



# Relationship Between First Language Phonological Awareness and Second Language Vocabulary Comprehension and production Among Colombian English Preschool Learners

*Relación entre la Conciencia Fonológica en Primera Lengua y la Comprensión y Producción de Vocabulario en Segunda Lengua de Estudiantes Preescolares de Inglés en Colombia*

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## **Abstract**

**Introduction:** Phonological awareness in young children is a meaningful predictor of reading processes. However, little is known about how first language phonological awareness and its main components (letter recognition, segmentation, and blending) influence the development of second language pre-reading abilities, such as vocabulary comprehension and production, among Spanish-speaking English learners. This study aimed to analyze the correlations between these variables from a bilingual perspective to understand the connections between them and shed light on the implications for bilingual education.

**Method:** This longitudinal, correlational study examined the association between Spanish phonological awareness (the independent variable) and English pre-reading skills (the dependent variables) among 121 English-learning preschoolers in Medellín, Colombia. The instruments used were the Test of Phonological Awareness in Spanish and an adapted version of the Cambridge Young Learners Exam (Starters) reading and vocabulary exam.

**Results:** The results indicate an association between the two variables at Time Two. Two analysis paths were proposed, and it was found that blending had a direct and significant effect on time two. Phonological awareness directly affected comprehension in Time One, predicting comprehension in Time Two. Comprehension and vocabulary in time one predicted the same variables in time two. Additionally, phonological awareness had an indirect, significant effect on the vocabulary portion of the Young Learners Exam in Time two, as mediated by the exam's Time one scores.

**Discussion:** These findings suggest an association between phonological awareness and pre-reading skills and the influence of psycholinguistic variables on second language learning processes.

**Keywords:** mother tongue, psycholinguistics, preschool children, foreign languages.

## Resumen

**Introducción:** La conciencia fonológica de los niños pequeños es un predictor significativo de los procesos de lectura; sin embargo, se sabe poco sobre la influencia de la conciencia fonológica de la primera lengua y sus componentes principales (reconocimiento, segmentación y combinación de letras) en el desarrollo de habilidades previas a la lectura de una segunda lengua, como la comprensión y producción de vocabulario, entre los estudiantes de inglés de habla hispana. Este estudio tuvo como objetivo analizar las correlaciones entre estas variables desde una perspectiva bilingüe, no sólo para comprender las conexiones entre ellas, sino también para arrojar luz sobre las implicaciones en la educación bilingüe.

**Método:** Estudio longitudinal y correlacional examinando la asociación entre la conciencia fonológica del español (variable independiente) y las habilidades de prelectura en inglés (variables dependientes) en 121 estudiantes de inglés en edad preescolar en Medellín, Colombia. Los instrumentos incluyeron el Test de Conciencia Fonológica en español y una versión adaptada del examen de lectura y vocabulario Cambridge Young Learners Exam (Starters).

**Resultados:** Los resultados indican una asociación entre estas dos variables con implicación de tiempo. Se propusieron dos caminos de análisis y se encontró que la combinación tenía un efecto directo y significativo en el segundo tiempo. La conciencia fonológica tuvo un efecto directo sobre la comprensión en el primer tiempo, prediciendo la comprensión en el segundo tiempo. La comprensión y el vocabulario en el Tiempo uno, predijeron las mismas variables en el Tiempo dos. Además, la conciencia fonológica tuvo un efecto indirecto y significativo en el vocabulario del examen para jóvenes estudiantes en el momento dos, mediado por las puntuaciones del examen para jóvenes estudiantes en el momento uno.

**Discusión:** Estos hallazgos sugieren no sólo una asociación entre la conciencia fonológica y las habilidades previas a la lectura, sino

también los efectos de las variables psicolingüísticas en los procesos de aprendizaje de una segunda lengua.

**Palabras clave:** lengua materna, psicolingüística, niños en edad preescolar, lenguas extranjeras.

## **1. Introduction**

Phonological awareness is a fundamental factor in early literacy skills, as it allows learners to associate letters to their corresponding sounds and vice versa (Hougen, 2016). The development of phonological awareness relies considerably on the previous experiences children have, which might enhance or detract their level of vocabulary, oral and listening skills and alphabet knowledge, all related to the later construction of this crucial competence (O'Connor, 2014).

The various components of phonological awareness and their relation to general reading processes in bilingual children has been discussed from perspectives that analyze these variables in the same language (Torgesen et al., 2000; Al Otaiba et al., 2013; Rezaei & Mousanezhad Jeddi, 2020). However, more recent studies have focused on them from two or even more languages (Kuo et al., 2016, Kwakkel, 2021, Patel et al., 2022), opening new possibilities to the comprehension of bilingual processes, particularly on young children learning to read and write.

Pre-literacy abilities have been recently analyzed through both cognitive and linguistic components, and even though there is evidence regarding the influence of the first ones in these processes, particularly with functions such as IQ and working memory (Łockiewicz et al., 2018; Loosli et al., 2012; Rezaei & Mousanezhad Jeddi, 2020), there are studies that emphasize on the effect psycholinguistic abilities like phonological awareness have to fully develop them, especially when comprehending material (Dolean et al., 2021; Soto et al., 2020)

A large body of research evidence indicates that early development of PA is an essential determinant of later literacy development

among children learning to read in English as their native language (Torgesen, 2004). However, it is unclear if this association can be applied to Spanish-speaking children learning to read in English as a foreign language, which is why the purpose of this study was to analyze the relationship between Spanish (L1) Phonological Awareness (PA) and English (L2) pre-reading skills for EFL preschoolers in Medellín, Colombia, in order to generate strategies and discussions that lead to a deeper understanding of this phenomena. Additionally, this study tests Cummins' (1979) interdependence hypothesis to examine the extent to which L1 PA is associated with L2 early reading skills.

Comprehending the relationship between the development of phonological awareness and pre-reading skills can conduct educators and researchers to the design and implementation of strategies and techniques to enhance bilingual children's performance as they go through the first years of their educational path, in order to continue improving their abilities in later challenges.

## **2. Method**

This longitudinal and correlational study focused on the relationship between L1 phonological awareness and the level of vocabulary comprehension and production of the sample. Measures included Spanish phonological awareness as its independent variable and English vocabulary comprehension and production as the dependent ones.

### **2.1. Participants**

The sample consisted of 121 children conveniently selected from six private bilingual schools in Medellín. Inclusion criteria considered children who received the same number of hours of instruction in EFL. Exclusion criteria were applied when children did not obtain normal scores in the independent variables and were exposed to additional instruction in English from their parents or other educational institutions; these sets of criteria were applied to make the sample as homogenic as possible in teams of educational

conditions. Two children were excluded from the study, one due to the first exclusion criteria and one for the second.

121 children with a mean age of 4.76 years (SD: 0.429) who met the inclusion and exclusion criteria established for the study participated. The sociodemographic characteristics of the participants are shown in table 1.

**Table 1**  
Sociodemographic characteristics of the sample.

Characteristics	n	%
Sex		
Girls	66	54.5
Boys	55	45.5
Age		
4 years old	29	24.0
5 years old	92	76.0
SES		
4	51	42.1
5	61	50.4
6	9	7.4
School		
1	11	9.1
2	18	14.9
3	8	6.6
4	4	3.3
5	59	48.8
6	21	17.4

Instruments. The instruments used in this study are described in the following table.

**Table 2**

Instrument operationalization

Variable	Instrument	Scoring	Reliability coefficient
Phonological awareness (in Spanish)	TOPPS (Test of Phonological Awareness in Spanish) (Francis et al., 2001)	Direct scale with scores from 1 to 30.	Analysis yielded a reliability coefficient of .83 (n =100) for the entire test.
Vocabulary comprehension and production (in English)	YLE reading and vocabulary adapted test.	Direct score from 0 to 50.	Cronbach's Alpha for all the components of the test is above 0.8

## 2.2. Procedure

In order to collect data, the researchers held meetings with parents from the schools where the sample was collected, in order to inform them of the procedure and obtain their informed consent, which was previously approved by the bioethics committee at Universidad Católica Luis Amigó (approval number 67465), based on the decree number 8430 of 1993 from the Health Ministry of Colombia. The schedule to collect data was then agreed with the schools, in order to have sufficient time with each child. The evaluation protocol for the independent variable (Phonological Awareness - PA) was applied individually, with an approximate duration of 15 minutes per child.

PA measured in 1 time and YLE measured in 2 different moments, in groups separated by 6 months and an approximate duration of 25 minutes per group. Measures were taken directly from the lead researcher.

## 2.3. Statistical Analysis

Data analysis was carried out in the SPSS version 25 program (IBM Corporation, 2017a) and its extension Amos version 24.0 (IBM Corporation, 2017b). A descriptive analysis and frequencies of the sociodemographic characteristics of the participants and the study variables were carried out. Subsequently, Spearman's Rho coefficient was used to analyze the correlations between the variables that make

up phonological awareness and performance on the Young Learners Exam. Finally, a path analysis was used to determine the effects of phonological awareness on performance on the Young Learners Exam at two different times (T1 and T2).

The estimator used was generalized least squares, appropriate for variables that do not meet the assumption of normality (Byrne, 2016). Goodness-of-fit indicators were reported: comparative fit indices ( $IFI \geq ,90$  and  $CFI \geq ,90$ ), goodness-of-fit index ( $GFI \geq ,90$ ) and its corresponding corrected index ( $AGFI \geq ,90$ ), normalized fit index ( $NFI \geq ,90$ ), Tucker-Lewis index ( $TLI \geq ,90$ ) and the root mean square error of approximation ( $RMSEA \leq ,08$ ). Values of  $IFI$ ,  $CFI$ ,  $NFI$ ,  $TLI$ ,  $GFI$  and  $AGFI$  equal to or greater than 0.90 were considered appropriate, as well as a value equal to or less than ,05 in  $RMSEA$  (Byrne, 2016; Hu & Bentler, 1999; McArdle & Nesselroade, 2014).

### **3. Results**

Table 3 shows the descriptive data of central tendency of the participants' performance on the Phonological Awareness tests and the Young Learners Exam at T1 and T2. Phonological awareness shows a mean of 13,17 with a standard deviation of 1,27. Letter recognition has a mean of 5,13 and a standard deviation of ,67. The segmentation shows a mean of 5,25 and a standard deviation of ,79. The mixture has a mean of 2,76 and a standard deviation of ,95. The following variables refer to the scores obtained in the Young Learners Exam (YLE) exam at two different times (Time one and Time two), both in the total exam and in two subcategories: Comprehension and Vocabulary. For Time one, the mean of the YLE total is 10,68 with a standard deviation of 2,82, while the means of Comprehension and Vocabulary are 4,51 and 6,17 respectively. By Time two, the YLE total mean increases to 12,26, while the Comprehension and Vocabulary means are 5,33 and 6,94 respectively.



**Table 3**

*Descriptives of the study variables*

Variables	n	Min.	Max.	Me	M	SD
Phonological awareness (TOPPS)	121	11	16	13	13,17	1,27
Letter recognition (TOPPS)	121	4	6	5	5,13	,67
Segmentation (TOPPS)	121	3	7	5	5,25	,79
Blending (TOPPS)	121	1	5	3	2,76	,95
Young Learners Exam (YLE). Time one	121	6	22	10	10,68	2,82
Comprehension YLE. Time one	121	2	14	4	4,51	2,16
Vocabulary YLE. Time one	121	1	11	6	6,17	1,69
Young Learners Exam (YLE). Time two	121	7	21	12	12,26	2,59
Comprehension YLE. Time two	121	2	11	5	5,33	1,61
Vocabulary YLE. Time two	121	4	11	7	6,94	1,70

Table 4 shows the correlations between different measures of languageskills, including phonological awareness, letter recognition, segmentation and blending, with results on the YLE (Young Learners English) exam at two different times. For each language skill, separate correlations are provided for the YLE total and for two subcategories of the test: Comprehension and Vocabulary.

At Time one, phonological awareness shows the highest correlation with the YLE total score ( $r: ,10$ ), followed closely by segmentation ( $r: ,1$ ). However, none of these correlations were statistically significant. In the Comprehension and Vocabulary tasks, phonological awareness and segmentation show the highest correlations ( $r: ,133$  and  $r: ,131$  respectively), although they were not significant either.

At Time two, the correlation between phonological awareness and the YLE total score increased to  $,18$  and was statistically significant ( $p: ,047$ ), suggesting that there is a positive relationship between these variables. Letter recognition, segmentation, and blending also show positive correlations, although none of them are statistically significant.

**Table 4**  
Spearman correlation coefficient (r) between phonological awareness variables and the Young Learners Exam at T1 and T2

	YLE. Time one			YLE. Time two		
	YLE total	Comprehension	Vocabulary	YLE total	Comprehension	Vocabulary
Phonological awareness	,10	,13	,04	,18*	,14	,15
Letter recognition	-,007	,01	-,009	,04	-,06	,08
Segmentation	,10	,06	,13	,06	,12	,02
Blending	,08	,11	,01	,15	,14	,12

Note: \*p< 0.05

Two path analysis models were estimated to determine the effects of the independent variables of phonological awareness on the dependent variables of the Young Learners Exam at two different times: T1 and T2. The models obtained satisfactory goodness-of-fit indicators (Byrne, 2016; McArdle & Nesselroade, 2014). (See Table 5).

**Table 5**  
Indicators of goodness of fit of the proposed structural models

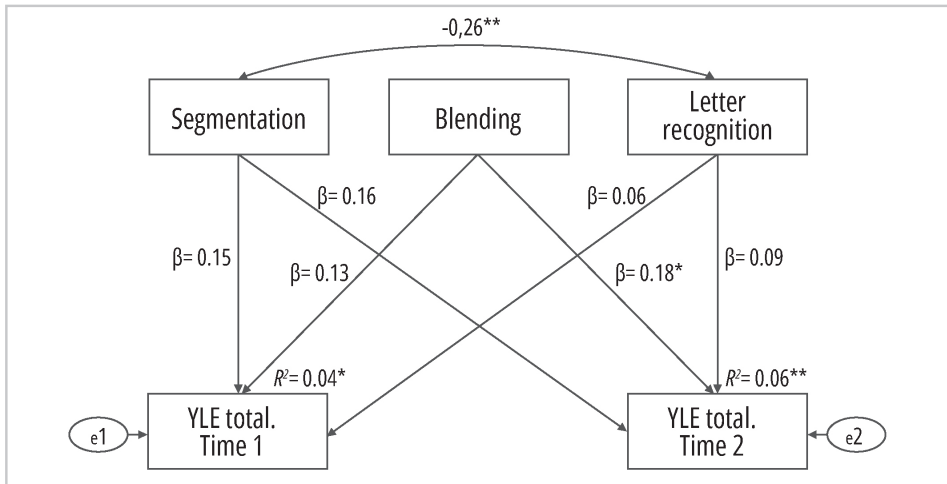
Indicators	Model 1	Model 2
IFI	1,03	1,00
CFI	1,00	1,00
NFI	,99	,980
TLI	1,19	1,00
GFI	1,00	,994
AGFI	,997	,954
RMSEA	-	-

Figure 1 shows the standardized direct effects of the independent variables on the dependent variables. It was found that the dimensions of phonological awareness (segmentation, blending, and letter recognition) explained 4% of the variance on the Young

Learners Exam at Time one and 6% at Time two. Performance on the blending task reported a statistically significant direct effect on the Young Learners Exam at Time two.

**Figure 1**

Variables and associations



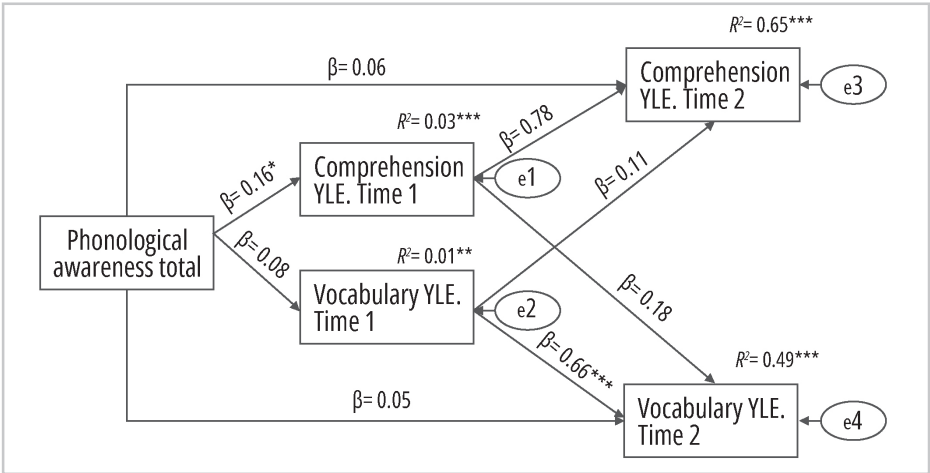
Note:  $*p < 0.05$ ;  $**p < 0.01$

In model 2 (see Figure 2), the global construct of phonological awareness was taken as an independent variable, the YLE comprehension and vocabulary tasks at Time one as mediating variables, and the YLE comprehension and vocabulary tasks at Time two as dependent variables. Phonological awareness explained 3% and 1% of YLE comprehension and vocabulary performance at Time one.

Phonological awareness had a statistically significant direct effect on comprehension performance, but not vocabulary performance. Both phonological awareness and the YLE comprehension and vocabulary variables at Time one explained 65% and 49% of the variation in YLE comprehension and vocabulary performance at Time two. The greatest effect was provided by the YLE variables at Time one. When analyzing the indirect effects of phonological awareness on the YLE variables at Time two, mediated by the YLE variables at Time one,

it was found that phonological awareness presented a statistically significant indirect effect on vocabulary at Time two, but the indirect effect on comprehension at Time two was not significant.

**Figure 2**  
Model of variables and association



Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

## 4. Discussion

This study focused on the relationship between phonological awareness in Spanish and the development of pre-reading skills in English in preschool children. Results showed that there is an association between these two variables in Time two, which was evidenced in the direct and significant effect that the blending component had on YLE scores in Time two. This association is consistent with Al Otaiba et al. (2013) and Ehri (2000) who point out that phonological awareness' components such as listening, rhyme and alliteration, sentence segmentation, and syllable and onset-rime blending and segmenting play a fundamental role in the development of pre-reading skills, since they allow learners to identify and manipulate the sounds and letters contained in the words they read.

Additionally, phonological awareness had a direct effect on comprehension in Time one, predicting comprehension in Time two, which highlights the relevance of developing phonological awareness skills over time, since it not only benefits second language processes, but also strengthens learners' ability in their first language. The need to continue forming students in phonological awareness is stressed by studies such as Schaefer & Kotze (2019) and Soto et al. (2020), who worked with bilingual students and reported gains in letter and word recognition both in their first language and in English as a second language.

Furthermore, comprehension and vocabulary in Time one predicted the same variables in Time two, illustrating the cumulative nature of language learning, which is consistent with previous findings in Grimm et al. (2018), Muter et al. (2004) and Yuan et al. (2022), who portray a process of language development that goes from letter to words to sentences. This is a particularly relevant finding since it focuses on the progression educators should focus on when developing pre-literacy skills in their students.

Moreover, phonological awareness had an indirect and significant effect on YLE's vocabulary in Time two, mediated by YLE's Time one scores, which supports the connection between phonological awareness and vocabulary development and the need to understand this process, especially in bilingual children, through gains in both factors. This finding is supported by Krenca et al. (2022) who studied the transfer of both phonological awareness skills and vocabulary development in English - French bilingual children through the associations they were able to make when being exposed to an intervention using words with similar phonological patterns.

Additionally, Dickinson et al. (2004), partially support this when indicating that phonological awareness in Spanish and English were statistically meaningful predictors of their later scores as well as early literacy skills. These findings suggest not only an association between phonological awareness and pre-reading skills, but also the effects of psycholinguistic variables in second language learning processes.

Some of the limitations of this study come from its methodological design, since it is not experimental and with a non-randomized sample, which implies that its findings can only be interpreted within the group of participants, limiting its explanatory power. The level of control over the possible intervening variables was not complete, which would require further studies to ensure that these do not have significant effects over the study variables. Finally, the instrument which measured phonological awareness is not standardized for Colombian populations, this instrument needs to go through this process first before being used in future studies. Given this, further research should focus on larger and randomized samples of bilingual children and exploring in detail the various components of both phonological awareness and pre-reading skills.

Furthermore, future research can also include analysis of factors that predict the development of phonological awareness skills, reading comprehension and vocabulary development, which have also been linked in previous studies, as well as longer studies that evaluate the development of these skills over time.

This study also emphasized on the need for educators and researchers to work hand in hand in order to analyze the implications of phonological awareness on pre-literacy skills, as well as the ways in which phonological awareness can be understood and promoted in educational settings, particularly those with bilingual children, who face various challenges during their language development process.

Additionally, research in this field could benefit from interdisciplinary approaches that contribute not only to the development of skills, but also to the construction of bilingual linguistic policies that embrace the process of language learning from a holistic perspective that includes all actors of the educational and cognitive research fields. Teachers and linguistic researchers should also bear in mind that this process is a complex and multifactorial one that requires detailed attention, in order to understand the impact that educational practices such as reading aloud and introducing meaningful chunks of language to bilingual preschool children have on the development of both phonological awareness and later reading processes.

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