

Supporting School Readiness through Intensive Summer Programs: Evidence from an Emergent Literacy Intervention

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Abstract

This study examines the effectiveness of an intensive summer program designed to support school readiness through the development of emergent literacy in preschool children. Using a pre-experimental pre-test/post-test design, 16 preschoolers participated in a two-week intervention including structured daily activities such as guided reading, phonological awareness tasks, and graphomotor exercises.

Emergent literacy was assessed through a multidimensional instrument covering vocabulary, print knowledge, letter recognition, phonemic awareness, early writing, and story comprehension, alongside measures of visual attention and instruction comprehension.

Results indicate significant improvements in emergent literacy and visual attention following the intervention. However, substantial individual variability was observed. Gains in literacy were not consistently associated with improvements in visual attention, suggesting that executive functions – operationalized through instruction comprehension – may play a more important role in mediating learning outcomes.

These findings support a multidimensional perspective on emergent literacy and highlight the importance of integrating cognitive factors into intensive summer programs aimed at enhancing school readiness. The study provides preliminary empirical evidence for the effectiveness of short, structured interventions in early childhood education.

Keywords: school readiness, emergent literacy, intensive summer programs, executive functions, early childhood education

JEL Classification: I21, I24

1. Introduction

The fundamental importance of emergent literacy (pre-literacy) is well documented in the scientific literature, this dimension being considered an essential predictor of school success during the first years of formal education and of subsequent educational trajectories (Cabell, Justice, Logan, & Konold, 2013; Lonigan & Phillips, 2016; Koželuhová & Koželuh, 2024). Longitudinal studies indicate that the level of emergent literacy skills during the preschool years predicts both later reading and writing acquisition and long-term academic outcomes (Cabell, Justice, Konold, & McGinty, 2011; McClelland, Acock, Piccinin, Rhea, & Stallings, 2013; Balea, Kovacs, & Pogăcean, 2024). In this context, well-structured early interventions become crucial for consolidating a solid foundation of precursor skills, especially among children from socio-economically vulnerable backgrounds (Law et al., 2017; Moonsamy & Carolus, 2019; Xu & Liu, 2021).

Building on these premises, the present study aims to investigate the effectiveness of a two-week intensive programme conducted during the summer holiday for the development of emergent literacy skills among older preschoolers transitioning to the preparatory grade, as well as the role of visual attention and instruction comprehension in explaining the observed progress.

2. Literature Review

Recent research highlights that educational programmes explicitly oriented toward literacy during the preschool years – either through language- and literacy-centered curricula or through complementary programmes – can generate consistent gains in vocabulary, phonological awareness, knowledge of print conventions, and letter recognition, particularly among children at educational risk (Lonigan et al., 2013; Nancollis, Lawrie, & Dodd, 2005; Thomas, Colin, & Leybaert, 2020). Meta-analyses of family literacy programmes and targeted interventions confirm that investments made during the preschool stage present a particularly favorable cost-benefit ratio and contribute to reducing developmental gaps before school entry (Fikrat-Wevers, van Steensel,

& Arends, 2021; Hannon, Nutbrown, & Morgan, 2020; Fikrat-Wevers et al., 2021). In Romania, findings from preparatory grade studies and remedial programmes likewise emphasize the need for systematic approaches to emergent literacy, adapted to local contexts and to children's initial developmental levels (Balea, Kovacs, & Temple, 2023; Hurjui, 2024).

A critical moment for such interventions is represented by the transition from kindergarten to the beginning of formal schooling. Intensive summer programmes implemented over short periods but with high frequency have proven effective in accelerating literacy development and strengthening school readiness, including among children with developmental or reading difficulties (Pears, Kim, Fisher, & Yoerger, 2016; Donnelly, Huber, & Yeatman, 2019; Christodoulou et al., 2017). Such interventions aim to maximize exposure to literacy activities within a limited time frame while maintaining a high level of engagement and a playful character, which makes them particularly suitable for preschool-aged children (Lennox, Westerveld, & Trembath, 2018; Yen & Lee, 2019).

From a theoretical perspective, emergent literacy is a complex construct that includes multiple interrelated subcomponents: expressive vocabulary, knowledge of print conventions, recognition of letters and words, phonemic awareness, early writing skills (e.g., name writing), and story comprehension (Cabell et al., 2013; Cabell et al., 2011; Casani, 2024). Assessments of emergent literacy profiles indicate that these indicators organize into distinct patterns, with direct implications for the design of educational interventions (Cabell et al., 2011; Cabell et al., 2013; Cabell et al., 2011 – profiles). Consequently, programmes targeting multiple subskills simultaneously are more likely to support a smooth transition toward the reading and writing demands of primary education (Lonigan & Phillips, 2016; Koželuhová & Koželuh, 2024; Balea et al., 2024).

In addition to these linguistic and print-related dimensions, the literature also highlights the role of cognitive factors such as visual attention and executive functions in literacy acquisition. Experimental and longitudinal studies show that visuospatial attention supports rapid letter and word recognition, line tracking, and efficient text scanning, thereby influencing the pace of reading acquisition (Franceschini, Gori, Ruffino, Pedrolli, & Facoetti, 2012; Plaza & Cohen, 2007; Valdois, 2019; Justice et al., 2008; McClelland et al., 2013). At the same time, executive functions – particularly inhibitory control, working memory, and cognitive flexibility – are significantly

associated with literacy performance, especially reading comprehension, beyond the contribution of purely linguistic components (Gandolfi, Viterbori, Traverso, & Usai, 2021; Follmer, 2017; Nouwens, Groen, Verhoeven, & Segers, 2021; Williams, 2022). The ability to understand and follow instructions may therefore be viewed as an applied manifestation of executive functions in structured learning situations.

3. Methodology

3.1. Context and participants

The research was conducted within the framework of an intensive summer “school readiness” programme designed as a short-term intervention implemented prior to children’s entry into the preparatory grade. Such programmes, focused on literacy and self-regulation during the summer period, have been shown to significantly improve school readiness, particularly among children at educational risk (Pears, Kim, Fisher, & Yoerger, 2016; Donnelly, Huber, & Yeatman, 2019; Christodoulou et al., 2017).

The programme described in the present study consisted of 10 consecutive working days, including daily focused activities lasting 60-90 minutes. This structure followed the rationale of short but frequent interventions recommended in the literature on intensive summer programmes: concentrated exposure to literacy tasks within a limited time frame in order to prevent skill erosion and accelerate progress before school entry (Donnelly et al., 2019). The format was designed to maximize children’s exposure to emergent literacy stimuli (letter activities, word games, stories, and phonological awareness tasks), while simultaneously maintaining a high level of engagement and reducing the risk of fatigue during the preschool years.

The intervention target group consisted of 16 older preschoolers transitioning to the preparatory grade. The relatively small sample size is typical of pilot studies aimed at testing the feasibility and potential effectiveness of intensive intervention formats prior to implementation on larger samples (Donnelly et al., 2019; Christodoulou et al., 2017).

From an ethical perspective, the study complied with educational research standards. Informed consent for children’s participation was obtained from parents or legal guardians, who were informed about the purpose of the intervention, the nature of the activities, and the procedures for

data use. All data were processed and reported exclusively in aggregated and anonymized form, ensuring participant confidentiality throughout the research process.

3.2. Intervention design

The present study employed a pre-experimental one-group pre-test/post-test design aimed at evaluating the impact of an intensive educational intervention on the development of emergent literacy. The main dependent variable was the level of emergent literacy skills, analyzed both globally and across specific subcomponents, while the independent variables included participation in the intervention programme and, at a more detailed level, systematic exposure to different types of activities (guided reading, phonological tasks, and graphomotor activities). At the same time, the design allowed for the exploration of the role of moderating variables, such as visual attention and the ability to understand instructions, in explaining the observed progress.

The intervention was implemented over two consecutive weeks in an intensive “school readiness” format, including structured daily activities. The choice of this format aimed to increase the intervention dose (intensity of exposure), a factor considered essential in the literature for obtaining visible effects within a relatively short period of time. In this respect, the design targeted not only the presence of the intervention itself, but also the frequency and consistency of exposure as operationalized dimensions of the independent variable.

In order to ensure implementation fidelity, each day followed a relatively constant structure, with clearly defined and repeatable sequences. This standardization was intended to reduce contextual variation and increase the comparability of learning experiences among participants, while still preserving the flexibility necessary for adapting to the rhythm of the group. The educational environment was organized to support this coherence: daily routines, the predictable sequence of activities, and the alternation between cognitively demanding tasks and regulation moments (movement activities and guided play) contributed to maintaining an optimal level of engagement and controlling situational variables.

The daily intervention structure followed a predictable routine, starting with emotional regulation and functional routines to facilitate the transition toward subsequent cognitive tasks.

The central component of the design was the “story time” session, which functioned both as the main instructional stimulus and as an element of internal coherence within the intervention. From

a methodological perspective, this component may be considered the core mechanism through which language exposure was operationalized, generating the content for subsequent activities. Guided reading, conducted daily in an interactive manner, aimed to simultaneously activate multiple processes: comprehension, anticipation, vocabulary development, and familiarization with print conventions.

Building on this core component, pre-literacy activities were organized as structured tasks oriented toward operationalized objectives targeting the development of phonological awareness, vocabulary, and the relationship between oral and written language. These activities were complemented by graphomotor exercises, which functioned as behavioral indicators of writing readiness, and by practical workshops that facilitated the transfer and application of knowledge in concrete contexts.

Each day concluded with a recap stage, functioning as a form of formative assessment and consolidation of learning acquisitions through verbalization and guided reflection.

3.3. Data analysis

The data analysis aimed to quantify the impact of the 10-day intensive programme on the three variables assessed: overall emergent literacy level, visual attention, and instruction comprehension. Descriptive statistics and paired-samples t-tests were employed, a procedure commonly recommended in pre–post design studies to capture changes within the same group of participants (Cohen, 1988; Lakens, 2013). Inferential analyses were conducted only on participants with complete pre-test and post-test datasets. The practical significance of the observed differences was estimated using effect size measures (Cohen's d), in accordance with standard recommendations from the psychological and educational research literature (Cohen, 1988).

4. Results

The comparative pre-test/post-test analysis revealed a statistically significant increase in the total emergent literacy score, $t(7) = 3.59$, $p = .009$, with a very large effect size (Cohen's $d = 1.27$). The statistical indicators for each dimension are systematized in **Table 1**.

Dimension	t	p (t-test)	p (Wilcoxon)	Cohen's d	Interpretation
Expressive vocabulary	1.87	0.104	0.125	0.66	moderate, non-significant effect
Print concepts	1.26	0.250	0.313	0.44	small-to-moderate effect
Letter recognition	3.33	0.013	0.016	1.18	large, significant effect
Word awareness	1.00	0.351	0.317	0.35	non-significant
Phonemic awareness	2.81	0.026	0.042	0.99	large, significant effect
Name writing	2.37	0.050	0.066	0.84	at the threshold of significance
Story comprehension	-0.70	0.504	0.396	-0.25	no progress
Total score	3.59	0.009	0.016	1.27	very large effect

Table 1. Comparison of pre-test and post-test scores for emergent literacy competencies

4.1. Progress in psychological variables (Visual attention)

The results indicate an improvement in visual attention test scores (maximum score = 18) following the intensive summer programme. The initial mean score was 12.50 (SD = 2.51), while the final mean score increased to 13.88 (SD = 2.17), corresponding to an average gain of +1.38 points (SD = 1.41). A paired-samples t-test showed that this increase was statistically significant, $t(7) = -2.76$, $p = .028$, while the effect size (Cohen's $d = 0.98$) indicated a large effect. The 95% confidence interval for the mean difference is [0.20; 2.55].

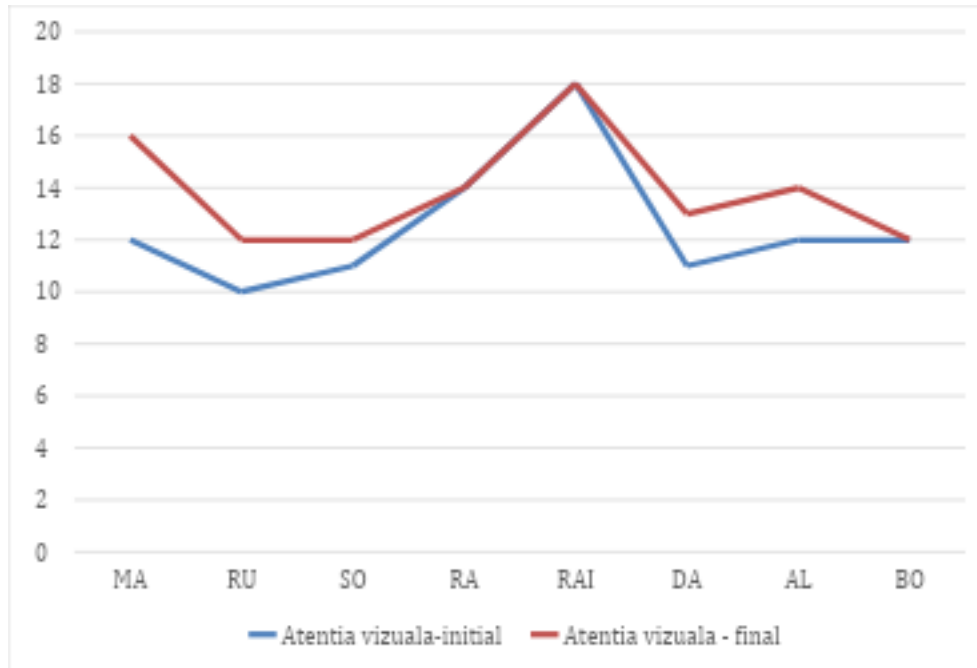


Figure 1. Evolution of Individual Performance on the Visual Attention Test

The individual analysis of the scores revealed differentiated responses:

- Participant MA showed the largest improvement (+4 points).
- Participants RU, DA, and AL each improved by +2 points.
- Participants RA, RAI, and BO showed no changes in visual attention scores. Notably, participant RAI achieved the maximum score (18/18) at both points of assessment.

4.2. Overall progress in emergent literacy

The assessment of emergent literacy skills (maximum score = 74 points) showed that the initial mean score was 26.31 points, while the final mean score increased to 32.31 points, corresponding to an average gain of +6.00 points per child (a relative increase of approximately 23%). Inferential analysis confirmed the statistical significance of this difference ($t(7) = 3.59$, $p = .009$; Wilcoxon signed-rank test: $p = .016$, Cohen's $d = 1.27$).

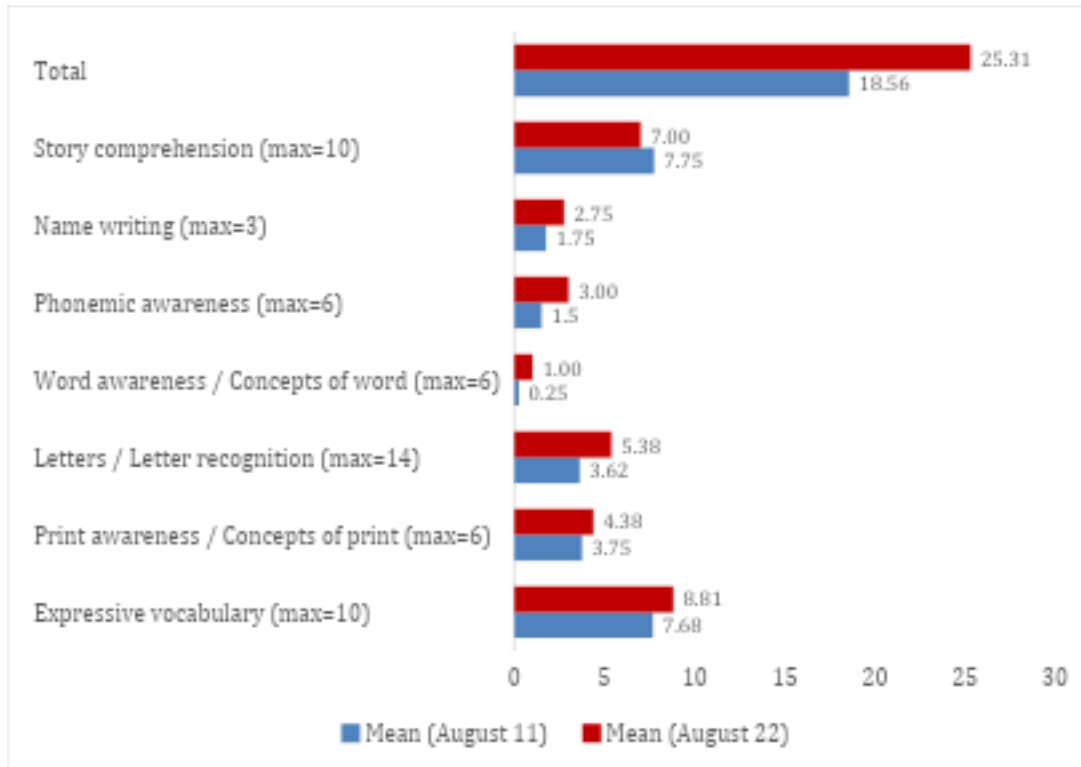


Figure 2. Dynamics of mean scores on emergent literacy subscale

The subscale analysis indicated that the gains were distributed as follows:

- Letter recognition: from 3.62 to 5.38 ($p = .013$, $d = 1.18$)
- Phonemic awareness: from 1.50 to 3.00 ($p = .026$, $d = 0.99$)
- Expressive vocabulary: from 7.68 to 8.81
- Print text knowledge: from 3.75 to 4.38

Story comprehension scores remained relatively stable across assessments, showing no statistically significant progress.

4.3. Interaction between variables

Individual data comparison revealed cross-over patterns between literacy gains and psychological variables:

- Participants RA, RAI, and BO did not show increases in visual attention scores ($\Delta = 0$), yet they achieved substantial gains in emergent literacy ($\Delta = +11$ points, $\Delta = +13.5$ points, and

$\Delta = +4$ points, respectively). Participant RA presented a high score on instruction comprehension (14/16).

- Children such as RU and DA, who demonstrated improvements in visual attention (+2 points), showed only moderate literacy gains (+6 and +4 points).

5. Discussions

The findings of this study support the hypothesis that an intensive and structured two-week summer programme can generate meaningful educational gains in both emergent literacy and visual attention. The average increase of approximately 23% in the overall literacy score, together with the large effect identified for visual attention (Cohen's $d \approx 0.98$), is consistent with the literature on intensive summer interventions aimed at developing pre-reading skills and school readiness, which reports moderate to large effects even within relatively short periods of time (Pears et al., 2016; Donnelly, Huber, & Yeatman, 2019; Christodoulou et al., 2017; Balea, 2023; Balea, Kovacs, & Pogăcean, 2024). These findings suggest that school readiness programmes implemented during the transition from kindergarten to formal schooling may represent a realistic and effective strategy for supporting adaptation to preparatory grade, particularly for children in situations of educational vulnerability.

The subscale results suggest that the intervention particularly influenced the foundational components of emergent literacy associated with the development of decoding mechanisms and phonological processing (letter recognition and phonemic awareness).

An important aspect of the study concerns the relationship between literacy progress and the assessed cognitive factors. The literature highlights that visual-spatial attention contributes to rapid letter recognition, sequential tracking of text lines, and efficient scanning of printed material (Franceschini et al., 2012; Plaza & Cohen, 2007; Valdois, 2019; Justice et al., 2008). The present findings confirm that the intervention facilitated improvements in this cognitive dimension; however, they also suggest that visual attention represents more of a facilitating condition than a sufficient predictor of rapid literacy progress. The individual variation showing that some children with no changes in visual attention achieved substantial literacy gains indicates the involvement of additional cognitive mechanisms.

In this context, the data suggest a particularly important role of executive functions. The profiles

of participants who achieved the greatest literacy gains – especially the case of RA, who displayed high performance on the instruction comprehension task (14/16) despite zero growth in visual attention – indicate that the ability to understand, maintain, and apply sequences of instructions may function as a genuine “learning amplifier.”

These observations are consistent with contemporary models and longitudinal research highlighting the contribution of executive functions – particularly inhibitory control, working memory, and cognitive flexibility – to the development of emergent literacy and reading comprehension, beyond strictly linguistic or perceptual abilities (Follmer, 2017; Gandolfi et al., 2021; Nouwens, Groen, Verhoeven, & Segers, 2021; Williams, 2022; Balea et al., 2024).

The results also highlight considerable individual heterogeneity in response to the intervention, which aligns with previous findings on distinct developmental profiles (Cabell et al., 2011; Hurjui, 2024). For instance, in the case of participant RAI, the absence of further progress in visual attention is easily explained by a ceiling effect, a phenomenon frequently reported in cognitive assessments of young children when the instrument no longer discriminates very high levels of performance (Clausén Gull et al., 2024).

Limitations and future directions

This study presents several limitations that must be noted:

- **Sample and control:** The small sample size (N=16, with complete data for 8 participants in the inferential analysis) and the absence of a control group limit the generalizability of the conclusions and the possibility of rigorously separating the intervention effect from maturation or external variables (Donnelly et al., 2019).
- **Long-term Tracking:** The relatively short duration of the programme and the absence of follow-up assessments do not allow conclusions regarding the long-term stability of the observed gains (Hannon, Nutbrown, & Morgan, 2020).
- **Operationalization:** Executive functions were operationalized through a single measure - instruction comprehension - which provides only a partial perspective on a complex construct.

Future research should include broader executive function assessment batteries, larger samples, experimental designs with control groups, and longitudinal evaluations.

6. Conclusions

The findings of this study suggest that an intensive and rigorously structured two-week summer programme can contribute to the development of emergent literacy skills in preschool children transitioning to school. The average increase of approximately +6 points in the overall literacy score, together with the statistically significant improvement in visual attention (Cohen's $d=0.98$), indicate that short but intensive interventions represent a promising educational strategy for supporting school readiness and reducing initial learning gaps before entry into the preparatory grade.

Secondly, the study highlights that the relationship between literacy and cognitive factors is multidetermined. Executive functions – operationalized through the instruction comprehension task – play a critical role in how children capitalize on literacy activities. The ability to follow rules, maintain task sequences, and use feedback effectively functions as a learning amplifier, facilitating successful engagement in structured educational activities even when visual attention metrics remain flat.

Furthermore, the individual variability and the recorded ceiling effects emphasize the need for personalized early educational interventions. Task difficulty, work pace, and the type of educational support provided must be adjusted according to each child's baseline cognitive profile. From an applied perspective, this study provides clear arguments for the systematic integration of integrated activities (linguistic, cognitive, and motor) within school-transition programmes. A short, intensive, and playful programme grounded in meaningful child experiences can successfully facilitate active engagement and accelerate progress before the onset of formal schooling within the local educational context.

Declaration of AI use

During the preparation of this work, the authors used Gemini to translate the text into English and to verify its coherence, structure, and grammatical correctness. The authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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