

PERSIAN CUED SPEECH: THE EFFECT ON PHONOLOGICAL COMBINATION AND SEGMENTATION SKILLS OF CHILDREN WITH INTELLECTUAL DISABILITY

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Abstract

The aim of this paper was to study the effect of a Persian Cued Speech training program for increasing the phonological combination and segmentation skills of intellectually disabled children. This study was a quasi-experimental study. A convenience sample was selected and divided in two groups, namely an experimental group and a control group ($n = 5$). The study used the Phonological Awareness Questionnaire as the tool of analysis. The Cued Speech training is a forty 90-minute session program, which was implemented on the experimental group. At the end of the program, they were again assessed with the questionnaire. The findings from the study show the efficacy of our intervention on increasing the Phonological Combination and Segmentation skills ($P < 0/10$, $P < 0/05$). Using Cued Speech with the intellectually disabled children can be helpful to develop their pre reading skills such as phonological awareness.

Keywords: Intellectually disabled; Phonological Combination; Phonological Segmentation; Cued Speech

Introduction

Human being is a social creature who needs to exchange ideas, express feelings and communicate with others. In the current world, reading as a form of language, is an important tool that causes the spread of ideas and is used for communication; failure in this area would cause a person to face many difficulties (Bernthal and Bankson 2009).

For ordinary students, it is easy to learn to read. Therefore, many think that reading does not have a mysterious aspect because they think less about its complexity and learning conditions. However, reading is one of the high level skills of language in which the individual decodes symbols of spoken language that come in the form of written language. In advanced societies, all children are expected to learn to read, because reading is the most important and the highest goal of education for all children. The valves of knowledge are open to the child through reading; the child can learn anything through reading (Buckley, Laws, and Byrne 2000). A key to learning reading is phonological awareness (Majsterek and Ellenwood 1995) and the two major factors that have a greater role in reading are combined and fractionated phonological skills (Pirzad). Phonological awareness is the ability to recognize and manipulate the structure of a statement without relying on its meaning. Children have to learn the alphabet in order to read and write; therefor they should have phonological awareness. In other words, children need to be aware of that constructive unit tones of a word (consonants and vowels) can be transformed into the form of written units (letters). Children should gradually be able to spell a new word into its building blocks and fractions (fractions phonological). Then, they have to be able to find the appropriate letters of these units and combine them to form a sound (phoneme blending) so that they can read the written word (Shokouhi). For children to be aware of phoneme skills (phonemic blending and fractionation) they require adequate understanding of phonemes and syllables of their words as separate elements (Frederickson and Reason 2006). This ability is important to the extent that some children, especially if they are poor readers, may never obtain enough adequacies in sophisticated phonemic manipulation tasks (Leybaert and Alegria 1998).

Children having many problems in this aspect and in the basic concepts of reading (phonemic awareness) are weak children with intellectual disability (Soltani and Roslan 2013). Educable children with intellectual disability in terms of language development at all levels (conjugation - semantics - phonology), face various degrees of difficulties.

For example, at the phonology level, they have difficulty in pronouncing some letters and in recognizing characters. Their store of vocabulary, both expressive and receptive, is lower than that of normal children. Their sentences are shorter than usual and their speech contains grammatical errors. These children also have difficulty in understanding abstract concepts and they have problems in diagnosing words that have different meanings.

They are not able to use appropriate language to situations and circumstances. Studies have also shown that children with intellectual disability due to low phonological awareness skills are at risk of having future problems in reading. Therefore, high quality remedial and therapeutic interventions need to be utilized to help them improve their shortcomings to some extent (Soltani and Roslan 2013; Fitzgerald, Annabel and Thorn 2009; Crain, 2003).

One of these corrective and remedial interventions is Cued Speech training. The Cued Speech is a visual communication system that uses speech mouth movements, accompanied by "signs" using (phonemes) till such that each of the sounds of spoken language can be distinguished from one another (Movallali, 2012). The Cued Speech promotes reading ability in the individual children by improving their phonological awareness. This is because the base of a speech cued is in the increase in phonological awareness of the children (Beck, 2008). One of the major benefits of Cued Speech is that it is simple to learn and to use. Furthermore, the burden of use generally rests on the family, thus it can be a good way to help children with intellectual disability to improve their speech and language skills (Soltani and Roslan 2013; Fitzgerald, Annabel and Thorn, 2009; Beck, 2008). In the Cued Speech, the principle of multiple sensory integration is used. There are also several modalities also available for children. The child uses hearing, vision, and movement simultaneously because listening, lip reading, and speech are used together. Speech cued promotes basic phonological awareness (phonemic blending and fractionation) of children (khalili Kermani, Behzadi and Jazebi zade 2012), while speech and its factors such as (phonological blending and fractionation) improve the phonemic awareness of the child. Furthermore, the Cued Speech has various uses for children with Down syndrome, some of which include correcting pronunciation, increasing vocabulary, improving receptive and expressive language, and improving reading ability. The most important long-term effects and the main purpose of developing speech cued are to improve children's reading. In this training method, all labial patterns can be recognized by using the nine forms of arms in three places close to the lips (in Persian). Thus, each speech sound is seen different from other sounds. Using the forms found in each position in a syllable, syllables are formed (Movallali, 2009).

Many of the studies that have been conducted in this field indicated that Cued Speech training has a relationship with intelligibility of speech (Brentari and Wolk 1982), transformation preposition (Hernadezs, Monreal and Orza 2003), internal rate of production of spoken language phonology (Koo, 2003), rhyme and code breakers (Narr, 2008), sequence of verbal processing skills and verbal memory (Coryell, 2001), phonology knowledge and ability reading (Crain, 2003; Bouton, Bertoneini, Sernicolaes and Cole 2011) of hearing-impaired and deaf children.

Additionally, Movallali (2011) has shown in a study, that there exists a relationship between speech signals and increasing attention (because organ sounds indicate the position of the lips or tongue) of those with language-learning difficulties, improved the rhythm and intonation of people with apraxia, increased the attention of the speaker, increased social interactions of individuals with PDD (autistic spectrum), and improved voice and speech recognition in persons with hearing impairment, physical problems, and impaired vision-auditory problems (Movallali, 2011).

However, the speech of deaf children has developed symptoms. Therefore, further studies need to be done on the children with less mental disabilities. On the other hand, the results of some research have shown that younger students undergoing training in Cued Speech have better performance (Colin, Magnan, Ecalle and Leybaert 2007). The present study aimed to investigate the effect of Cued Speech training improvement on the composition and fractionation of phonological skills in children with intellectual disability, aged 7 to 11 years. This study is one of the few studies that have directly examined Cued Speech training on the composition and fraction of phonological skills (in Persian) educable children with intellectual disability. If the result of this study is confirmed, parents and their children can be made to be more familiar with the knowledge and understanding of child language development. Therefore, the management of this field can be upgraded and the necessary preventive measures can be taken to improve common childhood speech and language difficulties. A more aggressive approach need to be taken to overcome the long-term effects of childhood language disorders on various aspects the children's life. If left unattended, many of these disorders will continue to adulthood and affect the future of these children to be not so bright.

Materials and Methods

Present study employed a quasi-experimental design with pre-test and post-test. The statistical of the population included all high level educable children with intellectual disability in 2012-2013 who referred for the treatment and education at exceptional children school in Gorgan. Given the nature of the study, 10 children (5 patients in the experimental group and 5

patients in the control group) were selected by random sampling. The average age of the children in the experimental group was 8/60 and in the control group 8/80 years and the average age of mothers in the experimental group was 35/80 and 36/40 in the control group.

In order to determine the level of phonological awareness, both groups of students with mental retardation examined by pre-test. The experimental group was trained in forty sessions and after training, both groups were measured by post-test. In order to demographic characteristics of the study, demographic characteristics questionnaire were used that included gender, age, educational status, economic status and age of the parents.

In this study to measure the composition and fraction of phonological skills, phonological awareness tests (Bernthal and Bankson 2009) were used. This test has 10 sub-scales that each follows a ten-point scale to assess the skills of child. In this case, for each sub-test is given two to three word help. If the subjects were asked to answer, gets 1 score and if it fails to respond or give a wrong answer, gets zero point. The test-retest reliability coefficient alpha 0/982 to 0/903 has achieved. Also this test has a good formal and content validity. The sub-scales of word differentiation and phonological analysis of the Test of Language Development (Beck, 2008) had a higher validity Coefficients than 0/90. The test has structures validity of the age differentiation and group differentiation (between normal children and children with dyslexia). The internal consistency of the test showed that the correlation coefficient of the sub-scale scores and the total score ($p < 0/001$) is significant (Bernthal, et al. 2009). In order to quantify the information gathered from descriptive statistics and comparison of two matched control groups, independent t-test was used.

Results

Data from the study showed that mentally retarded students' age in both groups were between 7 and 11 years old. Mothers' educational status were between bachelor's degree and lower than diploma and their aged were between 28 and 47 years old (Table 1).

Control group				Experimental group				
Educationa l status of the mother	Mother' s age	Child' s sex	Child's age	Educationa l status of the mother	Mother' s age	Child 's	Age of the child	Subjects number
Diploma	36	Male	7	Upper diploma	35	Femal e	7	1
Under diploma	47	Female	8	Under diploma	38	Male	8	2
Bachelor	33	Male	11	Under diploma	42	Male	9	3
Under diploma	46	Female	9	Diploma	36	Femal e	9	4
Diploma	39	Male	10	Bachelor	28	Male	10	5

Table 1: Descriptive characteristics of the subjects in the experimental and control groups

The results of a descriptive study in pre-post-test for both groups are presented in Table 2.

Standard deviation	Mean	Group	Variables
1/64	4/20	Experimental	pretest of Combined phonological
3/89	6/20	Control	
1/67	7/60	Experimental	posttest of Combined phonological
2/88	6/40	Control	
0/89	0/40	Experimental	pretest of Fractions phonological
2/48	1/80	Control	
1/67	1/60	Experimental	posttest of Fractions phonological
2/60	1/60	Control	

Table 2: Mean and standard deviation of pre-test and post-test educable children with intellectual disability

As can be seen in Table 3, the mean scores of the experimental group are considerably more than control. Therefore the independent t-test was used to assess significant differences between two groups.

Standard deviation	Mean	Frequency	Statistical indicator Group
2/70	3/40	5	Experimental
1/48	0/20	5	Control

Table 3: Descriptive indicators added to the phonemic composition of the two control groups

The results showed that there is a significant difference between control and experimental groups in phonological composite score ($05/0 < p$ and $32/2 = t$) (Table 4).

Significance level	Freedom degree	T	Means difference	Levin test		Group
				Significance level	F	
0/05	8	2/32	3/ 20	0/198	1/97	Experimental
						Control

Table 4: Comparison of pre-test and post-test scores of the two experimental and control groups combined phonological

Since the mean score of the experimental group significantly is more than control; therefore, to investigate the significant differences between the groups were analyzed using t-test (Table 5).

Standard deviation	Mean	Frequency	Statistical indicator Group
1/09	1/20	5	Experimental
1/09	-0/20	5	Control

Table 5: Measures of description of added score of phonological fractions of two experimental and control groups.

According to Table 6 between the control and experimental groups showed a significant difference exists in score of fractionation of phonological ($10/0 < p$ and $02/2 = t$).

Significance level	Freedom degree	t	Means difference	Levin's test		Group
				Significance level	F	
0/10	8	2/02	1/ 40	0/508	0/480	Experimental
						Control

Table 6: Comparison of pre-test and post-test score of the experimental and control groups in the phonological fraction.

Discussion

Previous studies have shown that the relationship between weak phonological awareness (phonemic skills of blending and fractionation) and mental retardation is a significant. These studies also suggest that poor phonological awareness (phonemic skills and combined fractions) depends very much on the education these children have received. In appropriate teaching styles will double these problems in these children, and will make

them resistant to change, and will enhance the communication and language deficits in mentally retarded children (Soltani and Roslan 2013; Beck, 2012). Thus, this study could provide the necessary reason for the current training program to be evaluated and corrected.

The study findings showed that there is significant positive relationship between Cued Speech and phonological combination and fraction skills of children with intellectual disability ($p < 0.05$, $p < 0.01$). This means that Cued Speech training increased composition and fractionation syllable skills and ultimately improved the speech and reading ability of the children.

The results of this research are consistent with Sultani and Roslan (Soltani and Roslan 2013), Fitzgerald (Fitzgerald, et al. 2009), Bouton (Bouton, et al. 2011), Leybaert (Leybaert and Lechat 2001), Colin (Colin, et al. 2007), Narr (2008), Hernandez (Hernandez, et al. 2003), and Movallali (2011).

Sofia Bvtvn and colleagues in their study aimed to investigate the relationship between phonological awareness and Cued Speech in hearing impaired children with and without cochlear implant hearing showed that the Cued Speech caused an improvement in phonological awareness and reading in these children. Their accuracy and speed of reading were equal to those of their peers in the matched control group (Bouton, et al. 2011).

Research findings of Movallali showed that Cued Speech in people with PDD (autistic spectrum) caused the students to receive speech training through their visual sense. Since the spectrums of autistic children often do not have eye contact, Cued Speech draws their attention to the face of speaker and raises their social interactions (Movallali, 2011).

Therefore, in explaining the findings of the study, it can be said that because of its simplicity, convenience and high efficacy, the use of Cued Speech can be a good way to teach children with intellectual disability to improve their language and speech skills (Beck, 2008). This is also because Cued Speech is based on increasing the phonological awareness (phonemic blending and fractionation) of the children (Beck, 2008). The cued speech uses various senses such as visual sense of hearing, sense of proprioception and motor together in an integrated and coordinated manner. Therefore, it is effective and appropriate for students with special needs, including children with intellectual disability (Movallali, 2011).

The efficacy of phonological awareness training in cued speech raises the fundamental component of the children's phonological composition and fractionation in the following ways:

Cued Speech trains the children about all speech sounds through their own vision, and all their senses are used to remove any ambiguities.

Whenever auditory processing in children with intellectual disability has difficulty, Cued Speech completes the hearing canal using equipment such as a hearing aid or the residual hearing of the child is amplified.

Meanwhile, Cued Speech is a multisensory approach to language processing, in which a person helps another to fully understand the most powerful communication channel.

Cued Speech helps the child by internalizing the complete morphological structure, grammar and phonological language of spoken language audio channels.

It is also a way to develop vocabulary, clarify spelling and improve reading skills (phonemic awareness, spelling, rhyming, and identifying the shape and position of the verb). This helps the child to be better off in reading and writing (Azbel, 2004).

Children with intellectual disability are highly motivated to play the imitation game or activity in a meaningful implementation of speech signals. They are interested to improve their phonological awareness and to identify the letters as they more appropriately. Thus, it can be used to provide motivational training for the pediatrics (Beck, 2008).

Conclusion

The Cued Speech is as an appropriate corrective intervention tool for children with intellectual disability for improving their skills and increasing their phonemic composition and fractionation. Additionally, the training needs to be given at a younger age and in a more compact fashion, to achieve better results. Finally, since using Cued Speech is simple, therefore, it is necessary to inform parents on how to use it based their symptoms, so it can be easily used at home.

This study has the following limitations: the number of sessions was limited, the sample size was small, and it was difficult to have access to the respondents to pursue the study further. It is suggested that future research need examine gender differences in children with intellectual disability and the contribution of other family members such as parents and siblings of children. In this way, the Cued Speech influence on the children's phonological skills combined and fractionated would increase the wealth of information and would enhance the generalizability of the results.

Acknowledgement

The authors of this study wish to express their appreciation for the cooperation and participation of students with intellectual disability in Gorgan, as well as their mothers and teachers, and the directors. The study is dedicated to all exceptional children and their mothers who love their children by their maternal life support.

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