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# Teaching Phonological Awareness in the Classroom to Support Reading Acquisition: A Systematic Review

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## Abstract

This study addresses the systematization of phonological awareness (PA) intervention programs in the classroom, a key component for reading learning and educational inclusion. Following PRISMA guidelines, 18 programs were analyzed, demonstrating that phonological awareness teaching is feasible and beneficial in school contexts, particularly for students with learning difficulties. This approach promotes early detection and intervention within an inclusive framework, catering to disabled and non-disabled students. The findings emphasize the need for further research to standardize intervention methods and move towards more inclusive educational practices. These insights are crucial for developing pedagogical strategies that effectively integrate phonological awareness, contributing to accessible and equitable education for all students. The significance of this study lies in its potential to guide future educational policies and teaching practices, highlighting the value of phonological awareness as an inclusive and essential tool in the educational process.

**Keywords:** Phonological awareness; reading instruction; inclusive education; learning disabilities; intervention programs.

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# Enseñanza de la conciencia fonológica en el aula para favorecer el aprendizaje de la lectura: una revisión sistemática

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## Resumen

En la presente investigación se aborda la sistematización de programas de intervención de conciencia fonológica (CF) en el aula, un componente clave para el aprendizaje lector y la inclusión educativa. Siguiendo los lineamientos PRISMA, se analizaron 18 programas, evidenciando que la enseñanza de la CF es factible y beneficiosa en contextos escolares, particularmente para estudiantes con dificultades de aprendizaje. Esta forma de abordar la CF en el aula promueve su detección e intervención temprana en un marco inclusivo, atendiendo al estudiantado con y sin discapacidad. Los resultados enfatizan la necesidad de investigaciones adicionales que permitan estandarizar programas de intervención y avanzar hacia prácticas educativas inclusivas. Estos hallazgos son fundamentales para el desarrollo de estrategias pedagógicas que integren efectivamente la CF, contribuyendo así a una educación accesible y equitativa para todo el estudiantado. La relevancia de este estudio radica en su potencial para orientar futuras políticas educativas y prácticas docentes, subrayando el valor de la CF como herramienta inclusiva y esencial en el proceso educativo.

**Palabras clave:** Conciencia fonológica; educación inclusiva; enseñanza de la lectura; dificultades de aprendizaje; programas de intervención.

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# INTRODUCTION

Phonological awareness (PA) is a key precursor to literacy acquisition (Clayton et al., 2019; González-Seijas et al., 2017). It is a metalinguistic skill that enables individuals to reflect on linguistic units and manipulate their core components (McNeill et al., 2017). These components include the word, syllable, rhyme, and phoneme levels (Justi et al., 2021). The latter is significant for reading development and is a key focus of educational intervention (Castles et al., 2018; Moll et al., 2014). Due to its importance, students are expected to develop phonemic awareness through formal instruction during the early school years (Double et al., 2019). In educational settings where students have shown difficulties in phonological awareness, problems have been observed in learning letter–sound correspondences and, consequently, in acquiring reading skills (Gutiérrez-Fresneda et al., 2020).

PA programs are generally implemented in the classroom by teachers trained to instruct typically developing students (Molina-Roldán et al., 2021) or outside the classroom by professionals specialized in supporting students with reading difficulties individually or in small groups (Kruse et al., 2015). Inclusive education encourages all students to develop their learning primarily within the classroom (Wallace et al., 2021). Moreover, there is convincing evidence that PA can be effectively taught in the classroom through collaboration between teachers and speech and language therapists (Archibald, 2017). Sá and Lousada (2022) report that studies implementing PA programs have demonstrated effectiveness in fostering PA development. However, methodological inconsistencies, such as a lack of uniformity in the skills included, may affect the reported effectiveness. In this context, the teaching of PA in the classroom has become a challenge for all professionals working in the educational field, especially for classroom teachers, who have had to adapt traditional teaching methods to meet the academic needs of a highly diverse student population (Wilson et al., 2019).

In this regard, it is crucial to systematize classroom-based PA intervention programs and identify the elements that meet minimum standards for replicability in inclusive settings. PA instruction should explicitly address the strategies needed to respond to students' diverse needs and errors during learning, for example, scaffolding and positive feedback (Schuele & Boudreau, 2008; Phillips et al., 2008). Additionally, duration, intervention intensity, and the types of skills targeted should be considered when designing instruction (Phillips et al., 2008). Therefore, we aim to systematize relevant information on classroom-based PA intervention programs. Although systematic reviews exist to date, they do not focus on the classroom as the primary setting for PA instruction. Reviewing and systematizing classroom-based PA intervention programs could support the development of PA in a way that includes all students. Based on this, the following research questions were formulated:

(1) What are the fundamental pillars of PA instruction in the classroom to support reading acquisition?

(2) What outcomes have been observed in classroom-based PA training programs?

# METHOD

This study followed a systematic review design, and its development adhered to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards at each stage (Page et al., 2021).

## *Search strategy*

The search was conducted in the Web of Science, Scopus, and EBSCO databases in August 2021. The search strategy included the following keywords: *"phonological awareness" AND intervention OR programme OR training OR therapy OR treatment OR strategies AND classroom*, combined using the Boolean operators AND and OR. Filters were applied to the full text. No restrictions were placed on language or

publication date. The first three researchers conducted the process jointly to avoid errors or duplicating the information extracted from the databases.

## Eligibility criteria

The selection of studies was based on the following inclusion criteria: (a) research on PA intervention programs; (b) the intervention program had to be implemented in the classroom; (c) the intervention had to be delivered to the entire class; and (d) programs in all languages were included.

On the other hand, the following exclusion criteria were applied: (a) programs in which PA was addressed in small groups within the classroom; (b) programs that did not intervene on PA but used it as an assessment tool for other skills; and (c) research types such as systematic reviews, meta-analyses, books, theses, and grey literature.

## Study selection process

The search yielded 559 articles [Scopus (9%), EBSCO (64%), Web of Science (27%)]. All database studies were organized into a shared Excel spreadsheet, including information on authors, year, title, and abstract. Subsequently, the first author (DA) manually removed duplicates, a process verified by the second author (DG). Based on the inclusion and exclusion criteria, the first three authors reviewed an equal number of articles, reading the titles and abstracts. Articles that met the inclusion criteria were selected for full-text review. The fourth author (DI), blinded to the evaluations of the other researchers, reviewed 20% of the articles (Pettigrew & Roberts, 2005), achieving strong inter-rater reliability ($\kappa = 0.81$; McHugh, 2012). As a result, 82 studies were selected for full-text review. At this stage, the first two authors independently reviewed the chosen texts. In discrepancies, the articles were jointly reanalyzed to reach a consensus. Ultimately, 18 articles met the established criteria and were included in this review (Figure 1).

## Quality assessment of the studies

The quality assessment of the articles included in the review was conducted by the fourth author (DI) and verified by the rest of the authors in cases of uncertainty. For this purpose, the Quality Assessment for Diverse Studies (QuADS) tool was used (Harrison et al., 2021). It consists of 13 items, each scored on a scale from 0 to 3, yielding a maximum total score of 39. Higher scores indicate better study quality.

## Data extraction

Once the 18 articles were selected, the data extraction process began for each study. The first three authors printed and reviewed the articles simultaneously. Each author then cross-checked the extracted information with a colleague to ensure accuracy. The first author (DA) manually extracted and organized the data into three tables. In contrast, the second author (DG) verified the information and standardized the data to improve clarity and understanding.

Initially, general information about each study was extracted, including the year of publication, research design, country where the study was conducted, and language. Subsequently, key details related to the intervention characteristics were collected, such as participants' age, the grade level at which the program was implemented, and program duration (total duration, number of sessions, session frequency, and minutes per session). Finally, information about the intervention programs was analyzed based on the framework proposed by Labra et al. (2022). For each intervention program, the following data were extracted: author, language, country, participants, duration of the intervention, targeted skill, interventionist professional, and intervention strategies used. In addition, the primary outcomes and contributions of the programs to PA instruction within the classroom were included.


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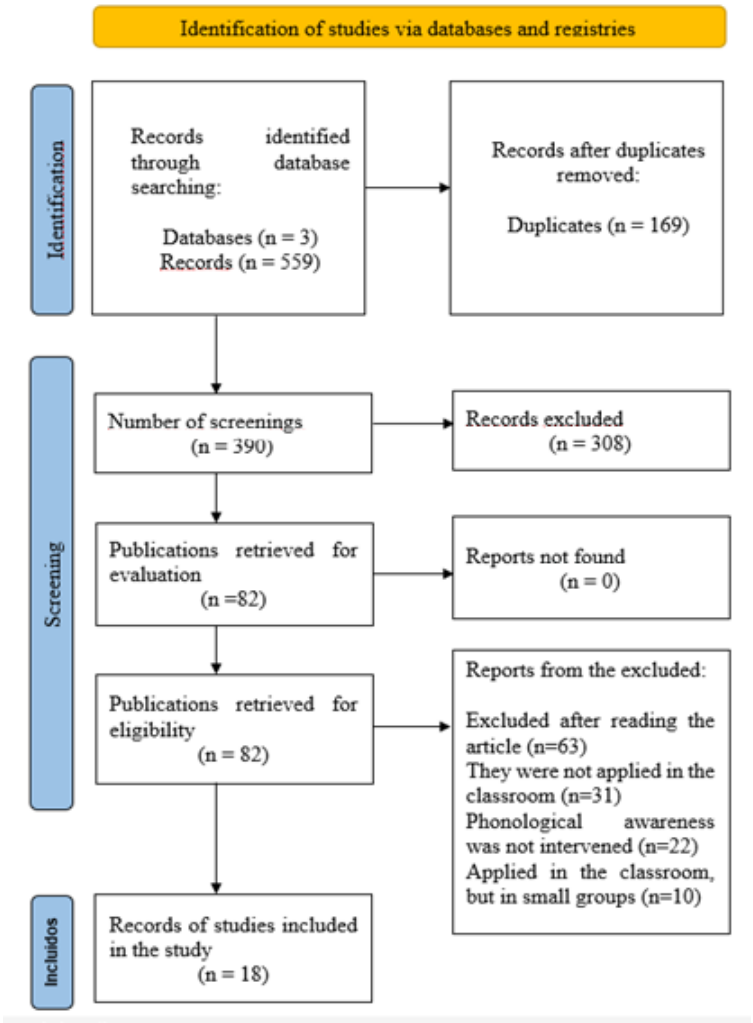
**Figure 1**

*PRISMA Flow Diagram*




# RESULTS

(1) *What are the fundamental pillars of PA instruction in the classroom to support reading acquisition?*

## *Characteristics of the studies*

As shown in Appendix 1, most of the eighteen analyzed studies employed an experimental design (61%). Regarding language, 44% of the studies were conducted in Spanish. Regarding methodological quality assessment, using the QuADS scale criteria, the analyzed studies yielded scores ranging from 20 to 34 points, corresponding to quality levels between 51% and 87%. Overall, the item that received the highest score was the statement of intervention objectives ($\bar{x}$=2.9). In contrast, the item with the lowest score showed that stakeholders were considered in the study design ($\bar{x}$=0.3) (Appendix 2).

## Targeted skill and participants

All 18 reviewed interventions included the teaching of phonemic awareness. Among these studies, seven reported that their results contributed to understanding the relationship between PA intervention programs and reading development (Carson et al., 2013; Fresneda, 2018; Linan-Thompson et al., 2005; Mayer & Motsch, 2015; Parpucu & Dinç, 2017; Ritter & Saxon, 2011; Schuele et al., 2008). Two studies linked their findings to writing (Bodé & Content, 2011; González-Seijas et al., 2015), and only one focused on academic performance (Porta & Ramírez, 2020).

Regarding participants, only eight studies included individuals with disabilities or at academic risk in their samples (Acosta-Rodríguez et al., 2011; Carson et al., 2013; Linan-Thompson et al., 2005; Mayer & Motsch, 2015; Muñoz et al., 2018; Ritter & Saxon, 2011; Schuele et al., 2008; Tyler et al., 2014).

## Facilitator

In 12 of the 18 studies analyzed, the intervention was led by classroom teachers, and in only one case was it led by a speech and language therapist (Ritter & Saxon, 2011). In the studies by Schuele et al. (2008) and Acosta-Rodríguez et al. (2011), the interventions were conducted collaboratively by a speech and language therapist and the teachers, who designed and implemented PA tasks in the classroom. In addition, 13 studies provided training to facilitators. Of these, eight focused on the intervention programs (Bodé & Content, 2011; Carson et al., 2013; Flórez-Romero et al., 2009; González-Seijas et al., 2015; Linan-Thompson et al., 2005; Mayer & Motsch, 2015; Schuele et al., 2008; Stuart, 1999); two focused on theoretical aspects of PA (Muñoz et al., 2018; Tyler et al., 2014); and three studies reported providing training without detailing its content (Gutiérrez-Fresneda, 2018; Kelly et al., 2019; Porta & Ramírez, 2020).

## Intervention strategies and dosage

Regarding strategies or supports, only three studies provided specific details about those used during the intervention (Linan-Thompson et al., 2005; Acosta-Rodríguez et al., 2011; Ritter & Saxon, 2011). These studies included modeling, explicit instruction, feedback, and scaffolding supporting PA learning.

The total duration of the reviewed studies varied considerably. The longest interventions were those by González-Seijas et al. (2013; 2015) and Schuele et al. (2008), with groups followed up to three years in the former studies and approximately 25 weeks in the latter. Among the shortest interventions were those by Flórez-Romero et al. (2009), lasting seven weeks, and those by Laing & Espeland (2005) and Parpucu & Dinç (2017), lasting a total of eight weeks. It is worth noting that no consistent standard was observed regarding how intervention duration was reported: it ranged from hours, as in Linan-Thompson et al. (2005), to years, as in González-Seijas et al. (2013; 2015), and also included durations reported in days and months.

(2) *What outcomes have been observed in classroom-based PA training programs?*

## Main findings and conclusions

The various studies analyzed here indicate that PA instruction can be implemented from an early age; some even emphasize the importance of its implementation as a means of preventing difficulties in reading and writing acquisition (Stuart, 1999; González-Seijas et al., 2013; Parpucu & Dinç, 2017; Kelly et al., 2019). The studies by Carson et al. (2013), Tyler et al. (2014), and Kelly et al. (2019) further reinforce that classroom-based phonemic awareness instruction yields the most significant impact. Some studies target phonemic awareness from an early age, achieving positive outcomes even among students at risk, such as those with language disorders (Flórez-Romero et al., 2009; Laing & Espeland, 2005; González-Seijas et al., 2013; 2015; Tyler et al., 2014; Kelly et al., 2019). Several studies suggest that students at risk for reading difficulties can benefit from PA intervention within the classroom context, particularly when combined with interventions targeting other skills that support emergent literacy—such as rapid naming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(González-Seijas et al., 2013; 2015; Mayer & Motsch, 2015; Gutiérrez-Fresneda, 2018), alphabet knowledge (Stuart, 1999; Linan-Thompson et al., 2005; Ritter & Saxon, 2011; Carson et al., 2013; Gutiérrez-Fresneda, 2018; Kelly et al., 2017; Porta & Ramírez, 2020), vocabulary development (Flórez-Romero et al., 2009; Porta & Ramírez, 2020), and morphological awareness (Porta & Ramírez, 2020).

### *Contributions of classroom-based PA intervention*

Implementing PA intervention in the classroom has proven to be as effective as programs conducted in clinical settings, according to Stuart (1999), enabling students to rapidly acquire the concepts without needing instruction outside the classroom. Moreover, this approach is more cost-effective, eliminating the need for additional staff, extra materials, or time outside the regular school schedule, as highlighted by Linan-Thompson et al. (2005), Schuele et al. (2008), and Kelly et al. (2019). Significantly, teaching PA in the classroom also facilitates the early identification of students with low reading performance and those who require support in additional cognitive skills (Schuele et al., 2008; Bodé & Content, 2011).

## DISCUSSION

This review aimed to systematize relevant components of studies on PA instruction in the classroom. Its main contribution is defining how programs are structured to address this skill. This review is directly aligned with inclusive education, which promotes teaching all students within the classroom setting (Wallace et al., 2021). Our findings show that PA instruction in the classroom is carried out alongside the development of other skills, such as rapid naming and grapheme–phoneme conversion. These findings are consistent with previous studies suggesting that PA training should include additional skills related to reading instruction (Sá & Lousada, 2022). However, it is essential to emphasize that our analysis shows PA, and specifically phonemic awareness, continues to play a central role in reading instruction and learning, reaffirming the importance of its training within educational settings.

On the other hand, our results reveal a widespread lack of detail regarding the strategies used in the reviewed programs. Intervention strategies are key to supporting students in achieving the expected outcomes, for example, through questioning, feedback, and modeling. The reviewed studies report strategies such as modeling, scaffolding, and feedback, which align with the recommendations of Schuele & Boudreau (2008), who suggest that professionals should not only ask questions, but also carefully sequence instruction, provide extensive practice, and offer scaffolding based on the student's level of performance. In our view, this is one of the most significant variables in intervention, yet at the same time, one of the least detailed in the studies, which could hinder the implementation and replicability of these programs (Spencer et al., 2008).

Regarding therapeutic dosage, the American Speech-Language-Hearing Association (2016) highlights its importance for the effectiveness of PA intervention. Our results show no consensus regarding the sessions' duration, frequency, and length. This poses a challenge for evidence-based decision-making, as although this information is explicitly reported in the studies, as suggested by Carson et al. (2013) and Phillips et al. (2008), there is no clear trend that would allow for a precise determination of intervention dosage in PA instruction within the classroom. This represents a challenge for both teachers and speech and language therapists, as properly defining the duration of treatment is crucial to ensuring the acquisition of language and/or reading skills (Baker, 2012). Such heterogeneity has previously been reported for other language levels (Segura-Pujol & Briones-Rojas, 2021). It may hinder replicability and decision-making according to evidence-based practice guidelines (Sá & Lousada, 2022). Therefore, it is recommended that future research report dosages based on students' needs and available classroom resources (Hegarty et al., 2018).

Regarding the interventionist, although collaborative work between teachers and speech and language therapists is presented as a valuable approach for teaching PA in the classroom (Veríssimo et al., 2021), only two studies in this review reported collaborative PA instruction in the classroom.

Nevertheless, such interactions contribute to improved teaching practices that facilitate learning for all students, including those with disabilities (Archibald, 2017). This highlights a key opportunity for developing programs that foster collaborative implementation of PA instruction between teachers and speech and language therapists (González-Fernández et al., 2023). Therefore, future studies must specify how professionals should interact in teaching PA in the classroom, both during the assessment process (Manosalba-Torres & Arancibia-Gutiérrez, 2023) and during intervention (Kjeldsen et al., 2019).

Finally, studies such as those by González-Seijas et al. (2013) and Linan-Thompson et al. (2005) support the notion that early PA instruction in the classroom is not only more cost-effective and efficient than in clinical settings but also aligned with the principles of inclusive education (Muñoz et al., 2018). This approach facilitates the early detection and intervention of PA difficulties, particularly among students at risk for learning difficulties, within their regular educational environment.

### *Limitations*

The limitations of this study include the number of databases used. For future research, it is recommended to expand the scope and include additional databases that may contain studies not considered in this review. Moreover, the analysis does not allow for the identification of which programs are effective for PA training. Therefore, meta-analyses are recommended to obtain such information.

### *Conclusion*

PA is recognized as an essential skill for learning to read and write. The reviewed programs reveal limited information regarding strategies or procedures that can help clarify how to teach this skill in the classroom. These findings will improve decision-making for those responsible for designing language intervention programs, educational plans, and even those in charge of shaping educational policy. However, the high variability of the results highlights the urgent need for further research, including studies incorporating students with greater support needs.

## AUTHOR CONTRIBUTIONS

**Durley Ruth Amaya-Medina**: Project administration; Formal analysis; Conceptualization; Data curation; Writing – original draft; Writing – review and editing; Investigation; Methodology; Resources; Supervision; Validation; Visualization.

**Daniela González-Fernández**: Formal analysis; Conceptualization; Data curation; Writing – original draft; Writing – review and editing; Investigation; Methodology; Resources; Supervision; Validation; Visualization.

**Juan Felipe Flores-González**: Formal analysis; Writing – review and editing; Validation; Visualization.

**Daniela Iturra-Osorio**: Formal analysis; Writing – review and editing; Validation; Visualization.

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## APPENDIX 1

*Characteristics of intervention programs in phonological awareness in the classroom*

| Author (Year)Language/ Country | Participants (CS = Control group; EG = Experimental group / MA = Mean age) | Duration of the classroom intervention | Type of study | Level of the targeted | Facilitator / Facilitator training | Intervention strategies | Main results and conclusions | Contributions of the PA intervention in the classroom |
|---|---|---|---|---|---|---|---|---|
| Stuart (1999) English/England | 112 students CG = 57; MA: 5.08 EG = 55; MA: 5.0 | Total: 12 weeks, 30 minutes per day. | Experimental | Phoneme | Classroom teachers. Training on the program | Not reported. | Significant gains were observed in the experimental group in phoneme segmentation and awareness, as well as improvements in reading and writing skills. One year after the intervention, this group remained ahead in phonemic awareness. These findings support the idea that early intervention has lasting effects on reading and writing development. | Most children can quickly acquire PA concepts within the classroom setting without the need for small group instruction. |
| Linan-Thompson et al. (2005) Spanish / United States | 28 students: CG: 58 participants; MA = 5.78 EG: 70 participants; MA = 5.78 | Total: 2 sessions total 3 sessions per week, 20 minutes each | Experimental | Phoneme | Classroom teachers. Training on the program | Modeling, explicit language use, corrective feedback, scaffolding, and rhyming activities | Despite the short duration of the intervention, at-risk children who received explicit reading instruction in Spanish made significant gains in PA skills. | PA interventions are easy to implement and cost-effective in classroom settings. Teachers were able to apply the intervention quickly, without the need for additional resources, and it improved students' academic performance. |
| Laing and Espeland (2005) English / United States | 11 participants: CG = 5; MA: 4.3 EG= 6; MA: 4.3 | Total: 8 weeks, 2 sessions per week, 15 minutes each | Experimental | Rhymes and phonemes | Researcher Training not reported. | Not reported. | The brief, low-intensity intervention improved PA in children with expressive language and/or phonological disorders, bringing them to the level of | Classroom-based interventions can directly improve PA skills in children with speech and/or language delays. |

| Author (Year)Language/ Country | Participants (CS = Control group; EG = Experimental group / MA = Mean age) | Duration of the classroom intervention | Type of study | Level of the targeted | Facilitator / Facilitator training | Intervention strategies | Main results and conclusions | Contributions of the PA intervention in the classroom |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | their peers in the control group. | |
| Schuele et al. (2008) English / United States | 113 participants: CG= 56; MA: 5.67 EG= 57; MA: 5.67 | Total: 36 sessions, 3 per week, 20 minutes each. | Experimental | Rhyme, syllable, and phoneme | Classroom teachers and speech-language pathologist. Training on the program. | Not reported. | PA instruction has a positive impact on reading and writing; however, the quality of instruction and the way children engage in sessions are key factors. | Classroom-based PA instruction helped differentiate typically developing children from those with lower performance. Small-group instruction is more costly and may be better targeted to children with greater needs. |
| Flórez-Romero et al. (2009) Spanish / Colombia | 126 participants: CG= 25; MA: 4 – 4.75 EG= 101; MA: 4 – 4.75 | Total: 7 weeks | Experimental | Not reported. | Classroom teachers Training on the program. | Not reported. | The program combined universal practices with targeted interventions, including PA and small-group work, and was more effective in fostering skills required for alphabetic success. | Small-group PA work benefits children performing below average. |
| Acosta et al. (2011) Spanish / Spain | 3 participants MA: 4 | Total: 48 sessions, 3 per week, 15 minutes each | Case study | Syllabic and phonemic | Classroom teachers and speech-language pathologist. Training not reported. | Classroom organization, structured PA knowledge, scaffolding, and interactive modeling. | Improvements were observed in intersyllabic and intrasyllabic awareness within the classroom context. However, the development of phonemic awareness was minimal. It is concluded that although classroom-based instruction may positively impact syllabic awareness in children with Specific language impairment (SLI), a more | Children with SLI can benefit from classroom-based intervention focused on intersyllabic and intrasyllabic awareness. However, improving phonemic awareness likely requires targeted work outside the classroom. |



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|---|---|---|---|---|---|---|---|---|
| | | | | | | | clinical approach is required to effectively develop phonemic awareness. | |
| Bodé and Content (2011) Luxembourgish / Luxembourg | 307 participants CG= 157; MA: 5.67 EG= 150; MA: 5.58 | Total: 20 weeks, 5 sessions per week, 10 minutes each | Experimental | Rhyme, syllable, and phonemeas | Classroom teachers. Training on the program. | Not reported. | Moderate statistical effects were found for phoneme synthesis and pseudoword tasks. For pseudoword spelling, only syllable synthesis and short-term verbal memory were significant predictors. Teacher training and participation in supervision sessions did not contribute significantly. | The study suggests that PA activities can be easily integrated into the current kindergarten context without requiring specialized knowledge or substantial instructor supervision. Moreover, they may help teachers identify non-responders, who are potentially at greater risk for learning difficulties. |
| Ritter and Saxon (2011) English / United States | 59 participants: CG= 29; MA: 6.67 EG= 30; MA: 6.67 | Total: 12 weeks, 2 sessions per week, 25 minutes each | Experimental | Rhyme, syllable, and phoneme | Speech-language pathologist. Training not reported. | Modeling, repetition, guidance, and verbal explanations. Facilitative prompts based on the child's responses. | The implementation of the PSI program in the classroom significantly improved reading skills in children identified as at risk for reading disabilities. | This study provides preliminary evidence that children at risk, including those identified with speech and language impairments, can also benefit from classroom-based PSI interventions. |
| Carson et al. (2013) English / New Zealand | 129 participants: CG= 95; MA: 5.03 EG= 34; MA: 5.03 | Total: 12 weeks, 4 sessions per week, 30 minutes each | Quasi-experimental | Phoneme | Classroom teachers. Training on the program. | Not reported. | Intensive classroom-based PA instruction significantly improved reading and spelling, benefiting both children with *TEL* and those at risk for reading difficulties. | PA instruction should adopt a comprehensive approach to the development of phonemic awareness. |
| González et al. (2013) Spanish / Spain | 326 participants: CG = 155; MA: | Longitudinal study of up to 3 years in | Experimental | Rhyme, syllable, | Classroom teachers. Training not reported. | Not reported. | After three years of intervention in | Not reported. |

| Author (Year)Language/ Country | Participants (CS = Control group; EG = Experimental group / MA = Mean age) | Duration of the classroom intervention | Type of study | Level of the targeted | Facilitator / Facilitator training | Intervention strategies | Main results and conclusions | Contributions of the PA intervention in the classroom |
|---|---|---|---|---|---|---|---|---|
| | 3.99 – 5.97 EG= 171; MA: 3.94 – 5.95 | preschool; 2 sessions per week | | and phoneme | | | PA and rapid naming starting at age 4, the results showed improved performance compared to the official curriculum. Age-specific tasks suggest that PA is particularly critical at ages 4 and 5, while rapid naming plays a greater role at age 5. The findings underscore the importance of designing interventions tailored to needs identified from an early age. | |
| Tyler et al. (2014) English / United States | 24 participants: MA: 3.10 – 4.11 | Total: 10 weeks, 4 sessions per week, 20 minutes each | Quasi-experimental | Phoneme. | Classroom teachers. Training on theoretical aspects | Not reported. | Explicit phonemic awareness instruction for 4-year-old children led to significant gains, highlighting the importance of targeted instruction in phoneme blending. | Phonemic awareness instruction involving complex tasks can be implemented in the classroom setting with 4-year-old children, benefitting even those at risk for reading disorders. |
| González et al. (2015) Spanish / Spain | 271 participants: CG= 133; MA: 3.93 – 5.9 EG= 138; MA: 4.04 – 5.97 | Longitudinal study of up to 3 years in preschool; 2 sessions per week, 30–45 minutes each | Quasi-experimental | Rhyme, syllable, and phoneme | Classroom teachers. Training on the program. | Not reported. | The results highlight the importance of PA and vocabulary development (VD) in writing, as both are fundamental for spelling skills and the automatization of basic written processes. PA contributes to early spelling. | Explicit classroom instruction in PA and rapid naming improves writing acquisition, at least at basic levels. These findings underscore the importance of designing programs suitable for classroom implementation. |



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|---|---|---|---|---|---|---|---|---|
| Mayer and Motsch (2015) German / Germany | 85 participants: CG= 68; MA: 6.4 EG= 17; MA: 6.4 | Total: 14 weeks, 2 sessions per week, 40 minutes each | Experimental | Rhyme, syllable, and phoneme | Classroom teachers. Training on the program. | Not reported. | Children with a double deficit require targeted support. These results are the first to show that inclusive classroom interventions for German-speaking children can successfully prevent difficulties in written language acquisition among those at risk for dyslexia. | PA difficulties can be addressed within the classroom context, even when combined with rapid naming difficulties. However, it is suggested that small-group instruction may be even more effective for these children. |
| Parpucu and Dinç (2017) Turkish / Turkey | 43 participants: CG= 19; MA: 5.0 – 6.0 EG= 24; MA: 5.0 – 6.0 | Total: 8 weeks, 3 sessions per week, 40–60 minutes each. | Quasi-experimental | Rhyme, syllable, and phoneme | Researcher. Training not reported. | Not reported. | The Colorful Worlds of Sounds program is effective in improving PA. The findings emphasize the importance of early PA intervention in education and its positive impact on reading development. | Not reported. |
| Gutiérrez (2018) Spanish / Spain | 408 participants: CG= 202; MA: 5.36 EG= 206; MA: 5.36 | Total: 60 sessions, 5 per week, 45 minutes each | Quasi-experimental | Word, rhyme, syllable, and phoneme | Facilitator and training not reported | Not reported. | Phonemic awareness contributes more significantly to reading acquisition than syllabic awareness, which appears to be less relevant. The study suggests designing instructional proposals based on tasks focused on awareness of the smallest units of speech, along with activities that promote rapid naming and | Not reported. |

| Author (Year)Language/ Country | Participants (CS = Control group; EG = Experimental group / MA = Mean age) | Duration of the classroom intervention | Type of study | Level of the targeted | Facilitator / Facilitator training | Intervention strategies | Main results and conclusions | Contributions of the PA intervention in the classroom |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | dialogic reading. | |
| Muñoz et al. (2018) Spanish / Chile | 162 participants: CG= 81 EG= 81 | Total: 5 months, 7 sessions per week, 15 minutes each | Quasi-experimental | Phoneme. | Classroom teachers. Training in theoretical aspects | Not reported. | The intervention in phonemic awareness led to notable improvements in phoneme segmentation, highlighting its benefits. Teachers positively valued the feedback and planning, both of which were crucial for enhancing teaching practices. | Classroom-based phonemic awareness intervention is effective when implemented through a professional development approach, enhancing skills. |
| Kelly et al. (2019) English / Australia | 120 participants: CG= 60; MA: 4.2 EG= 60; MA: 4.2 | Total: 38 weeks, one 40-minute session every two weeks | Experimental | Rhyme, syllable, and phoneme | Classroom teachers. Training not reported.especificado. | Not reported. | The program group showed significant improvements in phonemic awareness, literacy, and reading. The program was effective in enhancing PA skills and alphabet knowledge in young children. Short and varied instruction proved to be effective. | PA instruction delivered by classroom teachers in large-group settings can be effective. One-on-one models, while more resource- and time-intensive, reach fewer students. |
| Porta and Ramírez (2020) Spanish / Argentina | 129 participants: CG= 58; MA: 5.5 EG= 55; MA: 5.5 | Total: 22 sessions (PA); 14 sessions (PA + vocabulary + morphological awareness), 30 minutes each | Quasi-experimental | Rhyme, and phoneme | Classroom teachers. Training not reported. | Not reported. | The results of this study support the integration of PA, vocabulary, and morphological awareness into kindergarten interventions to promote later literacy success. Focusing on PA alone may not yield the long-term outcomes required for more advanced literacy tasks | Early intervention programs can be effectively delivered to entire classrooms by trained classroom teachers. |



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|---|---|---|---|---|---|---|---|---|
| | | | | | | | such as reading comprehension. | |

## APPENDIX 2

*Quality assessment of articles on PA intervention programs included in the review*

| Study / Items | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Score | Quality % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stuart (1999) | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 0 | 2 | 28 | 72 |
| Linan-Thompson, et al (2005) | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 1 | 1 | 3 | 0 | 2 | 28 | 72 |
| Laing and Espeland (2005) | 2 | 3 | 3 | 3 | 1 | 3 | 2 | 3 | 1 | 1 | 2 | 0 | 2 | 26 | 67 |
| Schuele, et al (2008) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 0 | 2 | 31 | 79 |
| Flórez-Romero et al. (2009) | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 33 | 85 |
| Acosta, et al (2011) | 2 | 2 | 3 | 1 | 0 | 2 | 2 | 1 | 2 | 2 | 1 | 0 | 2 | 20 | 51 |
| Bodé and Content (2011) | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 29 | 74 |
| Ritter and Saxon (2011) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 0 | 2 | 32 | 82 |
| Carson el al. (2013) | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 34 | 87 |
| González-Seijas et al. (2013) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 0 | 1 | 29 | 74 |
| Tyler, et al (2014) | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 0 | 2 | 30 | 77 |
| González-Seijas et al. (2015) | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 0 | 2 | 31 | 79 |
| Mayer and Motsch (2015) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 3 | 0 | 1 | 30 | 77 |
| Parpucu and Dinç (2017) | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 3 | 2 | 2 | 3 | 0 | 2 | 29 | 74 |
| Gutiérrez-Fresneda (2018) | 2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 0 | 2 | 31 | 79 |
| Muñoz et al. (2018) | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 26 | 67 |
| Kelly et al. (2019) | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 0 | 3 | 31 | 79 |
| Porta and Ramírez (2020) | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 0 | 2 | 29 | 74 |