

The Importance of Phonological Awareness Training in Improving Reading in a Compact Deaf Child Carrying a Cochlear Implant

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Abstract:

The current study aims to find out the importance of phonological awareness training in improving reading in a deaf-integrated child carrying cochlear implants, as the study was applied to a group of 15 compact deaf students with cochlear implants, aged 08 and 09 years. We used the semi-experimental approach, where the intelligence test "Ahmed Zaki Saleh" was applied in order to exclude mental disability, and we also used the reading test of the researcher "Zaddam Hadda" and the phonological awareness test of the researcher "Azdaou Chafika" A tribal application in order to prove the existence of a problem at the level of reading and phonological awareness in this category, then we applied exercises for training in phonological awareness derived from the therapeutic pedagogical protocol of the researcher "Belhouchat Karim", and then we re-applied the reading test and the phonological awareness test post-application.

We found that phonological awareness training helps improve reading in a deaf-embedded child with a cochlear implant. The speech-language therapist must develop the phonological awareness of this group in order to improve their level of reading.

Keywords: Deaf child carrying cochlear implants – phonological awareness – reading – phonological awareness training

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Introduction:

The child enters into interaction with oral language from birth, and doubles in the recognition of his language, where his acoustic perceptions begin in the first months of his life, where the infant can sense the sounds that exist in the mother tongue, and gradually form a set of phonological representations, which are representations consisting of basic units to cut speech into phonological units (phoneme, syllable, word) as well as an idea on the audio features (the exit of the letter and its characteristic), these representations are called semi-phonological behaviors appear before the age of three By voice manipulation.

The development of phonological awareness is an important language skill in a child, formed by repetitive activities. The schooled child learns to read and write after he

has possessed advanced linguistic abilities such as linguistic understanding and production, where we find him in control of the basic linguistic competence, and we find he has acquired the phonological system of his mother tongue (oral language) at the level of perception and sound production, and also has a good linguistic balance and controls the most used grammatical organization.

The child's spoken language develops in the early stages of his life, thus preceding reading, and is considered a basis for it, because of its importance in the child's acquisition of rich experience in terms of intentional ability to identify separate linguistic units such as words, syllables and phonemes that make up speech, which is called phonological awareness, and the development of the latter is a prerequisite for success in reading because the child who realizes that the word consists of sounds and syllables is not difficult for him to read in the first grade.

By phonological awareness, we mean the willingness and competence to understand oral language as the sequence of language units such as syllable, rhyme, and phoneme, and this is shown by the possibility of assigning and manipulating various phonological components such as substitution, conversion, and deletion (Abdullah Mohammed, 2007, p. 137) It involves a certain type of knowledge of words, means awareness of spoken language and consists of elements of speech that can be divided into parts of sounds smaller than the syllable.

The development of phonological awareness is a coherent and continuous development of different levels of awareness towards the linguistic units that make up speech, namely word awareness, syllable awareness, and phonemes awareness (Hempenstall, 1997).

As we know that the sense of hearing is one of the most important variables that play an important role in the development of basic skills necessary for acquisition and learning, especially the skill of reading, which affects the cognitive and linguistic development of the child, and therefore the occurrence of any defect in this sense will prevent that, which results in the emergence of a disorder in this skill.

The current study aims to find out the importance of phonological awareness training in improving reading in a deaf child with cochlear implants, as the study was applied to a group of 15 compact deaf students with cochlear implants, aged 08 and 09 years. We used the semi-experimental approach where the intelligence test "**Ahmed Zaki Saleh**" was applied in order to exclude mental disability, and we also used the reading test of the researcher "**Zaddam Hadda**" and the phonological awareness test of the researcher "**Azdaou Chafika**" A tribal application in order to prove the existence of a problem at the level of reading and phonological awareness in this category, then we applied exercises to train on phonological awareness derived from the therapeutic pedagogical protocol of the researcher "**Belhouchat Karim**", and then we re-applied the reading test and the phonological awareness test post-application.

Problematic:

Hearing disability is one of the problems that prevent the individual's auditory system from performing its functions, as it causes him a kind of disability and isolation from the environment in which he lives and makes him unable to enjoy his full competencies and thus hinders the development of his social, communication and academic skills.

The function of reading is one of the very complex cognitive functions, as it is the product of the interaction of many mental processes, the most important of which are auditory perception, visual perception, attention, and linguistic comprehension. (Saidi, 2009, p. 08)

Many studies (Amira 2001, Abdul Razzaq 1998, Jaljal 1995) have shown that there are a large number of mental abilities and different cognitive processes that intervene during the reading process, the most important of which are attention, visual and auditory perception, auditory discrimination, as well as memory, whether short-term or long-term, as well as the use of different mental images and the analysis of the grammatical and linguistic construction of the text and its various ideas.

But before reaching the stage of analysis, the reader must have awareness of what he reads so that the information is stored correctly and then analyzed in a more correct way, as we find that the child faces at the beginning of his learning a problem in phonological awareness in general, which is the problem of the deaf child in particular, and this is what studies have shown that have taken care of this category and found that most children with this disorder suffer from problems at the cognitive level, especially at the level of phonological awareness, which is considered one of the metascientific competencies (Laribi, 2015, p. 590) which plays a major role in the process of learning to read, as studies conducted over the past years almost unanimously on the importance of phonological awareness in the reading process in general. (Rekza, Al Hammadi, 2017, p. 348)

Reading acquisition processes are mainly based on phonological awareness processes, and any problem with phonological processing processes limits reading acquisition. (Nasrallah, Miz'al, 2011)

Among the studies that we were able to see is a study (Azdaou, 2012) entitled "**Phonological Awareness and the Processes of Reading Acquisition in the Child**", which is considered preventive because it is concerned with understanding the cognitive processes associated with reading in the early stages of its acquisition in the average child in particular. The study is divided into three main areas: the first area was to identify the relationship between phonological awareness and learning to read in children as a general axis, the second area was to identify the relationship between cognitive processes and bilingualism, and finally the third area focused on studying the impact of social and economic factors on phonological awareness and reading. (Azdaou, 2012, p. 197). The results of this study were supportive of previous

studies, as they confirmed a relationship between phonological awareness and learning to read.

We also refer to a study (Laribi, 2015) entitled "**Phonological awareness and its relationship to reading among deaf children carrying cochlear implants, classically equipped and normal children**" - a comparative study -, where the researcher tried through this study to highlight the most important differences between deaf children carrying cochlear implants, deaf children equipped classically and normal children at the level of phonological awareness and reading, by showing the most important problems and difficulties that he finds at the level of phonological tasks, by comparing The three groups mentioned above. The results showed that deaf children suffer from disturbances of phonological consciousness and therefore show differences from normal children as well as reading disorders, especially in classically equipped children. (Laribi, 2015, p. 415)

Due to the overlap of problems suffered by the deaf child, the researchers worked hard to find solutions that open the field of communication, including acquisition and learning, so they worked to develop them until they reached a technique that combines surgery and processing, which is the cochlear implant, which is an electronic device designed to capture sound waves and convert them into electrical impulses, and then the ions are distributed in the cochlea through electrodes implanted in the spiral channel so that they work on auditory stimulation. (BRIN. F, 2004, p.120) and later undergo special training programs and a long time to reach the initial stages of learning. (Issiufly and Primot, 2000) and (Plaza, 1999) showed that children with reading difficulties should undergo special exercises to develop their metaphonic abilities in order to reduce the development of these difficulties.

Based on the afore mentioned and from previous studies, problematic questions have been raised as follows:

General questioning:

Does phonological awareness training help improve reading in a deaf child with a cochlear implant?

Sub-question:

Are there differences in reading in deaf children with cochlear implants before and after phonological awareness training?

2- Hypotheses

General hypothesis:

Phonological awareness training helps improve reading in a deaf child carrying a cochlear implant.

Sub-hypothesis:

There are differences in reading in deaf children with cochlear implants before and after phonological awareness training in favor of post-application.

Objectives and Importance of the Study

This study aims to highlight the importance of phonological awareness training in improving reading in a deaf child carrying cochlear implants.

It derives its importance from the topic it addresses, especially in terms of the applied aspect, as it will have a role in the initiative of researchers to delve deeper into this topic, and also helps specialists in speech-language therapy, educational sciences, and pedagogy in training on phonological awareness and clarifying its importance in acquiring reading in order to develop programs with a scientific pedagogical method that works to develop phonological awareness for this category and thus improve their level of reading. Not forgetting to take into account the growth and individual nuances.

Study terminology

- **Deaf child:** It is that child who has insufficient hearing ability, as it does not allow him to learn the language of his surroundings, participate in normal activities that correspond to his age, or continue and benefit from education.

- **Cochlear implant:** a technique that is done by capturing sound waves and converting them into electrical impulses and then distributing in the ions in the cochlea through electrodes distributed in the spiral channel so that they work on auditory stimulation.

(Brin, 2004, p. 120)

- **Phonological awareness:** the ability of individuals to distinguish between different components of speech, awareness of parts in different dimensions, and deal with phonological units, it is not innate or spontaneous but appears with learning to read and grows in an interactive form with it (Issoufly, 2000, p. 95).

- **Reading:** A set of cognitive, linguistic, and cognitive processing activities for written visual information, which allows the reader through an alphabetical system of the written language to decode, understand and translate the written symbols of this language.

(Brin, 2004, p. 124)

- **Training program:** It is a set of activities for improving reading based on phonological awareness.

Applied side

Methodology

The method is defined as a set of rules that are developed in order to reach the truth in science or the way followed by the researcher in his study of the problem or is the art of the correct organization of a series of ideas or procedures (Sharroukh, 2003, p. 90), and we have used in our study this semi-experimental approach which is the most appropriate for this study.

Place of study

This study was conducted in three schools belonging to the central province of Algiers (Abderrahmane Jaadi School in Kouba / Omar Rabie School in Ain Naadja / Mohamed Zignoun School in El Harrach)

Study Group

The study was applied to a group of 15 compact deaf pupils with cochlear implants, aged 08, 09 years (auditory age), and 10-12 years (chronological age) without comorbidities.

Study Tools

- **Intelligence test "Ahmed Zaki Saleh"**: This test is applied to individuals between the ages of 08 – 18 years to estimate the general mental ability of individuals, which depends mainly on the perception of the relationship between a group of forms and the selection of the offending form, this test was applied to exclude the mental disability of deaf children Study group.

- **Phonological awareness test "Azdaou Chafika"**: The test was prepared within the framework of the preparation of a doctoral thesis (2011/2012) under the title "Phonological awareness and the processes of acquiring reading in children".

The test consists of seven tasks, each containing three items, except for the fifth item, which is divided into three subtasks, which in turn contain three items each.

- ✓ First item: judging rhymes
- ✓ Second item: produce a word that rhymes with the intended word.
- ✓ Third item: Choose a word ending with the same consonant.
- ✓ Fourth item: Choose a word ending with the same consonant.
- ✓ Item Five: Deletion of Sections
- ✓ Item Six: The missing sound
- ✓ Item VII: Replacement of the first phoneme

This test has been used in order to detect children with problems with phonological awareness.

- **Reading test "Zaddam Hadda"**: The test was prepared within the framework of the preparation of a doctoral thesis (2016/2017) under the title "Studying the child's reading mechanisms through building a test in Arabic and diagnosing dyslexia in the Algerian school" The test contains three items under which sub-items fall:

- ✓ Read syllables: It falls under two sub-items.
- ✓ Read words: four sub-items fall under it.
- ✓ Read sentences and texts: six sub-items fall under it.

This test has been used to detect children with reading problems and has been applied pre- and post-application after the proposed exercises for phonological awareness training.

- **The proposed exercises for training on phonological awareness "Balhouchat Karim"**: These exercises were derived from the proposed pedagogical protocol for the development of reading comprehension abilities in mentally retarded children of the researcher "**Belhouchat Karim**", where the researcher relied in the preparation of exercises on the exploitation of the ideas contained in some protocols that concerned the education of phonological awareness among normal children from the kindergarten level to the primary stage, according to the following steps:

- ✓ From sentence to word
- ✓ Word to syllable
- ✓ From syllable to phoneme
- ✓ Rhyme
- ✓ From syllable to a word

These exercises have been used in order to improve phonological awareness and thus improve reading in deaf children.

Presentation and analysis of the results of the study

1 – IQ test application results

The IQ test has been applied to the researcher "**Ahmed Zaki Saleh**" and the results are recorded in the following table.

Table (01): IQ test application results

Case Number	Age	Study Level	Overall score of the test	IQ	Appreciation
01	11 years old	Third primary	30	110	Normal intelligence
02	10 Years	Fourth primary	37	129	Normal intelligence

03	10 Years	Fourth primary	25	105	Normal intelligence
04	11 years old	Fourth primary	32	115	Normal intelligence
05	12 years	Fourth primary	25	99	Normal intelligence
06	11 years old	Third primary	21	95	Normal intelligence
07	10 Years	Fourth primary	20	94	Normal intelligence
08	10 Years	Fourth primary	20	94	Normal intelligence
09	12 years	Third primary	27	107	Normal intelligence
10	10 Years	Third primary	31	114	Normal intelligence
11	10 Years	Third primary	32	115	Normal intelligence
12	10 Years	Third primary	29	129	Normal intelligence
13	12 years	Third primary	29	129	Normal intelligence
14	10 Years	Third primary	23	100	Normal intelligence
15	10 Years	Third primary	21	95	Normal intelligence

From the previous table, it is clear that the study group has normal intelligence, and therefore the intellectual disability of these children was excluded.

2 – Results of the application of the phonological awareness test and the reading test

The general hypothesis states that phonological awareness training helps improve reading in a deaf child pregnant with cochlear implants, so we applied the reading test of the researcher "**Zaddam Hadda**" and the phonological awareness test of the researcher "**Azdaou Chafika**" a tribal application in order to prove the existence of a problem at the level of reading and phonological awareness in this category, then we applied exercises for training on phonological awareness derived from the therapeutic pedagogical protocol of the researcher "**Belhouchat Karim**", and then we re-applied the reading test and the phonological awareness test post application. The results are recorded in the following table:

Table (02): Results of Phonological Awareness and Reading Tests Before and After Phonological Awareness Training

	Results before phonological awareness training		Results after phonological awareness training	
Cases	Reading test	Phonological Awareness Test	Reading test	Phonological Awareness Test
01	633	15	685	17
02	668	16	700	16
03	667	16	709	19
04	693	21	732	23
05	585	12	674	16
06	675	15	699	20
07	685	17	706	18
08	505	09	593	12
09	452	06	490	07
10	593	10	651	10
11	596	12	683	17
12	691	19	733	20
13	672	19	720	19
14	586	10	611	15
15	616	11	687	14

The overall score for the reading test: 751 points

The overall score for the Phonological Awareness Test: 27 points

Through the previous table, we notice an improvement in the final mark for each case after training on phonological awareness in the phonological awareness and reading tests.

Table (03): Arithmetic Averages of the Scores of the Reading and Phonological Awareness Tests before and after training

audition	Before training	After training
Phonological Awareness Test	X = 13,86	X = 16,20
Reading test	X = 623,13	X = 669,73

Through the previous table, we notice that there is a variation in the arithmetic averages before and after training in the phonological awareness test and the reading test, where we notice an increase in these averages after training compared to the results before training.

Presentation and analysis of the results of the sub-hypothesis

The sub-hypothesis states that there are differences in reading in deaf children with cochlear implants before and after phonological awareness training in favor of post-application, and the following table shows the results of the analysis of variance.

Table: (04) Results of Analysis of Variance

Source	DF	SS	MS	F
A	1	8449	8449	03,49
B	1	5983888,2	5983888,2	*131,1
S	14	71513,9	/	/
AB	1	6869,5	6869,5	02,17
AS	14	93815,5	2415,3	/
BS	14	63373,6	4526,6	/
ABS	14	445272,6	3162,3	/
Total	59	6141603,4	/	/

* A function of the level $\alpha = 05$

$P < 05$ tabulated value

Through the previous table, it was found that there are differences in the scores of the study group before and after the phonological awareness training, where $05 P > 131,1 = (1,14) F$

By referring to Table (03), the sub-hypothesis can be accepted.

General conclusion

This study aimed to investigate the importance of phonological awareness training in improving reading in deaf children carrying cochlear implants, and based on theoretical studies and previous studies that dealt with the study of the relationship of phonological awareness to reading, such as the study "**Azdaou, 2012**" tracking children from the beginning of the first year to the second year of primary school, and the results showed a relationship between the two variables, and the study of "**Laribi, 2015**", a comparative study between deaf children carrying cochlear implants, classically equipped children and normal children and found that the growth of Phonological awareness in deaf children is the same compared to normal children, but the delay in detection is what creates for them the delay in the growth of phonological awareness, and she also emphasized the correlation between reading and phonological awareness, and this is what we reached in this study, where the general hypothesis and the partial hypothesis were accepted, and it was found that children carrying cochlear implants need training on phonological awareness in order to improve reading and at the same time this training increases their level of phonological awareness.

We found that phonological awareness training helps improve reading in a deaf-embedded child with a cochlear implant. The speech-language therapy specialist must develop the phonological awareness of this group in order to improve their level of reading.

Conclusion

Through this study, we tried to reach whether phonological awareness training helps improve reading in a deaf child carrying cochlear implants, based on previous studies that confirm the relationship between phonological awareness and reading, and indeed we found that phonological awareness training improves reading in deaf children with cochlear implants. Finally, we hope that our study will open a path for other studies.

Suggestions

- Building a phonological awareness training program in line with reading test standards
- Re-study, but longitudinally with deaf children carrying cochlear implants so that the results are credible in terms of acquiring, learning, and improving reading
- Taking into account phonological awareness in school curricula for people with special needs in general and deaf children in particular in order to avoid learning difficulties

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