

# Phonological Simplification Processes In Preschoolers Of 4 And 5 Years From Sincelejo, Colombia

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## ABSTRACT

**Objective:** To describe the phonological simplification processes in 4 and 5-year-old preschoolers in a Colombian city. The study involved 99 children aged between 4 and 5 years from two educational institutions in Sincelejo city (Colombia). For this, the Test to Evaluate Phonological Simplification Processes Revised (TEPROSIF-R) was applied. **Methodology:** it was framed under a quantitative approach; It is a study with a non-experimental, cross-sectional, descriptive design, in which the phonological simplification processes in 4- and 5-year-old children are identified and characterized. **Results:** the most frequent type of process in the total sample was related to the syllable structure and the word, followed to a lesser extent by substitution, highlighting a normal performance in the assimilation process. **Conclusions:** After identifying the process that most frequently occurs in the sample, the importance of promptly stimulating and intervening in oral language deficiencies from the phonological component (Phonological Simplification Processes) becomes relevant, to prevent language disorders and future difficulties in reading and writing language in minors.

**Keywords:** child development, preschool, language, mental processes, discrimination, phonetics (Desc)

## 1. INTRODUCTION

From the natural phonology theory's point of view, children put into practice an innate system of mental operations known as Phonological Simplification Processes. With it, they modify the words that they still cannot produce correctly to simpler forms (Caballero et al., 2017). In other words, "boys and girls use PSF by eliminating more difficult sounds for easier ones" (Rodríguez et al., 1999).

Phonological Simplification Processes become simplification strategies executed by children in their productions, they are typical of typical phonological development and are slowly

reduced as children grow, to produce words like the adult model. These processes must be completed and almost eliminated by the time they are six years old. However, in earlier stages, when children present difficulties with the word phonological structure and simplification originates in great quantity between the ages of 4 and 5. Their phonological performance would be inadequate, a phonological disorder characteristic behavior (Coloma et al. al., 2010). On the other hand, the phonological processes or repair strategies carried out by children with typical and atypical development can evidence their mental representation during the acquiring a phoneme process or syllabic structure. Based on the use of more complex phonological processes, children who demonstrate greater phonological knowledge also have a better prognosis (Soares et al., 2019).

The phonological processes included within phonological skills are developed at different cognitive complexity levels, ranging from a sensitivity level to recognizing the sounds that distinguish words from others of greater complexity, which intervene when segmenting or pronouncing them, omitting, or adding phonemes. (Gutiérrez-Fresneda & Díez Mediavilla, 2018). According to the above, 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 (Rodríguez et al., 1999). Bosch establishes that the processes related to the syllable structure refer to the natural tendency to reduce the words and the complex syllables that make up the same basic structure such as the consonant (C) + vowel (V). We speak of assimilation processes when a phoneme is replaced by another similar or equal in a word, affecting the word. Substitution simplification patterns refer to the one class of phonemes change, for another that is not present in the spoken word (Pestana et al., 2016; Carhuachín Huerta & Carhuachín Huerta, 2022; Coloma et al., 2010).

Within communication skills, preschoolers, between 4 and 5 years old, face different contexts that demand language skills. From classroom practice and professional practice in Sincelejo-Sucre, there are frequent manifestations and concerns of teachers regarding the children's oral expression in their charge. Since they manifest problems related to phoneme production in various oral contexts. This scenario exposes substitutions' presence, assimilations, and difficulties in the syllable structure of the spoken word. This is how the phonological simplification processes evaluation in the language area allows communication problem identification and, in turn, the identification of literacy learning problems (Albarracín et al., 2013); variable that is undertaken to relate in another investigation. This study aimed to identify the presence of increased or not increased PSF, and to characterize their respective classification in 4 and 5-year-old preschool children from Sincelejo city.

## **2. MATERIALS AND METHODS**

The research was framed under a quantitative approach. It is a study with a non-experimental, cross-sectional, descriptive design (Munnangi & Boktor, 2022), in which the phonological simplification processes in 4- and 5-year-old children are identified and characterized.

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. The population consisted of preschool students, 4 and 5 years old, enrolled in public sector schools and private from Sincelejo city of which 99 children met the inclusion and exclusion criteria established in this study. The information was collected by consulting the selected students' basic data. Then proceeded to carry out a visual screening (Snellen chart) and an auditory screening (Screening Instruments for the Early Detection of Hearing Deficiencies in Children Under Five Years and Schoolchildren), This made it possible to exclude from the study those children who presented hearing limitations and uncorrected visuals. And a final filter, the Kaufman Brief Intelligence Test (K-BIT) (Krumm et al., 2020) 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 (Albarracín et al., 2013) was applied to measure phonological simplification processes.

For data processing, once the assessment instruments were applied, tabulation was executed. It creates a database in accordance with the variables under study, which were 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 the presentation and analysis of the results, univariate and bivariate tables were used in the descriptive component according to the variable's nature to be presented. The descriptive analysis was made by means of valuation percentages and the phonological simplification processes frequencies. The estimators were evaluated by age, to control for confounding variables.

For the present study, the instrument used to evaluate the PSF was subjected to a pilot test in a population with characteristics like those of the sample, after the results, the Crombach's Alpha coefficient was executed to check the internal consistency, finding as result 0.90, which suggests that the instrument has excellent reliability for its application in the study population.

### 3. RESULTS

#### 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
Related to syllable and word structure	188	263	451
Assimilation	55	41	96
Substitution	163	179	342
<b>TOTAL</b>	406	483	889

Source: Prepared by the research group

**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	
	Frequency	Percentage	Frequency	Percentage	Frequency	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
<b>Total</b>	44	100,0	55	100.0	99	100.0

Source: Prepared by the research group

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, assimilation. For both age groups, reflecting that a 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 children number had performance levels in deficit (27.3%) and risk (26.3%), concluding that more than 50% of these have phase PSF out for their age.

### 3.2 Processes related to the syllable structure and the word and performance levels.

**Table 3.** Processes related to the syllable structure and the word by age

SUB-PROCESSES	AGES (years)	
	4 n= 44	5 n= 55
Consonant cluster reduction	15	28
Diphthong reduction	3	15
Trabant consonant omission	39	16
Coalescence	6	11
Omission of unstressed elements	96	152
Stressed syllable omission	11	25

Addition of phonemes	17	10
Phoneme inversion	1	6
<b>TOTAL</b>	<b>188</b>	<b>263</b>

**Source:** Prepared by the research group

**Table 4.** Performance levels according to the total of processes related to the syllable structure and the word

Performance level.	4 years n=44		5 years n=55		TOTAL	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Normal	34	77,3	26	47,3	60	60,6
Risk	5	11,4	14	25,5	19	19,2
Deficit	5	11,4	15	27,3	20	20,2
<b>Total</b>	<b>44</b>	<b>100,0</b>	<b>55</b>	<b>100,0</b>	<b>99</b>	<b>100,0</b>

**Source:** Prepared by the research group

Regarding the processes related to the syllable structure and the word in the 4-year-old subjects, the sub-processes with the greatest extent were unstressed elements omission (96) and trabant consonant omission (39); while in the 5-year-old subjects they were unstressed elements omission (152), consonant group reduction (28) and stressed syllables omission (25). It should be noted that 5-year-old children had the highest number in the total of this process type; however, at both ages, the omission of the unstressed element prevailed (table 3).

According to the performance levels established in the test (Table 4), it was evidenced that in both age groups a significant proportion of children showed normal performance (60.6%). In addition, it is necessary to mention that in the 5-year-old group performances in deficit (27.3) and risk (25.5) is notably reflected, highlighting a greater number of children who simplify their words in an increased way.

### 3.3 Substitution processes and performance levels

**Table 5.** Substitution processes

SUB-PROCESSES	AGES (years)	
	4 n= 44	5 n= 55
Trabant phoneme aspiration of syllable	15	21
Posteriorization	3	3
Frontalization	16	57
Consonant labialization	1	1
Occlusion of fricatives or affricates	70	20

Fricativization of stops or affricates	3	6
Fricatives with each other	8	3
Consonant voicing	1	1
Consonant aphonization	3	1
Semi-consonantization of liquids	1	1
Substitution of liquids for each other	16	38
Substitution of liquids for oral non-liquids	6	3
Substitution of oral non-liquid phonemes for liquids	10	7
Nasalization of phonemes	6	10
Oralization of nasal consonants	3	1
Vowel substitution or dissimilation	1	6

**Source:** Prepared by the research group

**Table 6.** Performance levels according to the total substitution processes number

Performance level	4 years n=44		5 years n=55		TOTAL	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Normal	16	36,4	13	23,6	29	29,3
Risk	13	29,5	14	25,5	27	27,3
Deficit	15	34,1	28	50,9	43	43,4
<b>Total</b>	44	100,0	55	100,0	99	100,0

**Source:** Prepared by the research group

Regarding the substitution process (table 5), it is notable that when children are 4 years the occlusivization sub-process of fricatives or affricates predominates (70), while at 5 years, in addition, this (with a lower number), it stands out the frontalization to a greater extent (57), the liquids substitution among themselves (38) and the syllable-locking phoneme aspiration (21).

As shown in Table 6, at both ages a significant children number presented deficits (43.4%), which mainly indicates the processes use in which they substitute the more difficult phonemes for the easier ones, not corresponding to their age. However, the 4-year-old group was characterized by showing the largest number of children with normal performance (36.4%).

### 3.4 Assimilation processes and performance levels

SUB-PROCESSES	AGES (years)	
	4 n= 44	5 n= 55
Identical assimilation	15	21

Lip assimilation	1	1
Tooth assimilation	5	8
Palatal assimilation	8	1
Velar assimilation	14	3
Assimilation to liquid phonemes	1	3
Nasal assimilation	1	1
Vowel assimilation	10	3
<b>TOTAL</b>	<b>55</b>	<b>41</b>

**Source:** Prepared by the research group

**Table 8.** Performance level according to the total assimilation processes number

Performance level	4 years n=44		5 years n=55		TOTAL	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Normal	37	84,1	44	80,0	81	81,8
Risk	5	11,4	7	12,7	12	12,1
Deficit	2	4,5	4	7,3	6	6,1
<b>Total</b>	44	100,0	55	100,0	99	100,0

**Source:** Prepared by the research group

When studying the assimilation processes (Table 7), it was found that, in 4-year-old children, the most common threads were identical assimilation (15) and velar assimilation (21); while in 5-year-old children identical assimilation (21) is the thread with the greatest tendency.

Regarding the performance level in the processes of A (table 8), it is evident that normal performance is the level that predominates in both age groups (81.8%), which indicates that assimilation is the least present process in the expression oral of the minors under study.

#### 4. DISCUSSION

Examining the PSFs, it becomes evident that the process type with the highest number in the study group, at both ages, is characterized by making word structure simpler (E), followed by those in which children substitute the phonemes belonging to one class for others of another class (S), and less frequently those that consist of changing a phoneme, to make it the same or similar to 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 (Andrade, 2009).

In particular, the most persistent thread in relation to ESP is the omission of the unstressed element in both age groups, as evidenced in a study, in which this thread predominated at ages 4, 5, and 6 years (Pavez et al., 2013), whose frequency is explained by the children tend to maintain the stressed words units because they are more perceptible and invariable. However, an Ecuadorian study exposed in its research that, at the age of 4, thanks to syllabic awareness development, children improve intelligibility in the sound emission due to the recognition they give to the structure of words (Walls, Sara., 2020). In accordance with the above, the present study showed that for the substitution process, children under 5 years old present a deficit level more frequently, while normal performance predominates in the 4-year-old group. This finding agrees 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).

Finally, in the assimilation process, no major difficulties are shown. Since almost all preschoolers between 4 and 5 years old had a normal performance level. This is a behavior that is repeated as described by Ascensión and Solís in their research, and contrary to what was exposed in an international study, in which a greater occurrence of the simplification phonological process was found in the same preschool stage. Likewise, in 5-year-old children, it was the second most prevalent process (Soares et al., 2019).

The 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 normality level being the lowest proportion, which indicates that most 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.

## **5. CONCLUSION**

The objective stated in the study was achieved, allowing us to identify and describe the Phonological Simplification Processes in preschool children aged 4 and 5 years belonging to Educational Institutions in Sincelejo city. It is evident that the process most used by children is related to the syllable structure and the word, so these usually affect the structure and metrics of their oral productions; both groups had performance levels at risk and deficit for this PSF. The assimilation process is the one that occurs less frequently, a normal performance level is found for this PSF in the study population.

After the development of this study, the importance of promptly stimulating and intervening in oral language deficiencies from the phonological component (Phonological Simplification Processes) becomes relevant, to prevent language disorders and future difficulties in reading and writing language.



## REFERENCES

- Albarracín, É., Carranza, P., & Meléndez, E. (2013). Adaptación psicométrica del test para evaluar procesos de simplificación fonológica (Teprosif-R). *Persona*, 016, 73-91. <https://doi.org/10.26439/persona2013.n016.3>
- Andrade, M. Á. (2009). Reseña de «Test para evaluar procesos de simplificación fonológica. TEPROSIF-R» de María Mercedes Pavez, Mariangela Maggiolo y Carmen Julia Coloma. *Onomázein*, 19, 151-154.
- Caballero, C., Hinalaf, M. de L. A., & Scauso, R. (2017). Procesos de simplificación fonológica en niños de 4 y 5 años. Versión espontánea. <https://ri.conicet.gov.ar/handle/11336/98119>
- Carhuachín Huerta, L. N., & Carhuachín Huerta, L. N. (2022). Adquisición de los rasgos consonánticos del quechua ancashino en niños bilingües de 2, 4 y 5 años: Procesos fonológicos sistemáticos. *Letras (Lima)*, 93(137), 102-116. <https://doi.org/10.30920/letras.93.137.8>
- Coloma, C. J., Pavez, M. M., Maggiolo, M., & Peñaloza, C. (2010). Desarrollo fonológico en niños de 3 y 4 años según la fonología natural: Incidencia de la edad y del género. *Revista signos*, 43(72), 31-48. <https://doi.org/10.4067/S0718-09342010000100002>
- Gutiérrez-Fresneda, R., & Díez Mediavilla, A. (2018). Conciencia fonológica y desarrollo evolutivo de la escritura en las primeras edades. <https://doi.org/10.5944/educXX1.13256>
- Krumm, G. L., Filippetti, V. A., & Kimel, E. (2020). Funciones ejecutivas en niños escolarizados con alta y baja creatividad. *Psicogente*, 23(44), 1-19. <https://doi.org/10.17081/psico.23.44.3493>
- Munnangi, S., & Boktor, S. W. (2022). *Epidemiology Of Study Design*. En StatPearls. StatPearls Publishing. <http://www.ncbi.nlm.nih.gov/books/NBK470342/>
- Paredes, Sara. (2020). La conciencia fonológica y el desarrollo fonológico, Quito, julio— Diciembre 2020 [Universidad Central del Ecuador]. <http://www.dspace.uce.edu.ec/bitstream/25000/22473/1/T-UCE-0020-CDI-494.pdf>

- Pavez G., M. M., Maggiolo L., M., Coloma T., C. J., & Peñaloza C., C. (2013). Procesos de simplificación fonológica en niños de 4, 5 y 6 años con dificultades fonológicas. *Rev. chil. fonoaudiol.* (En línea), 49-61.
- Pestana, P. del C. B., Vásquez, M. M. P., Álvarez, A. R. B., Pineda, V. del C. O., & Cuello, J. R. F. (2016). Los procesos fonológicos de simplificación en niños de 3 a 5 años de Sincelejo. *Revista Colombiana de Rehabilitación*, 15(1), 4-11. <https://doi.org/10.30788/RevColReh.v15.n1.2016.3>
- Rodríguez, V. M. A., Acosta, V. M., & Santana, A. M. M. (1999). *Dificultades del lenguaje en ambientes educativos: Del retraso al trastorno específico del lenguaje*. Elsevier España.
- Soares, M. E. de C., Payão, L. M. da C., & Oliveira, M. (2019). Analysis of phonological processes in the acquisition of complex onset in children with typical phonological development. *Revista CEFAC*, 21. <https://doi.org/10.1590/1982-0216/201921111118>
- Lara-Díaz, M. F., Gómez-Fonseca, Á. M., García, M., Niño, L., & Guerrero, Y. (2010). Relationships between difficulties of oral language at 5 and 6 years old and reading processes at 8 and 9 years old. *Revista de la Facultad de Medicina*, 58(3), 191-203. Recuperado de [http://www.scielo.org.co/scielo.php?script=sci\\_abstract&pid=S0120-00112010000300004&lng=en&nrm=iso&tlng=es](http://www.scielo.org.co/scielo.php?script=sci_abstract&pid=S0120-00112010000300004&lng=en&nrm=iso&tlng=es)
- Manzano. (2009). Sobre la acotación de efectos y la existencia de relación. Recuperado de <http://asignatura.us.es/dadpsico/apuntes/efectos.pdf>
- Manzano. (2014). Chi cuadrado de Pearson, para dos variables nominales. Recuperado de <http://asignatura.us.es/dadpsico/apuntes/EpChiCuadrado.pdf>
- Ministerio de Educación. (s. f.). ¿Por qué la conciencia fonológica es relevante para la adquisición de la lectura y la escritura? Recuperado de <http://ftp.e-mineduc.cl/cursosceip/Parvulo/NT1/I/unidad2/documentos/leccion2.pdf>.

Ministerio de Educación Nacional de Colombia. (2009, abril). Por una educación inicial incluyente y para toda la vida. Recuperado de <https://www.mineducacion.gov.co/1621/article-192210.html>

Ortiz Rubia., V. (2007). PROCESOS FONOLÓGICOS DE SIMPLIFICACION DEL HABLA. (Tesis de Grado, Universidad del Aconcagua. Facultad Ciencias de la Salud). Recuperado de <http://bibliotecadigital.uda.edu.ar/229>.

Pavez G., M. M., Coloma T., C. J., Maggiolo L., M., & Peñaloza C., C. P. (2013). Procesos de simplificación fonológica en niños de 4, 5 y 6 años con dificultades fonológicas. *Revista Chilena de Fonoaudiología*, 12, ág. 49–61-ág. 49–61. <https://doi.org/10.5354/rcdf.v12i0.29926>

Rodríguez-Melgar, S. V. (2010). Procesos del lenguaje oral y los niveles de la conciencia fonológica en preescolares [Data set]. <https://doi.org/10.5281/zenodo.20812>