



Teachers' Beliefs and Practices to Support Emergent Literacy Development in Preschool Education: The Moderating Role of Continuous Training

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Abstract

The main goal of this study was to explore the relationship between emergent literacy beliefs and practices among Portuguese preschool teachers and to investigate the moderating role of experience and training (initial and continuous). The participants were 266 preschool teachers working in Portugal. The results indicate higher levels of holistic beliefs than technicist beliefs regarding emergent literacy. Practices aimed at promoting oral language and phonological awareness were reported as the most frequently used practices in the classroom. Teachers who had continuous training in emergent literacy had more holistic beliefs and performed more practices to promote children's phonological awareness and knowledge of the relationship between oral and written language. Continuous training was also a significant moderator of the relationship between emergent literacy beliefs and practices. These findings highlight the importance of continuous training in fostering the use of quality research-based practices in the classroom.

Keywords Preschool teachers · Emergent literacy practices · Holistic beliefs · Technicist beliefs · Teachers' training

Résumé

L'objectif principal de cette étude était d'explorer la relation entre les croyances et les pratiques émergentes en matière d'alphabétisation parmi les enseignants portugais du préscolaire et d'étudier le rôle modérateur de l'expérience et de la formation (initiale et continue). Les participants étaient 266 enseignants du préscolaire travaillant au Portugal. Les résultats indiquent des niveaux plus élevés de croyances holistiques que de croyances technicistes concernant l'alphabétisation émergente. Les pratiques visant à promouvoir le langage oral et la conscience phonologique ont été signalées comme les pratiques les plus fréquemment utilisées en classe. Les enseignants ayant suivi une formation continue en alphabétisation émergente avaient des croyances plus holistiques et pratiquaient davantage de pratiques visant à promouvoir la conscience phonologique des enfants et la connaissance de la relation entre le langage oral et

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écrit. La formation continue a également été un modérateur important de la relation entre les croyances et les pratiques émergentes en matière d’alphabétisation. Ces résultats soulignent l’importance de la formation continue pour favoriser l’utilisation de pratiques de qualité fondées sur la recherche en classe.

Resumen

El objetivo principal de este estudio fue explorar la relación entre las creencias y prácticas de alfabetización emergentes entre los profesores de preescolar portugueses y investigar el papel moderador de la experiencia y la formación (inicial y continua). Los participantes fueron 266 profesores de preescolar que trabajan en Portugal. Los resultados indican niveles más altos de creencias holísticas que de creencias tecnicistas con respecto a la alfabetización emergente. Las prácticas destinadas a promover el lenguaje oral y la conciencia fonológica fueron reportadas como las prácticas más utilizadas en el aula. Los maestros que tuvieron capacitación continua en alfabetización emergente tenían creencias más holísticas y realizaron más prácticas para promover la conciencia fonológica y el conocimiento de la relación entre el lenguaje oral y escrito de los niños. La formación continua también fue un moderador importante de la relación entre las creencias y prácticas de alfabetización emergentes. Estos resultados ponen de relieve la importancia de la formación continua para fomentar el uso en el aula de prácticas de calidad basadas en la investigación.

Introduction

In recent years, experts and policy-makers have recognized the importance of emergent literacy for early school success (Ford et al., 2018; Stuckey & Albritton, 2019), which has long-term social and economic implications for families and society. Emergent literacy refers to the knowledge, skills, and attitudes that children acquire before they begin formal literacy instruction and that predict reading and writing acquisition (Kennedy & McLoughlin, 2023; Rohde, 2015; Teale & Sulzby, 1986). These skills are developed at home and at preschool before children are able to read and continue to improve through formal education (National Early Literacy Panel, 2008). Oral language, metalinguistic skills and code-related skills are among these skills (Pavelko et al., 2018; Whitehurst & Lonigan, 2002). Oral language development, including vocabulary and morphological and syntactic development, is crucial for literacy learning, as it provides children with the foundations for the decoding and comprehension of written language (Lane & Wright, 2007). Metalinguistic skills refer to the ability to reflect about oral language (Melogno et al., 2022). Among these skills, one extensively examined aspect is phonological awareness (PA), characterized by the capacity to explicitly capture the sound structure of spoken language and the ability to analyse and manipulate phonological segments. Research has shown that PA is one of the strongest predictors of reading acquisition (Lerner & Lonigan, 2016; Sigmundsson et al., 2017). As written language represents oral language, the mastery of code-related skills, such as print knowledge, letter recognition, and name writing proficiency, also predicts literacy development (Cruz et al., 2023; Puranik

& Lonigan, 2012). These domains do not develop independently of one another in preschool years, and their integration is crucial for literacy development (Kim & Petscher, 2011). Specifically, children need to understand the relationship between oral and written language, which involves mapping oral language onto print and recognizing the physical, contextual, and structural differences between written and oral language. Some children can recognize letters but may not understand the relationship between written language and oral language (Cruz et al., 2023).

Literacy development is highly dependent on opportunities to interact with oral and written language (Dowling et al., 2020; Rohde, 2015), and these opportunities are mainly offered by adults (family and educators) in children's regular environments (Sheridan & Gjems, 2017; Viana et al., 2019). As not all children are immersed in home environments that provide them with those opportunities, schools play a crucial role in establishing systematic practices to enhance children's emergent literacy skills (Rohde, 2015). In fact, research has shown that one of the main predictors of the development of emergent literacy is the quality of early education (Lee-Hammond & McConney, 2017; Niklas & Tayler, 2018). The quality of education involves several variables that, according to Tietze and Viernickel (2010), can be grouped into three large categories: the structure, which includes variables such as group size or adult training; the educational orientations, which include variables such as the teachers' beliefs and values; and the process, which includes variables such as the interactions between the children and adults and teachers' practices. Considering this framework, we aim to analyse how preschool teachers' educational orientations (i.e. beliefs) are related to their emergent literacy practices, considering one key variable related to structure—teacher training. Research has shown that training plays a pivotal role in influencing teachers' beliefs regarding children's emergent literacy development, as well as in fostering the use of evidence-based and systematic practices integral to high-quality preschool education. In the following section, we delve more deeply into these interconnected aspects.

Preschool Teachers' Practices to Promote Emergent Literacy: The Role of Training and Beliefs

Teachers' knowledge about literacy is considered critical in shaping classroom practices and planning learning experiences to promote children's early language and literacy development (Sop & Çeliktürk Sezgin, 2021). This knowledge includes both content knowledge (knowledge on developmental processes and on how written and spoken language are structured) and practical knowledge (knowledge of effective strategies and practices to enhance early language and literacy) (Piastra et al., 2020a, 2020b). Lynch (2017) suggested that content knowledge can improve teachers' willingness to implement changes in their practice. Piastra et al. (2020a, 2020b) studied the literacy content knowledge of 437 preschool teachers and found positive associations between this knowledge and classroom emergent literacy practices. This finding is consistent with the claim that teachers will be better able to access all the components of emergent literacy if they have access to a model that describes the components, their interactions, and the importance of environmental factors in

supporting children (Girard et al., 2013). Thus, teachers' training and professional development play crucial roles in improving their conceptual and practical knowledge (Girard et al., 2013; Klawiter & Sheng, 2019). Research has shown that teacher training is essential for providing teachers with knowledge of quality research-based strategies and adding practice with feedback, but it is also relevant for addressing teachers' beliefs about children's learning (Lynch, 2017). Teachers' beliefs are one of the main predictors of their practices (Sandvik et al., 2014). There are two major types of emergent literacy beliefs: (1) a holistic viewpoint and (2) a technician/componential viewpoint (Brown et al., 2012; Mata & Marques, 2010; Stipek & Byler, 1997). Early childhood teachers in the preschool years who hold a holistic view consider early literacy to be social, community based, culturally defined, and largely related to the construction of meaning. These teachers prioritize various strategies for children's development. Among these are strategies such as singing and rhyming to foster phonological growth, and shared reading and conversations to promote oral language development. Additionally, they emphasize teacher modelling and scaffolding for nurturing writing skills (Lynch, 2017). From a holistic viewpoint, the opportunities for emergent literacy development that occur in children's natural environments and the active role of children in the acquisition of written language are two central elements (Mata & Marques, 2010). Therefore, teachers can also build on children's everyday experiences and ask questions, such as "what information do we receive in the mail? How can I remember the grocery to buy? What message is the story sharing? Which names start the same as my own name? If the sound is the same, the letter used to write should be the same?"

There is a contrasting literacy perspective—a technician viewpoint, which entails a skill-based, componential approach, in which there is a focus on conventional reading and writing skills. This approach is a bottom-up approach to literacy, where there is a focus on teaching discrete skills, often taught in a sequential arrangement. The assumption is that building these skills will help children learn to read. Early childhood teachers who view early literacy as achieved through skills-based instruction and explicit guidance on specific components of the reading process hold a componential view of early literacy. A componential view does not rely as much on engaging in shared book reading and play-based engagement with print materials but rather on letter knowledge, emergent writing, and other code-related skills (Mata & Marques, 2010). As stated before, the emphasis of this approach is on breaking down the literacy process into discrete components and sequentially building foundational skills to prepare children for formal reading and writing instruction in later stages of education. Therefore, within this viewpoint, activities such as structured lessons focused on teaching individual letters and their corresponding sounds and explicit instruction on letter drawing or word assembling during writing activities are highly valued.

Research has shown that emergent literacy beliefs may be partially shaped by teachers' age and level of education. For example, in a Portuguese study with 91 educators from public schools, Mata and Marques (2010) found that older preschool teachers had more holistic beliefs and fewer technician conceptions. In another study conducted in Hong Kong (Cheung et al., 2022) with primary schoolteachers, the results suggested that those who had higher educational levels held more humanistic (i.e. child-centred) and fewer technician beliefs regarding teaching.

Both technician and holistic approaches are crucial to early literacy development (McGinty et al., 2012). However, Stipek and Byler (1997) showed that teachers who held beliefs related to a technician or a componential perspective were less likely to support child-centred practices. More recently, Campbell (2020) found a correlation among teachers' play-based practices, child-centred literacy beliefs and holistic conceptions of phonics.

The Present Study

The structure of early childhood education in Portugal encompasses distinct cycles, including daycare (“*creches*”) for infants and toddlers and preschool (“*jardins de infância*”) for children older than three years, until the age of formal school entry, which is approximately 6 years old. These cycles are designed to address the specific developmental needs of different age groups, providing a tailored educational environment (Aguiar & Mata, 2021). In both cycles, assessment and evaluation adopt a nuanced approach, with an emphasis on continuous assessment rather than formal examinations. Observational methods play a crucial role in gauging children's progress, allowing educators to tailor educational activities to meet individual needs (Cardona et al., 2021). The Curriculum Guidelines for Pre-School Education (OCEPE) is a legal document that guides the construction and management of the curriculum in preschool and the responsibility of each preschool teacher in Portugal (Silva et al., 2016). Those guidelines emphasize a holistic approach to learning. For example, they underscore the importance of play-based learning, recognizing play as a fundamental element in fostering cognitive and socioemotional development in young children. Regarding literacy, the OCEPE clearly emphasizes a holistic viewpoint by stating the relevance of promoting oral language and by reinforcing the relevance of playful activities in children's natural environment as the best way to promote skills and positive attitudes regarding emergent literacy; however, it does not totally disregard the technician view, as it also mentions the need to develop code-related skills. Therefore, preschool teachers play a central role in selecting and implementing practices that facilitate children's early language and literacy development (Lynch, 2017; Piasta et al., 2020a, 2020b). Examining the relationship between preschool teachers' emergent literacy beliefs and practices and the variables that have a role in this relationship is crucial for informing the design of actions to foster quality education in early childhood. Although previous research has suggested that age and educational level can play a role in preschool teachers' beliefs (Cheung et al., 2022; Mata & Marques, 2010), less attention has been given to the role of in-service (i.e. continuous) training in shaping emergent literacy practices and beliefs. This is especially important in contexts where a large portion of teachers are extremely experienced and had their initial training several decades ago. This is the case for Portugal, where the mean age of preschool teachers is approximately 50 years, according to the statistics of the Portuguese Ministry of Education for 2021/22 (Direção-Geral de Estatísticas da Educação e Ciência, 2023). Many of these teachers had their initial training when literacy readiness approaches, often focused on predetermined milestones and skill acquisition, were dominant in early

education. This model assumed a linear progression of development, with an emphasis on memorization and isolated skill acquisition (Chambers et al., 2016), and thus was more congruent with a technicist viewpoint. The transition from readiness to emergent literacy approaches represents a paradigmatic shift in early childhood education that occurred in Portugal only at the beginning of the twenty-first century (Mata, 2006). Emergent literacy embraces a holistic and child-centred perspective, recognizing the multifaceted nature of language development and literacy acquisition. Therefore, the current in-service training programmes offered across the country are focused on contemporary educational theories and child-centred and holistic perspectives, where learning and literacy extend beyond isolated skill acquisition (Mata & Marques, 2010). Thus, the goals of this study were (a) to explore whether the beliefs and emergent literacy practices of Portuguese preschool teachers depend on variables related to teachers' educational background, teaching experience and training (initial and/or in-service training); (b) to investigate whether there is a relationship between teachers' emergent literacy beliefs and their practices; and (c) to test the role of teachers' educational background, teaching experience and training as moderators of the relationship between teachers' emergent literacy beliefs and their practices.

Method

Participants

The participants in this study were 266 preschool teachers working in Portugal. Table 1 presents the demographic characteristics of these participants. The participants were mainly from the North region of Portugal, and only one was a male. Only 22.2% completed a postgraduate degree; the majority had only a graduate degree. Approximately half of the participants (51.9%) reported that they were taught emergent literacy content during their initial training (graduation degree). A slightly greater percentage (56.4%) reported having emergent literacy content during continuous training, i.e. training courses attended after they graduated. Most of the participants (86.8%) were working in a public preschool institution at the time of data collection. On average, teachers were 53 years old and had 29 years of experience, and those who attended continuous training courses on emergent literacy had approximately 54 h of attendance, but there was a large variation, with teachers reporting a minimum of 4 and a maximum of 250 h (Table 1).

Measures

Educators' Beliefs Concerning Written Language Scale (Mata & Marques, 2010).

This self-report measure was designed to assess preschool teachers' emergent literacy beliefs. It includes two subscales: holistic beliefs (8 items; e.g. "Children learn important things about reading and writing before they are taught in kindergarten or school") and technicist beliefs (7 items; e.g. "The child must learn to write the

Table 1 Characteristics of the participants ($N=266$)

	<i>N (%)</i>	<i>M (SD)</i>
<i>Region</i>		
North	182 (68.4)	–
Centre	46 (17.3)	–
Lisbon	16 (6.0)	–
Algarve	21 (7.9)	–
Azores	1 (0.4)	–
<i>Context</i>		
Public	231 (86.8)	–
Private	35 (13.2)	–
<i>Gender</i>		
Female	265 (99.6)	–
Male	1 (0.4)	–
<i>Educational level</i>		
Graduate degree	207 (77.8)	–
Post-graduate degree	59 (22.2)	–
<i>EL in initial training</i>		
No	128 (48.1)	–
Yes	138 (51.9)	–
<i>Continuous training in EL</i>		
No	116 (43.6)	–
Yes	150 (56.4)	–
<i>Age</i>		
Years of experience	–	53.46 (8.27)
Hours of continuous training in EL	–	28.60 (9.34)
		53.85 (35.40)

EL = emergent literacy

letters of the alphabet well before trying to produce messages, short texts or stories”). The agreement with each sentence contained in the items was marked using a 5-point Likert scale (5 = Strongly Agree, 4 = Agree, 3 = Neither Agree nor Disagree, 2 = Disagree, 1 = Strongly Disagree). The study of adaptation for Portuguese preschool teachers (Mata & Marques, 2010) indicated high internal consistency for both the holistic beliefs scale ($\alpha=0.824$) and the technicist beliefs scale ($\alpha=0.772$).

Teachers' Emergent Literacy Practices (TELP) Scale

This scale was developed for the purposes of this study. The survey included 28 items that described practices commonly performed in early childhood in Portugal to promote oral language, phonological awareness, knowledge of code-related skills (i.e. writing) and knowledge of the relationship between oral and written language. Each item was rated using a 5-point Likert scale (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always). These items were first developed based on a literature review (Aguilar & Mata, 2021; Cardona et al., 2021; Viana et al., 2019). The first pool of items was analysed by a group of 10 preschool teachers who rated

the frequency of use of each item and indicated more strategies that they used frequently; these teachers were not included in the survey. A panel of experts, composed of the authors of this study and two other researchers with experience in emergent literacy, discussed the results and suggestions of the teachers. This discussion led to the final version with 28 items that was used in this study. The items that compose this scale are presented in Appendix 1.

Procedure

The study was approved by the ethics committee of the Lusíada University, following the guidelines of the Psychology for Positive Development Research Center (reference UL/CE/CIPD/2209). The data were collected online between November 2022 and January 2023, and the participants were recruited through mailing lists. All participants provided online informed consent. No information that would allow us to identify each participant individually was requested, hence granting the anonymity and confidentiality of the data.

Statistical Analysis

There were 29 missing values, totalling only 0.25% of the total response dataset. Thus, no variable had more than 10% missing values. First, confirmatory factor analyses (CFA) were performed to check the dimensionality of the teachers' beliefs and emergent literacy practices questionnaires. A comparative fit index (CFI) and a gamma hat higher than 0.90, as well as a root mean square error of approximation (RMSEA) less than 0.08, were considered indicators of an adequate model fit (Hu & Bentler, 1999; Marsh et al., 2004). Reliability was tested using McDonald's omega (ω) and Cronbach's alpha, with values higher than 0.70 being considered indicators of adequate internal consistency (Hair et al., 2014). Next, multigroup CFA was used to test the configural, metric and scalar invariance of the factor structure across educational levels (graduate versus postgraduate), emergent literacy content in initial training, and continuous training in emergent literacy. A $\Delta\text{CFI} \leq 0.01$ and a $\Delta\text{RMSEA} \leq 0.015$, as well as a low Bayesian information criterion (BIC), indicate model invariance (Chen, 2007; Cheung & Rensvold, 2002). Latent mean comparisons were then performed to explore differences in teachers' beliefs and practices across the subgroups. For purposes of model identification, for each one, the latent means of the first group were constrained to zero, and the latent means of the second group were freely estimated and then compared by means of a z test. CFA, invariance analyses and latent mean comparisons were conducted using Mplus version 7 (Muthén & Muthén, 2012). The analyses were performed using the maximum likelihood estimator with robust standard errors (MLR). MLR accounts for missing data and deals with small deviations to normality in the distribution of the data. Factor scores were subsequently used to perform moderation analyses, although descriptive statistics of the raw scores were also presented for interpretation purposes. The two types of beliefs were tested as predictors of the four types of emergent literacy practices in a series of linear regression models, while years of experience, number

of hours of training in emergent literacy, educational level, having had emergent literacy content during initial training, and having had continuous training in emergent literacy were tested as mediators by adding an interaction term between these and the predictors (teachers' beliefs) to the models. A significant interaction term ($p < 0.05$) between the beliefs and the moderator suggested the existence of a moderation effect. These analyses were performed using the PROCESS macro (Hayes, 2018), version 4.2, developed for IBM® SPSS Statistics.

Results

Dimensionality and Descriptive Statistics for the EL Beliefs and Practices

Table 2 presents the results of the CFA. Regarding teachers' beliefs, CFA for the two-factor model had a poor fit, as indicated by the CFI value. Item 5 ("It is necessary for the child to know the letters of the alphabet and their sounds before starting to write") had the lowest factor loading and a high error covariance with another item. Therefore, this item was removed, and the model was rerun, which led to an improvement in model fit (Table 2). Figure 1 presents the standardized values for this revised model. All factor loadings were higher than 0.30. The correlation between technician and holistic beliefs was significant and negative, meaning that teachers who had more holistic beliefs had fewer technician beliefs and vice versa. Reliability was high for both holistic belief ($\alpha = 0.780$; $\omega = 0.788$) and technician belief factors ($\alpha = 0.771$; $\omega = 0.784$).

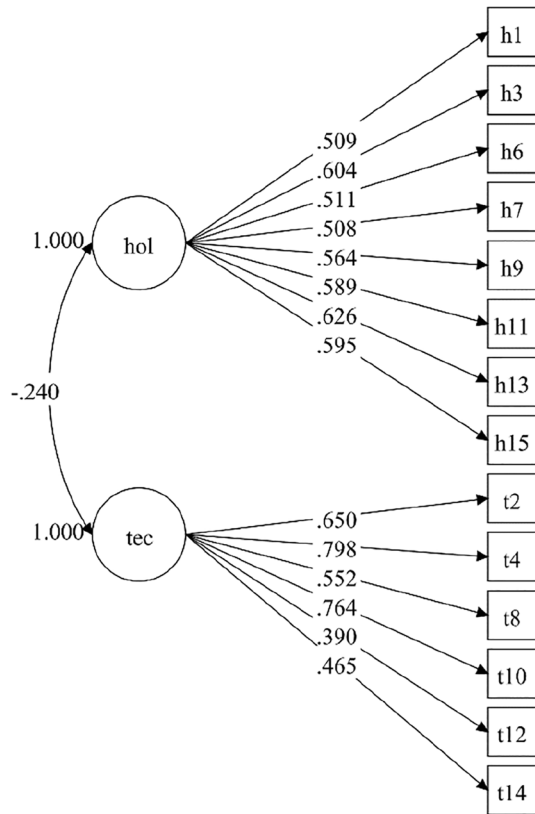
Regarding the measure of emergent literacy practices, the four-factor model yielded a poor fit. The inspection of the Lagrange multiplier tests suggested that six items had high error covariances with other items or could also be loaded into different factors. Therefore, these items were removed step-by-step until an acceptable fit was achieved. The removal of the six items led to an acceptable fit (Table 2). Figure 2 presents the standardized values for this second model. All factor loadings were higher than 0.30. The correlation between the four factors was very high, with the lowest correlation being observed between oral language and written language practices. Reliability was high for four factors: practices that foster phonological awareness practices ($\alpha = 0.842$; $\omega = 0.853$), oral language ($\alpha = 0.846$; $\omega = 0.852$),

Table 2 Confirmatory factor analysis: model fit indices

Model	χ^2_{SB}	<i>df</i>	<i>p</i>	CFI	RMSEA [90% CI]	Gamma	BIC
<i>EL beliefs</i>							
Two-factor	197.095	89	<0.001	0.861	0.068 [0.055, 0.080]	0.948	9472.220
Two-factor revised ^a	146.408	76	<0.001	0.900	0.059 [0.044, 0.073]	0.960	8598.740
<i>EL practices</i>							
Four-factor	796.758	344	<0.001	0.837	0.070 [0.064, 0.077]	0.890	13,716.402
Four-factor revised ^b	421.957	203	<0.001	0.895	0.064 [0.055, 0.072]	0.930	10,936.702

EL = Emergent literacy; ^aafter removing item 5; ^bafter removing items 1, 2, 4, 5, 15 and 22

Fig. 1 Standardized values for the factor structure of the teachers' beliefs measure. *Note* hol = Holistic beliefs; tec = Technician beliefs. All estimates are statistically significant ($p < 0.05$). The items can be consulted in Mata and Marques (2010)



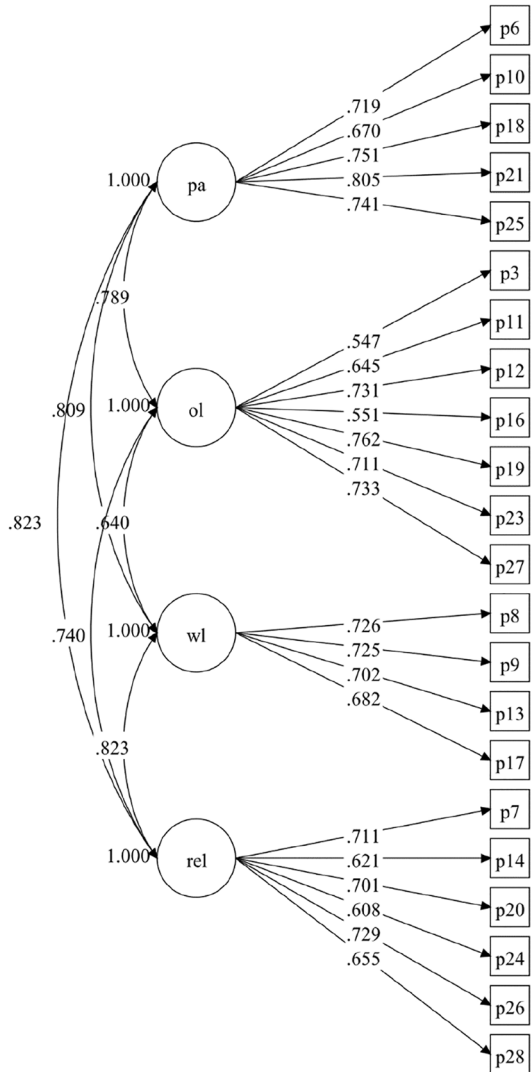
written language ($\alpha = 0.797$; $\omega = 0.803$) and knowledge of the relationship between oral and written language ($\alpha = 0.823$; $\omega = 0.829$).

Table 3 presents the descriptive statistics for the raw scores, considering the mean of the scores that compose each dimension. Overall, the results indicate a much greater mean score for holistic beliefs than for technician beliefs. Although, in general, all practices are reported to be implemented quite often, the practices used to promote oral language and phonological awareness are more frequent than practices used to promote code-related skills and knowledge of the relationship between oral and written language.

Invariance and Mean Differences in Emergent Literacy Beliefs and Practices

The results of the invariance analysis of the teachers' beliefs are presented in Appendix 2. Measurement invariance was achieved for all the variables. Thus, latent mean analysis was performed. No significant mean differences were found as a function of education level for either of the two types of beliefs. Similarly, no differences were found between teachers who received initial training in emergent literacy and those who did not. However, significant differences were found between the teachers who

Fig. 2 Standardized values for the factor structure of the measure of teachers' emergent literacy practices. *Note* pa=Phonological awareness; ol=oral language; wl=written language; rel=relationship between oral and written language. All estimates are statistically significant ($p < 0.05$). The items can be consulted in the [Appendix 1](#)



had continuous training in EL; those with this type of training had more holistic beliefs (mean = 0.380; $p = 0.014$) than did the teachers who did not have continuous training in emergent literacy.

The results of the invariance analysis of the measures of teachers' emergent literacy practices can be found in Appendix 3. Measurement invariance was achieved for all the variables. No significant mean differences in the four types of practices were found as a function of education level. However, significant differences in the practices were found as a function of the training received. Teachers who had emergent literacy content during their initial training performed more practices to promote knowledge of written language (mean = 0.273; $p = 0.045$) and to promote knowledge of the relationship between oral and written language (mean = 0.292; $p = 0.029$)

Table 3 Descriptive statistics for the raw scores

	<i>N</i>	Minimum	Maximum	Mean	Std. deviation	Skewness	Kurtosis
<i>EL Beliefs</i>							
Holistic	266	2.88	5.00	4.43	0.44	-0.65	0.11
Technicist	266	1.00	4.83	2.26	0.75	0.71	0.79
<i>EL practices</i>							
Phonological awareness	258	2.00	5.00	4.20	0.56	-0.62	0.60
Oral language	260	2.29	5.00	4.45	0.46	-0.83	1.07
Written language	265	1.75	5.00	3.81	0.68	-0.36	-0.10
Rel.	264	1.50	5.00	3.79	0.65	-0.28	-0.09

Rel. = relationship between oral and written language

than teachers who did not have this content. Teachers who had continuous training in emergent literacy performed more practices to promote phonological awareness (mean = 0.354; $p = 0.035$) and to promote the relationship between oral and written language (mean = 0.477; $p = 0.001$) than did their counterparts who did not have this type of training.

Relationship Between Emergent Literacy Beliefs and Practices

Holistic beliefs were significantly associated with the frequency of practices used to promote phonological awareness ($r = 0.441$; $p < 0.001$), oral language ($r = 0.580$; $p < 0.001$) and knowledge of the relationship between oral and written language ($r = 0.419$; $p < 0.001$). Although the correlation size was lower than that of the previous studies, holistic beliefs were also positively associated with a greater frequency of practices promoting written language acquisition ($r = 0.274$; $p < 0.001$). Technicist beliefs were significantly associated with the frequency of practices aimed at promoting written language acquisition ($r = 0.284$; $p < 0.001$), but not with the remaining practices.

Years of experience, number of hours of training in emergent literacy, educational level and having had emergent literacy content during initial training were not moderators of the relationship between teachers' beliefs about emergent literacy and the emergent literacy practices that they performed in the classroom.

There was a significant moderating effect of continuous training in emergent literacy on the relationship between holistic beliefs and phonological awareness practices (Table 4). The results indicated that the relationship was stronger for teachers who did not complete this training (Beta = 0.941; $p < 0.001$) than for their peers who had completed the training (Beta = 0.515; $p < 0.001$). This finding indicates that at low levels of holistic beliefs, teachers who had continuous training on emergent literacy performed more practices to promote phonological awareness than did those who did not have such training (see Fig. 3).

A significant interaction effect between continuous training and technicist beliefs on the practice of oral language was also found (Table 4). The relationship between

Table 4 Regression results for the moderating effects

	R^2	p	Beta	SE	p
<i>Phonol. awareness</i>	0.216	<0.001			
Hol			1.367	0.301	<0.001
CT			0.055	0.046	0.233
Hol*CT			-0.426	0.184	0.022
<i>Oral language</i>	0.040	0.012			
Tec			0.202	0.083	0.016
CT			0.084	0.034	0.015
Tec*CT			-0.107	0.050	0.032

Tec = technician beliefs; Hol = holistic beliefs; CT = continuous training; SE = standard error

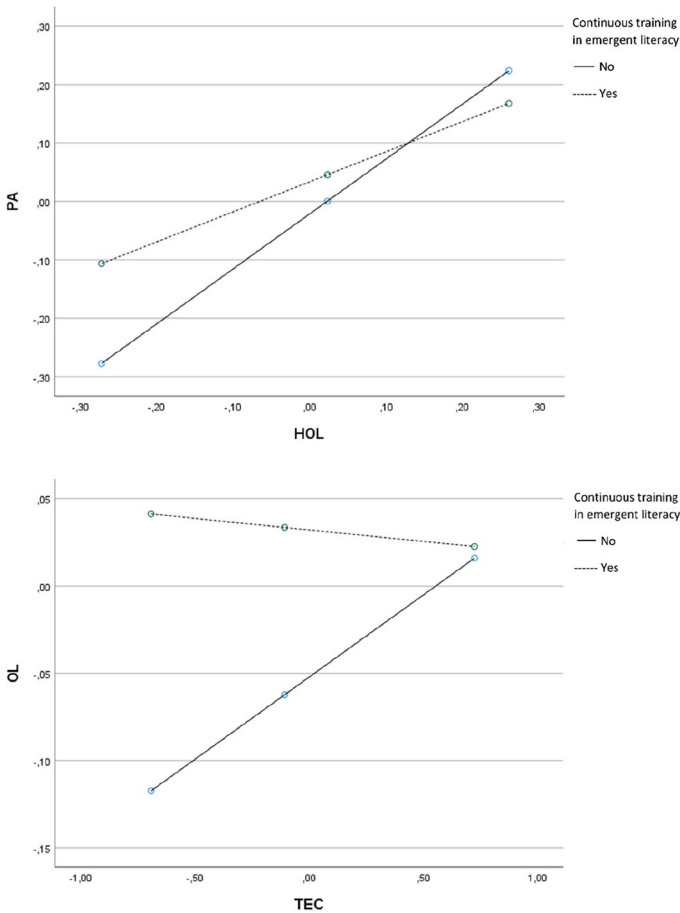


Fig. 3 Moderation effect of having continuous training in emergent literacy in the relationship between teachers' beliefs and practices. *Note* HOL = holistic beliefs; TEC = technicist beliefs; PA = Phonological awareness; OL = oral language

technicist beliefs and practice of oral language was significant for the group that did not have continuous training in emergent literacy (Beta=0.094; $p=0.015$) but was not significant for the group that had training (Beta= -0.013; $p=0.680$). Thus, at low levels of technicist beliefs, teachers who had continuous training in emergent literacy performed more practices to promote oral language than did their peers (see Fig. 3).

Discussion

The goals of this study were (a) to explore whether the beliefs and emergent literacy practices of Portuguese preschool teachers depend on variables related to teachers' educational background, teaching experience and training; (b) to investigate whether there is a relationship between teachers' emergent literacy beliefs and their practices; and (c) to test the role of teachers' educational background, teaching experience and training as moderators of the relationship between teachers' emergent literacy beliefs and their practices. To achieve these goals, two self-report measures were administered to the participants to assess their emergent literacy beliefs and practices. These measures showed adequate reliability and the obtained factor structure. The CFA results for the beliefs measure reproduce the original factor structure (Mata & Marques, 2010), which is aligned with the theoretical approaches regarding written language, with one perspective based on a holistic conceptualization of written language and the importance of constructing meaningful experiences with children in their daily contexts and the other perspective focused on training specific skills and the conventional characteristics of written language (Brown et al., 2012; Campbell, 2020; Mata & Marques, 2010). The CFA results for the scale of teachers' practices reflect the core dimensions of emergent literacy: conceptual and procedural knowledge about written language, as well as oral language (Whitehurst & Lonigan, 1998).

Regarding the first specific goal, the results indicate that holistic beliefs are more prevalent than technicist beliefs and that practices to promote emergent literacy are frequently performed in classrooms, especially practices to promote oral language and phonological awareness. A study performed in Portugal approximately 30 years ago indicated that preschool teachers did not think that activities to promote early literacy skills, such as phonological awareness and letter/sound knowledge, were among the most important activities to be developed in preschool education (Guimarães & Youngman, 1995). The results of our study suggest that this belief has changed, with holistic beliefs being highly prevalent among Portuguese preschool teachers, which in turn is reflected in the high frequency of emergent literacy practices reported by the participants. It is possible that this change is aligned with the emphasis given to language and literacy in the current legal orientations—the Portuguese Curriculum Guidelines for Preschool Education (Silva et al., 2016)—reinforcing the relevance of promoting positive attitudes and emergent literacy skills through meaningful and contextual experiences. Moreover, the results of this study indicated that emergent literacy practices and beliefs did not vary as a function of teachers' educational background and teaching experience, contrary to the findings

of other studies (Cheung et al., 2022; Mata & Marques, 2010). However, significant differences were found in the beliefs and practices of teachers who had continuous training in emergent literacy. Those with this training had more holistic beliefs and implemented practices to promote phonological awareness and knowledge of the relationship between oral and written language more frequently than teachers who did not have continuous training in emergent literacy. These results highlight the positive impact of the continued in-service training on changing teachers' beliefs (Lynch, 2017; Sandvik et al., 2014), suggesting that it can foster a holistic perspective regarding written language, valuing the importance of proximal contexts and the active role of children in the appropriation of written language. A significant effect of having had emergent literacy content during the teachers' initial training (i.e. during the undergraduate programme that they attended) was also found in the frequency of performing activities to promote the acquisition of code-related skills and the knowledge of the relationship between oral and written language. These results are also in accordance with previous studies that indicate that training is a key factor in promoting the use of evidence-based practices to foster emergent literacy (Girard et al., 2013; Klawiter & Sheng, 2019). Thus, training in emergent literacy seems to be a key factor, whether it is performed in undergraduate programmes or in continuous training courses offered to teachers.

Regarding the second goal—to explore the relationship between teachers' emergent literacy beliefs and their practices—the results of our study indicate that, on the one hand, holistic beliefs are associated with a greater frequency of practices promoting phonological awareness, oral language, and knowledge of the relationship between oral and written language. On the other hand, technicist beliefs were associated only with the frequency with which practices promoted written language acquisition, focusing on componential and instrumental skills, such as letter knowledge. This finding suggests that holistic beliefs tend to contribute to a meaningful and diverse use of emergent literacy opportunities in preschool contexts, enhancing the development of several important predictors of formal reading and writing skills (Sigmundsson et al., 2017).

Concerning the last goal, continuous training in emergent literacy was found to be a moderator of the relationship between teachers' beliefs and the frequency of their practices. The results suggest that continuous training is a powerful way to promote changes in the practices of preschool teachers, promoting a greater frequency of evidence-based strategies to foster emergent literacy skills, regardless of their beliefs.

Some limitations of this study must be acknowledged. The first limitation relates to the reliance only on teachers' self-reports to collect data. Teachers may be biased towards responding favourably rather than truthfully (social desirability bias), especially those who have engaged in in-service training and are aware of the current perspectives on emergent literacy. Those may report beliefs and classroom practices that align with their training, but there is no guarantee that they implement them effectively and consistently in their classrooms. To overcome this limitation, future research should also incorporate other data collection methods, such as classroom observations. Interviews with teachers can also provide a deeper understanding of teachers' beliefs about emergent literacy. Another limitation regards the unequal distribution of gender in our sample, which reflects the reality of the education system

in Portugal. According to national statistics for the 2021–22 school year, 99.0% of teachers from preschool were female (Direção-Geral de Estatísticas da Educação e Ciência, 2022). Additionally, there was an unequal distribution of teachers from public and private schools. In 2021–22, there were 9527 teachers in public preschools and 7084 teachers in private preschools. Therefore, future research should replicate the present study with a larger sample of private schools. Another limitation of this study is that no data regarding the children's family literacy practices were collected, nor were data collected regarding the conditions of the classrooms and the availability of materials in the different schools. Future studies should explore these aspects, as teachers' practices may depend to some extent on school conditions and children's backgrounds.

Conclusions and Future Areas of Research

Despite these limitations, this study represents an attempt to enhance the current knowledge about the relationship between teachers' beliefs and the practices that they implement in the classroom to promote children's emergent literacy skills. A relevant outcome of the study regards the strong relationship between holistic beliefs about written language and the frequency of activities to promote oral language, phonological awareness and knowledge of the relationship between oral and written language. Instead of promoting only specific code-related skills that are instrumental to reading and writing, holistic conceptions seem to promote an integrated practice towards the promotion of emergent literacy skills and knowledge about the relationship between oral and written language, which foster not only the appropriation of the alphabetical principle but also the creation of sense and meaning about reading and writing. The results of this study also highlight the need to think about the initial training of teachers concerning written language (Kennedy & McLoughlin, 2023). As the theoretical paradigm in Portugal has shifted towards a whole-school approach where meaningful opportunities should be promoted in preschool contexts, initial training must reflect this change, empowering teachers to adopt evidence-based frameworks and strategies to promote emergent literacy in children's natural environments and through experiences that allow children to gain knowledge, skills and positive attitudes regarding the relationship between oral and written language (Silva et al., 2016). Most of the preschool teachers who participated in this study were more than 50 years of age, which reflects the mean age of this professional group in Portugal (Direção-Geral de Estatísticas da Educação e Ciência, 2023). This evidence prompts discussion about the importance of professional development, through continued in-service training, as a means to ensure that teachers' beliefs and practices are informed by up-to-date research findings, which is of utmost importance in countries where a large portion of teachers concluded their initial training several decades ago, as was the case for Portugal. Professional development should be planned not only as a strategy to promote gains in conceptual knowledge but also to accompany and supervise evidence-based interventions, allowing reflection about the processes, difficulties, intentions, and contextual realities of

diverse preschool settings. Additionally, in the future research, the instruments validated in this study could contribute to a reflection and evaluation of changes in teachers' beliefs and practices across professional development processes. Furthermore, they can be used to map and systematize beliefs and the frequency of emergent literacy practices and, with the data collection, involve teachers in decision-making processes about evidence-based strategies to promote emergent literacy. Future research should also use qualitative methodologies to gain a deeper understanding of teachers' beliefs and origins and to assess teachers' resistance to change, as resistance to change may hinder the potential effects of continuous training and professional development.

Appendix 1

Teachers' Emergent Literacy Practices Scale

Dimension	Items in Portuguese	Items in English
Phonological awareness	Ler textos com versos que rimam*	Read texts with rhyming verse*
Written language	Ajudar as crianças a escreverem o seu nome*	Helping children to write their name*
Oral language	Pedir às crianças que contem episódios do seu dia-a-dia	Ask the children to tell stories from their everyday life
Written language	Elogiar as tentativas de escrita das crianças*	Praise children's attempts at writing*
Oral language	Dar feedback às crianças sobre a sua oralidade*	Giving children feedback on their speaking*
Phonological awareness	Chamar a atenção para palavras que terminam com o mesmo som (ex. João, balão)	Draw attention to words which end with the same sound (e.g. <i>João, balão</i>)
Relationship between oral and written language	Promover tarefas de escrita inventada em grupo ou pequeno grupo	Promote invented writing tasks in group or small group
Written language	Demonstrar os sons das letras	Demonstrate letter sounds
Written language	Ler livros alfabéticos, que foquem no abecedário (ex. livro ABC de Luísa Ducla Soares)	Read alphabet books, focusing on the alphabet (e.g. ABC book by Luisa Ducla Soares)
Phonological awareness	Brincar com as palavras e tirar sílabas para ver o som que fica	Play with words and take out syllables to see what sound remains
Oral language	Fazer perguntas sobre as histórias que impliquem inferências (ou seja, deduzir ideias que não estão explícitas)	Ask questions about the stories that involve inferences (i.e. deducing ideas that are not explicit)
Oral language	Fazer o reconto das histórias com as crianças	Retell the stories with the children

Dimension	Items in Portuguese	Items in English
Written language	Chamar a atenção para as letras dos nomes das crianças	Draw attention to the letters in children's names
Relationship between oral and written language	Escrever o que as crianças pedem e ler o que foi escrito	Write down what the children ask for and read what has been written
Relationship between oral and written language	Elogiar as tentativas de leitura das crianças*	Praise children's attempts to read*
Oral language	Ler livros/histórias em voz alta	Read books/stories aloud
Written language	Mostrar a diferença entre letras maiúsculas e minúsculas	Show the difference between upper- and lower-case letters
Phonological awareness	Brincar com as palavras e dividi-las em sílabas	Play with words by dividing them into syllables
Oral language	Fazer perguntas sobre as histórias que ouvem	Ask questions about the stories children hear
Relationship between oral and written language	Promover a leitura e a escrita nas brincadeiras das crianças (listas de compras, menus, receitas, etc.)	Promote reading and writing in children's play (shopping lists, menus, recipes, etc.)
Phonological awareness	Chamar a atenção para palavras que começam com o mesmo som (ex. bola, bota)	Draw attention to words that start with the same sound (e.g. <i>bola</i> , <i>bota</i>)
Oral language	Explorar palavras novas e desconhecidas para as crianças*	Explore new and unfamiliar words for children*
Oral language	Fazer perguntas sobre as histórias que ouvem (pedir para fazerem juízos críticos)	Ask questions about the stories children hear (ask them to make critical judgements)
Relationship between oral and written language	Seguir o texto com o dedo enquanto leio para as crianças	Follow the text with your finger while reading to the children
Phonological awareness	Fazer jogos de sons	Making sound games
Relationship between oral and written language	Pedir às crianças que escrevam palavras sem copiar (ou seja, escrever como elas "acham que pode ser")	Ask children to write words without copying (i.e. write as they "think it might be")
Oral language	Fazer perguntas sobre informação explícita nas histórias (por exemplo, onde, quando, quem?)	Ask questions about explicit information in the stories (e.g. where, when, who?)
Relationship between oral and written language	Construir mapas conceituais sobre temas explorados na sala	Building conceptual maps on themes explored in the classroom

*Items eliminated from the scale following factor analysis

Appendix 2

Invariance Analysis for the Teachers' Beliefs Questionnaire

Model	χ^2_{SB}	df	p	CFI	RMSEA [90% CI]	Gamma	BIC	Δ CFI	Δ RMSEA
<i>Educational level</i>									
Configural	243.924	152	<0.001	0.883	0.067 [0.051, 0.083]	0.911	8735.046	–	–
Metric	266.616	166	<0.001	0.872	0.068 [0.052, 0.082]	0.901	8687.526	0.011	0.001
Scalar	284.159	180	<0.001	0.867	0.066 [0.051, 0.080]	0.899	8627.009	0.005	0.002
<i>EL in initial training</i>									
Configural	232.271	152	<0.001	0.888	0.063 [0.046, 0.079]	0.921	8786.828	–	–
Metric	242.732	166	<0.001	0.893	0.059 [0.042, 0.074]	0.924	8725.721	0.005	0.004
Scalar	259.589	180	<0.001	0.889	0.058 [0.041, 0.073]	0.920	8664.640	0.004	0.001
<i>Continuous training in EL</i>									
Configural	249.924	152	<0.001	0.870	0.070 [0.054, 0.085]	0.904	8744.492	–	–
Metric	252.914	166	<0.001	0.884	0.063 [0.047, 0.078]	0.914	8675.814	0.014	0.007
Scalar	272.608	180	<0.001	0.877	0.062 [0.047, 0.077]	0.910	8617.111	0.007	0.001

Appendix 3

Invariance Analysis for the Emergent Literacy Practices Questionnaire

Model	χ^2_{SB}	df	p	CFI	RMSEA [90% CI]	Gamma	BIC	Δ CFI	Δ RMSEA
<i>Educational level</i>									
Configural	778.742	406	<0.001	0.846	0.083 [0.074, 0.092]	0.797	11,237.174	–	–
Metric	799.360	428	<0.001	0.847	0.081 [0.072, 0.089]	0.797	11,134.755	0.001	0.002
Scalar	826.229	450	<0.001	0.845	0.079 [0.071, 0.088]	0.797	11,037.210	0.002	0.002
<i>EL in initial training</i>									

Model	χ^2_{SB}	df	p	CFI	RMSEA [90% CI]	Gamma	BIC	Δ CFI	Δ RMSEA
Configural	773.109	406	<0.001	0.844	0.082 [0.074, 0.091]	0.801	11,264.811	–	–
Metric	791.295	428	<0.001	0.845	0.080 [0.071, 0.089]	0.801	11,165.607	0.001	0.002
Scalar	812.707	450	<0.001	0.846	0.078 [0.069, 0.086]	0.801	11,060.518	0.001	0.002
<i>Continuous training in EL</i>									
Configural	736.502	406	<0.001	0.861	0.078 [0.069, 0.087]	0.817	11,164.948	–	–
Metric	765.622	428	<0.001	0.858	0.077 [0.068, 0.086]	0.813	11,079.352	0.003	0.001
Scalar	812.922	450	<0.001	0.847	0.078 [0.069, 0.086]	0.801	11,004.526	0.011	0.001

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Declarations

Conflict of interest The authors report there are no competing interests to declare.

Ethical Approval The study was reviewed and approved by the ethics committee of the Psychology for Positive Development Research Center (reference UL/CE/CIPD/2209). An informed consent was requested to the participants.

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