Agreement proportions were ranging from 90% to 100% .

Test scoring

The score on each item ranging from 0 to 1 score , and the total score on the scale ranging from 0 to 24 scores .

Procedure

Participants were selected, then pretest data were collected using the pre- reading skills test. The classroom PA training program was conducted by the second author with the experimental class in one large group for 5 weeks with 20 minute sessions conducted three times a week .A variety of fun, play-based phonological activities were used with the class that incorporated the spectrum of PA skills (e.g., rhyming, sound/syllable matching, sound/syllable isolation, sound/syllable blending, sound/syllable addition or substitution, and sound/syllable segmentation).

The children participated by singing, listening, answering questions, and following directions. The following is a list of the PA activities addressed during training:

1. Sound Matching/Sound Identification
2. Rhyming Activities
3. Sound Addition or Substitution Activities
4. Sound/Syllable Blending Activities

5. Sound/Syllable Segmentation Activities.

The second author started with the earlier developing PA skills, such as matching and rhyming, and moved throughout the continuum of PA skills. These activities were rotated from easiest to hardest throughout the 5 week training period. At the end of the study, the posttest data were collected again using the same measure to determine the effectiveness of the PA training.

Experimental Design

An experimental pretest-posttest control-group design was used in this study. In this mixed design, two groups are formed by assigning half of the participants to the experimental group and half to the control group. Both groups were pretested and posttested in the same manner and at the same time in the study. The bivalent independent variable was the PA training and it assumed two values: presence versus absence of PA training. The dependent variables were the gains in scores on pre- reading skills test.

Results

Table 2 shows data on ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores . The table shows that the (F) value was (285.166) and it was significant value at the level (0.01).

Table 2. ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores

Source	Type III sum of squares	df	Mean square	F	Sig.
Pre	5.814	1	5.814		
Group	1123.316	1	1123.316	285.166	0.01
Error	173.323	44	3.939		
Total	1297.277	46			

Table 3 shows T test results for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores . The table shows that (t) vale was (16.75). This value is significant at the level (0.01) in the favor of experimental group. The table also shows that there are differences in post- test mean scores between experimental and control groups in pre- reading skills test scores in the favor of experimental group.

Table 3. T. test results for the differences in post- test mean scores between experimental and control groups in pre- reading skills test scores

Group	N	Mean	Std. deviation	t	Sig.
Experimental	24	16.583	2.44	16.75	0.01
Control	23	6.826	1.37		

Table 4 shows data on repeated measures analysis for pre- reading skills test. The table shows that there are statistical differences between measures (pre- post- sequential) at the level (0.01).

Table 4. *Repeated measures analysis for pre- reading skills test*

Source	Type III sum of squares	df	Mean square	F	Sig.
Between groups	1351.970	1	1351.970	643.039	0.01
Error 1	94.611	45	2.102		
Between Measures	955.545	2	477.772	136.724	0.01
Measures x Groups	647.176	2	323.588	92.601	0.01
Error 2	314.498	90	3.494		

Table 5 shows data on Scheffe test for multi-comparisons in pre- reading skills test . The table shows that there are statistical differences between pre and post measures in favor of post test, and between pre and sequential measures in favor of sequential test, but no statistical differences between post and sequential test.

Table 5. *Scheffe test for multi-comparisons in pre- reading skills test*

Measure	Pre M= 6.82	Post M= 16.58	Sequential M= 6.48
Pre	--	--	--
Post	10.41*	--	--
Sequential	966*	0.75	--

Discussion

The main objective of the present study was to explore whether there were differences in post – test scores mean between control and experimental groups on pre – reading skills . The study also examined if the program was effective, if this effect was still evident a month later.

The results of this study as revealed in tables 3 and 5 show that the phonological awareness program was effective in improving the pre- reading skills of children in experimental group, compared to the control group whose subjects did not receive such an intervention.

The present study comes to try to resolve the conflict. Many researchers are still trying to answer the “chicken and egg” question of which came first. Is PA a prerequisite for learning to read or does PA develop as a consequence of being exposed to reading instruction (Yopp, 1992). A great majority of research conducted supports the idea of PA as a powerful predictor of early reading achievement.

This study supported other research findings in the literature about teaching children at-risk for reading disabilities and future academic failure (Vellutino & Scanlon, 1987; Wagner, et al., 1997). These children could benefit from a supplemental curriculum using appropriate sequence to train their phonological awareness, which is said to be a reliable predictor of future reading development. The effects of phonological awareness instruction have been addressed in previous research; however, this study contributed to the literature in several significant ways. First, it extended the participants to children as young as preschool and had implications that phonological awareness was teachable to younger children. Second, the results of this study indicated that children being considered at-risk for reading abilities and had not received any formal reading instruction are capable of improving their pre-literacy skills in preparation for their future reading. Finally, it is significant for educators to

work to prevent reading failure in young children. This study demonstrated that phonological awareness skills can be effectively instructed to preschool children better positioning them for reading success.

Worth mentioning is that students in the experimental group retained the learnt information for a long time even after the period of the program finished, and this indicates the training effect.

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