



Testing the Effectiveness of a Social and Emotional Skill Program for Preschool Children

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Abstract

Socioemotional skills in children and youth are vital for protecting against risk factors and promoting prosocial behaviors. Schools play a crucial role in addressing socioemotional issues, with preventive programs enhancing student socioemotional development and fostering positive school environments. This study evaluates the effectiveness of the DROPI program, developed based on principles from the CASEL model, to promote social and emotional skills in preschool children in Portugal. The study involved 345 Portuguese preschool children (aged 3–6 years) from 16 preschool classrooms across 9 kindergartens. Using a quasi-experimental design, participants were divided into intervention and control groups and assessed at pre- and post-intervention stages. Direct assessments were conducted for vocabulary and emotional knowledge using the Peabody Picture Vocabulary Test-4 and the Portuguese version of the Emotional Knowledge Assessment Scale, respectively. Additionally, teachers and parents assessed children's self-control, cooperation, assertiveness, and responsibility using the Portuguese version of the Social Skills Assessment System. Results indicated a significant increase in vocabulary and emotional knowledge over time in the intervention group compared to the control group. The intervention group also significantly improved self-control, reported by both teachers and parents, as well as cooperation and assertiveness as assessed by teachers. This study reinforces the importance of implementing programs that aim to enhance socioemotional development in early childhood.

Keywords Socioemotional development · Socioemotional learning · Prevention programs · Preschool children

Introduction

Despite the prioritization of academic knowledge in educational settings, the increasing number of children with emotional, behavioral, and mental health issues highlights the need to broaden the focus of educational interventions (Greenberg et al., 2003). Developing socioemotional education is crucial for promoting socioemotional skills and well-being, providing children with tools to build emotional, social, and intellectual skills that contribute to holistic development and act as protective factors against future mental difficulties (Denham, 2005; Zins et al., 2004).

According to the OECD (2019), educational success involves promoting socioemotional skills, which are

essential for students' well-being. The lack of these skills can reduce school engagement, negatively impacting academic performance, behavior, and health (Weare, 2009). Schools are ideal for teaching and practicing these skills through empirically supported programs (Weissberg et al., 2015).

In Portugal, despite increasing preventive interventions and skill development initiatives, systematic and empirically validated socioemotional intervention programs remain scarce (Pinto & Raimundo, 2016a, 2016b). The literature has suggested that the effectiveness of existing programs varies based on their implementation and target populations (Durlak et al., 2011; Sklad et al., 2012; Taylor et al., 2017). The success of these programs does not solely rely on their design but also on how effectively they are implemented. Successful implementation, supported by strong teacher engagement and continuous professional development, is crucial to achieving the desired outcomes in students' socioemotional development (Durlak et al., 2011). Thus, it seems important to further examine the

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effectiveness of such programs in understudied populations such as Portugal. This study seeks to test the effectiveness of a socioemotional skill development program for preschool children on an array of socioemotional skills, using both direct and indirect assessment methods.

Social-emotional Learning in Preschool

Social and Emotional Learning (SEL) enhances socioemotional skills, helping students manage emotions, establish healthy relationships, and make responsible decisions (Collaborative for Academic, Social, & Emotional Learning, 2020). SEL has shown positive impacts on students' problem-solving skills and relationships with both peers and adults, leading to academic and life success (Greenberg et al., 2017; Weare & Nind, 2011). In preschool, socioemotional development is supported by emotional knowledge, regulation, and social experiences (Denham et al., 2003). These competencies help children perceive and think about themselves and others, regulate emotions, and build secure relationships (Kaur & Sharma, 2021). Children lacking these skills may face relational, social, and academic challenges (Bornstein et al., 2010).

Intervention Programs

Universal and preventive interventions are known to predict and promote student development and improve the school environment (Weare & Nind, 2011). Social and emotional learning programs provide measurable improvements in students that persist over time (Greenberg et al., 2017). Programs aligned with the recommendations of the Collaborative for Academic, Social, and Emotional Learning (CASEL) effectively promote socioemotional skills, academic success, and mental health, while also reducing behavioral problems (Weissberg et al., 2015).

The early participation in these programs in preschool appears to be the most effective, as early childhood is crucial for developing healthy relationships, behaviors, and emotional regulation (Campbell, 2002; Lavigne et al., 2009). Focusing on socioemotional development in preschool can address early signs of social interaction challenges, anxiety, and potentially low self-esteem. Early investment in socioemotional skills helps children build relationships, communication, empathy, resilience, and emotional control, preventing future learning difficulties, interpersonal conflicts, and mental health issues (Denham et al., 2012; Gunter et al., 2012).

Portuguese Preschool Context

In preschool education, the effectiveness of intervention programs depends on the quality of the dynamics and pedagogical practices employed by each teacher, including their adaptation to the characteristics of the group and individual children. This dynamic, in turn, depends on the teacher's interpretation of the concept of educational intentionality, as well as the regulations of the institution (Bierman & Motamedi, 2015; Darling-Churchill & Lippman, 2016; Denham et al., 2012; Ministry of Education, 2006). Portugal is a privileged context for the implementation of SEL programs by preschool teachers, given that they are highly qualified staff. Specifically, in Portugal, preschool teachers are required to have at least a Bachelor's degree and most have a Master's degree in early childhood education (European Commission/EACEA/Eurydice, 2019, 2023). According to a Eurydice report (2023), the minimum qualification level in Portugal contrasts with most of the European countries in which teachers' qualification levels range from upper secondary education (ISCED 3) to bachelor's degree (ISCED 6).

All Portuguese teachers have to follow the Curriculum Guidelines for Preschool Education (Silva et al., 2016). The curriculum emphasizes play and relational environments to foster children's development (Silva et al., 2016). It also emphasizes the relevance of helping the child learn to make decisions, solve problems, take on responsibilities, develop a sense of curiosity, and enhance relational and initiative skills (Silva et al., 2016). However, teachers have the freedom but also a responsibility to adapt the general guidelines to each group (Silva et al., 2016). Even though in the steering document several references are made to the importance of SEL and the role of the teacher as a facilitator of interactions that, through play, provide the child with a relational and stimulating environment, the guidelines are general, and teachers can combine them with the implementation of more specific SEL programs to enhance children's socioemotional skills.

In Portugal, several SEL programs have been developed to target socioemotional skills in preschool children. Programs such as *Emogenius*, which promotes emotional regulation and social interactions, and *Salto de Gigante*, which helps children navigate emotional management and peer relationships during the transition to primary school, have proven effective. Additionally, the *Amigos do Ziki* program has shown success in easing the transition from preschool to primary school by enhancing emotional intelligence and social skills (Koltcheva et al., 2022). Other programs, like *Nino e Nina*, aim to foster self-control and emotional intelligence, while the *DROPI* program draws on the CASEL framework and SAFE methodology

(Sequential, Active, Focused, Explicit; Greenberg, 2023) to provide a structured, evidence-informed approach to promoting socioemotional development in preschoolers. These various initiatives highlight the growing landscape of socioemotional learning programs in Portugal, underlining the need for continued evaluation and refinement of approaches like *DROPI*, which offers complementary strategies to these established programs.

The Current study

Despite increased development, implementation, and evaluation of SEL programs in recent years, the effectiveness remains unclear, particularly in Portugal, where very few quasi-experimental studies have been conducted (Pinto & Raimundo, 2016a, 2016b). This study aims to evaluate the effectiveness of the *DROPI* program (an acronym derived from "drop feelings"), using a robust research design. The program aims to promote socioemotional skills in the preschool classroom, including self-awareness, self-esteem, empathy, communication, emotional management, critical thinking, and resilience. It is grounded on the theoretical framework of the CASEL model (2020), and follows the SAFE methodology (Sequential, Active, Focused, Explicit) to ensure that activities are structured, active, and explicitly designed to support socioemotional development in an engaging, playful manner. Despite its growing use in Portuguese schools, there is no formal assessment of its effectiveness. This study represents the first systematic evaluation of the *DROPI* program's effectiveness, marking a critical step toward establishing its empirical validation.

Research Focus and Hypotheses

Specifically, this study aims to analyze whether the socioemotional program positively affects the vocabulary and key emotional and social skills variables. Previous research has demonstrated a strong connection between vocabulary development and socioemotional skills, emphasizing that a richer vocabulary facilitates emotional expression, conflict resolution, and the ability to form healthy relationships (Denham et al., 2003; Greenberg et al., 2003). Studies have also shown that socioemotional learning programs that encourage children to recognize and discuss their emotions can enhance their language skills, including vocabulary (Denham et al., 2012). The bidirectional relationship between language and socioemotional development suggests that children with more advanced language skills tend to navigate social interactions more effectively, which in turn supports further vocabulary growth (Beck et al., 2012). These findings justify the hypothesis that the *DROPI* program,

by promoting socioemotional skills, could also positively influence children's receptive vocabulary. Additionally, the promotion of socioemotional competencies is associated with the development of communication skills, which may contribute to vocabulary expansion (Bornstein et al., 2010; Denham et al., 2003; McClelland & Cameron, 2011). Socioemotional learning (SEL) programs that encourage children to recognize and discuss their emotions are shown to enhance their communication abilities, thereby contributing to vocabulary expansion (Denham et al., 2003; Greenberg et al., 2003; Mahoney et al., 2020). When children are supported in understanding and expressing emotions, they develop both socioemotional and linguistic competencies, enabling them to articulate their feelings and engage more effectively with others. Based on prior research indicating that universal intervention programs can positively impact socioemotional competencies, we expect that:

Hypothesis 1 Children participating in the *DROPI* program will show a statistically significant increase in their level of emotional knowledge regarding i) facial expressions; ii) emotional behaviors; and iii) emotional situations, compared to children who do not participate in the program.

Hypothesis 2 The *DROPI* program will result in a statistically significant improvement in vocabulary compared to children who do not participate in the program.

Hypothesis 3 The *DROPI* intervention program will lead to an improvement in children's social skills, specifically in the areas of self-control, cooperation, and assertiveness, compared to children who do not participate in the program.

Method

Study Design and Participants

This study employed a quasi-experimental design recruited through convenience sampling in a public school cluster. The preschool socioemotional development program *DROPI* was administered to 345 children (53% boys) aged between 3 and 6 years old ($M = 54.44$ months; $SD = 10.91$ months), enrolled in 16 preschool classrooms in nine kindergartens located in the north of Portugal (see Table 1). The age of the youngest participant in the study was 33 months (approximately 2 years and 9 months). All classrooms in the study were mixed-age, with children ranging from 3 to 6 years old. Classroom size varied between 19 and 26 children, with an average of 22 (cf. Table 1). In Portugal, preschool classrooms are generally regulated to have 20 to 25 children per class, with one lead educator assisted by one operational assistant (Abreu Lima et al., 2014). Children were distributed between

Table 1 Sociodemographic characteristics of participants

	Intervention group (<i>n</i> = 255)				Control group (<i>n</i> = 90)				Total (<i>N</i> = 345)				
	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>	in–Max
Child characteristics													
Boys	131	100%			50	56%			181	51%			
Age (months) at T0			54.05	0.82			55.53	1.15			53.12	10.89	33–77
Teachers' characteristics													
Women	12	100%			4	100%			16	100%			
Age (years)											58.25	4.00	48–64
Experience (years)											33.50	4.43	24–41
Bachelors' degree in ECE	12	100%			4	100%			16	100%			
Classroom characteristics													
Group size											22	3.5	19–26

Note. The youngest participant was almost 3 years old when the study began. All other children were 3 or more years old

the control group ($n = 91$; 55% boys, $M = 55.53$ months; $SD = 11.15$ months) and the intervention group ($n = 254$; 52% boys, $M = 54.05$ months; $SD = 10.82$ months). No differences were found regarding children's age, $t(343) = 1.106$, $p = 0.270$, and gender, $\chi^2(1) = 0.387$, $p = 0.536$ between groups. The kindergartens were from both more urbanized zones and rural regions, resulting in a moderate socioeconomic diversity within the sample. The decision to adopt the DROPI socioemotional skills program for preschool was made by the school's administration based on the recommendation of the school psychologist. All educators were contacted and invited to participate. Most educators agreed to participate ($n = 12$, 7 kindergartens), and four educators from 2 kindergartens chose not to participate in the program but volunteered to be part of the control group. As such, each entire kindergarten was designated to either intervention or control groups. Teachers had, on average, 58 years ($SD = 4.00$) and 33 years of experience, a pattern similar to national data in public preschools (Abreu Lima et al., 2014). All of them had a bachelor's degree (cf. Table 1).

Procedure

The research protocol was approved by the Ethics Committee of the Faculty of Psychology and Education Sciences, University of Porto. Written informed consents were obtained from parents and teachers. We used a combination of indirect (i.e., reports) and direct (i.e., children) assessment methods. Teachers and parents of children from both intervention and control groups completed the questionnaires before and after the intervention, respectively at the beginning (October–November) and end (June–July) of the school year. Given resource and time constraints, emotional knowledge and receptive vocabulary were assessed by trained examiners on a subsample of children through direct

measures ($n = 155$; see Fig. 1). All children from the control group were included and an equivalent number of intervention classrooms ($n = 4$) were randomly selected, and all children from these classrooms were part of the subgroup.

The DROPI program was implemented by twelve trained teachers who completed an 18-h training course led by two psychologists. The training covered program objectives, session structure, socioemotional skill development, classroom management strategies, and techniques for fostering emotional regulation, empathy, and conflict resolution. During implementation, teachers received ongoing support, including follow-up meetings, classroom visits, and feedback sessions with psychologists to ensure program fidelity.

DROPI Intervention Program

DROPI is a socioemotional development program for children aged 3 to 12 years. The program aims to enhance socioemotional skills, including self-awareness, self-esteem, empathy, communication, emotional management, critical thinking, and resilience, aligning with the CASEL model (2020). The program was developed by psychologists and specifically designed for preschool children, helping them understand and express emotions through structured learning activities. The program is implemented by trained DROPI multiplying agents, who complete an 18-h theoretical and practical training. DROPI is delivered in classroom settings and tailored to the specific needs of each class, using a flexible, playful, and dynamic approach.

In terms of duration, the DROPI preschool intervention consists of 20 weekly sessions, each lasting approximately 45 min. Its methodology emphasizes active participation, experiential learning, and interactive processes to engage children effectively in their socioemotional development (see Table 2 for an overview of the program's themes and goals

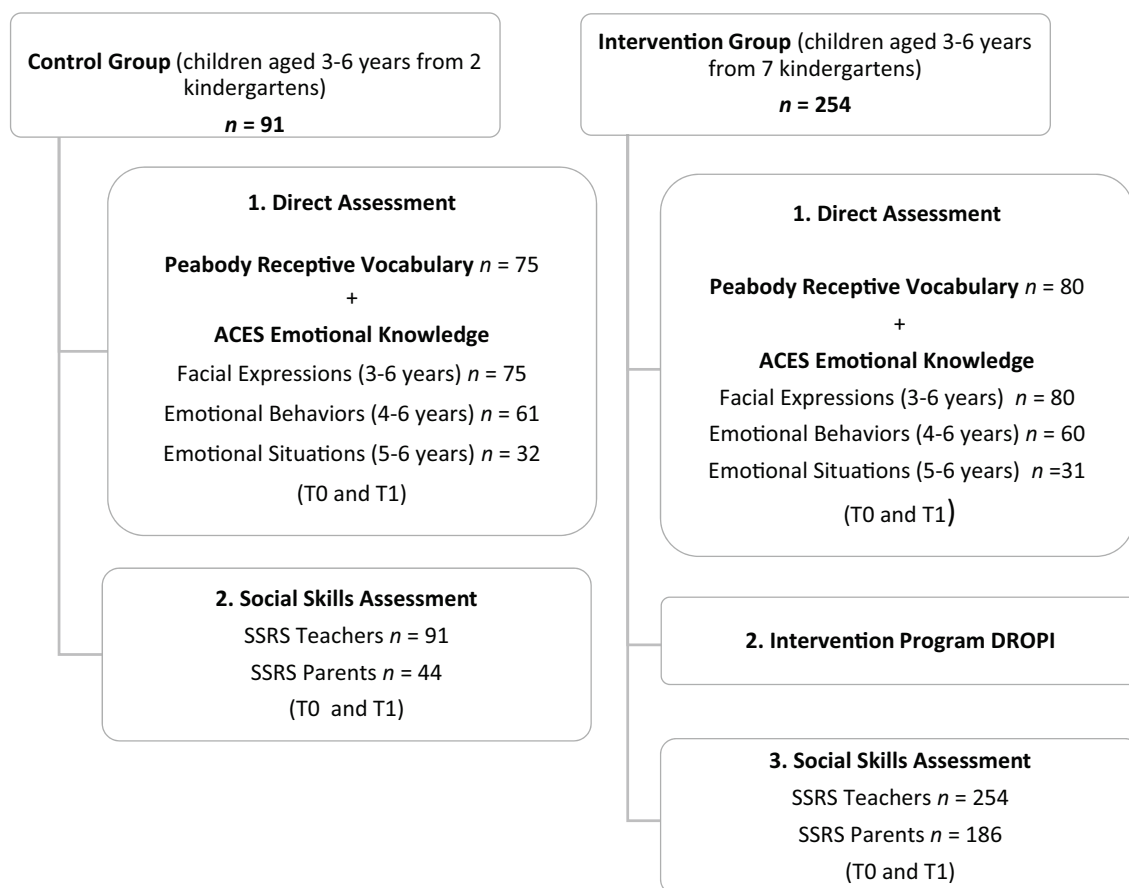


Fig. 1 Study design

per session). Regarding the control classrooms, teachers and children were not involved in any other specific project or activity other than the usual teaching practices.

Measures

Emotional Knowledge

Emotional knowledge was assessed using the Portuguese version of the Assessment of Children's Emotion Skills (ACES; Schultz et al., 2004; Portuguese translation Alves et al., 2008). This instrument includes three subscales: Facial Expressions, Emotional Behaviors, and Emotional Situations. It measures the child's ability to label one of four emotions (joy, sadness, fear, and anger) and associate it with various stimuli, namely, a photographed facial expression (Facial Expressions), a verbally presented description of behavior (Emotional Behaviors), or a verbally presented situationally context (Emotional Situations). The maximum possible score is, respectively, 20, 15, and 15, for Facial Expressions, Emotional Situations, and Emotional

Behaviors. The ACES has been widely used in research, showing good psychometric properties, including predictive validity (e.g., Vergara et al., 2022). Cronbach's alphas in this study were 0.60 (pretest) and 0.56 (post-test).

Receptive Vocabulary

The adaptation to Portuguese of the Spanish version of the Peabody Picture Vocabulary Test (PPVT; Dunn, 1986) was used to assess receptive vocabulary. The test involves 5 practice cards and 125 test cards, each with four illustrations. Children select the picture that best represents the word spoken by the examiner. Scoring is based on the number of correct responses, with a score of 1 indicating correctness and 0 indicating incorrectness, with the test typically lasting up to 15 min. The final raw score represents the number of correct responses (Dunn, 1986). The PPVT allows for a quick and objective assessment of receptive vocabulary comprehension skills across semantic areas, including people, actions, qualities, body parts, time, nature, places, objects, animals, mathematical terms, tools, and instruments. This test provides a standardized measure of receptive vocabulary frequently

Table 2 Sessions, themes, and goals of the DROPI program

Sessions	Themes	Goals
1–2	Promotion of group cohesion	Introduction to the DROPI Program Presentation of the book "Take the leap with DROPI" and in-depth exploration of the story and its main character, the DROPI kangaroo Engage children with the character DROPI
3	Self-awareness and empathy	Promote self-awareness and empathy Identify psychological characteristics in others
4–5	Emotional expression	Introduction to the concept of emotions Reflect on different forms of emotional expression Understand and associate emotions with different daily moments
6–7	Emotional Expression—Joy	Identify and recognize joy (in oneself and others) Reflect on different forms of emotional expression of joy Understand and associate joy with different daily moments
8–9	Emotional Expression—Fear	Identify and recognize fear (in oneself and others) Reflect on different forms of emotional expression of fear Understand and associate fear with different daily moments
10–11	Emotional Expression—Anger	Identify and recognize anger (in oneself and others) Reflect on different forms of emotional expression of anger Understand and associate anger with different daily moments
12–13	Emotional expression and control	Explore different forms of emotional expression of anger Enhance the adoption of adaptive strategies to deal with anger
14–15	Emotional expression—Sadness	Identify and recognize sadness (in oneself and others) Reflect on different forms of emotional expression of sadness Understand and associate sadness with different daily moments
16–17	Emotional expression and empathy	Bring children closer to adaptive strategies for different emotions. Promote empathy and the spirit of sharing and mutual assistance. Promote self-control and emotional self-regulation
18	Emotional expression and empathy	Reflect on the importance of positive interpersonal relationships Reflect on the impact we can have on others. Reinforce the importance of empathy
19	Evaluation and group cohesion	Promote gratitude and group cohesion Recognize in each of us the ability to generate well-being in others
20	Evaluation and group cohesion	Promote self-awareness and group cohesion Reflect on the DROPI program and the achieved results

used as an indicator of intellectual and cognitive competence (Dunn, 1986). The receptive vocabulary scores refer to the raw scores obtained from the test.

Social Skills

The assessment of children's social skills was conducted using the Portuguese version of the Social Skills Rating System preschool version intended for teachers and parents (Lemos & Menezes, 2002), which was previously adapted from the Social Skills Rating System (Gresham & Elliott, 1990). This tool includes three subscales in the teacher version (viz., cooperation, assertiveness, and self-control) and four subscales in the parent version (the previous subscales plus responsibility), each with 10 items. In the teacher version, Cronbach's alpha values indicated good reliability both at pretest ($\alpha_{\text{self-control}}=0.83$, $\alpha_{\text{cooperation}}=0.92$, and $\alpha_{\text{assertiveness}}=0.90$) and post-test ($\alpha_{\text{self-control}}=0.90$, $\alpha_{\text{cooperation}}=0.80$, and $\alpha_{\text{assertiveness}}=0.92$). For the parent version, Cronbach's alphas suggested acceptable to good

reliability, both at pretest ($\alpha_{\text{self-control}}=0.79$, $\alpha_{\text{cooperation}}=0.76$, $\alpha_{\text{assertiveness}}=0.73$, and $\alpha_{\text{responsibility}}=0.73$) and post-test ($\alpha_{\text{self-control}}=0.79$, $\alpha_{\text{cooperation}}=0.77$, $\alpha_{\text{assertiveness}}=0.70$, and $\alpha_{\text{responsibility}}=0.69$).

To assess the impact of the socioemotional intervention on children's outcomes (viz., emotional knowledge, receptive vocabulary, and social skills), we conducted a 2 (time) $\times$ 2 (group) ANOVA involving repeated measures. The assessment time (T0 vs. T1) served as the within-subjects variable, while the treatment group (intervention vs. control) was the between-subjects factor. To further examine the interaction effect, paired sample t-tests were conducted separately for each group to compare pretest and post-test outcome measure levels.

Results

Descriptive statistics are presented in Table 3.

Table 3 Means and standard deviations of all variables and results of the paired samples t-tests

Measures	Intervention group		<i>t</i>	<i>d</i>	Control group		<i>t</i>	<i>d</i>
	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>			Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>		
Emotional knowledge								
Facial expressions	6.64 (1.99)	7.28 (1.59)	− 2.669**	0.30	6.01 (2.08)	6.39 (1.71)	− 1.416	0.16
Emotional situations	7.22 (1.69)	8.71 (2.15)	− 3.515***	0.63	7.28 (1.82)	6.59 (1.93)	1.697*	0.30
Emotional behaviors	6.27 (2.05)	8.30 (2.44)	− 4.989***	0.64	6.29 (2.13)	6.67 (2.13)	− 1.596	0.20
Vocabulary	28.01 (15.95)	41.98 (16.87)	− 7.616***	0.85	29.23 (16.58)	36.41 (15.66)	− 3.843***	0.44
Social Skills – Teacher report								
Self-control	1.12 (0.44)	1.46 (0.41)	− 15.988***	1.06	1.21 (0.46)	1.36 (0.36)	− 3.588***	0.39
Cooperation	1.27 (0.44)	1.55 (0.41)	− 11.729***	0.78	1.40 (0.39)	1.59 (0.34)	− 4.725***	0.51
Assertiveness	1.07 (0.49)	1.44 (0.44)	− 17.845***	1.18	1.03 (0.53)	1.30 (0.51)	− 5.558***	0.60
Social Skills – Parent report								
Self-control	1.29 (0.31)	1.34 (0.29)	− 2.614**	− 0.22	1.37 (0.33)	1.32 (0.30)	0.875	0.13
Cooperation	1.34 (0.34)	1.37 (0.32)	− 1.066	− 0.09	1.23 (0.36)	1.27 (0.32)	− 0.596	− 0.09
Assertiveness	1.42 (0.35)	1.48 (0.29)	− 2.583**	− 0.22	1.43 (0.27)	1.46 (0.29)	− 0.531	− 0.08
Responsibility	1.18 (0.36)	1.24 (0.31)	− 2.160*	− 0.18	1.17 (0.40)	1.22 (0.31)	− 0.772	− 0.12

* $p < .05$; ** $p < .01$; *** $p < .001$

Preliminary Analyses

One-way ANOVA tests were conducted to understand if there were statistically significant differences between the two groups (intervention vs. control) at pretest for all dependent variables. No statistically significant differences were found between the groups at pretest for the situations and behaviors subscales of the emotional knowledge scale nor the receptive vocabulary scale (all $ps > 0.05$). Statistically significant differences between the groups were found in the pretest for the facial expressions subscale of the emotional knowledge scale, but the effect size was small, $F(1, 168) = 4.69$, $p = 0.032$, $\eta^2 = 0.027$. No differences were found between the groups in social skills at pretest (all $ps > 0.05$), except for the teachers' report of children's cooperation levels. Specifically, the control group ($M = 1.4$, $SD = 0.39$) showed a slight advantage over the intervention group ($M = 1.26$, $SD = 0.45$) before the intervention ($F(1, 231) = 6.131$, $p = 0.014$, $\eta^2 = 0.019$).

Impact of the DROPI Program on Children's Emotional Knowledge and Receptive Vocabulary

Knowledge of Facial Expressions

There was no significant interaction effect between group and time in the facial emotional expressions variable ($F(1, 153) = 0.554$, $p = 0.458$). We only found significant main effects of time ($F(1, 153) = 8.112$, $p = 0.005$, $\eta_p^2 = 0.050$) and

group ($F(1, 153) = 9.989$, $p = 0.002$, $\eta_p^2 = 0.061$). Although the intervention group already showed a slight advantage at pretest, paired sample t-tests showed that the knowledge of facial expressions further improved in the intervention group. By contrast, the increase in the control group did not reach statistical significance (see Table 3 and Fig. 2).

Knowledge of Emotional Situations

Regarding knowledge of emotional situations, multivariate tests showed an interaction effect between group and time ($F(1, 61) = 13.781$, $p < 0.001$, $\eta_p^2 = 0.184$) as well as a significant main effect of group ($F(1, 61) = 7.343$, $p = 0.009$, $\eta_p^2 = 0.107$). The effect of time was not statistically significant ($F(1, 61) = 1.854$, $p < 0.001$). Specifically, the intervention group improved knowledge of emotional situations from pretest to post-test, while this knowledge decreased in the control group over time. Subsequent paired sample t-tests confirmed a significant increase of knowledge of emotional situations in the intervention group and a significant decrease in the control group (see Table 3 and Fig. 2).

Knowledge of Emotional Behaviors

For the knowledge of emotional behaviors, multivariate tests indicated a statistically significant interaction effect between group and time ($F(1, 119) = 12.464$, $p < 0.001$, $\eta_p^2 = 0.095$) as well as a significant effect of time ($F(1, 119) = 26.396$, $p < 0.001$, $\eta_p^2 = 0.182$). These results suggest that both groups improved their overall knowledge of emotional behaviors over time, however children in the intervention

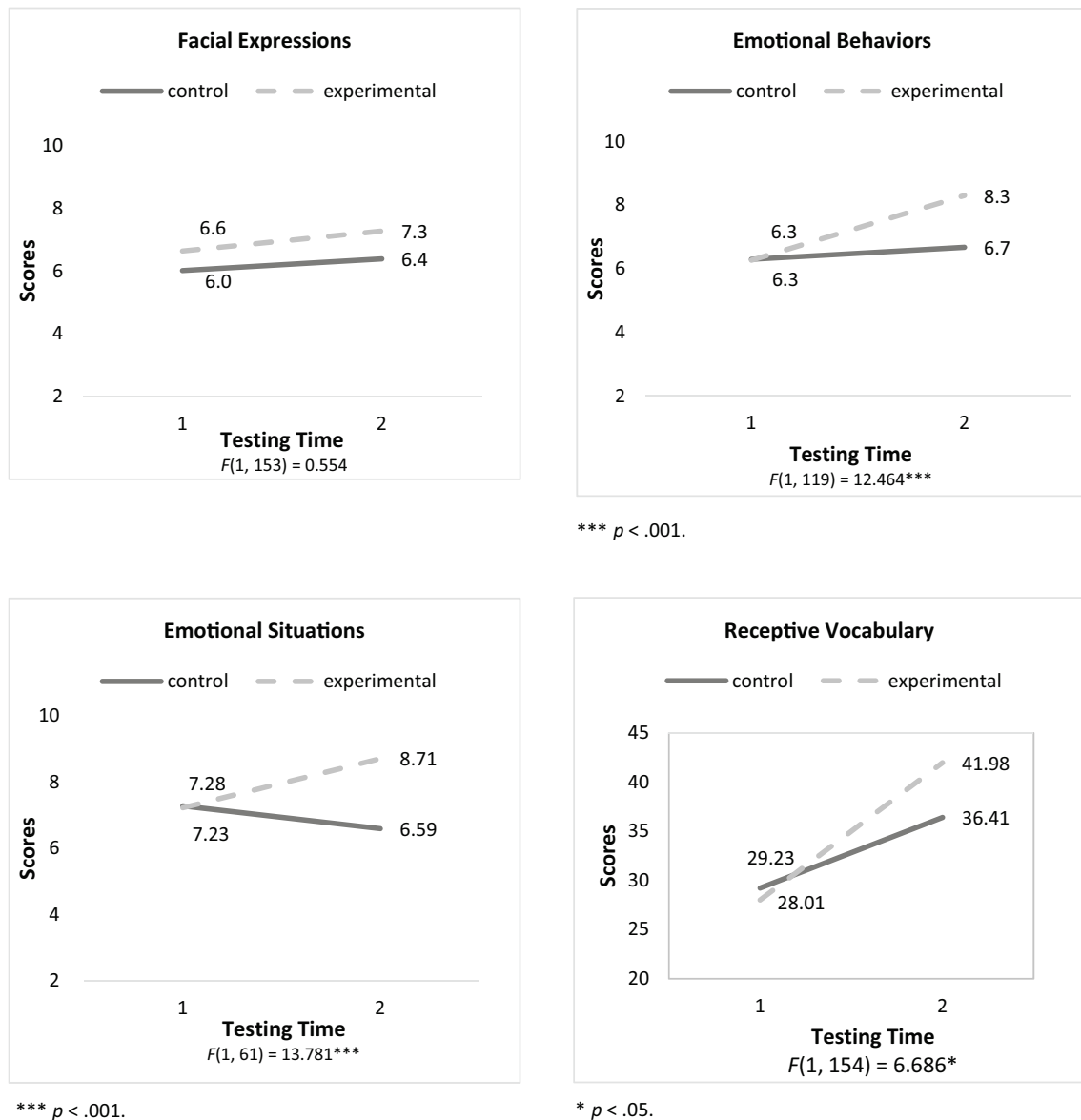


Fig. 2 Emotional knowledge and receptive vocabulary levels before and after the intervention, depicting the interactive effect of group*time

group showed a greater improvement than those in the control group. Subsequent paired sample t-tests confirmed that knowledge of emotional behaviors significantly increased from pre to post-test in the intervention group, but the improvement was not statistically significant in the control group (see Table 3 and Fig. 2).

Receptive Vocabulary

The analysis of the receptive vocabulary revealed a statistically interactive influence of group and time on children's scores ($F(1, 154) = 6.686, p = 0.011, \eta_p^2 = 0.042$) and a significant effect of time ($F(1, 154) = 65.12, p < 0.001, \eta_p^2 = 0.297$). Specifically, both groups improved in receptive vocabulary from

pretest to post-test, but the effect was more pronounced for the intervention group. While the effect size for the increase over time was large in the intervention group ($d = 0.85$), the effect size was smaller in the control group ($d = 0.44$; see Table 3 and Fig. 2). As such, the DROPI program was effective in strengthening this measure of children's verbal ability.

Impact of the DROPI Program on Children's Social Skills

Teachers' Report

Self-Control

For the self-control domain in the SSRS-teachers' version, we found a significant interaction effect between group and time, $F(1, 310)=20.067$, $p<0.001$, $\eta_p^2=0.061$ and a significant effect for the time factor ($F(1, 310)=129.158$, $p<0.001$, $\eta_p^2=0.294$) with both groups showing an increase in self-control over time, but with a greater increase in children's self-control in the intervention group. Paired sample t-tests confirmed that the increase was more pronounced in the intervention group ($d=1.06$) than in the control group ($d=0.39$; see Table 3 and Fig. 3).

Cooperation

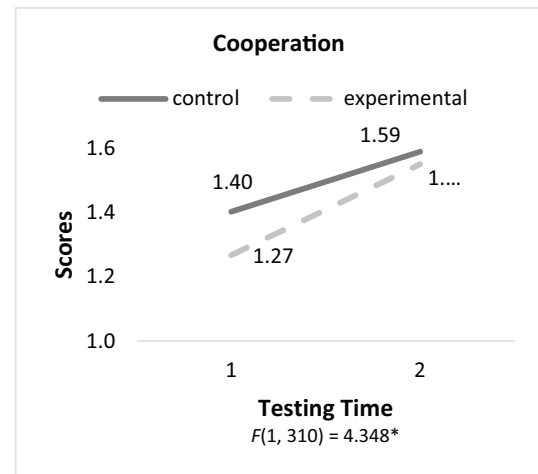
Similar to self-control, the results of the cooperation domain in the SSRS-Teachers showed a statistically significant interaction effect between group and time ($F(1, 310)=4.348$, $p=0.038$, $\eta_p^2=0.014$) and a significant main effect of time ($F(1, 310)=6.868$, $p<0.001$, $\eta_p^2=0.251$). This result indicates a significant increase in cooperation levels among children over time, with a greater improvement in the intervention group. Paired sample t-tests confirmed that the increase in cooperation levels was more pronounced in the intervention group ($d=1.06$) than in the control group ($d=0.39$; see Table 3 and Fig. 3).

Assertiveness

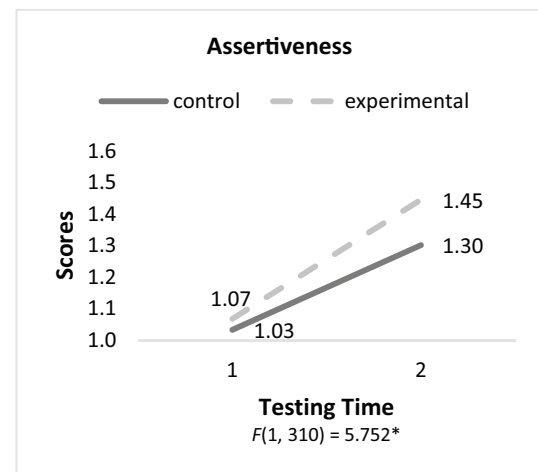
Similar to the abovementioned results, results of the assertiveness domain in the SSRS-Teacher revealed a statistically significant effect of group combined with time ($F(1, 310)=5.752$, $p=0.017$, $\eta_p^2=0.018$) and a significant main effect of time ($F(1, 310)=201.924$, $p<0.001$, $\eta_p^2=0.394$). While the overall scores of assertiveness significantly increased from pretest to posttest for both groups, paired sample t-tests revealed that the growth was more noticeable in the intervention group ($d=1.18$) than in the control group ($d=0.60$; see Table 2.1 and Fig. 3). In short, these results indicate that the DROPI program had a positive effect on preschool children's social skills, namely self-control, cooperation and assertiveness, as reported by teachers.



*** $p < .001$.



* $p < .05$.



* $p < .05$.

Fig. 3 Children's social skills levels assessed by teachers before and after the intervention

Parents' Report

Self-Control

The results of the self-control dimension in the SSRS-Parent version revealed a statistically significant interaction effect between group and time ($F(1, 184) = 4.369, p = 0.038, \eta_p^2 = 0.023$), but no main effect of time. Paired sample t-tests indicated that children in the intervention group slightly improved their self-control, whereas children in the control group slightly diminished their self-control from pretest to post-test (see Table 3 and Fig. 4).

Cooperation

For the cooperation dimension in the SSRS-Parents, multivariate analyses indicated that there were no significant main time ($F(1, 184) = 1.171, p = 0.279$) nor interaction effects

($F(1, 184) = 0.009, p = 0.923$). Within-subject contrasts also did not reveal significant effects for the cooperation dimension ($p > 0.05$), corroborating the results of multivariate analyses. The results point to stability in cooperation scores over time, regardless of participation in the intervention program (see Table 3 and Fig. 4).

Assertiveness

Regarding the assertiveness dimension in the SSRS-parent, the analyses did not show a statistically significant effect of time ($F(1, 184) = 0.978, p = 0.086$) nor interaction ($F(1, 184) = 0.361, p = 0.549$). Notwithstanding, subsequent paired sample t-tests revealed that the intervention group significantly increased their assertiveness levels from pre to post-test, whereas no significant change was observed in the control group (see Table 3 and Fig. 4).

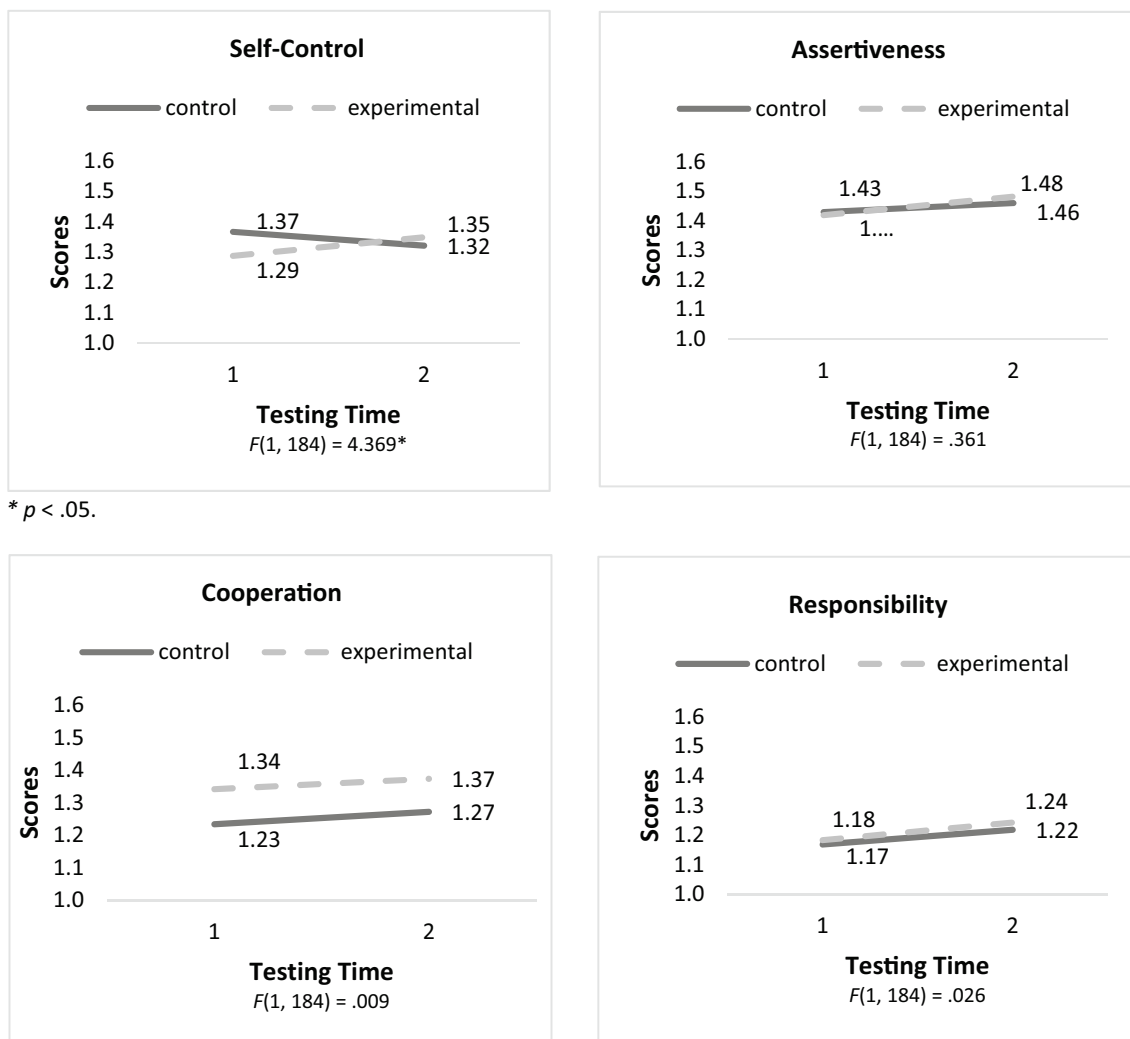


Fig. 4 Children's social skills levels assessed by parents before and after the intervention

Responsibility

The results of the responsibility dimension in the SSRS-parent were similar to those found for assertiveness. Neither multivariate tests nor within-subject contrasts showed a significant effect of time ($F(1, 184) = 3.200, p = 0.075$) nor a significant interaction between the group and time ($F(1, 184) = 0.026, p = 0.872$). Again, paired sample t-tests indicated that the intervention group grew the responsibility levels over time, whereas no significant change occurred in the control group (see Table 3 and Fig. 4). Overall, parents reported a positive impact of the intervention on children's self-control skills, but no significant impact on their cooperation levels. Although no group $\times$ time effects were found for assertiveness and responsibility, the results still suggest a tendency of the intervention group to improve these outcome measures over time.

Discussion

This study investigated the effectiveness of the DROPI preschool socioemotional development program among preschool children in Portugal. This preventive program aims to promote socioemotional skills based on CASEL (Collaborative for Academic, Social, and Emotional Learning) principles. We analyzed whether the program had positive effects on several skills using a multi-informant approach (i.e., children, teachers, and parents). The results indicated significant increases in emotional knowledge, receptive vocabulary, and several social skills among children in the intervention group, providing evidence of the benefits of this SEL program in the Portuguese context. This study represents the initial systematic evaluation of the DROPI program's effectiveness. As the first empirical investigation into this socioemotional development program for preschool children, our findings provide a foundational basis for future validation studies and contribute to the growing body of literature on evidence-informed early childhood socioemotional interventions.

Impact of the DROPI Program on Children's Emotional Knowledge and Receptive Vocabulary

Children in the intervention showed greater improvements in the Emotional Behavior and Emotional Situations subscales of the Child Emotional Skills Assessment Scale (Schultz et al., 2004). The Facial Expressions subscale did not show an interactive effect between group and time, however subsequent t-test analyses revealed that only children in the intervention group improved in the identification of

facial expressions from pre to post-test. Taken together, these results support our first hypothesis. These findings are aligned with the findings of Tan et al. (2022), which corroborate the results supported by Denham (1986). Tan et al. (2022) also demonstrated that training significantly improves children's ability to interpret facial expressions, emphasizing its importance for social and emotional development. These results are clearly important as prior research has shown that the ability to recognize emotions in others is associated with more prosocial behavior and greater sympathy from peers (Denham et al., 2003). Children who can identify emotional expressions tend to display greater emotional competence, showing more empathy and a more receptive stance in social interactions (Alwaely et al., 2021; Denham et al., 2003). The marked improvement in the intervention group suggests that the DROPI program not only reinforced theoretical emotional knowledge but also provided practical opportunities for applying it *in daily interactions*. Denham et al. (2014) emphasize that emotional knowledge is crucial in the broader development of socioemotional competencies, particularly in the context of school adjustment. Interactive programs and storytelling, as noted by Izard et al. (2001), facilitate the learning of emotional behaviors by modeling appropriate responses and encouraging their application in real-life contexts. The significant group-by-time interaction observed in the emotional situations subscale further underscores the DROPI program's effectiveness in enhancing emotional understanding. The control group's regression likely reflects natural developmental stagnation due to the lack of specific stimuli. This suggests that the program successfully enhanced children's ability to interpret emotional situations, fostering positive social interactions. Although the DROPI program showed improvements in children's emotional skills, incorporating family involvement could strengthen its impact. Parental engagement is essential for consolidating children's skills and extending benefits into the home environment (Denham, 2012; Greenberg et al., 2003). Future implementations could include interactive parent-child activities, such as discussion guides and practical tasks, and structured family-based interventions, to reinforce emotional learning and foster deeper engagement.

As predicted in our second hypothesis, the intervention also significantly improved children's receptive vocabulary. In this regard, previous research emphasizes the strong connection between vocabulary and emotions, which directly influences children's social development (Beck et al., 2012; Denham et al., 2003; Greenberg et al., 2003). A broader vocabulary facilitates the expression and understanding of emotions, conflict resolution, and the formation of healthy relationships (Beck et al., 2012; Monopoli & Kingston, 2012; Smith, 2001). Therefore, our findings suggesting that the DROPI program may improve not only emotional skills but also vocabulary skills are promising, considering that a

more extensive vocabulary can lead to better socioemotional adjustment, and may also act as a critical component of socioemotional growth in children.

Impact of the DROPI Program on Children's Social Skills

The results revealed positive effects of the DROPI program on children's cooperation, self-control, and assertiveness after the intervention as assessed by teachers, thus supporting our third hypothesis. These results are consistent with previous studies showing significant improvements in self-control, cooperation, and assertiveness among children after socioemotional interventions when compared to the pre-intervention period (Hosokawa et al., 2023; Robson et al., 2020).

These social skills, such as cooperation, assertiveness, and self-control, are critical for social adjustment during childhood and throughout life (Durlak et al., 2011; Greenberg et al., 2017; Taylor et al., 2017). Given that the preschool years represent a period of rapid social growth (Webster-Stratton & Herman, 2010), the early implementation of interventions that foster socioemotional development is essential. Denham (2005) emphasizes the importance of emotional competence in children's social development, highlighting how early emotional understanding contributes to social success. Furthermore, Izard (2002) underscores the role of emotion in shaping social behaviors, suggesting that emotional regulation is a key aspect of successful peer interactions. Integrating Denham's (2005) emphasis on emotional competence, where parents and teachers collaborate to support children's social and emotional learning, could be valuable for strengthening the family aspect of the intervention. Denham's framework highlights how caregivers' involvement in emotional development can shape children's social behaviors and promote social adaptation. Similarly, Izard's (2001) work on emotional regulation provides further insight into how emotion-based interventions, particularly those focused on emotion recognition and regulation, can support children's social skills and peer interactions. The CASEL (2020) framework and Durlak et al. (2011) emphasize the need for such interventions to be part of early childhood education curricula, highlighting the critical role of early interventions in shaping healthy development.

As for parents' reports, while a significant positive increase in self-control was observed in the intervention group compared to the control group, no significant differences were found in the dimension of cooperation. For assertiveness and responsibility, we did not find an interaction effect between group and time, however t-test results suggested that only the intervention group improved these skills (as perceived by parents) over time. These results

suggest that the DROPI intervention program may have positively influenced children's social interactions at school, but its impact on social skills at home may not have been as pronounced. This can be explained by the distinct nature of school and home environments, where behavioral expectations and social dynamics vary (Denham et al., 2012; Gresham, 2018; Webster-Stratton & Herman, 2010). Additionally, differences in parental perceptions regarding children's behavior may have contributed to these results. Specifically, parents might observe and interpret their children's behavior differently from teachers due to varying contexts and interactions. For instance, while teachers may note improvements in children's social skills within the structured environment of school, parents might not perceive these changes as readily in the home setting (Clarke et al., 2010; Denham et al., 2012; Hosokawa & Katsura, 2018; Webster-Stratton & Herman, 2010). These variations in observation and interpretation might explain the discrepancies in the reported effects of the intervention. Considering these aspects, it is important to recognize that parental assessments reflect a specific perspective of children's behavior in a particular context and may not fully capture the program's impact on all areas of social skills. It is also important to note that parents were not aware of whether their children were part of the intervention group. In future studies, it would be interesting to consider how communication with parents could be optimized, ensuring a better balance between maintaining the integrity of the study and the informed involvement of the parents.

Nevertheless, to further enhance the program's effectiveness, targeted strategies should be developed to address specific areas that showed limited improvement. For instance, enhancing efforts to promote cooperation, assertiveness, and responsibility within family contexts could be crucial. This could involve integrating more family-focused components into the program, such as resources designed to engage parents in fostering these social skills at home. By adapting the intervention to better address these specific aspects, it may be possible to achieve more comprehensive and sustained improvements in children's social behavior across different contexts.

Implications for Practice

The findings of this study have several significant practical implications for teachers, parents, and policymakers, highlighting the importance of specific socioemotional interventions from the early years of children's lives. The results of this study support the implementation of socioemotional intervention programs, such as the DROPI Program, to enhance social skills, vocabulary, and emotional understanding among preschool-aged children, thus improving

their socioemotional development. This study highlights the importance of the role of teachers in promoting children's socioemotional well-being. The results suggest that well-trained and empowered teachers can play a crucial role in the effective implementation of socioemotional intervention programs, providing adequate support and guidance to the children in their care (Greenberg et al., 2017).

This study also has implications for the formulation of policies aimed at promoting children's socioemotional well-being from an early age. Governments and regulatory bodies may consider integrating socioemotional intervention programs into preschool curriculum guidelines and family support policies, thus ensuring healthy and balanced child development. The CASEL (2020) framework and Durlak et al. (2011) emphasize the need for such interventions to be part of early childhood education curricula, highlighting the critical role of early interventions in shaping healthy development. By investing in early socioemotional interventions, schools, and educational institutions can help reduce behavioral and emotional problems in children, promoting a positive and inclusive school environment.

Limitations and Directions for Future Research

This study is not exempted from limitations. Firstly, the quasi-experimental design, while robust, does not allow us to establish causality as definitively as a randomized controlled trial (RCT). Next to that, the use of a convenience sample and the program's implementation within a single school cluster are also shortcomings. This sample might not represent the broader population of preschool-aged children in Portugal, particularly those from diverse socioeconomic or geographic backgrounds. Children in this study were from the northern region of Portugal, which includes both urbanized and rural areas. While we observed some socioeconomic diversity within the sample, more detailed assessments of the socioeconomic status of participants would be beneficial to understand its potential influence on the results. Future studies should aim to include a more diverse and representative sample, considering variations in socioeconomic status and geographic location (e.g., urban vs. rural, different regions of Portugal). A limitation of this study is the limited variability in teacher age and experience. The average age of teachers was 58 years (ranging from 48 to 64), with an average of 33.5 years of experience (ranging from 24 to 41 years), indicating a highly experienced staff. Thus, the findings may not be generalizable to settings with younger or less experienced teachers. Future research should explore how teacher characteristics, including age, experience, and training, influence the implementation of socioemotional interventions. Another significant limitation of

this study was the lack of evaluation of teachers' personal and emotional characteristics, which may influenced the program's outcomes. Differences in teachers' training, professional experience, and emotional regulation could have a substantial impact on the delivery and effectiveness of socioemotional interventions (Denham et al., 2012; Greenberg et al., 2017). Attributes such as empathy, stress management, and teachers' perceptions of their role in fostering children's socioemotional development might also have influenced the program's success. However, despite these potential variations in teachers' competencies, the results of our study were positive and significant. This suggests that the intervention was effective in real-world classroom settings even with these factors not being directly assessed. To address this gap, future research should examine how specific teacher characteristics, including their expertise, emotional competencies, and instructional styles, may moderate the impact of socioemotional interventions. Furthermore, the lack of follow-up assessments prevents us from evaluating the long-term impact of the DROPI program. It is also important to note that individual assessment of vocabulary and emotional knowledge was based on a subsample. Although the intervention participants were randomly selected, it would be important to conduct further studies with larger samples.

Future research should involve more diverse and representative samples from various educational contexts (e.g., public vs. private, urban vs. rural), as well as from different geographic, socioeconomic, and cultural backgrounds, to enhance the generalizability of findings. Longitudinal studies are needed to assess the sustainability of the DROPI program's effects over time and identify any long-term benefits or challenges. To gain a more complete understanding of the intervention's effects, future studies should use a variety of assessment methods, including behavioral observations, and peer reports. This will provide a more comprehensive evaluation of socioemotional development. It is important to account for uncontrolled contextual factors such as family environment, social support, and school resources in future research to isolate the specific effects of the DROPI program.

Future research needs to investigate moderating factors, such as exploring how individual child characteristics (e.g., age, gender), contextual factors (e.g., parental support, school environment), and teacher attributes (e.g., knowledge, emotional regulation) influence the effectiveness of the intervention. Further investigation into the mechanisms through which the DROPI program affects socioemotional development is needed. For instance, understanding the role of emotional regulation and social interactions can help refine and optimize the intervention. Adapting the program for different cultural contexts and scaling its implementation across various educational settings should be considered to enhance its effectiveness.

Conclusion

In summary, this study underscores the importance of socioemotional interventions in early childhood and demonstrates the potential benefits of the DROPI program. The findings suggest that DROPI may positively impact socioemotional skills such as self-control, cooperation, assertiveness, emotional knowledge, and receptive vocabulary. Despite the promising results, further research, including RCTs and longitudinal studies, is essential to confirm these findings and better understand the program's long-term effects. This study provides an evidence-based foundation for educational policies and practices, advocating for the systematic implementation of SEL programs like DROPI to support holistic child development. By guiding policymakers and teachers, these findings underscore the importance of careful and systematic implementation of SEL programs to enhance preschool children's overall well-being and success.

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Declarations

Conflict of interest The authors declare that they have no competing interests.

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