

Relationship Between The Phonological Simplification Processes And Initial Reading In Children Of 4 And 5 Years Of Educational Institutions From Sincelejo, Sucre

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ABSTRACT

This research objective was to determine the relationship between phonological simplification processes and initial reading skills. The study involved 99 children aged between 4 and 5 years from two educational institutions in Sincelejo city. For this, the Test to Evaluate Phonological Simplification Processes, Revised (TEPROSIF-R), and the Test for the Early Detection of Difficulties in Learning to Read and Write were applied. The results obtained showed that the most frequent process type in the total sample was that related to the syllable structure and the word (451) and to a lesser extent that of substitution (342) and assimilation (342). Consistent with this, in the initial reading a significant number of children reflected severe difficulties in phonological awareness skills (47.5% in syllable segmentation and 36.3% in phoneme identification) and phoneme discrimination (41.4%). From the results found, using Pearson's Chi Square, a theoretical relationship was obtained between phonological simplification processes and initial reading skills ($p=0.000$), and the effect magnitude was also calculated through the "Cramer's V", obtaining a "large effect" in this relationship.

Keywords: Child development, reading, preschool, language, mental processes, discrimination, phonetics (Desc)

1. INTRODUCTION

Phonological Simplification Processes (PSF) are “mechanisms that allow the child to express himself even when his speech abilities prevent him from adequately reproducing all the phonological features and structures of his language. These processes must be understood as a mental operation” (Ortiz, 2007, p.16). In other words, "boys and girls use PSF by eliminating the most difficult sounds for easier ones" (Acosta and Moreno, 1999, p.84). Therefore, "greater phonological development implies using fewer processes" (Pavez, Maggilo, and Coloma, 2009, p.49). According to this, natural phonology describes three types of processes: related to syllable and word structure (ESP), substitution (S), and

assimilation (A). The first and second are the most frequent in subjects between 3 and 7 years old, and less frequently those of assimilation (Acosta, & Moreno, 1999, p. 84 -85).

For its part, "learning to read is the culmination of a process that begins a few years before entering first grade" (Bravo, Villalón, and Orellana, 2004, p.8). This process is considered initial reading, defined by López (2019) as: "the period of personal and cultural development in which children acquire knowledge of the written language and begin their learning process" (p.2). The initial reading connotation as a "process" implies understanding it as some integrated aspects set that allows the preparation of children to face the reading formal acquisition process. This is how phonological awareness appears gradually during the first years of preschool education, that is, between the ages of three and five, most children would have elementary aspects in this area during their toddler or kindergarten studies. In this sense, it can be affirmed that phonological awareness attributes to the child becoming aware of oral language components (phonemes, syllables, words) and manipulating them voluntarily in the different reading and writing situations, and whose development is closely related to their oral language development (Flores-Flores et al., 2022). The literature shows that, in subjects with typical development, and whose literacy context is conducive, the most basic levels of this ability, such as rhyme awareness and syllabic awareness, emerge around 4-5 years and are consolidated around the age of 8 when boys and girls dominate reading decoding (Gutiérrez et al., 2022).

Before formally acquiring this reading process, the individual must go through some reading stages or prerequisites that will determine its acquisition, these being understood as the "first approach to learning to read in which the first efforts to learn to read appear, which they usually occur in formal learning contexts such as school" (Castro & Andrea, 2017). Learning to read and write is a complex process that emerges during the preschool years and continues to develop in school interaction. For this interaction to be successful in the first year, it is necessary that the children have achieved a "foundational level" in some basic psycholinguistic skills, such as phonological development (Ministry of Education of Chile, [MINEDU]), which constitutes the oral language, specifically the expressive level, and involves the gradual elimination of PSFs. Thus, children who have the ability to manipulate and reflect on phonemes will have an easier time learning to read and write (Sá & Lousada, 2022). Therefore, it can be said that "according to empirical evidence, the expressive language components are the ones that best explain the development of pre-reading skills" (Arango-Tobón et al., 2018).

To that degree, there are studies that emphasize the connection between phonological skills training and the reading-writing improvement process, and others. It shows that children with phonological deficits have problems in posterity for reading and writing. The understanding and magnificent ability approach have motivated its study from different epistemological positions; however, they all agree on their importance. From school, the challenge includes, in the first instance, children's phonological development level, since this will depend on the

knowledge and success that they will have later in tasks related to the recognition, identification, and phonemes differentiation and the language rules that govern them in their possible combinations, to form syllables and words (Sastre-Gómez et al., 2017).

This study aims to determine the theoretical relationship, approached from the first perspective, regarding the PSF and the components of the initial reading stipulated by Cuetos et al. by analyzing the behavior of both in the studied population.

2. MATERIALS AND METHODS

2.1 Research type and approach

This research project was framed under a quantitative approach. It is a study with a non-experimental and descriptive type cross-sectional design with a correlational phase. In this study, the relationship between the phonological simplification processes in children aged 4 and 5 years and their initial reading skills was determined.

2.2 Population and sample

Probabilistic sampling was performed using the OPENEPI epidemiological calculator version 3.0.3 using the formula for finite populations $n = \frac{EDFF * Np(1-p)}{[(d^2 / Z^2 1 - \alpha/2) * (N - 1) + p * (1-p)]}$, with 95% confidence and 5% precision.

Sampling frame.

- Target population

The public and private sector's preschool education students from Sincelejo -Sucre.

- Accessible population.

Students, aged between 4 and 5 years, enrolled in the Dulce Nombre de Jesús Educational Institution and the Pre-University Student Educational Institution from Sincelejo city.

- Eligible population.

99 students who met the inclusion and exclusion criteria established in this study.

2.3 Instruments

2.3.1 Test to Evaluate Phonological Simplification Processes (TEPROSIF-R).

Its objective is to identify the processes with which children aged 3-6 years simplify their words phonological production and provides norms to establish whether processes' number

they present correspond to what is expected for their age. This test consists of 37 items corresponding to different metrics words, stress, and syllabic complexity. In addition, the test has an initial scan of the first 15 items scan, to allow the examiner a global and brief evaluation to identify in the first instance if the child uses more PSF than expected according to her age. This rating will depend on the PSFs number presented, since each process will be given a rating of 1, so that, when the adding all of these, the result indicates the child's phonological performance (Normal, Risk and deficit), considering their chronological age (Andrade, 2009). For the present study, this instrument was subjected to a pilot test in a population with characteristics like that of the sample. After the results, Crombach's Alpha coefficient was applied to check the internal consistency, finding a result of 0.90, which suggests that the instrument has excellent reliability for its application in the study population.

2.3.2 Test for the early detection of difficulties in learning to read and write

It assesses an abilities series related to the reading acquisition: syllabic awareness, phoneme discrimination, phonological memory or short-term memory, and verbal fluency or access to the lexicon, each of them with a maximum score of 5 points, for a total of 30 points in the whole test. The administration time is approximately 5 to 10 minutes and is applicable to children from 4 years (Cuetos et al., 2015). Considering that the study population includes 5-year-old schoolchildren, the subtests with more complex items were adapted in relation to the original test (aimed at 4-year-old children), without altering the items number or their score. Like the previous one, a pilot test was executed by applying Crombach's Alpha coefficient to check its internal consistency, finding 0.76 as a result, which makes it sufficient to guarantee the instrument reliability in this population.

2.4 Procedure

A meeting with teachers and directors was held with each selected educational community that were selected and approached. Likewise, a meeting was held with children relatives who accomplish with the inclusion criteria established in the research. All this was executed with the purpose of providing them with information about the study to be carried out, filling out the informed consent and establishing the population that would participate in it.

The information was collected by consulting the selected students' basic data. Then, a visual screening (Snellen chart) and an auditory screening were executed (Screening Instruments for the Early Detection of Hearing Impairments in Children Under Five Years and Schoolchildren). This made it possible to exclude from the study those children who presented uncorrected hearing and visual limitations. As a final filter, the Kaufman Brief Intelligence Test (K-BIT) was applied to rule out those children with a possible deficit in verbal intelligence. Once the population participating in the study was selected, the TEPROSIF-R Test was used to measure the phonological simplification processes. As well, the Test for the Early Difficulties Detection in Learning to Read and Write was applied to

those children with processes, by Cuetos et al. to 4- and 5-year-old children for initial reading status measurement.

For data processing, once the assessment instruments were applied, tabulation was executed. After that, it was created a database in accordance with the variables under study. Then it was stored in a capture form designed in EPI INFO. The database was stored in a file in xls format. For information processing, the statistical package SPSS version 23 was used.

Finally, for results presentation and analysis, the univariate and bivariate tables were used in the descriptive component according to the variables' nature to be presented. The descriptive analysis was made by percentages and frequencies means of the phonological simplification processes assessment and the initial reading. For the variable relationship test, Pearson's chi-square test was used, and the effect size was verified with the "V of Cramer", on which Jacob Cohen (1923 - 1998), provided a guide for the specific values: from 0 to 0.10, no effect; from 0.10 to 0.30, the effect is small; from 0.30 to 0.50, the effect is medium or moderate and from 0.50 to 1.00, the effect is large. Accordingly, to quantify the relationship between the two nominal variables, Pearson's chi-square was calculated and transformed according to Cramer's V, which allows obtaining an amount between 0 (absolute absence of relationship) and 1 (maximum relationship). To conclude whether there was a relationship, V was asked for a minimum amount of 0.10, from which it was interpreted if it was a small effect ($V \geq 0.1$), medium ($V \geq 0.3$) or small. large ($V \geq 0.5$). (Manzano, 2014) Use V of cramer: (Manzano, 2009). The estimators were evaluated by age, to control for confounding variables.

3. RESULTS

Based on the objectives outlined, this chapter presents the Phonological Simplification Processes description. Initial Reading state and the relationship between them were studied in a sample made up of 99 children who met the inclusion criteria and exclusion.

3.1 Phonological simplification processes and Performance Levels According to Total Processes

Table 1: Phonological Simplification Processes by age

PHONOLOGICAL SIMPLIFICATION PROCESSES	AGES (years)		
	4 n= 44	5 n= 55	n= 99
Relate to syllable and word structure	188	263	451
Assimilation	55	41	96
Susbstitution	163	179	342

TOTAL 406 483 889

Source: Prepared by the research group itself

Table 2: Performance levels according to the total number of phonological simplification processes in the entire sample

Performance level	4 years n=44		5 years n=55		Total	
	Frecuency	Percentage	Frecuency	Percentage	Frecuency	Percentage
Normal	30	68	16	29,1	46	46,4
Risk	8	18	18	32,7	26	26,3
Deficit	6	14	21	38,2	27	27,3
Total	44	100,0	55	100,0	99	100

Source: Prepared by the research group itself

In relation to the total PSF by age (table 1), the most frequent process type was related to the syllable structure and the word followed by substitution, and to a lesser extent for both age groups, the assimilation reflects that the greater number of PSF was present in the 5-year-old subjects. The performance levels (table 2) show that 46.4% of the sample obtained a normal performance, demonstrating the processes use that are consistent with their chronological age. Despite this, a significant number of children had performance levels in deficit (27.3%) and risk (26.3%), concluding that more than 50% of these have PSF out of phase for their age.

3.2 Total performance of initial reading

Table 3: Total initial reading performance for the entire sample

Performance level	4 years n=44		5 years n=55		Total	
	Frecuency	Percentage	Frecuency	Percentage	Frecuency	Percentage
Good performance	1	2,3	1	1,8	2	2
Normal	20	45,5	17	30,9	37	37,4
Mild difficulty	6	13,6	7	12,7	13	13,1
Severe difficulty	17	38,6	30	54,5	47	47,5
Total	44	100,0	55	100,0	99	100,0

Source: Prepared by the research group itself

In relation to the performance levels of the total Initial Reading test (Table 3), more than half (54.5%) of the 5-year-old children and just over a third (38.6 %) of the 4-year-olds presented severe difficulty. All these data are high for both age groups considering the total number of children evaluated. However, in the normal performance level, it was those under 4 years of age who stood out (45.5%).

3.3 Performance levels of total PSF and initial reading

Table 4: Performance levels of total PSF and initial reading

Total Lectura Inicial	Total PFS							
	Deficit	%	Normal	%	Risk	%	Total	%
Good performance	0	0,0%	1	2,2%	1	3,8%	2	2,0%
Mild Difficulty	2	7,4%	8	17,4%	3	11,5%	13	13,1%
Severe Difficulty	18	66,7%	16	34,8%	13	50,0%	47	47,5%
Normal	7	25,9%	21	45,7%	9	34,6%	37	37,4%
Total	27	100,0%	46	100,0%	26	100,0%	99	100,0%

Source: Prepared by the research group itself

According to the performance obtained by the total sample in the PSF variable, 66.7% of the children who obtained a deficit performance reached the lowest level (severe difficulties) in the initial reading; this result was the same in 50% of the children at risk at the PSF level. However, the performance of severe difficulty (34.8%) and mild difficulty (17.4%) was reflected in an important group of children who showed PSF according to their age (table 4).

Table 5: The theoretical relationship between PSF and initial reading

Cross variables with an initial reading	Pearson's chi-square	p-value	Cramer's V	Interpretation Effect size
Total PFS	976,034	0,0000744569901502863	0,669427342263865	Big effect
Syllable and word structure	706,577	0,0000984204379429916	0,569574840141872	Big effect
Sustitution	523,616	0,103579837942219	0,490317504695941	Medium Effect
Assimilation	235,65	0,602882289455245	0,465178868591682	Medium Effect

Source: Prepared by the research group itself

When testing the theoretical relationship between the total Phonological Simplification Processes and the total performance Initial Reading level (table 5). It uses Pearson's chi-square statistic, and its statistical significance (P value), It found that there is a relationship between these two variables, which was confirmed with Cramer's V with which a "large effect" was obtained in the relationship between the variables studied. The same happens with each of the PSF types, which show an effect on the initial reading. It finds a greater effect in the processes related to the syllable structure and the word.

4. DISCUSSION

This research's main objective was to determine the relationship between the phonological simplification processes in children of 4 and 5 years and their initial reading skills. When the PSFs were examined, it became evident that the process type with the highest number in the study group, at both ages, is characterized by making word structure simpler (ESP). followed by those processes in which children substitute phonemes belonging to one class for others from a different (S), and less frequently those results consist of changing a phoneme, it is to make it the same or like another that is present in the word (A). This coincides with the finding of a study executed on children aged 3 to 6 years. It showed that the process type with the highest frequency at all ages corresponded to those related to syllable and word structure; while those of assimilation and substitution were less used (Pavez et al. 2009, p.97).

Phonological performance levels obtained by the study group show that for the total PSF, more than 50% of the participants had performances distributed in risk and deficit, with the normality level being the lowest proportion, which indicates that many of these minors have PSF out of date for their age. In contrast to this, González and Taboada (2016) in their research executed on preschool children found performance at risk (20%), deficit (14.5%), and normal (65.5%), reflecting that more than 50% of the children had PSF according to their age. For the case, in the process related to ESP, normal performance was highlighted in most of the children. However, it is the 5-year-olds who stand out in risk and deficit performances. Results coincide with what was stated by Asensión and Solis, (2013) in a study implemented with children from 3 to 5 years old, in which most of the subjects between 3 (99%) and 4 years old (98%), presented a normal performance level; however, at 5 years, the children number at risk and deficit levels (18.2%) becomes visible. These same authors found that in the substitution process, the normal performance level stood out at all ages, with values of 96.1%, 92%, and 71.7%, respectively. This differs from the study group since a population large part was framed in the deficit performance level in the substitution process. However, this finding concurs with what was evidenced in a study executed by Coloma in 2010, in which it was found that the substitution process occurred in almost half (44.4%) of the 4-year-old children (Coloma et al., 2010).

In connection with the initial reading, the results reflected in the total sample predominance in severe difficulties. It denotes few skills in the abilities that compose it. This could generate future problems in the reading formal acquisition. Ugas, in 2017, highlights that in the pre-reading skills variable evaluated in his study, a predominance was observed in children aged 5 and 6 who were in the lower level and lower average (Wisnar, 2017). Based on these results, there are "data that indicate notable differences in the first years of schooling, between children who have pre-reading knowledge and those who do not, appreciating that the former learns to read and write better and faster than the latter" (Maglio and Ysla, cited in Ugas, 2017).

In Colombia, children who develop pre-reading skills are commonly those who can attend private educational institutions. It is evidenced in the findings presented, since the 4-year-old children who stood out with normal performances, mostly belong to a private institution. While many of the 5-year-olds who did not protrude at this level of performance attend public school. This discrepancy could be explained by the fact that in public institutions the children's initial experiences seem insufficient, considering that schooling begins from the transition grade, around 5 years. This leads us to infer that these possibilities are greater to the extent that they develop in challenging spaces rich in interaction, with themselves, with others, and with their environment. Spaces that are evidenced in quality initial education (Ministry of National Education of Colombia [MEN], 2009), as is supposed to happen in private institutions in which admission is given from the infant grade from the 2 and 3 years. Romero and Velandia (2010) mention that "children who reach the first grade of basic education without experiences that are required to learn to read efficiently, show lower initial achievement than their peers."

When testing the theoretical relationship between the variables under study, it was possible to identify its existence. Statistically verified by Pearson's chi-square test, and checking the effect size with Cramer's V, as a "large effect" between the related variables.

Together with this, when it crosses the variables total performance that was studied, it was interpreted that those children with deficit performance levels in the PSF variable are the same ones with the lowest performance in the initial reading. Bravo Valdivieso (2002) affirms that "phonological development is a threshold to perform the interaction with the initial decoding". Thus, it confirms, for the case, that the more out-of-date processes for their age children have, the lower the performance will be. Or the necessary pre-reading skills development to be able to learn to read. As this is a threshold for reading whose relationship can be explained by the difficulties in the mental organization of the language sounds that those children with phonological difficulties have as PSF, which limits the initial reading development since "the learning of reading is characterized by the action of various stimuli, such as those emerging from phonemic stereotypes (phonological aspects of language)" (Feld, 2014, p. 77).

It is evident that language development is necessary for the reading initial stages considering one of these process bases. Laura et al. (2010) mention that “between 40% and 75% of preschoolers with language compromises develop reading difficulties in later years”. More specifically Coloma et al. (2010) state that if the simplified productions have not yet been eliminated by structural sub-processes. Children cannot identify or manipulate the syllable, because they are not aware that the word is divisible. In addition, Herrera and Defior (2005) maintain that the difficulties present in memory span and short-term memory tasks (related to phonological memory) are explained by the problems that children have in the mental representation of the phonological features, in PSF, it considers it as one of the difficulties most frequently found in minors who have severe problems in reading.

Finally, in according to the findings, it is necessary to affirm that there is a theoretical relationship between phonological development in terms of PSF and the skills that integrate initial reading since children with better phonological development. This showed better performances in the initial reading with PSF that obey their age. Contrary to those with increased PSF for their age, who showed the lowest performances in the initial reading variable. In line with this, Orellana and Valdivieso (2006) mention that children who enter first grade with good phonological development achieve better performance in reading. The position is reaffirmed with what is stated by Bravo, who assures that "phonological processing is considered as a cognitive and phonological awareness verbal process, which fulfills the starting engine role for decoding, and which is activated by the pedagogical intervention". The phonological process activation in teaching will fulfill the decoding detonating role. It allows children to master the phonic oral language components and it facilitates their association with writing (Castro García et al., 2022).

5. CONCLUSION

The achievement of proposed objectives was fulfilled. It allowed determining the relationship between the Phonological Simplification Processes and the Initial Reading skills in children of 4 and 5 years belonging to Educational Institutions from Sincelejo city.

It is evident that the process most used by children is the one related to syllable structure and the word. These tend to affect the structure and metrics of their oral productions. In addition, it was shown that in the initial reading the children presented better skills in phonological memory and verbal fluency, while in phonological awareness and phoneme discrimination they had marked difficulties. Phonological simplification processes and initial reading do show a justified relationship by the difficulties showed in pre-reading skills increased in children with PSF. Therefore, the hypothesis that initial reading is related to phonological development is correct. It makes this finding a fundamental contribution to future speech therapy work investigations, due to the scarce approach to this subject in our national, regional, and local contexts.

After the development of this study, the importance of timely intervening in oral language alterations from the phonological component (Phonological Simplification Processes) becomes relevant, to prevent difficulties in the initial stages of reading, and consequently in the reading process.

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