

PHONOLOGICAL PROFILE OF CHILDREN WITH LOW VISION FROM 6 TO 9 YEARS OLD AT AN INSTITUTION FOR THE BLIND IN THE CITY OF SALVADOR – BA

Perfil fonológico de crianças com baixa visão de 6 a 9 anos de idade em uma instituição para cegos na cidade de Salvador – BA

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ABSTRACT

Purpose: to describe the phonological profile of children with low vision 6-9 years of age who do not have other associated pathology, and thus analyze whether significant differences in phonological development occurs in these children compared with the phonological development of children with normal vision. **Methods:** a descriptive, observational, cross-sectional qualitative study. 20 children aged 6 and 9 years old were enrolled in an institution for the blind in the city of Salvador-Ba, low vision and who had no other associated pathology were analyzed. For testing the phonological system used the Phonological Assessment of Children Protocol which is the appointment of 43 phonetically balanced pictures. The appointment was recorded on video. The information observed and recorded during testing were organized for analysis by matching according to age. **Results:** after detailed analysis of the speech samples recorded on video, the results were organized by age in tables, describing what phonemes were produced in each segment of the Brazilian Portuguese evaluated and the phonological processes used. **Conclusion:** the phonological development of children with low vision occurs by a slower, slow process when compared to the typical phonological development of children with normal vision.

KEYWORDS: Vision, Low; Speech, Language and Hearing Sciences; Language; Child

■ INTRODUCTION

The phonological acquisition of the child is marked by the presence of phonological processes, these processes are the result of a trend towards simplification that is inherent in the children's discourse, that is, they are natural and innate and occur in the child's speech patterns in order to simplify the most difficult targets in articulation, motor or planning terms and must be overcome as the child comes into contact with a language and faces sounds, structures and less simple and natural contrasts^{1,2}, so that the final outcome of the child's normal phonological development is a phonological system according to the one of the target adult^{3,4}.

From the age of two months on, the baby starts to maintain eye contact face to face with his/her mother and he/she spends a lot of time looking at faces. From three months on, the baby starts to be interested in the environment he/she lives in, the objects around him/her, especially those that he/she can manipulate and then facial expressions diversify, promoting a greater control of eye movement, tracking objects, and in addition, the baby begins to have greater control over the movement of tongue and lips, promoting the onset of vocalization⁵.

In the early years of life vision has a key role as a motivating stimulus for communication and performing of actions since in the beginning of life the relationship with the outside world is mediated largely by sight⁶.

Vision is an important basis of human learning through which children develop and learn naturally only by observing, exploring and interacting with the world around them. In the case of blind children or

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Conflict of interest: non-existent

visually impaired, visual information is lacking or received in a fragmented and distorted form^{7,8}. This lack of visual information is indicated as responsible for delays and changes in child development, especially during the early stages of language acquisition in children with visual impairment^{9,10}.

The bond and the eye contact between mother and child in the early years of life are a fundamental and unique form of communication for the baby^{11,12}. However, the relationship between the mother and the child with visual impairment is one of the first aspects to be affected, compromising other areas of development¹³. The impact on the family with the birth of a disabled child, as well as the expectations of interaction created by the mother before the child will determine the way in which they reinforce the consequences that the visual change already causes in child development^{14,15}.

A scholar has noticed that children with visual impairment need constant and specialized stimulation since the early years of life. This way, it is possible that the child has an expected development for the age group¹⁶. However, if not stimulated he/she presents delays in basic motor skills acquisition, language, social competence and cognition¹⁷.

Thus, the objective of this research is to describe the phonological profile of children with low vision from 6 to 9 years old who do not present other associated pathology, since in this period it is expected that the child has already finished the process of phonological acquisition, and thereby analyze whether it has significant differences in phonological development of these children compared to the phonological development of children with normal eyesight.

■ METHODS

It is a descriptive, observational, cross-sectional and qualitative study in which three six-year-old, five 7-year-old, four 8-year-old and eight 9-year-old children were analyzed, totalizing 20 children aged between 6 and 9 years old, 14 males and 6 females, registered in an institution for blind people in the city of Salvador, Bahia, with low socioeconomic status, living both in the urban and rural area of the municipality with low vision and who had no other associated pathology.

This research has been approved by the Ethics Committee of the University of the State of Bahia, under the opinion number 644.968.

All legal guardians of selected children signed the Informed Consent..

For testing the phonological system of children we used the Child Phonological Assessment Protocol - PAFI¹⁸, a pilot project developed by Bueno

et al (2010), which allows quick and easy evaluation of the phonological system of the child, analyzing the production of segments of Brazilian Portuguese and their combinations through the nomination of 43 figures of cards determined from a phonologically balanced selection of words.

The creators of PAFI collected their speech samples in children with normal vision, so it is important to note that to ensure the effectiveness of speech replies given by the children surveyed, the protocol illustrations were used in an enlarged size.

Testing was conducted by the researcher, individually, in a closed room, not acoustically treated, courtesy of the direction of an institution that is co-participant in this research, accompanied by the legal guardian of each child.

The naming of the pictures was recorded on videos of about 6 minutes, on each assessment. Each picture was progressively presented to research subjects.

Collected data were later transcribed for the test registry protocols.

The information observed and recorded during the assessment was organized for analysis by pairing according to age group.

For this research it was not verified if the socioeconomic status and gender reflect any change in the test answers.

The degree of visual acuity was not considered for analysis since it was not a significant factor for preventing viewing and naming of the displayed pictures.

The construction of the phonological profile by age group was determined according the highest number of children who produced certain phoneme or phonemic group, ie it was considered that the phoneme was acquired when 50% or more of all children with the same age, produced the same phonemes.

■ RESULTS

After detailed analysis of the samples of speech recorded on video, the results were organized, describing the profile phonological related to each age group, ie which phonemes were produced in each Brazilian Portuguese segment assessed and the phonological processes used by most children in the same age group.

Thus, it was verified that, out of the 20 children with low vision capacity analyzed, 12 were observed in the use of incomplete phonological processes and phonetic inventory, while eight children had phonological system compatible to the adult pattern.

Three children were analyzed in the group presenting 6 year-old children. All of them had

incomplete phonological system. The phonemes /r/, /ʌ/ in medial onset, the phoneme /r/ in coda medial and final was not acquired by any of the children observed in this age group, as well as no phoneme in a position of complex onset was acquired. The

most used phonological process in this group were: reduction of consonant cluster; metathesis; semi vocalization of liquid; substitution of liquid; final liquid deletion; erasing intervocalic liquid; devoicing, as shown in Table 1.

Table 1 – Phonological profile of 6-year-old children with low vision

CLASS	PRODUCED PHONEMES
Initial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /l/, /R/
Medial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /l/, /R/
Medial Coda	/s/
Final Coda	/s/
Initial Complex Onset	_____
Medial Complex Onset	_____
Phonological Processes Observed	<ul style="list-style-type: none"> - reduction of consonant cluster; - metathesis - semivocalization of liquid - substitution of liquid - deletion of final liquid - deletion of intervocalic liquid - devoicing
TOTAL CHILDREN ANALYSED	3 (100%)
CHILDREN WITH INCOMPLETE PHONOLOGICAL SYSTEM	3 (100%)

Caption: _____ - phonemes were not produced

Five 7-year-old children were analyzed. Two children had complete phonological system. All of them produced the phonemes in initial and medial onset position, however, three children had not acquired the phonemes /r/ in medial and final coda and the phonemes /pl/, /bl/, /kl/, /gl/, /e/, /fl/ in complex onset. The repair strategies most used by children under seven years old have been assessed: liquid substitution; assimilation; final liquid deletion; fronting. (Table 2)

Four 8-year-old children were observed, of those, only 1 showed the complete phonological system. The phonological profile of three 8-year-old subjects showed that the phoneme /r/ in the final coda and phonemes in complex onset /pl/, /bl/, /kl/, /gl/, /e/, /fl/ had not been acquired. Liquids substitution and final liquid deletion were the most used phonological processes in the group of 8-year-old children. (Table 3)

Table 2 – Phonological profile of 7-year-old children with low vision

CLASS	PRODUCED PHONEMES
Initial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /l/, /R/
Medial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /ŋ/, /l/, /R/, /r/, /ʌ/
Medial Coda	/s/
Final Coda	/s/
Initial Complex Onset	/pr/, /br/, /tr/, /dr/, /kr/, /gr/, /fr/
Medial Complex Onset	/br/, /tr/, /dr/, /gr/, /fr/, /vr/
Phonological Processes Observed	- substitution of liquid - assimilation - deletion of final liquid - fronting
TOTAL CHILDREN ANALYSED	5 (100%)
CHILDREN WITH INCOMPLETE PHONOLOGICAL SYSTEM	3 (60%)

Table 3 – Phonological profile of 8-year-old children with low vision

CLASS	PRODUCED PHONEMES
Initial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /l/, /R/
Medial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /ŋ/, /l/, /R/, /r/, /ʌ/
Medial Coda	/r/, /s/
Final Coda	/s/
Initial Complex Onset	/pr/, /br/, /tr/, /dr/, /kr/, /gr/, /fr/
Medial Complex Onset	/br/, /tr/, /dr/, /gr/, /fr/, /vr/
Phonological Processes Observed	- substitution of liquid - deletion of final liquid
TOTAL CHILDREN ANALYSED	4 (100%)
CHILDREN WITH INCOMPLETE PHONOLOGICAL SYSTEM	3 (75%)

Eight children were analyzed in the age group of 9 years old, of those, 5 had complete phonological system. Only three children presented incomplete phonological system, because phonemes in complex medial onset were not produced and neither the phoneme in initial complex onset / fl /. The majority of the 9-year-old children analyzed showed complete phonological system. The most used phonological processes by the 9-year-old children with incomplete phonological system were: reduction of consonant and liquid substitution (Table 4).

By making a percentage assessment regarding the trial and errors of the total number of corpus analyzed and trial and error by age group, we have that:

Out of 20 children, representing 100% of the subjects, 12 children, or 60% had some failure in phonological development, while eight children,

40% met the phonological development compatible with the expected for their age.

Analyzing by age group, 100% of the 6-year-old children evaluated showed incomplete phonological profile; in the 7-year-old-children group, 60% had phonological profile incompatible with expectations while 40% had acquired the phonological system; 75% of children under eight years old showed a failure in phonological development and 25% had acquired the phonological system; of the 9-year-old subjects evaluated, 37.5% had not acquired the complete phonological system while 62.5% had dominated all the phonological system, presenting the pattern of phonological development consistent with the expected for the age group.

6-year-old children had worse results compared to 7-, 8- and 9-years-old children. While most 9-year-old children had already acquired all the phonological system.

Table 4 – Phonological profile of 9-year-old children with low vision

CLASS	PRODUCED PHONEMES
Initial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /l/, /R/
Medial Onset	/p/, /b/, /t/, /d/, /k/, /g/, /f/, /v/, /s/, /z/, /ʃ/, /ʒ/, /m/, /n/, /ʎ/, /l/, /R/, /r/, /ʎ/
Medial Coda	/r/, /s/
Final Coda	/r/, /s/
Initial Complex Onset	/pr/, /pl/, /br/, /bv/, /tr/, /dr/, /kr/, /kl/, /gr/, /gl/, /fr/, /fl/
Medial Complex Onset	/br/, /tr/, /dr/, /gr/, /fr/, /vr/
Phonological Processes Observed	- reduction of consonant cluster; - substitution of liquid
TOTAL CHILDREN ANALYSED	8 (100%)
CHILDREN WITH INCOMPLETE PHONOLOGICAL SYSTEM	3 (37,5%)

Regarding the use of phonological processes, it was noted that as age increased the child used less simplifying processes in speech, that is, there was a gradual decrease in the use of repair strategies with increasing age.

■ DISCUSSION

This research was restricted to the description of the data found after analysis without establishing any diagnosis of phonological disorders for the observed results because the naming of pictures alone cannot determine whether a subject has or not phonological disorders, this requires the assessment of other aspects involved in language development¹⁹.

The vision plays a key role in the development of the individual and in his/her interaction with the outside world, motivating communication, socialization and independence²⁰.

The child's phonological acquisition and development normally occur between the birth and five years old, by when the mastering of a phonological system similar to the one of the target adult is expected^{3,21,22}.

The phonological process is defined as a systematic simplification that affects a sound class and it is used as a strategy to facilitate the speech of individuals¹⁶ marking both the normal language acquisition process and speech with phonological disorders^{1,23,24}.

In this study, it was found that 12 children aged between 6 and 9 showed incomplete phonetic inventory and made use of phonological processes. This may indicate the existence of a phonological system still under development. By the age of 6 the child can already produce all sounds correctly^{20,25}.

Phonological processes can generally be categorized in: syllabic structure processes and substitution processes¹.

Based on this definition, it is clear that the repair strategies used by children with low vision in this research fall into the two classifications mentioned.

In the phonological acquisition process it is expected a reduction in the use of phonological processes up to the age of 7²⁰, after this period the disappearance of all phonological processes and the establishment of a complete phonological system and similar to that of adults is expected^{3,26}.

The children studied used the same strategies employed by children with development that is considered typical, demonstrating a similarity between the phonological development of children with low vision and children with normal acquisition route, which is consistent with the research findings reported in the literature with children with speech disorders and those without deviation⁵.

The phonological development of children with low vision this study differs from the development of children with normal acquisition because of the permanence of phonological processes after the expected time for their disappearance²⁰.

The phonological process of substitution of liquid was the common use strategy to all age groups in this study. According to the literature, this process disappears in the speech of children with normal development at the age of 3 to 6 years old¹.

The phoneme / r / on medial and final coda, as well as phonemes on complex onset position are the last ones to be learned by children with normal phonological acquisition process. The acquisition of groups of complex onset ends at the age of 5 years old, being the last syllabic structure to be acquired²⁷⁻²⁹.

As 6-year-old children have not acquired the phonemes / r / in medial and final coda and no

phoneme in complex onset, it is suggested that these individuals are in the final stages of acquiring the phonological system³⁰.

It is noticed a delay in phonological development of the 7-year-old children compared with children of normal vision and typical phonological development, considering that they did not produce the phonemes / r / in medial and final coda and the phonemes / pl /, / bl /, / kl /, / gl / and / fl / in complex onset.

In the phonological profile of the 8-year-old subjects there was a reduction in the use of phonological processes, however, these processes must be eliminated at most at the age of seven, period in which you can still find the consonant cluster reduction processes and final liquid deletion²⁰.

Most of the 9-year-old children analyzed showed complete phonological system. Nevertheless, some children made use of phonological processes, indicating a serious delay in the acquisition of the phonological system when compared to development considered as standard.

In 2005, a study carried out with six children, two with normal vision, two with low vision and two blind, showed no difference in language development⁹. However, this present study, with a larger population (20 subjects) showed the presence of delay in phonological development compared to that expected for their age.

A survey conducted in 2010, with four children with low vision aged 8-19 months revealed a delay in phonological acquisition of children under the age of 12 months compared with children of the same age and normal vision. Whereas children over the age of 12 months showed equivalent productions to children with normal vision of the same age group³¹.

Another survey conducted in 2011, evaluated the language of 20 children aged 2-5 years old and found that children aged two and three years old had higher losses in the language compared to children aged four and five years old³².

These data agree with the results of this research, since there was a change in the production and acquisition of phonemes according to the increase in age. Children under 6 years old had worse results compared to children who were 7, 8 and 9 years old. While most 9-year-old children had already acquired the whole phonological system.

A comparative study in 2007 with 12 children, six visually impaired and six with regular sight, analyzed the construction of narrative and symbolic playing of these two groups and found that the blind children have slower development compared to sighted

kids, requiring more time for their development. In addition, there was a greater demand for interaction with the adults in order to obtain information from the world and overcome their limitations³³.

That study confirms the observations in the present study since it was found that the phonological development of children with low vision occurs slower and in a delayed way, when compared to the development of children which have gone through the typical acquisition process and that do not present visual limitations.

However, there are children who still cannot spontaneously, not even by a slower process, achieve a phonological system compatible with the standard adult pattern, that becoming a significant delay in the development of these children's language.

A study carried out in 2012 noted that the visually impaired child who has no other impairment, when properly stimulated from the first years of life may present levels of development compatible to those expected for his/her age, similar to a sighted child¹⁶.

Considering that the audiologist is the professional who works in the habilitation and rehabilitation of problems involving human communication, their participation in this process with subjects with low vision is completely relevant since individuals with visual impairment need tools and strategies that provide an effective communication and enable greater social integration³⁴.

■ CONCLUSION

This study revealed that the phonological development of children with low vision occurs by a slower and later process when compared with typical phonological development of children with normal vision.

It was observed a change in phonological acquisition as the age increases, however, this change is not enough for all the children to present the complete phonological system. Thus, the early language stimulation becomes relevant, ensuring the support that the child needs for a phonological development similar to that of target adults.

It is important that children diagnosed with low vision are accompanied and stimulated early by a specialized team, including the audiologist, so you can ensure development compatible to the expected for children of the same age with standard phonological development and normal vision.

RESUMO

Objetivo: descrever o perfil fonológico de crianças com baixa visão de 6 a 9 anos de idade, que não apresentem outra patologia associada, e assim, analisar se ocorre diferenças significantes no desenvolvimento fonológico dessas crianças em comparação com o desenvolvimento fonológico de crianças com visão normal. **Métodos:** estudo descritivo, observacional, transversal e qualitativo. Foram analisadas 20 crianças com idades entre 6 e 9 anos, cadastradas em uma instituição para cegos na cidade de Salvador-Ba, com baixa visão e que não apresentava outra patologia associada. Para testagem do sistema fonológico utilizou-se o Protocolo de Avaliação Fonológica Infantil que consiste na nomeação de 43 figuras balanceadas foneticamente. A nomeação foi registrada em vídeo. As informações observadas e registradas durante o teste foram organizadas para análise por meio do emparelhamento de acordo a faixa etária. **Resultados:** após análise detalhada das amostras de fala registradas em vídeo, os resultados foram organizados por idade em quadros, descrevendo quais fonemas foram produzidos em cada segmento do Português Brasileiro avaliado e os processos fonológicos utilizados. **Conclusão:** o desenvolvimento fonológico das crianças com baixa visão ocorre por um processo mais lento e tardio quando comparado ao desenvolvimento fonológico típico de crianças com visão normal.

DESCRITORES: Baixa Visão; Fonoaudiologia; Linguagem; Criança

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