



# Revista de Psicodidáctica

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Original

## Longitudinal Study on the Development of Literacy Skills During Literacy<sup>☆</sup>

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### ARTICLE INFO

*Article history:*

Received 7 May 2017

Accepted 28 September 2017

Available online xxx

*Keywords:*

Oral language

Written language

Writing

Literacy

Writing instruction

*Palabras clave:*

Lenguaje oral

Lenguaje escrito

Escritura

Alfabetización

Enseñanza de la escritura

### ABSTRACT

There are many studies carried out in recent years on the process of learning to read. But there are very few works centered on the writing system and on the elements that favor this learning. The objectives of this study were to know the skills that facilitate access to learning the written code. A longitudinal quasi-experimental design was used, which showed the progress of 426 students from 5 to 7 years in the learning of writing. The results indicate that oral language, phonological awareness and naming speed are elements that favor this learning and reduce the risk of learning difficulties in the writing system.

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### Estudio longitudinal sobre el fomento de las habilidades de escritura en el periodo de alfabetización inicial

#### RESUMEN

Durante las últimas décadas han sido numerosas las investigaciones que se han centrado en el estudio de las habilidades que favorecen el proceso de adquisición de la lectura. Sin embargo, son escasos los estudios efectuados con relación al aprendizaje de la escritura y al conocimiento de los factores que contribuyen a este aprendizaje. El objetivo de este estudio se ha centrado en determinar qué variables facilitan la adquisición de la escritura en los primeros momentos en los que se accede al aprendizaje del código escrito. Se ha empleado un diseño cuasiexperimental de corte longitudinal que permite observar la evolución de 426 estudiantes desde los 5 hasta los 7 años de edad. Los resultados apoyan el desarrollo de modelos didácticos que integren el desarrollo del lenguaje oral, la conciencia fonológica y la rapidez de denominación tanto para la mejora del aprendizaje de la escritura como para la prevención de dificultades en esta habilidad lingüística.

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### Introduction

Research on the literacy process has allowed us to identify the relationships between oral language development and written language learning in early ages (Ainsworth, Welbourne, & Hesketh,

2016; Axpe, Acosta, & Moreno, 2012; Gutiérrez & Díez, 2015), which has offered important advances in the knowledge of the skills involved in learning to read and write. The studies carried out in recent years have focused mainly on the initial learning of reading while research destined to the learning of writing in early ages (Gutiérrez, 2017; Vernon, 1998) is very scarce. This situation may be due to the general tendency to conceive reading and writing as two complementary skills (Magán-Hervás & Gértrudix-Barrio, 2017; Marí, Gil, Ceccato, & Cisternas, 2014) as a consequence of the similarities and characteristics that they share, since when reading, a message that comes from the spoken language is decoded and when writing a message from the same language is coded.

PII of original article:S1136-1034(17)30112-0.

<sup>☆</sup> Please cite this article as: Gutiérrez R. Estudio longitudinal sobre el fomento de las habilidades de escritura en el periodo de alfabetización inicial. *Rev Psicodidact.* 2018. <https://doi.org/10.1016/j.psicod.2017.09.002>

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However, it has become clear that different cognitive mechanisms are involved in reading and writing learning (Gutiérrez & Díez, 2016; Jiménez, Naranjo, O'Shanahan, Muñetón-Ayala, & Rojas, 2009).

Phonological awareness has been one of the most studied skills in early ages regarding learning of written language, especially in relation to reading (Bravo, 2016; Defior & Serrano, 2011; Ouellette & Haley, 2013). Both longitudinal and correlation studies in different languages have shown that there is a significant relationship between phonological awareness measures and learning to read (Arancibia, Bizama, & Sáez, 2012; Compton, 2003; Defior & Serrano, 2011; Gutiérrez & Díez, 2016; Landerl & Wimmer, 2008), to the point of being considered at present as the best predictor of this learning (González, López, Cuetos, & Vilar, 2017; Suárez-Coalla, García de Castro, & Cuetos, 2013). It has been evidenced that the intervention on phonological awareness must follow a sequential process, initially it must start from the manipulation of the larger units (words and syllables) to later accede to the management of the smaller elements (intrasyllable units and phonemes) (Gutiérrez & Díez, 2015; Schuele & Boudreau, 2008).

Another area of interest in recent research related to phonological awareness has been the rapid designation of visual stimuli. The denomination velocity is also an important predictor of learning to read in transparent orthographies because it intervenes in the speed with which long-term phonological information can be retrieved (Defior & Serrano, 2011; Suárez-Coalla et al., 2013). Longitudinal studies have found that previous performance in naming speed allows predicting subsequent success in reading (Kirby, Parrila, & Pfeiffer, 2003). However, most studies of predictive skills in written language have focused on learning to read, unlike what has happened with writing.

The relationship between naming speed and learning to write has been studied less (Cuadro & Berná, 2015) and with the presence of conflicting results. Some researchers have found no influence of the automatic and rapid designation on writing (Landerl & Wimmer, 2008; Suárez-Coalla et al., 2013), while other authors have observed influences between both variables (González, Cuetos, Vilar, & Uceira, 2015; Plaza & Cohen, 2004), suggesting the need for new research that may address the study of this interaction.

In the case of phonological awareness and naming speed, there is an agreement that oral language intervenes to a great extent in the development of written language (Gutiérrez & Díez, 2016). To access the written code, it must be noted that the letters are graphic signs that correspond to sound elements, since each letter is associated with a sound unit (Defior & Serrano, 2011). In this achievement, the different components of language are involved: phonological, morph syntactic, semantic and pragmatic, which allow the individual to develop his/her communicative capacity and acquire the skills to gradually separate the sentence structure from its meaning (Guarneros & Vega, 2014). The relation of the development of the component of the form (phonology, morphology and syntax) with the learning of the written code has been the most analyzed factor, however, few studies are oriented to the study of the different facets of oral language and its repercussion in the learning of writing.

The importance of phonological awareness and naming speed in the acquisition of reading is widely documented (Defior & Serrano, 2011; González et al., 2017), however, there are hardly any studies that analyze the influence of these skills and the different components of oral language with the learning of writing. Similarly, there are no longitudinal studies in Spanish that establish a causal effect of such skills and access to the writing system. Establishing if there are differences regarding the sex of the students in the process of acquiring writing abilities has not been an aspect that has been given special attention.

This study has focused on analyzing the effect that joint intervention in phonological awareness, naming speed and oral language have on the initial learning of writing and whether there are differences in this learning process according to sex. To do this, two groups of students are compared from the beginning of the third level of preschool education until the end of the second year of primary education, one that receives instruction on the indicated variables and another that follows the curricular program established in the official regulations. Our hypothesis is that students belonging to the group that is trained will obtain a better performance in the learning of writing.

## Method

### Participants

The study has 426 students aged between 5 and 7 years ( $M=6.42$ ,  $SD=0.54$ ), of which 48.6% are boys and 51.4% are girls. All of them attend six state and semi-private educational centers that share the characteristic of being located in a socio-cultural context of average level. Of these, three schools were assigned to the experimental group (212 students) and the other three to the control group (214 students), considering that there was a similar distribution in both groups of students attending semi-private and state centers. Of the 212 experimental participants, 47.4% were male and 52.6% were female, while of the 214 participants in the control group, 48.6% were male and 51.4% were female. The contingency analysis (Pearson's chi-square) between condition and sex did not show statistically significant differences ( $\chi^2=0.48$ ,  $p>.05$ ).

### Instruments

*Navarre-revised oral test* (PLON-R) (Aguinaga, Armentia, Fraile, Olangua, & Úriz, 2005). It is a standardized test that allows the evaluation of different components of language: form (phonology, morphology and syntax), content (semantics) and use (pragmatic). The direct scores of each of the dimensions are transformed into typical scores organized into three categories: "below average", "needs improvement" and "normal" for each age. This test has a Cronbach coefficient of reliability of .80. The results show high composite reliability (CR=.91), mean extracted variance (VME = 54.73%) and McDonald's Omega coefficient ( $\Omega = .63$ ).

*Test for the Evaluation of Phonological Knowledge* (PECO) (Ramos & Cuadrado, 2006). This test evaluates the levels of phonological knowledge (syllabic and phonemic), each of which consists of three distinct tasks: identification, addition and omission. It includes three subtests with syllables and phonemes, with a total of 30 items. The maximum score that can be obtained is 30, one point for each correct answer. The reliability, measured through Cronbach's alpha coefficient, is .80. The results showed that the composite reliability was high (CR=.93), the mean extracted variance higher than .50 (VME = 57.48%) and the McDonald's omega coefficient ( $\Omega = .71$ ) implying that a high percentage of variance is explained by the construct.

*Speed of naming.* The Rapid Automatized Naming Test (RAN) (Wolf & Denckla, 2003). The RAN test is an individual application test. The objective of the task is to name 200 stimuli as fast as possible, grouped into four subtests: digits, letters, colors and drawings. The RAN task records the time it takes to name the stimuli of each card and the number of errors made when naming them. With these two data, an efficiency index is performed for each of the four types of subtests presented, according to the procedure used by Compton (2003), which converts the scores into digits per second, letters per second, colors per second and drawings per second. This test has a Cronbach coefficient of reliability of .80. The results showed

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