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# Impact of a Social-emotional Skills-Building Program (*Pisotón*) on Early Development of Children in Colombia: A Pilot Effectiveness Study

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## ABSTRACT

Quality early childhood development (ECD) settings that address children's needs holistically provide safe and nurturing opportunities for children to thrive. We evaluated, through a quasi-experimental design, the impact of a social-emotional skills-building program (*Pisotón*) across ECD centers in Colombia. Developmental outcomes of children participating in *Pisotón* ( $n = 37$ ) for 12 weeks were compared to those of children who did not participate in the program ( $n = 37$ ) using the International Development and Early Learning Assessment (IDELA) measure and the Child Behavior Checklist (CBCL). The results show that participation in *Pisotón* significantly increased children's social-emotional development score by 0.37 standard deviation units as assessed by IDELA. Study implications are discussed.

## Introduction

During the first years of life, children develop core skills that are crucial to their ability to thrive throughout the life course (McCoy et al., 2017). Early childhood development (ECD) is a sensitive period where the bases for fundamental cognitive and social-emotional competencies are established (Britto et al., 2017). In turn, these competencies drive children's abilities to, for example, sustain attention, inhibit their automatic responses, follow directions, communicate with others, and solve conflicts (Grantham-McGregor et al., 2007). Moreover, early life experiences and the acquisition of early skills are key to achieving subsequent developmental milestones associated with several mental and physical health outcomes later in adulthood (Hoddinott, 2008). Early life adversities such as malnutrition, poverty, and displacement due to armed conflict, among others, are some of the risk factors that pose a great threat to children's development (Cronholm et al., 2015). Exposure to multiple adversities—simultaneously and consecutively—poses a cumulative burden and is highly detrimental to a child's wellbeing (Walker et al., 2011; Wachs et al., 2013). This is particularly important in low- and middle-income countries (LMICs) where children exposed to multiple risks are also less likely to have access to protective factors (Walker et al., 2011; Wachs et al., 2013).

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Nutrition, learning opportunities, and caregiver-child interactions are among the wide array of protective factors that can ameliorate contextual risks (World Health Organization, 2018). To mitigate the impact of early life adversities and multiple risk factors, practitioners and policymakers have focused on enhancing the quality of ECD settings by developing interventions to target skills such as executive function and other social-emotional competencies (Bethell et al., 2014; Bethell et al., 2017; Luecken et al., 2013). These developmental domains are linked to decision-making, emotion regulation, empathy, and inhibitory control, among other key domains (CASEL, 2013). These skills develop rapidly during early childhood due to, in part, increasing environmental demands and neurobiological processes and highlights the relevance of developing interventions during this crucial period (Shonkoff & Phillips, 2000; Zelazo & Carlson, 2012). The focus on promoting social-emotional skills in early childhood is supported by extensive evidence documenting numerous positive outcomes later on in life such as greater wellbeing and adjustment, better mental health and career or workplace performance, and improved academic achievement (Blair & Razza, 2007; Durlak et al., 2011; Eisenberg et al., 2010; Geldhof & Little, 2011; McClelland et al., 2007). Regarding the latter, evidence shows that social-emotional interventions have positive effects on children's math and reading achievement (Jones et al., 2011). Moreover, a longitudinal study by McCoy and Wolf (2018) showed that executive function predicted literacy and numeracy skills, and early literacy and numeracy skills predicted higher later executive function, which serves as evidence of how social-emotional skills are inter-connected to academic and cognitive skills over time. A recent study with preschool Latinx dual language learners further confirms longitudinal, reciprocal associations between social skills and receptive and expressive vocabulary skills (Clayton, Hein, Keller-Margulis, & Gonzalez, 2021), which further supports the notion that promoting social-emotional skills may positively affect early academic skills. Finally, research shows that executive function and social-emotional skills allow children to manage emotions and stress, attend to, engage with, and process information in educational settings, and enable them to interact and maintain positive interactions with peers, teachers, and adults in general (Blair, 2002; Ursache et al., 2012).

### *The Evidence Base for Social-Emotional Development Programs*

In several high-income countries, school-based approaches to promoting social-emotional skills have shown to be effective in increasing children's competencies and developmental and behavioral outcomes (Bierman et al., 2010; Diamond & Lee, 2011; Durlak et al., 2011). A recent systematic review identified three social-emotional development intervention characteristics that contribute to positive impacts: (1) including a training or professional development component for early childhood teachers or educators; (2) integrating the instruction of social-emotional skills into daily activities that allow children to develop, practice and refine their competencies; and (3) engaging children's families providing them additional opportunities to use the newly acquired skills at home (McClelland et al., 2017). Compared to research conducted in high-income countries, less evidence on the impact of approaches to social-emotional development programs in early childhood has emerged from LMICs. Efforts in the Latin America and the Caribbean region to implement ECD programs vary in the quality of the service offered, the scale of the implementation, and the approach of the interventions (Vegas & Satibañes, 2010). Despite the existence of varied strategies, few studies have evaluated the impact of ECD interventions on children's cognitive and social-emotional skills in the region. For instance, *Un Buen Comienzo*, a professional development program in Chile that seeks to promote the development of children's social-emotional and language skills had no statistically significant impact on children's outcomes, and showed only a small (marginally significant) effect on reduction in problem behavior, and increase in self-regulation (Yoshikawa et al., 2015). In Argentina, two programs, targeting children 3 to 5 years old, the Cognitive Training Program and the School Intervention Program, showed a positive and significant impact on children's social-emotional skills such as attention, inhibitory control, working memory, flexibility, and planning skills (Segretin et al., 2014).

### *The Case of Colombia*

The Colombian Government enacted a National ECD Law ("From Zero to Forever" or *De Cero a Siempre*; DCAS) to implement comprehensive ECD services (CIPI, 2013; Yoshikawa et al., 2015; Government of Colombia, 2019). DCAS provides a framework for the enhancement of differential and holistic services and for bolstering the quality of ECD at scale. One of the strategies to achieve this goal is the implementation of programs and interventions in existing ECD settings that are designed to promote the emotional and social development of children by engaging teachers and caregivers. This study aimed to evaluate the impact of a social-emotional skills-building program<sup>1</sup> (*Pisotón*), which has been implemented in Colombia and, more recently, linked as a strategic program in the context of DCAS. *Pisotón* aims to promote healthy social-emotional development in children (2 to 9 years old), particularly among children who face risk factors such as extreme poverty, exposure to violence, or who may have been impacted by conflict, natural disasters, or internal displacement (Manrique-Palacio et al., 2018; Russo, 1997; Russo, 2015).

In Colombia, *Pisotón* has also been used as part of a strategic governmental response to provide support in humanitarian emergencies, as the program aims to ameliorate and prevent the negative and cumulative effects of early traumatic experiences. Elsewhere in Latin America, including Bolivia, Ecuador, Peru, and Mexico, *Pisotón* has been implemented through a set of inter-institutional agreements. To date, the program has trained more than 26,000 educators, has been institutionalized in 10,000 entities, and has reached more than 78,000 beneficiary children and families in the Latin American region (Manrique-Palacio et al., 2018; Russo, 2015).

Qualitative and observational studies have explored the impacts of *Pisotón* on children, caregivers (mostly parents), and teachers.

<sup>1</sup> The exact Spanish-English translation of the focus of *Pisotón*, is Psycho-affective education. Despite this, we use the term social-emotional development as it is more widely used in literature.

One of those studies assessed the social-emotional well-being of children from across 18 Colombian localities (Manrique-Palacio et al., 2018). The results indicated that participation in *Pisotón* led to increased capacity to understand and regulate emotions and self-concept, and to the reduction of aggression, externalizing symptoms, and overall behavioral problems in children (Manrique-Palacio et al., 2018). A qualitative study explored the changes in teachers' pedagogical practices, showing that *Pisotón* led to positive changes in teachers' theoretical and didactical knowledge, sensitivity to children, as well as in their professional and personal satisfaction (Zinke et al., 2016). To date, however, no controlled quantitative evaluation has been conducted to determine the program's impact on direct child development measures. This is important because direct measures of development, as well as applying a comparison or no-treatment group, are key to appraising the program's impact and controlling possible biases in teacher or parental reports.

To contribute to the evidence-base of the impact of *Pisotón* and to address the methodological gap in how its evaluations have been conducted, we applied a quasi-experimental pilot evaluation in ECD centers located in areas in Colombia that have been affected disproportionately by the armed conflict and with high indices of violence, poverty, and other risk factors. Our main research question was: to what extent does *Pisotón* affect children's social-emotional and behavioral outcomes? We hypothesized that, compared to children who participated in a preschool program, children who participated in a preschool program that integrated *Pisotón* into their pedagogical guidelines and everyday routines and practices would show a significant improvement in social-emotional skills and a

**Table 1**  
*Pisotón* Logic Model.

Cross-cutting inputs	Participant/ program target level	Method of engagement, participation, and learning	Intended outcomes	Cross-cutting long-term outcomes
National and local governance partnership-building	Relevant government agencies	<ul style="list-style-type: none"> <li>• Formulation of agreements</li> <li>• Dissemination and knowledge/evidence-sharing with relevant stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Alignment with national and local policy guidelines</li> <li>• Sustainable partnerships</li> <li>• Integration into existing educational strategies and programs</li> <li>• Mechanisms for scale-up</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of holistic early childhood educational and health policies</li> <li>• Strengthened mechanisms for socioemotional development at scale</li> <li>• Mechanism for the realization of Child Rights in family and school environments</li> </ul>
Institutional partnership-building	Institutions for education and child development (e.g. preschools, centers, primary schools, other modalities if child education)	<ul style="list-style-type: none"> <li>• Formulation of formal agreements</li> <li>• Inclusive meetings and knowledge/evidence-sharing prior to implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Alignment with service-level curricular and pedagogical guidelines</li> <li>• Integration into institutional practices</li> <li>• Sustainable partnerships</li> </ul>	<ul style="list-style-type: none"> <li>• Installed skills and strategies for replicable socioemotional education and support across institutions</li> </ul>
Program's theoretical and conceptual framework, materials, trainers, academic partners and other program implementation leaders <sup>a</sup>	Child	<ul style="list-style-type: none"> <li>• Stories</li> <li>• Dramatic play</li> <li>• Games</li> <li>• Activities for reflexive expression</li> </ul>	<ul style="list-style-type: none"> <li>• Primary outcome: positive socioemotional development<sup>b</sup></li> <li>• Secondary outcomes: impacts on other developmental domains in early childhood</li> </ul>	<ul style="list-style-type: none"> <li>• Positive developmental trajectories</li> <li>• Social transformation through sustained developmental impacts</li> </ul>
	Primary caregivers (e.g. parents, grandparents)	<ul style="list-style-type: none"> <li>• 3 interactive workshops</li> <li>• 1 integration workshop</li> </ul>	<ul style="list-style-type: none"> <li>• Emotional and affective bond with children for the promotion of secure attachment and autonomy</li> <li>• Child-centered practices</li> </ul>	<ul style="list-style-type: none"> <li>• Sustained positive intergenerational parenting and caregiving practices</li> <li>• Positive family and home environments</li> </ul>
	Educational agents (e.g. teachers, psychologists, psychosocial support staff)	<ul style="list-style-type: none"> <li>• 9 interactive workshops</li> <li>• 1 integration workshop</li> </ul>	<ul style="list-style-type: none"> <li>• Avoidance of harmful practices</li> <li>• Knowledge and practice of play-based strategies with children for their social and emotional development</li> </ul>	<ul style="list-style-type: none"> <li>• Installed skills and strategies for replicable socioemotional education and support among workforce</li> </ul>
	Local community (e.g. neighborhood, commune)	<ul style="list-style-type: none"> <li>• Posters and flyers with key messages</li> <li>• Radio and social media campaigns</li> </ul>	<ul style="list-style-type: none"> <li>• Meaningful community participation in the context of ECD and implementation of Child Rights (e.g. protection, access to safe spaces)</li> </ul>	<ul style="list-style-type: none"> <li>• Sustained awareness and buy-in for the guarantee of holistic ECD programs/ services</li> </ul>

<sup>a</sup> Implementing leaders are members of the *Pisotón* team, affiliated to the Universidad del Norte Barranquilla in Colombia. The team includes master trainers (psychologists), communication and program implementation specialists, and research and evaluation units.

<sup>b</sup> The term socioemotional development is used here as a broad category which also includes "*desarrollo psicoafectivo*" or "psycho-affective development", as originally conceptualized in the program. There are specific themes and outcomes that are targeted throughout the course of early childhood and that include multiple skills and behaviors by exploring key several thematic areas. These themes are explored via stories, games, and subsequent reflections and include: (1) emotional bond (positive affect; attachment; separation anxiety); autonomy and discipline; socialization; motivation; expression of emotions; sexual development; moral development; communication; and self-esteem.

decrease in behavioral and emotional problems.

## Method

### Program Description

*Pisotón* aims to promote children's emotional expression and self-knowledge, and to bolster the adequate handling of conflicts among families through playful educational techniques (Galindo et al., 2014; Manrique-Palacio et al., 2017; Russo, 2016). The program includes activities for children, caregivers, teachers, and school psychologists (see Logic Model in Table 1). Activities that address children directly encompass four main and sequential processes. First, children are exposed in the classroom to stories where animal characters live through different circumstances and conflicts that children themselves may face during their development, thus enabling projective identification. Second, based on the stories, dramatic play activities are conducted to enable projective expression and experimentation by the children through acting and verbalization. This is an important technique because of children's pre-verbal language at this young age (Russo & Reales Silvera, n.n.). Third, games to be played in the home are introduced to enable projection and identification in an environment that fosters communication and elaboration with the child's relational figures (Winnicott, 1971). Fourth, to facilitate the elaboration and introjection of the themes explored (which include separation anxiety, autonomy, discipline, socialization, initiative, expression of emotions, socialization, moral development, communication, and self-esteem), children express the situations, which she or he had lived within different circumstances, to the trained educators.

Teachers, and psychologists attend 9 workshops at the beginning of the program, and caregivers (usually parents) attend 3 workshops, which focus on the promotion of secure attachment and strategies to support children's socio-emotional development. Those workshops are designed to provide caregivers, teachers, and psychologists with education strategies and approaches to positive discipline, and to strengthen family relationships, with the goal of promoting child-centered practices. Through an educational prevention approach, focusing on holistic human development, the program seeks to make parents and educators aware of their role in the

**Table 2**  
Demographic characteristics.

	N	%
Child gender		
Male	80	49.08
Female	83	50.92
Child Age		
4	123	75.46
5	35	21.47
6	1	0.61
Primary caregiver		
Mother	146	89.43
Father	17	10.57
Father Age		
19-29	34	20.85
30-49	91	55.83
50-64	3	1.84
65 +	2	1.22
Mother Age		
16-29	84	51.53
30-49	69	42.33
50-64	1	0.61
65 +	1	0.61
Father education		
Elementary school	41	29.93
High school	68	49.64
Technical	18	13.14
College	10	7.3
Mother education		
Elementary school	24	15.48
High school	81	52.26
Technical	39	25.16
College	11	7.10
Number of children		
1-3	132	86.84
4-6	17	7.9
7+	3	1.98
Race		
Afro-descendant	15	13.39
Other	97	86.61
Ethnicity		
Indigenous	14	12.50
No-Indigenous	98	87.5

social-emotional development of children (see Logic Model in Table 1). Caregivers, teachers and psychologists also participate in an “integration workshop” at the end of the program, which focuses on sharing experiences, perceptions, and perceived program results. Teachers and psychologists also gain access to practical tools to sustainably deliver the program in schools by participating in certification workshops on child development. Certified *Pisotón* psychologists visit the centers and schools throughout the program implementation and provide in-situ support to the teachers and schools during the 12 weeks of the intervention. Psychologists conduct an average of 8 visits to each of the participating centers during the 12 weeks of the program. In each visit, the psychologist supports the implementation of the described activities (e.g., dramatic play activities, experiential stories) in the centers. Once the program is introduced into a center or school, it can be integrated into the school curriculum or pedagogical plan. *Pisotón* also applies school-wide and community engagement strategies (e.g., primarily flyers, social media, and other visual materials) to disseminate key messages. Furthermore, by establishing partnerships with municipal education offices, *Pisotón* aims to promote awareness of sustainable social-emotional and psychosocial programming during early childhood at the local government level.

### *Participants and Demographic Characteristics*

Universidad del Norte in Barranquilla, Colombia, led the implementation of *Pisotón* in collaboration with preschools in the target regions, namely, Cauca, La Guajira, Vichada, San Andrés, Casanare, Caquetá, and Putumayo. Trained psychologists and teachers in public centers of integrated child development (or CDIs) delivered the program. CDIs enroll children 0-5 years of age with the lowest socioeconomic status in the country, including children and families who have been internally displaced as a result of the armed conflict. CDIs provide integrated services to children 0-5 years of age who otherwise could not afford center-based care. CDIs fall under the centralized administration and national operational system of the Colombian Institute of Family Wellbeing (ICFB for its acronym in Spanish).

In cooperation with ICBF, *Pisotón* chose a non-probabilistic sample of centers to participate in the current study based on the following criteria: 1) CDI center, 2) want to implement the *Pisotón* intervention, and 3) target 4- and 5-year-old children. Beneficiary families in control centers had to have a comparable level of economic income (as measured by the national standard of household income and classification), should not have previously participated in the *Pisotón* program, and should be located in a different neighborhood from the intervention centers to avoid intervention diffusion/contamination. In the control centers, only teachers and children willing to participate were included in the study. Primary caregivers of the children granted permission and children verbally assented to participate in the study.

This study applied a quasi-experimental pre-post impact evaluation design. A total of 163 children were assigned to either the intervention ( $n = 71$ ) or control groups ( $n = 92$ ). Children ranged in age from 4 to 6 years ( $M = 4.23$ ,  $SD = 0.43$ ) and 51% were female. Most of the mothers (89.43%) identified as the primary caregiver of their children. Most of the fathers and mothers had high school diplomas (49.64% and 52.55%, respectively). More information about the descriptive statistics can be found in Table 2.

### *Measures*

#### *The International Development and Early Learning Assessment (IDELA)*

IDELA is a direct child assessment developed by Save the Children (Pisani et al., 2018). IDELA measures children's early learning and development in six domains: motor development, emergent language and literacy, emergent numeracy, social-emotional development, executive function, and persistence. The measure is designed for external evaluators to assess developmental progression of children three to six years of age, has been implemented in about 45 country contexts, and has been shown to have strong psychometric properties across the different domains (Pisani et al., 2018). IDELA has been validated in a Nationally-representative sample in Colombia (Maldonado et al., 2021).

The 24 emergent language and literacy items assess print awareness, expressive vocabulary, drawing a human figure, letter identification, emergent writing, initial sound discrimination, and listening comprehension ( $\alpha = 0.86$ ). The 28 emergent numeracy items assess comparison, classification, numbers and shape identification, one-to-one correspondence, simple operations, and problem-solving ( $\alpha = 0.87$ ). The 17 social-emotional development items assess peer relations, emotional awareness, empathy, perspective-taking, self-awareness, and conflict resolution ( $\alpha = 0.93$ ). The 9 executive function domain items assess short-term memory and inhibitory control ( $\alpha = 0.79$ ). The 12 motor development items assess fine and gross motor skills ( $\alpha = 0.82$ ). Lastly, on-task persistence consists of 12 items, which measure the extent to which the child remains focused on the tasks throughout the assessment as rated by the evaluator ( $\alpha = 0.87$ ).

#### *The Child Behavior Checklist (CBCL)*

CBCL captures the perception of caregivers about children's behavioral and emotional problems and competencies. The items of the assessment tap into internalizing and externalizing symptoms (Achenbach & Ruffle, 2000). The CBCL has been standardized/normed using age- and gender-specific T-scores (Kaat et al., 2019). For this study, parents completed the Spanish version of the CBCL (Rubio-Stipec et al., 1990) for children between 1.5 to 5 years old, and rated their child's behavior on a 3-point scale (0 = not true; 1 = sometimes true; 2 = often true). The emotional reactivity subscale includes 9 items (e.g., “Disturbed by any change in routine”) ( $\alpha = 0.66$ ). The anxiety and depression subscale has 8 items (e.g., “Feeling are easily hurt”) ( $\alpha = 0.64$ ). The somatic complaints scale consists of 11 items (e.g., “Can't stand having things out of place”) ( $\alpha = 0.60$ ). The withdrawal subscale includes 8 items (e.g., “Avoids looking others in the eye”) ( $\alpha = 0.64$ ). The attention problems subscale includes 5 items (e.g., “Can't concentrate, can't pay attention for long”) ( $\alpha = 0.48$ ). The sleep problem subscale consists of 7 items (e.g., “Doesn't want to sleep alone”) ( $\alpha = 0.58$ ). The aggressive behavior

subscale includes 18 items (e.g., “Can’t stand waiting”) ( $\alpha = 0.82$ ). The low reliabilities of some scales are a salient limitation of the present study, as noted in the discussion section.

### Training and Data Management

Data collectors were psychology or early childhood education college students. Two members of Save the Children trained data collectors on-site for the application of IDELA. The training included group discussions followed by an application of the instrument among children from 4 to 6 years old in a CDI in Barranquilla. Implementation leads of *Pisotón* also conducted training on the application of the CBCL instrument by discussing the objective, scope, items, dimensions, and qualification of the test with data collectors. *Pisotón* staff also administered a short sociodemographic questionnaire to the parents. The training in both the CBCL instruments and the sociodemographic questionnaire was carried out in a two-day workshop. Because *Pisotón* involves the distribution of posters, visuals, and materials related to the content, data collectors were not blinded to the group assignment. All ethical and consenting procedures were reviewed and approved by ICBF and the Universidad del Norte’s Ethics Review Board. The participation of the children and their caregivers in the research was voluntary and only parents and children who consented and assented, respectively, were enrolled in the study.

### Data Analysis

Because this study used a quasi-experimental design, a matching procedure was used to adjust between-group comparisons for observable covariates. The main goal of matching was to obtain covariate balance, or in other words, to have similar intervention and control groups at baseline (Ho et al., 2007). To obtain covariate balance, we used cardinality matching, which is a recent advancement in optimal matching (Zubizarreta et al., 2014; Visconti & Zubizarreta, 2018), and has the following steps: (1) definition of the balance criteria (e.g., mean balance, fine balance, exact matching); (2) determination of the largest matched sample that achieves covariate balance based on the criteria defined in step 1; and (3) the result is a balanced matched sample with the largest possible size.

We implemented separate matching procedures for IDELA and CBCL. For each procedure, we included seven pre-intervention scores of the outcomes in the list of continuous covariates to be constrained for IDELA (first matching procedure using emergent literacy, emergent math, social-emotional development, motor development, executive function, persistence, and total scores) and CBCL (second matching procedure using emotional reactivity, anxious-depressed, somatic complaints, withdrawn, attention problems, sleep problems, and aggressive behavior scores). In each matching procedure, we also added seven demographic child and parent characteristics as covariates: father’s age (continuous), father’s education (ordinal), mother’s age (continuous), mother’s education (ordinal), child gender (binary girls = 0, boys = 1), Afro-descendant (no = 0, yes = 1), and Indigenous (no = 0, yes = 1). The mean balance criterion was used. The algorithm constrains the means of the groups to achieve baseline balance, so the differences between them cannot be larger than 0.2 standard deviation units (i.e., a common threshold used in the literature to achieve covariate balance; Silber et al., 2013). To account for missing values on the other demographic variables, we imputed the median for each of these observations and generated a binary indicator that identified if the value was imputed or not (Visconti, 2019). All binary covariates were included in the matching procedure to also reach balance in terms of imputed values.

For two variables, maternal and paternal education, we applied fine instead of mean balance. A fine balance is a stricter balance constraint because it implies that the marginal distribution of education will be the same for the matched treated and control groups as illustrated in Supplemental Table 2 for IDELA, and Supplemental Table 3 for CBCL. This type of constraint is recommended for prognostic covariates because it imposes more stringent requirements (Resa & Zubizarreta 2016).

**Table 3**  
Means of IDELA and CBCL before and after matching.

	Mean before matching	Mean after matching
IDELA		
IDELA total	59.84	58.01
Emergent language and literacy	43.54	41.50
Emergent numeracy	56.05	53.04
Social-emotional development	56.30	54.36
Motor development	65.38	63.69
Executive function	58.63	56.52
Persistence	79.16	78.94
CBCL		
Emotional reactivity	2.67	2.51
Anxiety and depression	3.97	3.80
Somatic complaints	2.02	0.02
Withdrawn	0.04	0.05
Attention problems	0.02	0.02
Sleep problem	0.02	0.02
Aggressive behavior	8.63	8.33



## Results

### Descriptive Statistics and Group Matching

A total of 163 children were enrolled in the 12-week program (71 children in the intervention group, and 92 children in the control group). Covariate balance was achieved for the 14 pre-intervention covariates (i.e., 7 covariates for IDELA, and 7 for CBCL), and the resulting matched sample was comprised of 37 children in each group for the IDELA measure and 71 for the CBCL. Means and the standardized differences (i.e., the difference in means in standard deviation units) before and after matching based on the mean balance criterion for IDELA are reported in Supplemental Table 1. We also illustrate, in Supplemental Table 2, how fine balance constrained the frequencies of education after matching. Four covariates were imbalanced before matching, and after matching all variables yielded standardized differences lower than 0.2 standard deviation units. The mean balance estimates for the CBCL outcomes are reported in Supplemental Table 3. The means of the IDELA and CBCL scores before and after matching are presented in Table 3.

### Differences in IDELA and CBCL Scores Between Groups

Table 4 reports results for the seven IDELA and CBCL post-test outcomes, respectively. The mean difference between groups, confidence intervals, and  $p$ -values are computed using an independent samples  $t$ -test. On average, children who participated in *Pisotón* had a significantly higher social-emotional development score in IDELA at posttest [0.37 standard deviation units ( $p = .014$ )] than children in the control group. There was no statistically significant difference between the intervention and control groups in emergent numeracy, emergent literacy, motor development, executive function, and persistence (see Table 4).

The impact of *Pisotón* on CBCL scores was less substantial compared to the impact on IDELA scores. The largest effect observed, though not statistically significant, was a posttest difference in aggressive behavior favoring children who participated in the program [0.20 standard deviation units ( $p = .198$ )]. There were no statistically significant differences in the other domains of CBCL, and there is insufficient evidence to conclude that *Pisotón* affected children's behavior as reported by their parents.

## Discussion

Our results suggest that participation in the *Pisotón* program was associated with higher scores of children's social-emotional development compared to children who were not exposed to the program. This study's findings are consistent with those of previous qualitative studies that assessed the benefits of *Pisotón* in improving children's social-emotional skills (Manrique-Palacio et al., 2017). Furthermore, our results align with studies demonstrating that early childhood interventions promote social-emotional skills by addressing the child, the family, and the school/educational environment holistically (McClelland et al., 2017). *Pisotón* targets the child, the family, and the educational system and is based on the premise that skill-building works best if the interactions between these three systems are considered.

Contrary to the literature showing that programs targeting social-emotional skills have a positive impact on academic outcomes (Bierman et al., 2010; Diamond & Lee, 2011; Durlak et al., 2011), this study failed to show an effect of the program on emergent numeracy, emergent literacy, motor development, executive function, and persistence. This is, however, somewhat expected given the focus of *Pisotón* on social-emotional skills-building instead of early literacy and numeracy. Also, shortly after an intervention such as *Pisotón* has been implemented, effects on academic outcomes may only become apparent by using additional observations in longitudinal follow-up studies. Thus, a long-term follow-up of the children who participated in *Pisotón* is warranted.

Furthermore, no effects were found on children's behavioral and emotional problems reported by parents (i.e., emotional

**Table 4**  
Effect estimates – IDELA and CBCL.

	Mean difference	Standardized estimate	95% CI	$p$ value
IDELA				
IDELA total	5.48	0.28	-0.04, 0.61	0.088
Emergent language and literacy	5.74	0.25	-0.06, 0.57	0.111
Emergent numeracy	5.28	0.24	-0.06, 0.54	0.115
Social-emotional development	8.11	0.37	0.07, 0.67	0.014
Motor development	2.49	0.11	-0.20, 0.43	0.481
Executive function	6.55	0.29	-0.16, 0.76	0.199
Persistence	4.72	0.18	-0.26, 0.63	0.415
CBCL				
Emotional reactivity	-0.02	-0.01	-0.32, 0.31	0.973
Anxiety and depression	0.12	0.04	-0.27, 0.36	0.772
Somatic complaints	-0.26	-0.12	-0.47, 0.22	0.485
Withdrawn	-0.01	-0.07	-0.45, 0.30	0.708
Attention problems	-0.01	-0.10	-0.48, 0.26	0.567
Sleep problem	-0.01	-0.11	-0.48, 0.26	0.567
Aggressive behavior	-1.19	-0.20	-0.51, 0.10	0.198

Note. The 95% CI is reported for the standardized estimate



reactivity, anxious-depressed, somatic complaints, withdrawn, attention problems, sleep problems, and aggressive behavior). This is in contrast with the extensive literature supporting that programs that focus on promoting non-cognitive skills have a positive effect on children's mental health (Durlak et al., 2015; Eisenberg et al., 2010). To further understand these research findings, it is important to consider key factors such as the measures used, and the design of the study. Firstly, it is relevant to mention that IDELA has been tested in international contexts and has shown excellent internal consistency test-retest reliability and construct validity (Pisani et al., 2015). Research has provided evidence that this tool can be adapted to different contexts, diverse cultures, and program needs such as Colombia (Maldonado et al., 2021; Pisani et al., 2018). Similarly, the CBCL has long been viewed as the "gold standard" in assessing childhood problems and has been shown to be valid when tested in more than 31 countries from Europe, Africa, and Asia (Rescorla et al., 2007). Yet, to our knowledge there is no evidence of the psychometric properties of the CBCL Colombian population similar to our sample characteristics, so the data presented here needs to be treated with caution.

In terms of the study design, we used a quasi-experimental evaluation that was based on the comparison between an intervention and a control group of children in Colombia. Children in the control group attended a regular CDI in which *Pisotón* had not been implemented at the time of the study. Therefore, although children in the control group had no access to the intervention, they participated in formal preschool education to learn and develop their academic and non-academic skills. Thus, the added value of *Pisotón* needs to be interpreted in comparison to children's access to formal education in ECD settings. The incremental value of *Pisotón* in comparison to other control conditions should be tested in future work utilizing a controlled, randomized experimental design.

### Limitations and Future Directions

Despite its strengths, the work presented also has several important limitations. The sample size of our study was small and, thus, limits (a) statistical power to detect significant program effects, and (b) the generalizability of the study findings. Further, even though the CBCL is a well-validated instrument to assess childhood problems as perceived by the parent, our results show low to moderate reliability of the CBCL subscales which might also impact the robustness of this study findings and also needs to be further examined in future studies. Additional psychometric analyses would be needed to ensure reliable measurement of emotional and behavioral problems in young Colombian children.

Additionally, the assignment of children to the control and intervention groups was not randomized. Even though RCTs are essential to determine the impact of interventions and establish causal relations (Meldrum, 2000), conducting them in LMICs such as Colombia represents a challenge (Bonsu et al., 2017). Enrollment barriers, reluctance to sign consent forms, and lack of financial resources pose a burden on researchers aiming to conduct RCTs in these settings and informed our decision to pursue a quasi-experimental evaluation with a comparison between an intervention and a control group of children. Future work should aim to devise ways to implement an RCT to rigorously test the effectiveness of *Pisotón* along with alternative, supplementary designs to address the practical, political, legal and/or ethical challenges associated with the strict control of an RCT design in this group of underserved children (Hein & Weeland, 2019). Furthermore, an implementation (or process) evaluation of *Pisotón* conducted concomitantly with an impact evaluation would generate additional insights into possible mediators of the program's effect and attributes that could drive uptake and observed effects (Ponguta et al., 2019). Furthermore, in terms of data analysis, we opted for a cardinality matching technique that allowed the adjustment for observable covariates. Other matching techniques, such as propensity score matching, do not guarantee covariate balance, and when constructing a matched sample, researchers need to rely on guesswork and multiple iterations until finding a balanced group (Hainmueller, 2012; King & Nielsen, 2019; Sekhon, 2009). Instead, cardinality matching ensures covariate balance by design and not by chance. In particular, the algorithm finds the largest matched sample that achieves the covariate balance constraints defined by the researcher beforehand without multiple iterations. However, teachers' and psychologists' characteristics were not collected during the intervention, and, therefore, it was not possible to control for those variables. Future work should incorporate those characteristics into the analysis to further explore their influence. Despite the benefits of this matching procedure, a randomized experimental design would further strengthen the interpretation of program effectiveness by reducing the likelihood that children in the intervention and control group differ in their baseline scores before participating in the program.

### Critical Analysis and Recommendations for Further Research, Policy and Practice in an International Context

This study constitutes an important effort to provide evidence on interventions designed for and implemented with young children in multiple national contexts. Controlled evaluations of ECD programs are often costly and difficult to implement. Our study, by applying cardinality matching, offers a promising alternative to robust evaluations where randomization is challenging. Our work also contributes to understanding models that effectively promote social-emotional skills in contexts shaped by conflict, crisis, and resulting early childhood adversities (Behrman et al., 2004). This study provides evidence of an intervention that might be used in humanitarian contexts such as Colombia to prevent and attenuate the negative effects of early adversity and to promote healthy development. Engle et al. (2011) found that through coordinated actions, programs, and services, children's adverse environments can be modified, and most importantly, their effects on development can be attenuated. Colombia, in particular, through its National ECD policy offers an enabling environment for the integration of these types of interventions in emergency contexts (Ponguta et al., 2020). As such, programs like *Pisotón* which are scalable and sustainable through institutional partnerships and multi-level through engagement of home, school and community levels hold great promise for strengthening ECD practices.

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