# AVERAGE VALUES OF PHRASE IN DIFFERENT SEVERITIES OF PHONOLOGICAL DISORDER

## *Média dos valores da frase em diferentes gravidades do desvio fonológico evolutivo*

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**ABSTRACT**

**Purpose:** to check the influence of severity arising from the phonological disorder related to semantics and morphosyntax. **Method:** the sample consisted of 14 children aged between 4:0 and 7:0 years, with phonological disorder. We carried out the child's phonological assessment, and the phonological disorder was classified according to the Percentage of Correct Consonants Revised, based on the Percentage of Correct Consonants, which classifies the severity of the phonological disorder in mild, mild-moderate, moderate-severe, and severe. We found that four subjects showed mild disorder, four showed mild-moderate disorder, three showed moderate-severe disorder, and three showed severe disorder. After this procedure, the children were exposed to morphosyntax and semantic evaluation, through the research on the average values of phrase, in which they collected phrases from three different language modalities: describing a picture, telling a story, and answering questions. The five phrases the children first spoke were punctuated according to their complexity. Next, we accomplished the statistical analysis through the Kruskal-Wallis non-parametric test. The significant p value is considered $p<0.05$. **Results:** there was no statistical significant difference among the different degrees of severity of the phonological disorder in the three evaluated language modalities, as related to the morphosyntax, semantics, total of construction, and total of length. **Conclusion:** we can conclude that the severity of the phonological disorder does not affect the children's performance regarding morphosyntax and semantic development, because there was no statistical significance among the results. Therefore, we may suggest that other studies should be carried out in order to confirm or not such results.

**KEYWORDS:** Speech Disorders; Speech-Language Pathology; Child Language; Child, Preschool; Child; Semantics

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## INTRODUCTION

The human language consists of phonological, morphological, syntactic, semantic and pragmatic elements[1]. During the language development, these subsystems work together and may present mutual influences[2].

The process of acquisition of the phonological system occurs gradually and it is characterized by productions which are controlled by phonological processes, considered as simplifications performed by children, observing the facilitation of complex aspects of adults' speech. These processes are present in the first phase of the linguistic development and as children learn their language,

those processes should be overcome, what makes possible the adequacy to the adult pattern[3,4].

The age of four years old is considered as an important mark for the conclusion of the phonological inventory. In that age, most children have already acquired the contrasts of the adult phonemic system and they use the language to effective communication[5].

Some children with ages higher than four years old present alterations in the normal speech development, which are, in some cases, unintelligible. Those are cases of Phonological Disorders (PD). The PD is related to disorders in the organization and classification of speech sounds, when children perform improper phonemes production, as well as improper use of the language phonological rules[6,7].

The PD is evidenced in children who present alterations of speech productions, in the absence of etiologic factors, such as: general learning difficulties, intellectual deficit, neuromotor dysfunctions, psychiatric disorders, otological problems/hearing loss or environmental and emotional factors[1].

Thus, as phonology is part of language, speech alterations which involve the organization of sounds system should be considered as language problems[1].

Based on that point of view, several children with PD seem to have difficulties in other language areas, such as syntax, morphology and lexical. In some cases, the PD prevents the development of those areas[1,8]. So, according to literature, pragmatic, semantic, morph-syntactic and phonological aspects should not be separated, because they are related in the development of linguistic skills[8,9].

The severity of the PD may be determined after several classifications. One of the most used is the calculation of the Percentage of Consonants Correct-Revised (PCC-R)[10]. It is a quantitative classification and has as focus the children's correct productions, based on the contrastive analysis of the phonological system. That theory allows the identification of how altered is the children's phonological system, because through the PCC-R[10], it is based the Percentage of Consonants Correct (PCC)[11], which determines the PD severity level as mild, mild-moderate, moderate-severe and severe.

Researches observe that children with PD with mild level present better performance in tasks regarding other language areas than children with more severe PD level, expressing that as higher the phonological impairment is, equally higher may be the impairments in other language areas[12].

With the purpose of classifying the children's language as late or out of normality patterns, a study[13] used the Average Values of Phrase (AVP), which provides qualitative and quantitative averages to analyze morph-syntactic and semantic elements, based on children with typical language development.

Using the same evaluation, a research[8] observed that children with diagnosis of PD may present impairments in other language subsystems, such as semantic and syntax.

So, it is believed that children with diagnosis of PD, because they present deficit in one of the language components, phonology in this case, may present impairments in the other language areas, such as semantics and morph syntactic, and the level of impairment of such components may vary according to the level of the severity of the PD.

Thus, this research has the purpose of verifying if there is relationship between the PD severity level and the performance in the AVP.

## METHODS

This research is experimental, descriptive and perspective, involving measures of quantitative and qualitative analysis.

The sample consisted of 14 children with PD, seven female and nine male subjects, with ages between 4:0 and 7:0 years old. These children performed speech and hearing screening and they were waiting to be speech patients in the department of speech at the speech and language clinic from an institution of education.

For the PD diagnosis, the following evaluations were performed: language, phonological awareness, speech, working memory, vocabulary, stomatognathic system, auditory, auditory processing, auditory discrimination.

The main criteria to include the children in the research was the diagnosis of PD. Besides, the children should be authorized by parents or responsible people to participate in the research by the signature of the Informed Consent (IC) and they should be aged between 4:0 and 7:0, because in the age of four years old most children have acquired their phonological inventory and the age of seven years old is considered the phase of stabilization and maturation of the language development, mainly in relation to the main morph-syntactic aspects[13].

As exclusion criteria, the following aspects were considered: subjects who received or were receiving any type of speech and language therapy, the not signature of the IC, the presence of speech and language alterations and PD, and the presence of evident impairments in the neurological, cognitive ans psychological aspects.

After confirming the PD, the children were submitted to deeper language evaluation through a research of the AVP[13]. In this evaluation, through

three different enunciation conditions (describing a picture, telling a story and answering the questions), it was performed collection and recording of the subjects' oral production. The five first sentences spoken by the children in each evaluated aspect were scored according to their complexity, according to a performed research were attributed different weights to the syntactic and lexical elements.

According to the author's idea[13], the score was performed in the following way: nouns and verbs, because they are considered the first to emerge in the language acquisition and to give sense to the sentence, were considered as semantic elements, receiving 2 points every time they were used; the adverbs, adjectives, prepositions, conjunctions, pronouns and articles were considered as syntax elements and each one received 4 points, because the use of those words would evidence more grammar knowledge and linguistic development.

Besides, it was performed total score count in each phase, to a total complexity survey (construction) and count of the number of words in a sentence, to a survey of the total of the extension[13]. So, quantitative and qualitative measures were obtained regarding the morph-syntactic and lexical aspects of the language of the children of this study.

Moreover, the PD was classified after the Percentage of Consonants Correct-Revised (PCC-R)[10], based on the Percentage of Consonants Correct (PCC)[11], which classifies the PD severity in mild (MD) (PCC-R between 86 and 100%), mild-moderate (MMD) (PCC-R between 66 and 85%), moderate-severe (MSD) (PCC-R between 51 and 65%) and severe (SD) (PCC-R lower than 50%). From the research participants, four presented MD, four presented MMD, three presented MSD and three presented SD.

The children who were part of this research are included in a research project, approved by the research and ethics committee from the origin institution, number 052/04.

Later, the data were organized in tables, regarding each language modality according to the PD severity, and it was performed an statistical analysis of those data through the non-parametric tests Kruskal-Wallis, which compares the ranks attributed to the values of each individual, with significant value of $p<0.05$. The values which presented statistical significant difference were indicated with an asterisk in the table.

## RESULTS

In the comparison among the PD severity levels, regarding each analyzed linguistic variables in the questions modality, there was no statistically significant difference, as it can be observed in Table 1.

Table 2 evidences the comparison between the different PD severity levels, regarding each analyzed linguistic variables in the modality history, in which there was no statistical significance.

Table 3 illustrates the comparison between the PD severity levels regarding each analyzed linguistic variable in the modality figures. It did not evidence statistical significance.

**Table 1 – Comparison between the severity levels of the phonological disorders regarding each analyzed variables in the modality questions**

| DS | Syntax | Semantics | Total construction | Total extension |
|---|---|---|---|---|
| MD | 5.7 | 2.9 | 8.6 | 2.9 |
| MMD | 14.9 | 5.7 | 20.7 | 6.6 |
| MSD | 16 | 6.2 | 22.2 | 7.1 |
| SD | 12.8 | 4.6 | 17.4 | 5.4 |
| *p* | *0.138* | *0.179* | *0.145* | *0.134* |

Legend: DS – severity level of the phonological disorder; MD – Mild disorder; MMD – Mild-moderate disorder; MSD – Moderate-severe disorder; SD – Severe disorder; Statistical test: *Kruskal-Wallis*, significance level: 0.05 (5%). The asterisk represents the p values with statistical significance ($p<0.05$).

**Table 2 – Comparison of the different severity levels of phonological disorders regarding each variable in the modality story**

| DS | Syntax | Semantics | Total construction | Total extension |
|---|---|---|---|---|
| MD | 14 | 6 | 20 | 6.5 |
| MMD | 16 | 7.3 | 23.3 | 7.5 |
| MSD | 13.2 | 7.4 | 20.6 | 6.8 |
| SD | 12 | 5.8 | 17.8 | 5.9 |
| *p* | *0.619* | *0.313* | *0.486* | *0.426* |

Legend: DS – severity level of the phonological disorder; MD – Mild disorder; MMD – Mild-moderate disorder; MSD – Moderate-severe disorder; SD – Severe disorder; Statistical test: *Kruskal-Wallis*, significance level: 0.05 (5%). The asterisk represents the p values with statistical significance (p<0.05).

**Table 3 – Comparison of the different severity levels of phonological disorders regarding each variable in the modality figure**

| DS | Syntax | Semantics | Total construction | Total extension |
|---|---|---|---|---|
| MD | 7.6 | 3.4 | 11 | 3.6 |
| MMD | 8 | 3.8 | 11.8 | 3.9 |
| MSD | 5.2 | 3.6 | 8.8 | 3.1 |
| SD | 7.6 | 4.6 | 11.8 | 4.2 |
| *p* | *0.258* | *0.591* | *0.298* | *0.241* |

Legend: DS – severity level of the phonological disorder; MD – Mild disorder; MMD – Mild-moderate disorder; MSD – Moderate-severe disorder; SD – Severe disorder; Statistical test: *Kruskal-Wallis*, significance level: 0.05 (5%). The asterisk represents the p values with statistical significance (p<0.05).

## DISCUSSION

As it is observed in the results, there was no statistically significant difference among the different PD severity levels in all analyzed variables. It is not observed any positive or negative relationship between the PD severity level and and the performance of the children in relation to the different variables of each language modality.

These findings can be related to a research[14] in which it was analyzed phonological awareness skills in comparison with the different PD severity levels. In the research, it was observed that there was no relationship among the phonological awareness skills and the different levels of PD severity, showing that the level of difficulty of the children, in relation to the phonological aspect, did not interfere in the ability to manipulate the linguistic segments.

Another study[9] which verified the performance of children with different PD severity levels in tasks of semantics shows that there is no relationship among the analyzed variables, because in the evaluated semantic fields the results were similar in all PD severity levels, agreeing with the findings of the present study.

So, according to some authors[15], children with speech difficulties present disorders in their phonological system, affecting the sounds production and the speech intelligibility. This speech alteration may be pure or followed by other language difficulties. So, as the PD is an alteration in the language development and the metalinguistic skills with semantics and syntax are part of it, strictly related, the results are relevant.

However, the results of this research disagree with the findings of another one[12], in which there was statistically significant difference among the different PD severity levels in the performance in semantic tasks. The authors of these researches refer that children with mild PD levels present better performance in vocabulary tests, because they were the only who presented results into the foreseen results for normality. According to them, in a certain way, the PD severity levels influence the performance of children in the performed vocabulary test.

Related to the research which was previously quoted, another performed study[16] shows that there is relationship between the phonological memory skills and the PD severity level, because there was statistically significant difference among the analyzed variables. Thus, the authors mention that there is a positive relationship between the memory work performance and the PD severity levels.

Thus, according to the results of the present research and of some others which agree with it, it is believed that the level of phonological alteration has no significant relationship with the performance in semantic and syntax tasks, as well as in the statement length, in children with PD. So, it is believed that the alteration in the language phonological subsystem and the severity level of this alteration do not influence the other subsystems, confirming that the PD is only a phonological alteration.

Although the age of the subjects are not considered in the analysis, it is important to highlight that it did not influence the obtained results, because the age groups were equally organized among the PD levels.

Finally, although this study found the result that children with PD are not influenced by the PD severity level in their performance regarding semantics and syntax and also the extension of the statements, there is disagreement among researches regarding phonology and other language areas. So, it is suggested the performance of more studies relating those subjects, with higher samples, with the purpose of confirming or not that relationship.

## CONCLUSION

The purpose of the article was reached and, through the findings, it is possible to verify that the semantic and morphological performance and the size of the statements are not influenced, according to the level of the PD severity. In the present research, there was no statistically significant difference among the PD severity levels, in all analyzed variables.

**RESUMO**

**Objetivo:** verificar se há influência da gravidade do desvio fonológico evolutivo quanto à semântica e morfossintaxe. **Método:** participaram do estudo 14 crianças com desvio fonológico, de idades entre quatro e sete anos. Foi realizada a Avaliação Fonológica da Criança e o desvio foi classificado a partir do Percentual de Consoantes Corretas– Revisado, baseado no Percentual de Consoantes Corretas, o qual divide a gravidade do desvio fonológico em leve, leve-moderado, moderado-grave e grave. Verificou-se, quanto à gravidade, que quatro sujeitos apresentavam desvio leve, quatro leve-moderado, três moderado-grave e três grave. Em seguida, as crianças foram submetidas à avaliação da semântica e da morfossintaxe, por meio da pesquisa da Média dos Valores da Frase, em que foram coletadas frases de três diferentes modalidades de linguagem: descrever uma figura, contar uma história e responder a perguntas. As cinco primeiras frases faladas pelas crianças foram pontuadas de acordo com a sua complexidade. Posteriormente, foi realizada análise estatística por meio da técnica não paramétrica de Kruskal-Wallis, sendo considerado significante valor de $p<0,05$. **Resultados**: não houve diferença estatisticamente significante entre os diferentes graus de gravidade do DF nas três modalidades de linguagem avaliadas, no que se refere à morfossintaxe, à semântica, ao total da construção e ao total da extensão. **Conclusão:** a gravidade do desvio fonológico não influencia o desempenho das crianças no que se refere ao desenvolvimento da semântica e da morfossintaxe, visto que não houve significância estatística entre os resultados. Desse modo, pode-se sugerir que outros estudos sejam realizados a fim de confirmarem ou não tais resultados.

**DESCRITORES:** Distúrbios da Fala; Patologia da Fala e Linguagem; Linguagem Infantil; Pré-Escolar; Criança; Semântica

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