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Estimating the effects of a low-cost early stimulation and parenting education programme in Mexico

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Estimating the effects of a low-cost early stimulation and parenting education programme in Mexico

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Summary

In Mexico today, and in Latin America more broadly, there are a range of programmes seeking to invest in children at early ages (Myers *et al.* 2013) because of the frequently reported positive effects associated with these interventions. This study examines the results of one of these programmes, Programa Educación Inicial (shortened to PEI, meaning 'early education programme') run by the Consejo Nacional de Fomento Educativo or National Council for Education Development in Mexico. This is a non-formal education programme providing training to pregnant women, parents (male and female) and caregivers of children between 0 and 4 years of age, living in highly marginalised, rural communities located across Mexico.

This programme is based on activities performed by community facilitators known as *promotoras* ('promoters'). These are individuals residing in the community who receive two weeks of training every year along with a supply of educational materials, a small monthly stipend and sporadic coaching by a full-time regional supervisor hired and trained by the Consejo Nacional de Fomento Educativo. *Promotoras* organise up to 65 information sessions (held once or twice a week) with parents, caregivers and children. They implement a training programme over terms lasting nine months of the year, based on a national curriculum and with a competency-based approach. The programme focuses on the development of four main sets of skills: (a) language and communication (which includes health, hygiene and nutrition, among other topics); (b) protection and care (interactions with others, executive function, etc.); (c) personal and social skills (movement, words, etc.); and (d) exploration of one's environment (body control, fine and gross motor skills, representation, etc.).

The intervention includes early stimulation practices to promote the cognitive development of children and the development of adequate parenting practices. It always includes an emphasis on the involvement of male parents.

Between 2012 and 2014, with support from the International Initiative for Impact Evaluation, we collected data in three different waves from nearly 1,000 families living in 126 communities located across 6 states in Mexico. This formed part of a randomised controlled trial to produce solid evidence of the effect this low-cost programme has on parenting practices and child development.[2] Although take-up of the programme by families was very low, the programme had positive impacts on both parenting practices and child development outcomes. An index of observed parenting practices when interacting with younger children increased 0.34 standard deviations in the first year and was highly statistically significant. Likewise, direct effects on child development were observed for younger children (a 0.15 standard deviation increase both in communication and gross motor skills), although the effects were muted in the second year and among older children.

Observed results suggest that parental training implemented through community-based models can be effectively implemented at a low cost. The results from the qualitative

[2] For the purpose of this study, effects on development included the measurement of children up to 6 years old, given the design and duration of the study (4-year-old children interviewed/observed in the baseline were interviewed in data collection waves 2 and 3 until they were 6 years old).

data collected also suggest that changes in the implementation process to increase take-up may result in more sustained and diverse impacts. In addition, this study provides lessons regarding the challenges it represents in bringing early childhood care and education to poor, rural and isolated communities.

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Abbreviations and acronyms

3ie	International Initiative for Impact Evaluation
ASQ-3	Ages and Stages Questionnaire 3
CCT	conditional cash transfer
CIDE	Centro de Investigación y Docencia Económicas (Centre for Economics Research and Teaching)
CONAFE	Consejo Nacional de Fomento Educativo (National Council for Educational Development)
ECCE	early childhood care and education
ECD	early childhood development
HOME-SF	Home Observation Measurement of the Environment-Short Form (National Longitudinal Survey of Youth 1979 Children and Young Adults)
MDE	minimum detectable effect
PEI	Programa de Educación Inicial (early education programme)
PPI	parenting practice index
PRODEI	Programa de Educación Inicial
RCT	randomised controlled trial

1. Introduction

Each year, new studies demonstrate the value of investing early in children. A recent review of research on early childhood development (ECD) programmes in *The Lancet* found that 27 out of 30 ECD programmes in low- and middle-income countries had statistically significant positive impacts on children's cognitive or behavioural development (Engle *et al.* 2011). Other reviews have found similarly positive results (Nores and Barnett 2010; Vegas and Santibáñez 2010). Even more strikingly, a growing number of studies have provided long-term evidence of the returns on these investments, from the Perry Pre-School and Abecedarian programmes in the United States (Heckman *et al.* 2010; Barnett and Masse 2007) to a programme that provided psychosocial stimulation to toddlers in Jamaica (Gertler *et al.* 2014).

While many of these programmes provide direct cognitive stimulation, nutrition, and/or other benefits to participating children, others seek to improve parenting practices through various goals. If successful, improved parenting practices mean that children can enjoy enhanced cognitive stimulation throughout the day, in the evening and on weekends, not just during their attendance at daycare, during visits or through formally organised pre-school programmes.

Furthermore, training a single parent or a couple of parents has the potential to benefit not just one child, but all the children in the family or in that family's close personal network. Therefore, parenting programmes could theoretically have considerably higher child development benefits at significantly lower costs than other common early childhood care and education (ECCE) programme delivery models, such as childcare centres.

Although there have been studies on the effects of various types of ECCE programmes, there is still not sufficient evidence on the outcomes of interventions focused mostly or exclusively on modifying parenting practices. While several studies show that investment in these programmes generates high rates of return for both individuals and governments (UNESCO 2010; Barnett 1996), there are no cost–benefit studies in contexts such as Latin America and Mexico. And there are few studies examining interventions that include male parents or caregivers. This study sought to address the lack of information in these areas and generate rigorous and useful evidence for scholars and decision makers interested in the design and implementation of effective ECCE programmes in developing countries.

In Mexico, ECCE programmes implemented by the federal government, such as the Programa de Educación Inicial (PEI or 'early education programme'), are usually designed to support populations living in areas of extreme poverty. These include those located in rural and semi-rural regions where access to formal education is not efficient or generalised. The relevance of estimating the effects and understanding of how interventions, such as the PEI, may help reduce inequalities in rural and poor communities is better understood after noting that in these areas of Mexico, almost 4 out of 10 people live below the national poverty line (World Bank 2012). Furthermore, considering that 55.3 million people live in poverty across the country (CONEVAL 2015), increasing the effectiveness of government interventions, such as the PEI, may

contribute to achieving a better distribution of educational opportunities among populations traditionally excluded from educational services.

The PEI has been in operation since 1992 under Consejo Nacional de Fomento Educativo (CONAFE, the National Council for Educational Development), a federal government agency working with rural and poor communities all over the country by providing informal educational services. The implementation of the PEI was initially based on the Programa de Educación Inicial (PRODEI) experience, an early childhood care programme established in 1981 by the Ministry of Education (ACUDE 2013). It is important to note that the total number of communities affected by the programme has significantly increased in the past two decades. By 2015, it had reached nearly 29,000 communities and 455,000 children. In recent years, CONAFE determined to expand the programme to additional communities, with the biggest factors for consideration being the availability of financial resources and local institutional capacities.[3]

Even though, to the best of our knowledge, no impact evaluation of the PEI had been conducted before this study, this programme has usually been perceived to be an efficient, informal ECCE intervention. Based on the notion that early interventions are necessary to promote social equity, the PEI has been in use for over 20 years in rural communities across Mexico. It represents a public investment of nearly USD30 million for just the financial year 2015.

The PEI supports more children than all other programmes combined (World Bank 2010) and it has greater coverage than any other ECCE programme in the country. Given the role the PEI may play as an effective intervention to reduce social gaps in rural areas across Mexico, new and sound evidence of its impact is relevant for decision makers. Therefore, the main goal of this impact evaluation is to generate rigorous, useful evidence for scholars and decision makers interested in the design and implementation of ECCE programmes in Mexico and in other developing countries.

The main findings of this study can be summarised as follows:

- **Parenting practices are positively affected by the implementation of the PEI.** An index of observed parent behaviours when interacting with younger children increased 0.34 standard deviations in the first year and was statistically significant; and
- **Marginal effects on child development were observed.** Direct effects on child development were observed for younger children (a 0.15 increase in standard deviation in both communication and gross motor skills). The effects were more muted in the second year and among older children.

[3] It is important to highlight that all the additional communities included in the programme for this study (either as treatment or control communities) had similar characteristics to the rest of the communities previously benefitting from the programme, at least according to the legal requirements. This was an explicit criterion submitted to CONAFE prior to the final selection, given the methodological design of this study. However, it is important to point out that the selection of the six states finally included in the sample was determined by considerations of safety and local institutional capacities.

2. Evaluation

2.1 Objective of PEI evaluation

The PEI is an intervention in which community facilitators known as *promotoras* ('promoters', usually women living in the same rural communities as the programme beneficiaries) are responsible for the organisation of weekly sessions with parents (male and female), caregivers and children. It is based on a curriculum that includes up to 65 sessions over the course of the year. After a short period of training, facilitators collaborate with parents, pregnant women and caregivers to improve parenting practices. This is done through organised weekly meetings in which parents receive information about supporting their children and practise these methods.

The main goal of these activities is to foster the development of infants and children by modifying parenting practices and promoting activities resulting in school readiness. In addition, the PEI provides information and training to pregnant women to improve healthcare during pregnancy. The programme also promotes the implementation of early stimulation practices at home for participating children to stimulate cognitive development, and emphasises the importance of including male parents in these activities.

Unlike other ECCE interventions, facilitators are members of the community who do not work exclusively with the children (they always work in the presence of the parents). Nor do they have permanent facilities or a mandatory professional degree in education, health or psychology. In exchange for their work, facilitators receive a symbolic payment of approximately USD50 every month.[4]

Considering the lack of available evidence about the effectiveness of this programme, the aim of this study is to estimate whether it actually changes parenting practices and influences child cognitive development.

2.2 Methodology, theory of change and analysis

2.2.1 Methodology

To estimate the effects of the PEI, we decided to conduct a randomised controlled trial (RCT). Rural communities were randomly assigned to control and treatment groups. The treatment group experienced implementation of the PEI with all of its components during two terms, each one lasting up to nine months according to the design of this programme (terms start in the autumn and finish in the spring).[5] During these terms, the *promotoras* were accompanied and monitored by regional supervisors during periodic visits and meetings.

The treatment thus consisted of the implementation of the PEI in a similar manner and conditions as in other rural areas of the country supported by CONAFE. The design of

[4] *Promotoras* are usually invited by regional supervisors, based on a selection process determined at the national level.

[5] There were three waves of data collection: baseline (wave 1), at the end of term 1 (wave 2) and at the end of term 2 (wave 3). It is important to mention that, because of the attrition rates observed during the implementation of the RCT, we decided to conduct our analysis based on a difference-in-differences estimator.

the study and the selection of instruments and questionnaires were all aimed at addressing the following research questions:

1. What is the impact of the PEI on the physical, cognitive and social-emotional development of children?
2. What is the impact of the PEI on the knowledge and behaviour of parents, especially fathers?
3. What is the cost and cost-effectiveness of the PEI, which is intended to be low-cost, but effective, compared with other programmes?

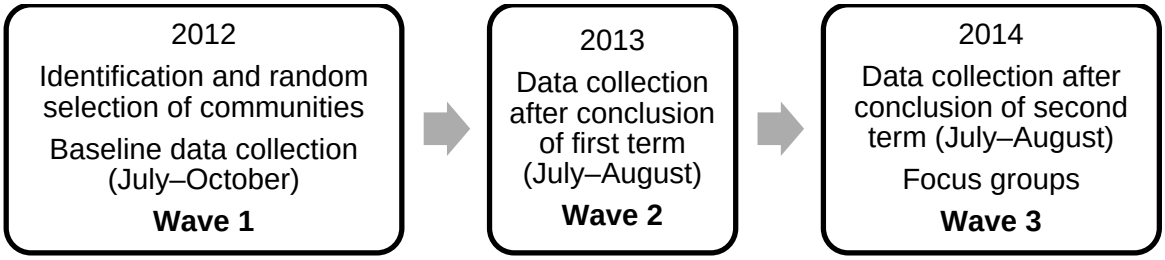
For the selection of the final sample, we initially considered a random selection of treatment and control pair communities within each of the six participant states. These states were selected based on their institutional capacity and how safe they were for conducting this study. The communities chosen were studied in addition to those included in previous calls to participate in this programme, thus assuring that treated communities would experience a similar implementation of the PEI.

However, given the reduced number of communities in some of the states, to increase the statistical power of the sample and reduce possible sources of error, we decided to pair communities, when possible, based on nearest neighbour propensity score matching. The goal was to obtain paired treatment-control units that were not significantly different in the variables that could influence the outcome. The only difference was the presence or absence of treatment, in this case the presence of an early education programme.

Based on this method, characteristics of the communities in both groups were similar so that differences in the average performance of children in the treatment group could be mostly attributed to the effects of the intervention. The sampled population is representative of the communities served by CONAFE. Regarding its external validity, findings from this study can be compared with and extrapolated to low-income populations living in rural areas with limited access to formal educational services.

Quantitative data were collected using three different sets of questionnaires. In each wave, we administered a questionnaire to caregivers that measured participation in the programme (in treatment communities) and caregiver parenting practices (in both types of communities). We interviewed pregnant women and male parents in addition to using the household questionnaire. Interviewers also observed and reported interactions between children and caregivers using items from the HOME-SF scale (Bradley and Caldwell 1984; Bradley *et al*. 1992; Bureau of Labor Statistics 2012).

Figure 1: Timeline, data collection process



Finally, to measure child development, we relied upon the Ages and Stages Questionnaire or ASQ-3 (Squires and Bricker 2009). This captures child development

across five areas: communication, gross motor skills, fine motor skills, problem solving and social-emotional development.[6] One of the advantages of the ASQ-3 over other options is that it can be applied by anyone with experience in childcare (parents or caregivers themselves can administer the questionnaire). In addition, the test is flexible in monitoring the skills expected in children based on their age. An additional advantage is that a version applicable to Spanish-speaking contexts has been developed.

The number of questionnaires administered per household was determined by the number of children attending PEI sessions or, in the case of the comparison group, that would eventually attend, but it never surpassed three per visited home. The questionnaire was administered directly to children by field researchers with support from the principal caregiver.

2.2.2 Theory of change

Several programmes are currently being implemented in Latin America to invest in children at early ages (Myers *et al.* 2013) supported by evidence highlighting 'strong associations' between socio-economic status and cognitive measurements (Paxson and Schady 2007). CONAFE's PEI is an example of these interventions as a non-formal education programme. It seeks to develop 13 competencies among children and an additional set of skills for parents through group sessions held in local communities. The main assumption behind the programme is that by organising non-formal instructional group activities, it is possible to develop competencies among children, parents (male and female), caregivers and future mothers.

An important characteristic of the PEI is its community-based implementation (Araujo, López-Boo and Puyana 2013). As described by Vegas and Santibáñez (2010), the PEI 'has strong family and community participation components […] community participation includes selecting [*promotoras*], providing spaces for educational sessions, convening community meetings for monitoring and evaluation activities (for example, to learn about programme progress and conduct self-evaluations), requesting the support of the authorities, and interacting with them as needed". As expected, this model is efficient (low training costs, low-cost educational materials, and use of community resources for the organisation of sessions [e.g. materials, occasional meals, and location], and limited supervision). *Promotoras* run up to 65 group sessions during each nine-month term.[7]

The curriculum guiding this intervention is centred on a competency-based approach with a set of four main competencies:

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[6] This instrument was built by Diane Bricker and Jane Squires from the University of Oregon. It is recognised by several organisations, including the American Academy of Neurology, the Child Neurology Society and First Signs, as a high-quality instrument for the detection of strengths and weaknesses of social and emotional development in children. The questionnaire is different depending on the specific age of the child in months: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36 and 42 months old. There is no significant difference regarding the number of items in each instrument.

[7] Four types of sessions are organised: (a) up to 26 sessions for caregivers and parents (male and female); (b) up to 5 sessions for male parents; (c) up to 18 sessions for caregivers and parents (male and female) focused on children; and (d) up to 8 sessions for pregnant women. In addition, *promotoras* may organise up to 8 additional sessions for diagnosis, planning and evaluation.

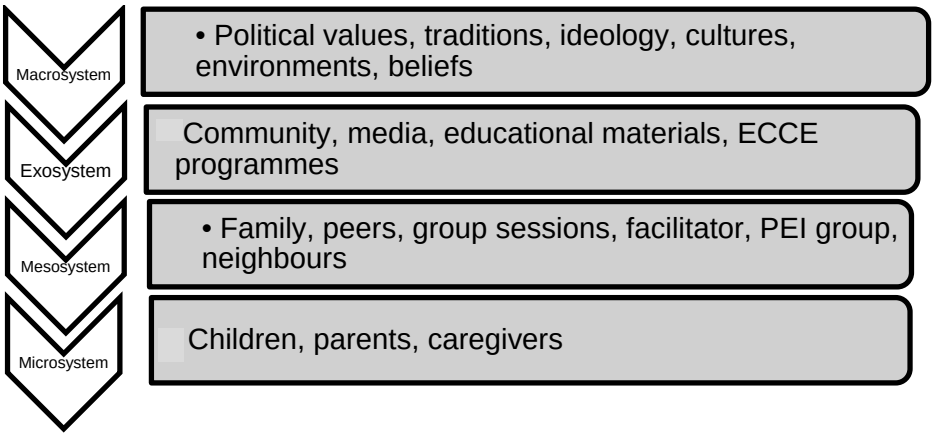
- language and communication (which includes health, hygiene and nutrition, among other topics)
- personal protection and self-care (interactions with others, executive function, etc.)
- personal and social skills (movement, words, etc.)
- exploration of one's environment (body control, fine and gross motor skills, representation, etc.).[8]

By participating in these meetings, parents and caregivers receive information and training covering four main topics: (a) childcare and protection; (b) individual and social development; (c) language and communication; and (d) exploration and knowledge of the environment.

The community-based implementation model adopted by the PEI is explained by the adaptation of Bronfenbrenner's 'ecological model of human development' (1994), in which 'human development takes place through a process of progressively more complex reciprocal interactions between an active, evolving biopsychological human organism and the persons, objects, and symbols in the immediate environment'.

Based on this model, the PEI uses a participatory approach in which any member of the community may influence the results and outcomes that children from the community achieve. This justifies community involvement in the PEI not only from an economic perspective, but also because of the relevance of community engagement as a way to ensure that younger members of the community receive adequate support during critical development stages. See Figure 2 for a representation of this approach as implemented in the PEI.[9]

Figure 2: Variables influencing PEI results by 'nested structure'



[8] The main goal is to develop among children the following competencies: language and communication, healthy practices, hygiene and nutrition, interactions with others, executive function, personal and social skills, body control, fine and gross motor skills, and representation, among others.

[9] It is important to point out, however, that several key factors affect the participation of parents and children. There seems to be a low expectation among parents and caregivers. There is a lack of organisation in sessions and a lack of knowledge of the programme among caregivers and parents. There are insufficient educational materials and a lack of effective training and technical support for *promotoras.* There is a lack of incentives, as used in other social programmes implemented in the same communities (such as PROSPERA, a conditional cash transfer programme targeted at the poorest regions of the country).

According to this model, every factor identified in each level will represent different 'activities, social roles, and interpersonal relations experienced by the developing person' (Bronfenbrenner 1994). These factors will determine how children acquire competencies that will impact on their development.

Table 1: Expected parenting/caregivers' practices (male and female)

Cluster	Expected practices
Child development	• Respect schedules, preferences and routines • Identify needs and provide emotional support • Foster autonomy and accept preferences • Foster self-esteem and confidence, avoid spanking • Teach rules and suggest expected behaviour • Respond adequately to temper tantrums • Recognise achievements and respect decisions • Interact constantly with children • Teach how to address conflicts • Teach how to respect different opinions/interests • Talk, ask, sing, provide information • Increase vocabulary, read to the children • Show affection • Promote physical activity, dancing • Foster manual activity • Encourage interaction with community • Foster observation of environment
Health and child protection	• Learn about health issues during pregnancy and early childhood (nutrition requirements, children's feeding habits and practices) • Learn about proper hygiene activities • Cleaning common areas/child areas • Understand the relevance of vaccination • Avoid dangerous situations (drowning, sharp and hot objects)
Parent/caregiver's personal development	• Reflect on personal skills and ways to support learning • Identify learning opportunities • Collaboration and teamwork • Understand others' perspectives • Reflect on results from own decisions • Organise community projects

Designers of the programme identified three different clusters of competencies to be developed: (a) child development; (b) health and child protection; and (c) parents or caregivers' personal development. Table 1 describes some of the expected parenting practices to be demonstrated by parents as a result of their participation in the PEI.

Figure 3 describes the main competencies to be developed by children and parents (CONAFE 2012). This is a key component of the programme. It describes the specific competencies that children regularly attending sessions should develop, including social-emotional, communication and gross/fine motor skills. It also describes the competencies parents and caregivers must acquire as a means to support children in their communities.

Figures 4 and 5 depict the last two groups of competencies. In Figure 4, the competencies relate mostly to child health and protection, for both parents and caregivers. The last set of competencies are expected to be developed only among parents and caregivers as a way to allow effective participation in community activities. These are especially aimed at promoting children's well-being through the implementation of the PEI activities.

Figure 3: Development of children

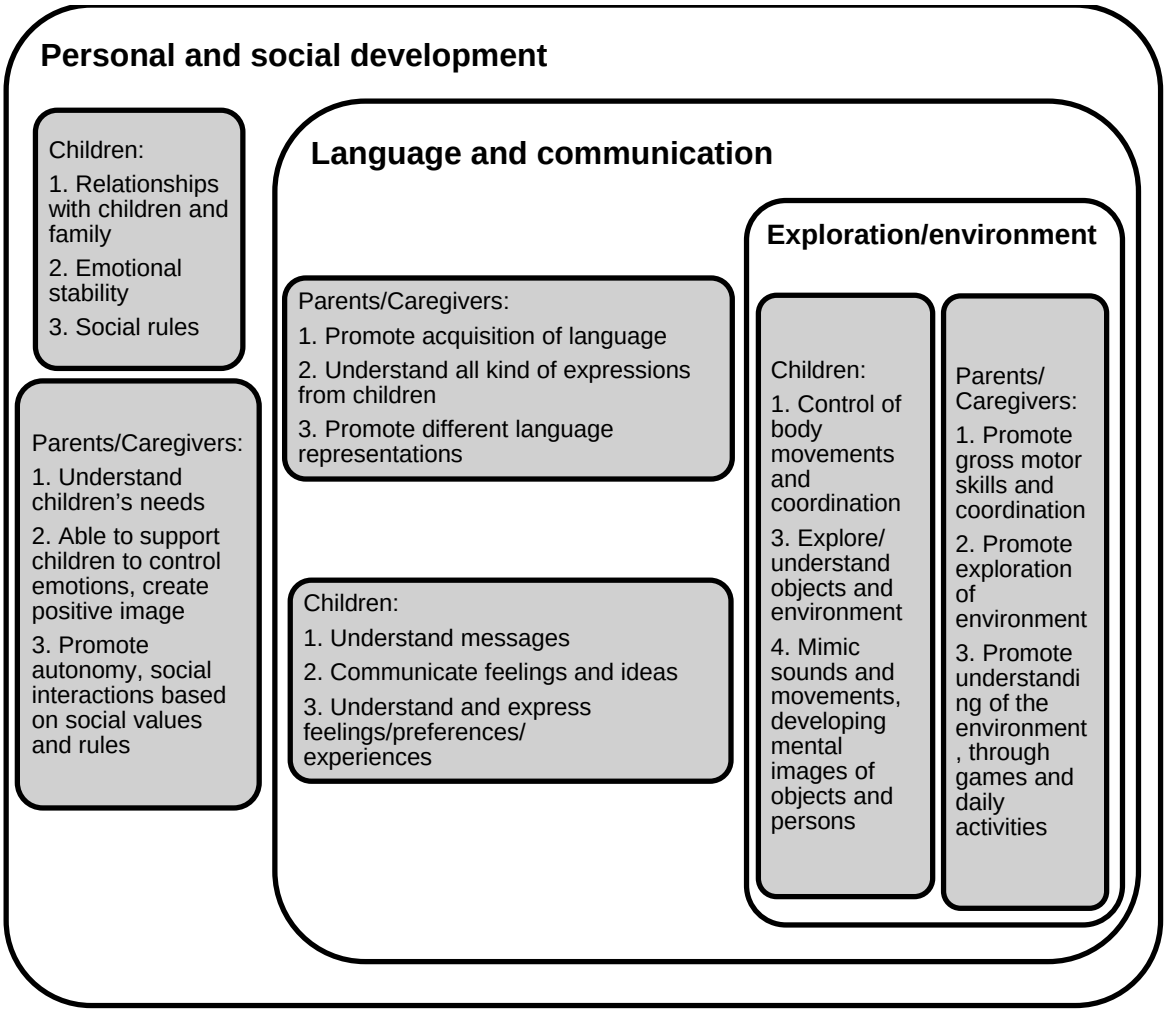


Figure 4: Health and protection of children

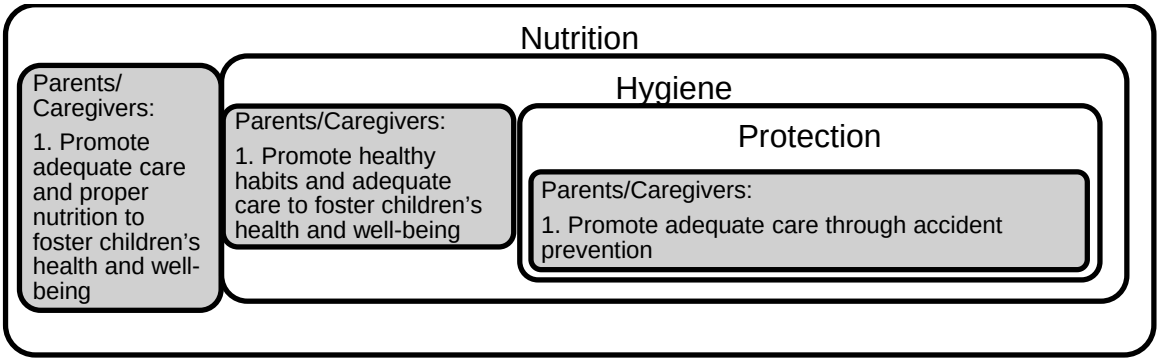
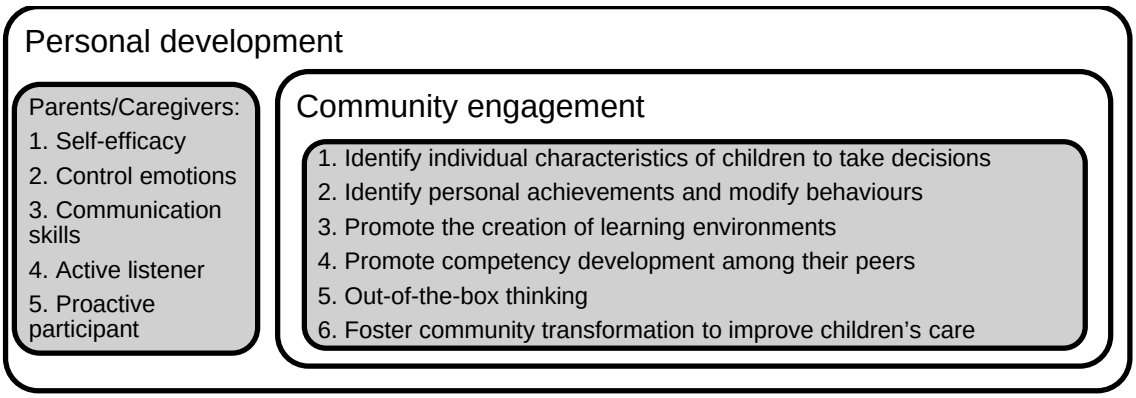


Figure 5: Parent/caregiver's personal development



2.2.3 Power analysis

To draw our final sample, CONAFE initially identified a population of 300 communities located in poor or very poor rural areas, all potentially fulfilling the selection requirements. Given the methodological requirements of an RCT, it was necessary to select a sample large enough to conduct a sound comparison between treatment and control groups. The sample size considered during the initial stages of the study was 160 (out of 300 communities).

Based on this number of sites, considering a significance level of 0.05, a correlation coefficient of 0.05, and the minimum number of families to be interviewed, we reached a power of 0.80 with a minimum detectable effect (MDE) size of 0.18 (0.20 if the correlation coefficient was 0.10). Under this estimation, all the communities included in the sample would have at least eight families where at least one child per family was between 0 and 42 months old. In addition, none of these communities should have been part of any ECCE programme – municipal, state or federal – since 2007.

After the 160 communities were randomly selected, we used a pair-wise matching process to assign communities either to the treatment group or the control group to increase comparability between them. However, the low quality of the administrative formats used by CONAFE and the lack of recently updated databases – many had inaccurate information and were missing data – forced us to implement a validation process at every stage.[10]

As a result of this validation process, we concluded that some of the selected communities were not eligible to participate in the study. This was mostly because of safety considerations, the possibility that they would lack adequate supervision (thus compromising the implementation of the programme as originally designed), or because similar early care interventions from other public agencies had been implemented among

[10] By implementing this validation, we addressed also the problem of self-selection, given that we requested that communities convene and approve their potential participation in the PEI. We did not inform them whether they would be part of the treatment or the control group. (In addition, no public official from CONAFE knew at this point the result of the random assignment already conducted.)

some of the selected families. When applying this new filter, the sample was reduced to 130 locations (later reduced to 126 because of attrition).[11]

Table 2 includes descriptive statistics regarding the number of children and caregivers participating in the study after three waves of data collection.[12]

Table 2: Attrition, descriptive statistics

Wave	Children		Caregivers	
	Treatment	**Control**	**Treatment**	**Control**
Baseline	797	788	690	672
2	553	598	472	493
	(69%)	(76%)	(68%)	(73%)
3	623	638	505	523
	(78%)	(81%)	(73%)	(78%)

2.2.4 Descriptive statistics

Table 3 shows the differences between the treatment and control groups and their statistical significance.[13] Note that for most of the variables, the treated and control households and individuals do not show significant differences. However, we were concerned by the results for some variables, such as number of members in the family, number of PROSPERA recipient households, and other variables related to parental practices. However, the general balance of most of the variables, plus the use of difference-in-differences, as discussed below, reduced the threat to validity in our estimations.

[11] We consequently considered power calculations and changes in the MDE based on the final number of families interviewed. For the 126 communities included in the final sample with roughly 12 households in each, assuming a statistical significance of 95% and an intra-cluster correlation of 0.05, we needed a modest effect of 0.20 in order to achieve a statistical power of 0.80. Doubling the intra-cluster correlation to 0.10 had very little impact on a minimum detectable effect of 0.22. Note that the higher number of households (i.e. 12 households) interviewed, in comparison with what had been anticipated for the original sample (i.e. 8 households), reduced concerns about power and MDE. All sample sizes were calculated using Optimal Design software.

[12] The final initial sample consisted of 64 treatments and 62 controls. In addition, during the validation of the sample, we identified the languages spoken in the communities to be visited by our field researchers: 22 of the sampled communities required interpreters for 6 languages other than Spanish (13 in Chiapas, and 9 in Oaxaca).

[13] For the balance test on the full set of variables, please see the Appendix.

Table 3: Balance treatment and control (selected variables, baseline)

A. Families	
Size (number of members)	0.7178***
Pregnant women	0.0049
Members who can read and write	0.0001
B. Caregiver	
Age of the child	0.0233
Time living in the community	0.9353
Mentioned a second caregiver	0.0304
PROSPERA recipient	0.0763***
Seguro Popular recipient	0.0121
Procampo recipient	0.0095
Scholarship recipient	0.0121
Senior citizen recipient	0.0063
Economic support from someone in the country	0.0033
Economic support from someone outside the country	0.0016
Was treated in a government clinic	0.0304
C. Children 0 to 36 months	
Children's books	0.0611
Storytelling	0.4009***
Frequency with which child eats with the father	0.0849
Frequency of speaking with child	0.0936
Closeness of child with the father	0.0241
Closeness of child with the mother	0.0176
Corporal punishment	0.0808
D. Father	
Plays with the child	0.0000
Helps in preparing the child's meals	0.1190
Helps to feed the child	0.1690***
Helps to dress the child	0.0960
Educational achievement expectations	0.1560
Pre-school registration	0.0000
E. Social behaviour (caregiver)	
Smokes	0.0670
Speaks with family to solve problems	0.0610
Speaks with family when sad	0.0330
Speaks with family when angry	0.0830
Drinks alcoholic beverages	0.0020
Argues with spouse	0.0360

2.2.5 Analysis

Even though a RCT design is considered the best option to estimate the effect of an intervention, attrition observed in the first stages of the data collection process forced us to explore a different method to estimate the impact of the PEI. Although the characteristics of the treatment and control groups were not significantly different in more than one key factor, we decided to use a difference-in-differences estimator. This would

reduce the probability of erroneously attributing any variation in the selected outcomes to the implementation of the PEI when these changes could be explained by previous differences in characteristics between the comparison (non-random allocation) and the treatment groups (random allocation). Using this estimator, we were able to identify differences in parenting practices and child cognitive development.

To estimate the effect of the PEI, we used a regression model with the following specification:

$$Y_{ft} = \beta_0 + \beta_1 Post + \beta_2 Treatment + \beta_3 Post * Treatment + \varepsilon_{b,t}$$

where Y_{ft} is the outcome variable corresponding to member of the family, *f* (parent or child) in term *t; Post* is a variable set to one after the PEI was implemented (term 1 or 2); *Treatment* is a variable set to one if the family *f* lives in any treatment community; Post*Treatment is an interaction to capture the impact of the PEI; and $\varepsilon_{b,t}$ is the error term across families and time/terms. β_0 to β_3 are regression parameters to be estimated. As expected, a statistically significant β_3 parameter would imply differences between treatment and control communities in the outcome of interest explained by participation in the PEI. A positive sign of the parameter would identify whether families in treatment communities positively changed parenting practices, or whether children improved their cognitive development according to the ASQ-3 measures.

In order to identify family members' perceptions regarding changes in parenting practices, seven focus groups were conducted in communities located in four states – Chiapas, State of Mexico, Puebla and Veracruz. The focus groups were organised to discover the perceptions, motivations, values and emotions of the programme beneficiaries regarding the operation and effects of the programme, including the overall development of children and the habits and customs of educating children.

2.3 Key findings

2.3.1 Parenting practices

Based on our analysis, **we did observe very modest improvements in parental behaviour despite the low level of programme participation**. The questionnaire included different observation items for children aged 0–3 years than it did for children aged 3–6 years.[14] The results for children aged 0–3 years are reported in Table 4.

After the first year of the programme, a principal components index of all nine observed practices reveals an improvement of 0.34 standard deviations. This is statistically significant at the 5% level. At the end of the second year, the improvement in the index is roughly half that size and is no longer statistically significant. We believe that an MDE of 0.22 (considering an intra-cluster correlation of 0.1 and a power of 0.80) is high enough to discard most of the small statistically significant effects in our sample. For the same reason, the **few significant effects found would be considered robust and strong**.

[14] Even though the PEI only supports children from 0 to 4 years old, we collected data from children up to 6 years old, given the design of the study. Children who were 3 years old during the baseline were interviewed twice in data collection waves 1 and 2.

Similarly, the span of time observed (three years) might not be sufficient to observe significant effects in many dimensions.[15] In terms of individual practices, almost all are positive. In the first year, caregivers were 0.14 standard deviations (statistically significant) more likely to respond to their child (i.e. if the child spoke to the caregiver during the interview). In the second year, caregivers were significantly more likely to hug or kiss the child during the interview (0.12 standard deviations).

For older children, aged 3–6 years, **we observed no statistically significant differences in the index of observed caregiver behaviour** (Table 5). The few significant differences in individual actions actually move in unexpected directions, suggesting slightly poorer caregiver practices. These estimates are based on a much smaller sample. While the most reliable estimate is the statistically significant index effect, this may suggest the higher value of this intervention at the earliest ages.

Because some children fell into the younger group during the first follow-up and then into the older group during the second follow-up, we estimated one further specification. This used just the seven caregiver practices that were observed across all ages and included all children (Table 6). Ultimately, this is a weighted average of the previous two estimates with significantly more weight given to the younger group because they are the larger sample. Consistently, the observed practice index effects are positive although not statistically significant.

There are many caregiver practices that cannot be observed directly during the course of a one-hour visit. Thus, we complemented the earlier analysis with caregiver own reports of behaviour. For the younger children, these data are reported in Table 7.

Three practices are statistically significant at the 5% or 1% level. First, **children in treatment households were 45% more likely to have more than one book (1% significance). They watch 0.3 fewer hours of television on weekdays (5%), and watch 0.4 fewer hours of television on weekends (1%).** Second, marginally significant results indicate that the **child is slightly less likely to be reported to be 'very attached' to the mother, which is normatively ambivalent depending on how respondents interpret attachment.** On the one hand, high attachment and affection are positive; on the other, reduced attachment could be interpreted by respondents as greater independence, also a positive outcome.

Finally, **children in treatment households were 10% less likely to leave the house more than once a week (90%).**

[15] Additionally, it is important to consider whether the significant results are a matter of chance rather than the true effects of the intervention, if we consider that most of the outcomes are non-significant. In order to address this concern, we computed the False discovery rate represented by the q-values using the Benjamini and Hochberg (1995) method. Q-values exhibit, for each corresponding p-value, the proportion of the rejected null hypotheses that are erroneously rejected. All q-values for all the average estimations included in this document are presented in the Appendix (Tables A1 to A6) and suggest a low chance that the significant p-values represent a false discovery for most of the outcomes. According to this method, results should be considered carefully where q-values are higher than 0.1, although it is important to remember that the use of this model is very sensitive to the size of the sample.

Table 4: Impact on observed parenting practices on infants and children 0–3 years

	Together with child	Spoke to child	Responded to child	Hugged/ kissed child	Spanking	Interfered with child's actions	Gave games	Kept child in sight	Safe play place	**Observed practice index**
T*W1	0.05	0.05	0.14**	0.06	-0.02	-0.03	0.04	0.04	0.06	0.34**
	(0.03)	(0.05)	(0.06)	(0.06)	(0.02)	(0.05)	(0.06)	(0.04)	(0.05)	(0.14)
T*W2	0.05	0.01	-0.04	0.12*	0.02	-0.01	0.10	0.02	-0.02	0.18
	(0.04)	(0.07)	(0.07)	(0.07)	(0.02)	(0.05)	(0.07)	(0.04)	(0.06)	(0.16)
W1	-0.07***	0.04	-0.04	-0.02	0.01	-0.03	-0.08*	0.05*	0.04	0.04
	(0.02)	(0.04)	(0.04)	(0.04)	(0.01)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
W2	-0.11***	0.07	0.03	-0.10*	-0.01	-0.10***	-0.12**	0.08***	0.09*	0.07
	(0.03)	(0.04)	(0.04)	(0.05)	(0.01)	(0.03)	(0.05)	(0.03)	(0.05)	(0.04)
Control average	0.97	0.72	0.71	0.70	0.02	0.17	0.32	0.86	0.78	0.00
N	1,164	1,163	1,164	1,163	1,162	1,162	1,162	1,163	1,154	1,164

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

.

Table 5: Impact on observed parenting practices on children 3–6 years

	Together with child	Spoke to child	Responded to child	Hugged/ kissed child	Introduced children	Restricted child's actions	Spanking	Positive attitude	Safe play place	Dark house	Clean rooms	House not packed	Observed practice index
T*W1	-0.06	-0.03	-0.05	-0.03	0.05	-0.06*	-0.01	-0.09	0.01	-0.13	-0.06	-0.11	-0.10
	(0.06)	(0.09)	(0.09)	(0.11)	(0.11)	(0.04)	(0.04)	(0.09)	(0.10)	(0.09)	(0.08)	(0.10)	(0.23)
T*W2	-0.12**	-0.12	-0.09	0.01	0.03	-0.04	0.01	-0.14*	-0.05	-0.11	-0.02	-0.02	-0.26
	(0.06)	(0.09)	(0.09)	(0.11)	(0.10)	(0.03)	(0.03)	(0.08)	(0.09)	(0.08)	(0.08)	(0.10)	(0.23)
W1	0.03	0.03	0.01	-0.01	0.05	0.05*	-0.02	0.14**	0.01	-0.06	0.09	0.14**	0.09
	(0.05)	(0.07)	(0.05)	(0.07)	(0.07)	(0.03)	(0.03)	(0.06)	(0.08)	(0.07)	(0.07)	(0.07)	(0.15)
W2	0.04	0.07	-0.03	-0.02	0.14**	0.01	-0.04	0.13**	0.15**	-0.09	0.14**	0.27***	0.17
	(0.05)	(0.07)	(0.06)	(0.08)	(0.07)	(0.02)	(0.03)	(0.05)	(0.06)	(0.07)	(0.06)	(0.07)	(0.15)
Control average	0.91	0.75	0.80	0.58	0.44	0.03	0.05	0.75	0.66	0.32	0.71	0.17	-0.04
Number of caregivers	185	177	178	185	175	174	183	175	183	174	174	174	185

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

Table 6: Impact on observed parenting practices on infants and children 0–6 years

	Together with child	Spoke to child	Responded to child	Hugged/ kissed child	Spanking	Interfered with child's actions	Safe play place	Observed practice index
T*W1	0.03	0.04	0.10**	0.02	-0.02	-0.04	0.05	0.22
	(0.02)	(0.04)	(0.05)	(0.06)	(0.01)	(0.03)	(0.05)	(0.12)
T*W2	-0.01	-0.03	0.03	0.04	0.00	-0.01	-0.02	0.04
	(0.03)	(0.06)	(0.05)	(0.06)	(0.01)	(0.03)	(0.05)	(0.14)
W1	-0.06***	0.02	-0.02	-0.05	0.01	-0.05*	-0.02	-0.10
	(0.02)	(0.03)	(0.03)	(0.03)	(0.01)	(0.03)	(0.04)	(0.07)
W2	-0.08***	0.06	-0.02	-0.12***	-0.01	-0.12***	0.05	-0.03
	(0.02)	(0.04)	(0.03)	(0.04)	(0.01)	(0.02)	(0.03)	(0.09)
Control average	0.96	0.73	0.73	0.68	0.02	0.15	0.76	0.00
Number of caregivers	1,346	1,339	1,339	1,345	1,342	1,335	1,334	1,346

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

Table 7: Impact on reported parenting practices on children 0–3 years

	T*W1	T*W2	W1	W2	Control Average	Number of caregivers
The child went out of house more than once a week	-0.10*	0.01	0.06	0.03	0.56	1,162
	(0.06)	(0.09)	(0.04)	(0.06)		
The child had more than one book	0.45***	-0.01	0.15***	0.27***	0.30	1,163
	(0.05)	(0.07)	(0.03)	(0.05)		
Told stories some times per year	0.01	-0.04	0.19***	0.31***	0.49	1,165
	(0.05)	(0.06)	(0.03)	(0.04)		
Took the child to market at least once a week	-0.07	-0.05	0.11***	0.14***	0.73	1,164
	(0.04)	(0.06)	(0.03)	(0.05)		
The child had more than 2 dolls or stuffed animals	0.00	0.01	0.10***	0.14***	0.67	1,158
	(0.04)	(0.05)	(0.03)	(0.04)		
The child had more than 2 toys to push or pull	-0.05	-0.03	0.12***	0.07*	0.21	1,163
	(0.04)	(0.06)	(0.03)	(0.04)		
Believed they should teach their children	-0.01	-0.02	0.04	0.01	0.89	1,165
	(0.03)	(0.04)	(0.02)	(0.03)		

	T*W1	T*W2	W1	W2	Control Average	Number of caregivers
How much TV watched at home on weekdays? (Hours)	-0.31** (0.16)	0.18 (0.21)	0.52*** (0.12)	0.39** (0.16)	0.79	1,162
How much TV watched somewhere else on weekdays? (Hours)	-0.04 (0.07)	0.09 (0.09)	0.09** (0.05)	0.03 (0.04)	0.17	1,165
How much TV watched at home on weekends? (Hours)	-0.41*** (0.14)	-0.13 (0.15)	0.52*** (0.10)	0.51*** (0.11)	0.58	1,165
How much TV watched somewhere else on weekend? (Hours)	-0.02 (0.08)	0.00 (0.11)	0.02 (0.05)	0.04 (0.07)	0.19	1.165
How long **is** the **TV on? (Hours)**	-0.15 (0.48)	0.62 (4.13)	0.38 (0.35)	10.22*** (2.66)	2.75	1,114
Parents lived together	-0.03 (0.03)	0.00 (0.04)	0.04** (0.02)	0.06** (0.02)	0.85	1,163
The child saw the **father every day**	0.02	0.09*	0.00	-0.06*	0.82	1,097

	T*W1	T*W2	W1	W2	Control Average	Number of caregivers
	(0.03)	(0.05)	(0.03)	(0.03)		
The child ate with parents more than once a day	0.03	0.06	0.03	0.01	0.75	1,099
	(0.04)	(0.05)	(0.03)	(0.04)		
The child was very attached to father	-0.04	-0.01	0.11***	0.14***	0.60	1,164
	(0.06)	(0.07)	(0.04)	(0.05)		
Responded to children when they required attention even if busy	0.07	0.05	-0.12***	-0.21***	0.55	1,164
	(0.06)	(0.07)	(0.04)	(0.05)		
The child was very attached to the **mother**	-0.07*	0.02	0.02	-0.02	0.86	1,165
	(0.04)	(0.06)	(0.02)	(0.04)		
How many spankings in the p**ast week?**	0.09	-0.24	0.24**	0.54***	0.71	1,163
	(0.20)	(0.19)	(0.12)	(0.12)		

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

For older children, caregiver-reported outcomes are listed in Table 8. There are no significant differences except for a reduction in the number of spankings in the past week by 0.55 (90 per cent significance). As with the observed behaviour, the programme seems to have much less of an effect among the older children (variations in the number of caregivers is explained by missing data).

Table 8: Impact on reported parenting practices on children 3–6 years

	T*W1	T*W2	W1	W2	Control average	Number of caregivers
Told stories at least once a week	-0.05	-0.08	0.13**	0.20***	0.41	193
	(0.08)	(0.08)	(0.06)	(0.06)		
The child had more than one book	0.00	-0.13*	0.13**	0.22***	0.50	196
	(0.08)	(0.07)	(0.06)	(0.06)		
There was a magazine at home	0.02	0.01	0.01	0.03	0.36	190
	(0.08)	(0.08)	(0.06)	(0.06)		
The child had an instrument to listen to music	-0.14	-0.1	0.11**	0.08	0.40	189
	(0.09)	(0.09)	(0.06)	(0.06)		
The child could listen to tapes	-0.17	-0.12	0.16**	0.12	0.76	84
	(0.11)	(0.10)	(0.08)	(0.07)		
Helped learn numbers	-0.08	-0.05	0.09*	0.10***	0.88	189
	(0.06)	(0.05)	(0.05)	(0.04)		
Helped learn letters	-0.06	-0.07	0.09*	0.13***	0.84	189
	(0.06)	(0.05)	(0.05)	(0.04)		
Helped learn colours	-0.03	-0.05	0.08	0.12***	0.86	189
	(0.06)	(0.05)	(0.05)	(0.04)		
Helped learn shapes and dimensions	0.00	-0.05	0.14**	0.24***	0.69	189
	(0.07)	(0.07)	(0.06)	(0.06)		
Allowed the child to choose food	0.03	0.06	0.00	-0.02	0.84	190
	(0.07)	(0.06)	(0.04)	(0.04)		
Took the child out several times	-0.09	-0.10	0.02	0.08	0.52	190
	(0.10)	(0.09)	(0.08)	(0.07)		
Took the child to a historic place or museum last year	-0.05	-0.03	-0.01	0.00	0.85	190
	(0.08)	(0.07)	(0.06)	(0.05)		
How much TV watched at home on weekdays? (hours)	-0.16	-0.03	0.42	0.14	1.50	196
	(0.34)	(0.29)	(0.26)	(0.21)		
How much TV watched somewhere else on weekdays? (hours)	-0.07	-0.03	0.14	0.01	0.29	196
	(0.13)	(0.13)	(0.09)	(0.11)		

	T*W1	T*W2	W1	W2	Control average	Number of caregivers
How much TV watched at home on weekends? (hours)	0.18	0.12	0.05	0.06	1.14	196
	(0.26)	(0.25)	(0.21)	(0.21)		
How much TV watched somewhere else on weekend? (hours)	0.08	0.12	-0.09	-0.09	0.31	196
	(0.15)	(0.14)	(0.12)	(0.12)		
How long is the TV on? (hours)	-0.54	-0.47	0.23	7.24***	4.21	189
	(1.41)	(2.35)	(1.09)	(1.89)		
Parents lived together	-0.04	-0.08*	0.04	0.06	0.87	196
	(0.05)	(0.05)	(0.04)	(0.04)		
The child saw the father every day	0.01	-0.01	0.04	0.05	0.79	188
	(0.08)	(0.07)	(0.06)	(0.06)		
The child ate with parents more than once a day	0.08	0.02	0.03	0.05	0.74	189
	(0.08)	(0.07)	(0.06)	(0.05)		
Child very attached to the father	-0.13	-0.03	0.15**	0.12*	0.61	189
	(0.09)	(0.08)	(0.06)	(0.07)		
Responded to children when they required attention even if busy	-0.05	0.01	-0.06	-0.15**	0.57	194
	(0.09)	(0.08)	(0.07)	(0.06)		
The child was very attached to the mother	-0.10	-0.05	0	-0.01	0.84	189
	(0.07)	(0.07)	(0.05)	(0.05)		
How many spankings in the past week?	-0.55*	-0.07	0.29	-0.11	1.09	192
	(0.33)	(0.27)	(0.27)	(0.20)		

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

2.3.2 Child development

Do these modest improvements in parenting have any impact on actual child development? We now turn to the impact of the programme on child development outcomes as measured in the ASQ-3 (Table 9).

We observe **statistically significant increases in two child development areas in the first year – communication (0.15 standard deviations) and gross motor skills (also 0.15 standard deviations)**. While changes in other areas (fine motor skills, problem solving or social-emotional skills) are positive, they are smaller and not statistically significant. A constructed total score also shows a positive, but not statistically significant, improvement.

Table 9: Impact on child development

	Skills					
	Communication	**Gross motor**	**Fine motor**	**Problem solving**	**Social**	**Total**
T*W1	0.15*	0.15*	0.08	0.01	0.04	0.11
	(0.09)	(0.08)	(0.09)	(0.09)	(0.08)	(0.09)
T*W2	0.09	0.08	-0.06	-0.08	0.00	0.01
	(0.09)	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)
W1	0.0699	0.163***	-0.210***	-0.0357	0.0697	0.0155
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)
W2	0.195***	0.383***	0.0117	-0.201***	0.252***	0.170***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Control average	0.00	0.00	-0.01	-0.01	0.00	-0.01
N (children)	1,583	1,583	1,583	1,583	1,583	1,583

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

When we segregate the analysis by the gender of the child, effect sizes are roughly similar (Table 10). Statistical significance disappears for both genders on communication, most likely because of statistical power, as the actual effect size is the same as in the joint analysis. The gross motor skill effect is larger for girls in year one than for boys.

Table 10: Heterogeneous effects on child development based on gender

	Skills					
	Communication	**Gross motor**	**Fine motor**	**Problem solving**	**Social**	**Total**
Girl	0.14***	-0.02	0.09**	0.06	0.15***	0.12***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
Girl * T*W1	-0.01	0.08	0.01	0.04	0.07	0.05
	(0.08)	(0.08)	(0.10)	(0.08)	(0.08)	(0.08)
Girl * Year 2 *Treatment	0.00	0.02	0.22**	0.01	-0.07	0.06
	(0.09)	(0.07)	(0.09)	(0.08)	(0.08)	(0.08)
W1	0.07	0.16***	-0.21***	-0.03	0.07	0.02
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)
W2	0.20***	0.38***	0.01	-0.20***	0.25***	0.17***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Boy effect	0.15	0.11	0.08	-0.01	0.00	0.09
W1	(0.10)	(0.09)	(0.11)	(0.09)	(0.09)	(0.10)
Boy effect	0.09	0.06	-0.16	-0.08	0.03	-0.02
W2	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.10)
Girl effect	0.14	0.19*	0.13	0.03	0.07	0.14
W1	(0.10)	(0.09)	(0.10)	(0.10)	(0.09)	(0.11)
Girl effect W2	0.10	0.09	0.06	-0.08	-0.04	0.04
	(0.10)	(0.08)	(0.10)	(0.10)	(0.10)	(0.10)
Control average	-0.07**	0.01	-0.05	-0.04	-0.08**	-0.06*
Number of children	1,583	1,583	1,583	1,583	1,583	1,583

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

Segregating the sample by child age using children older and younger than 36 months, we observe that the child development effects are entirely concentrated among the younger group, the same children for whom caregiver practices improved (Table 11).

Table 11: Heterogeneous effects of child development based on baseline age of child (divided at 36 months)

	Skills					
	Communication	**Gross motor**	**Fine motor**	**Problem solving**	**Social**	**Total**
Younger	-0.29***	-0.44***	-0.16***	0.00	-0.15***	-0.29***
	(0.05)	(0.04)	(0.05)	(0.06)	(0.04)	(0.05)
Younger *W1 * T	-0.067	0.13	0.00	0.26*	0.083	0.11
	(0.11)	(0.09)	(0.12)	(0.13)	(0.09)	(0.11)
Younger *W2 * T	0.35***	0.18**	-0.17	0.15	-0.096	0.12
	(0.11)	(0.08)	(0.11)	(0.12)	(0.08)	(0.08)
W1	0.069	0.16***	-0.21***	-0.036	0.069	0.014
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)
W2	0.21***	0.40***	0.018	-0.20***	0.26***	0.18***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Older effect W1	0.21	0.05	0.08	-0.20	-0.03	0.03
	(0.13)	(0.11)	(0.13)	(0.14)	(0.11)	(0.13)
Older effect W2	-0.20	-0.07	0.09	-0.21	0.08	-0.09
	(0.10)	(0.10)	(0.14)	(0.14)	(0.10)	(0.11)
Younger effect W1	0.14	0.18**	0.08	0.06	0.05	0.14
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Younger effect W2	0.15*	0.11	-0.08	-0.06	-0.01	0.03
	(0.09)	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)
Control average	0.23***	0.35***	0.12***	-0.0085	0.11***	0.23***
Number of children	1,583	1,583	1,583	1,583	1,583	1,583

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

If instead we divide the sample at 22 months (Table 12), the median age of children in the sample at the baseline survey, and use this as a test for sensitivity, surprisingly we see more significant impacts. These include impacts on communication among the older group, while gross motor improvements remain concentrated in the younger group. It may be that communication skills are most affected by the programme in the window between 22 and 36 months when speaking tends to begin in earnest.

Table 12: Heterogeneous effects of child development based on baseline age of child (divided at 22 months)

	Skills					
	Communication	**Gross motor**	**Fine motor**	**Problem solving**	**Social**	**Total**
Young	-0.20***	-0.39***	-0.02	0.07	-0.07*	-0.16***
	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Younger *W1 * T	-0.45***	0.08	0.05	-0.08	-0.12	-0.15*
	(0.09)	(0.09)	(0.10)	(0.08)	(0.09)	(0.08)
Younger *W2 * T	0.03	0.07	-0.27**	0.12	-0.13	-0.05
	(0.09)	(0.07)	(0.12)	(0.09)	(0.08)	(0.08)
W1	0.07	0.16***	-0.21***	-0.04	0.07	0.01
	(0.07)	(0.06)	(0.07)	(0.07)	(0.06)	(0.07)
W2	0.20***	0.39***	0.01	-0.20***	0.25***	0.18***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Older effect W1	0.35***	0.11	0.06	0.05	0.09	0.18*
	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.10)
Older effect W2	0.08	0.05	0.06	-0.14	0.06	0.03
	(0.10)	(0.08)	(0.12)	(0.10)	(0.09)	(0.10)
Younger effect W1	-0.10	0.20**	0.10	0.06	-0.03	0.03
	(0.10)	(0.10)	(0.11)	(0.09)	(0.10)	(0.10)
Younger effect W2	0.12	0.12	-0.21**	-0.06	-0.07	-0.02
	(0.10)	(0.09)	(0.10)	(0.09)	(0.10)	(0.10)
Control average	0.09***	0.17***	0.00	-0.04	0.03	0.07**
Number of children	1,583	1,583	1,583	1,583	1,583	1,583

Note: Community fixed effects included. Standard errors clustered at community level. T = treatment; W1 = data collection after term 1; W2 = data collection after term 2.

2.3.3 Cost-effectiveness analysis of the PEI

As has been noted, 'research estimating the economic returns to early childhood interventions is rare among studies outside the United States' (Nores and Barnett 2010). The main explanation for this condition is the limited number of longitudinal studies with reliable evidence on how some of the known direct effects (e.g. cognitive development) or indirect effects (parenting practices) result in access to higher income or better behaviour (less exposure to risks and imprisonment rates, for instance). Furthermore, as the same authors explain, 'Policy makers should recognize that even the more comprehensive benefit–cost analyses do not take into account all benefits. Some externalities are difficult or impossible to measure from current studies.'

Even though conducting a sound cost-effectiveness analysis requires more detailed and reliable information than is currently available in government offices (e.g. Myers *et al.* 2013), we were able to estimate costs for the implementation of the PEI for the financial year 2015. Based on the information provided by CONAFE, we identified that implementing the PEI in 2015 represented a per capita average annual spending of MXN1100, or nearly USD69.[22]

Table 13: Cost estimation (average cost, financial year 2015)

	Expenditure (MXN)	Children	Communities	Per child (MXN)	Community (MXN)
Chiapas	39,185,129.62	27,688	2,020	1,415.24	19,398.58
México	24,391,133.91	43,372	1,747	562.37	13,961.73
Oaxaca	32,432,881.40	26,144	1,752	1,240.55	18,511.92
Puebla	46,585,817.47	42,805	2,425	1,088.33	19,210.65
Querétaro	11,584,423.00	12,085	891	958.58	13,001.68
Veracruz	32,488,195.00	29,374	1,755	1,106.02	18,511.79
National	501,397,377.00	455,415	28,787	1,100.97	17,417.49

We found significant differences in the average costs across states. For instance, Estado de México invested nearly half of the national average for the implementation of the PEI (USD35), while Chiapas invested approximately 30 per cent more than the national average.[23] Based on this data, we were able to conduct our cost-effectiveness analysis, based on the model described by McEwan (2011). Table 14 includes the results we found by estimating the incremental cost-effectiveness ratio in the case of the parenting practices index.

[22] It is important to highlight the lack of available and reliable information to conduct this kind of analysis. The Mexican education system is in the process of implementing a reform that includes the establishment of a national evaluation system. However, until very recently, there were limited rules regarding the design of information systems, the use of official databases, and obligations regarding the timing of publication and availability of administrative information.

[23] According to CONAFE, the operation of the PEI requires three different types of expenditures: (i) books and educational materials; (ii) professional development activities; and (iii) salaries, stipends and operational costs for monitoring (transportation/meetings).

Table 14: Cost-effectiveness ratio of the PEI – parenting practices index

States	Average gain (SD)	Per pupil yearly cost (USD)	Per pupil cost per 0.1 gain (USD)
Chiapas	0.34	88.22	25.95
México	0.34	35.05	10.31
Oaxaca	0.34	77.33	22.74
Puebla	0.34	67.84	19.95
Querétaro	0.34	59.75	17.57
Veracruz	0.34	68.94	20.28
National	**0.34**	**81.08**	**23.85**
Sampled states (6)	**0.34**	**66.19**	**19.47**

Based on these findings, it is possible to identify that, with regards to the parenting practice index (PPI), a 0.1 standard deviation gain would cost on average USD19.47 per pupil for the six states included in our sample. In the case of the national average, the same estimation increases to USD23.85.

An important aspect to be noted is the significant difference regarding the cost of the programme across states. For instance, assuming an average effect across all states, the per pupil cost per 0.1 standard deviation gain in Estado de México will be nearly 50 per cent of the average cost across the six states included in the sample.

Once we estimated the costs regarding the PPI, we considered the incremental cost-effectiveness ratio for the other two effects found in our model, gross motor skills and communication skills (each 0.15 standard deviations). Table 15 includes our findings. Given that the effect sizes are nearly half the estimated size effect in the case of the PPI, the per pupil cost per 0.1 gain is higher. The variation already described regarding local expenditures in the PEI across states also represents substantial differences in costs.

Table 15: Cost-effectiveness ratio of the PEI – communication or gross motor skills

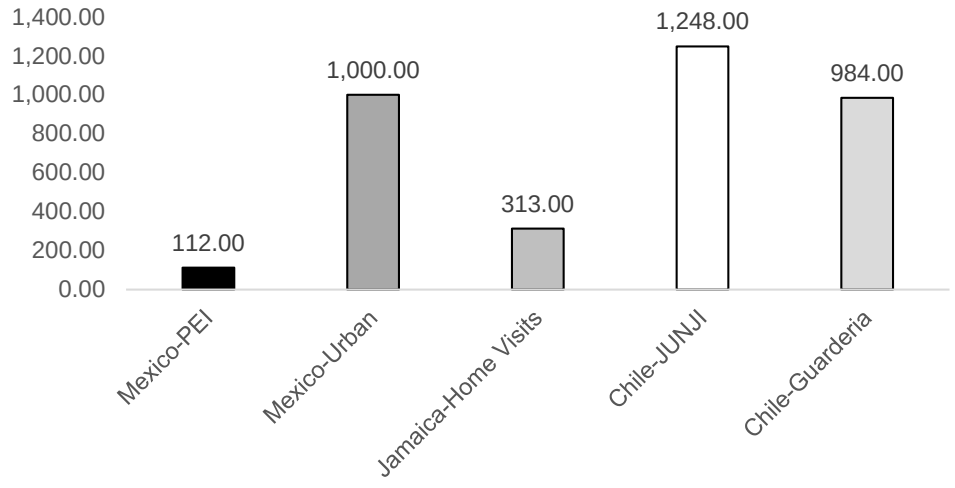
States	Average gain (SD)	Per pupil yearly cost (USD)	Per pupil cost per 0.1 gain (USD)
Chiapas	0.15	88.22	11.26
México	0.15	35.05	4.48
Oaxaca	0.15	77.33	9.87
Puebla	0.15	67.84	8.66
Querétaro	0.15	59.75	7.63
Veracruz	0.15	68.94	8.80
National	**0.15**	**81.08**	**54.05**
Sampled states (6)	**0.15**	**66.19**	**44.13**

In addition, we were able to compare the reported costs per child of different ECCE programmes in urban areas implemented in various countries, including Mexico (see Figure 6). Based on this comparison, we can conclude that this programme provides

services at a very low cost. As expected, this may suggest the feasibility of rapid expansion to other areas, although it may also suggest that more resources are required to improve its implementation.

In addition, it creates a new demand for evidence, particularly to understand whether the current allocation of resources (e.g. the low stipends with a single provision of educational materials per year) could be modified to increase the odds of having an impact on other skills or competencies and the magnitude of the identified effects.

Figure 6: Cost comparison between ECCE programmes (2010, USD)



3. Challenges in implementation and lessons learned

3.1 Quality of public databases and data collection process

The original data collection plan considered a larger sample from four states for logistical considerations (control and costs). However, we had to adjust both the size of the sample and the number of states after realising the low quality of the public databases used in the planning and implementation of the PEI. This poor quality was reflected in the lack of control over the number and characteristics of beneficiaries, and the absence of identification of communities where this programme had been implemented. These were certainly factors affecting the final methodological design of this study.

We noticed a lack of policies and protocols for the design and construction of most of the available administrative databases, resulting in additional costs for the appropriate design and implementation of an RCT. The organisation of seminars and workshops helped inform public officials about the requirements for this research method and the characteristics of the information required. However, often we found it necessary to collect data directly prior to planning actual data collection for research purposes.

We also found it useful to conduct validation processes of the administrative information regardless of the type and quantity delivered. Along with the dissemination of the results of the impact of the PEI, it seems useful to organise additional workshops focused primarily on informing research and official public communities about the challenges these studies pose in Mexico.

3.1.1 Coordination across states, delays and variation in quality

Collaboration with state governments and CONAFE's local public officials proved to be demanding. There was huge variation between local offices regarding the availability of information, institutional capacities, commitment, and experience with the implementation of impact evaluation studies. These were additional challenges for the implementation of the study and, in some cases, resulted in delays during the data collection processes.

Collaboration with supervisors and *promotoras* was essential in negotiating access to and reaching rural communities. A key lesson was to cultivate relationships with internal leaders (public officials openly committed to the realisation of this study). Their collaboration proved to be key to assuring the homogeneous implementation of the study. In addition, providing frequent information to all levels of public officials involved in the implementation of the PEI, regarding the implementation of the study, may help to overcome inefficiencies.

3.1.2 Language and translators

One of the main challenges related to the data collection process was to ensure adequate translation during the interviews conducted in rural communities. For this study, we implemented two different strategies. Where possible, we looked for local residents (from the region, not from the same community) who had participated as translators in other activities involving interviews, such as census or data collection for government programmes. Our second strategy was to hire external translation firms with extensive experience regarding data collection (usually through participation in government projects). However, we observed evident variations in quality and training among the translators, resulting in a need for closer monitoring and evaluation by field researchers.

As part of the study, we learned a valuable lesson in requesting the recording of a sample of interviews conducted in languages other than Spanish to validate the quality of the interpretation. As an additional academic product of this project, we plan to publish the results of this validation. It could be a possible measure of the variation that might be expected in the quality of data in future research projects involving interviews in different languages.

3.1.3 Lack of capacity among survey firms

One of the key factors explaining some of the main challenges regarding the data collection process was the lack of experience among survey firms regarding the use of cognitive development tests such as the ASQ-3. Although additional training was organised (including practice in rural communities not included in our sample), a key aspect to be considered is that this type of test requires intensive monitoring and technical support in the field. We decided to provide support *in situ* to field researchers during their visits (our supervisors were extensively trained in the proper administration of ASQ-3). We also provided long-distance support (e.g. by phone or through SMS) for the instructors who trained field researchers in Mexico City.

3.1.4 Cost-effectiveness analysis

A barrier we were not able to overcome was the collection of enough reliable and disaggregate data for the purpose of conducting a sound cost-effectiveness analysis.

Regardless of the fact that results from this type of analysis are not frequently available to the public, an important lesson for future evaluations is to include in the agreements not just access to data being directly collected, but also to administrative data.

In addition, it might be useful to organise a working group to include public officials from the government agency in charge of the programme to be evaluated. This group could define the procedures for the collection or generation of the information requested to conduct an analysis different from that expected in the RCT.

3.2 Implementation of the intervention

Even though the PEI can be considered to have well-defined procedures, observations conducted during the study suggest important variations across states during its implementation. For instance, we observed disparities regarding the availability of educational materials, type of monitoring practices, quality of technical support and characteristics of *promotoras* (e.g. experience, training and knowledge of the programme). This situation made it necessary to collect additional information to inform CONAFE of deficiencies in the implementation of the PEI. Also, it was necessary to request collaboration from state agencies to support supervisors and *promotoras* in implementing the PEI as it was originally designed.

These variations resulted in additional challenges in conducting the analysis, given that the use of covariates capturing variations in the implementation of the PEI was needed (i.e. actual number of available books or the number of organised sessions). It also required the collection of qualitative data (interviews and focus groups) to understand possible inadequacies in the implementation of the PEI.

3.2.1 Change of CONAFE directors

A critical challenge for the implementation of this study was the variation in practices and involvement with the evaluation of all the PEI and CONAFE directors appointed during the realisation of this study (three director-generals of CONAFE during this period). Although this condition is related to the length of this study, we need to consider the extent to which this variation resulted in additional challenges. The main lesson learned was the need to establish a close relationship with the local staff and to directly inform the director-general about the main findings whenever possible.

3.2.2 Low implementation fidelity

As a result of the observations made during the data collection processes, we realised that the fidelity of implementation was relatively low (e.g. low attendance, lack of coaching and lack of textbooks and educational materials). Given this problem, we decided to collect qualitative data to provide further details about the implementation of the programme along with estimates about its impact.

The main lesson learned has been to consider the organisation of the monitoring activities and to document any implementation aspects that might affect the results of the programme. In addition, it might be useful to consider the organisation of workshops or the preparation of reports to inform public officials in charge of the programmes. Furthermore, finding results only for the first year may suggest a declining trend in the fidelity of implementation.

3.2.3 Low take-up

In a given term, *promotoras* could facilitate up to 40 meetings per group. However, collected data suggest that actual attendance was significantly lower. At the baseline, on average, treatment households had attended two meetings. This is consistent with the fact that there were initial organisational meetings in both treatment and comparison communities. At the end of the first year, caregivers reported attending, on average, 11 meetings. At the end of the second year, they reported attending just under nine meetings, on average. However, the median household attended only four meetings during the first year and three during the second year. (Unfortunately, there is no available information from other states in the country regarding take-up.)

Based on information collected through the interviews, there are several factors that could explain this. These include:

- the implementation of conditional cash transfer (CCT) programmes in the same communities (offering incentives for adequate attendance, unlike the PEI)
- the parents' low expectations of the programme
- a lack of empathy with the *promotora*
- the lack of knowledge among parents regarding the goals and activities of the PEI.

There are several lessons to be learned from this situation, including the need to better inform beneficiaries of the programme and improve coordination between public agencies implementing social programmes in rural regions across Mexico.

3.3 Mixed methods

3.3.1 Qualitative studies

Given the low take-up and low implementation fidelity, conducting a qualitative study through the organisation of focus groups with parents and caregivers was a key aspect for a better interpretation of findings from our quantitative analysis. The results from this study informed our interpretation, provided information to those implementing the programme and helped identify some of the possible policy implications.

The purpose of the focus groups was to report beneficiaries' perceptions regarding the effects and implementation of the programme. To this end, we conducted 7 focus groups in 4 of the 6 states included in the study and involved communities with at least 10 households already registered in the programme. To conduct meetings in each community programme, beneficiaries who had attended sessions for at least three months were invited to participate voluntarily. From the information collected, the findings were grouped into five major areas:

- What is known about the PEI and CONAFE?
- What are the perceived changes: attitudes, practices and motivations?
- What interactions were there with other participants?
- What were the barriers to participation?
- What improvements were suggested?

What is known about the PEI and CONAFE?
Members of all seven groups were invited to participate in the programme by a *promotora*. In some cases, the participants were unable to identify the affiliation or institutional position of the public official who invited them to participate in the PEI. This also applied to recommendations by neighbours or relatives already involved. In every case, the reference came through a female (except when the *promotora* was a male member of the community).

Additionally, the beneficiaries had no clear idea of the institution that operates and coordinates the programme or the origin of its financial support. They did not know about CONAFE, nor did they know whether the programme was funded and promoted by the municipal, state or federal government. All groups defined the programme as being very similar to a school for parents (some differences in wording used). Beneficiaries, given the weekly sessions (or bi-weekly in some cases), felt the PEI was an opportunity to promote interaction with their children and a place to discuss any questions or concerns related to how to raise their children. Concern about learning to manage and educate their children patiently and without violence was of particular interest to mothers.

Parents sought to help their children to build and strengthen their self-esteem, to become independent, and to develop physical skills to help them solve problems. For mothers, the programme was important because it offered the opportunity to improve their relationships with their children. The programme helps them to understand their children's development and thus will affect the way their children will behave in the next stages of their lives.

From the perspective of the beneficiaries, the objectives pursued by the programme were understood to be:

- to improve the socialisation skills of children (help them overcome their fear of living with other children or other people)
- to facilitate the adaptation of children to formal education spaces (entry into pre-school)
- to foster better co-existence between mothers and their children
- to create spaces where children can learn more
- to play games and perform activities for early childhood stimulation.

In some cases, from direct questions about the purposes of the programme, beneficiaries noted confusion in their own answers. Thus, they expressed the need to know the objectives established by early childhood education.

This emphasises that groups in the State of Mexico need to be given the precise objectives of the programme and receive guidance in the development of the children involved. For the groups in this state, early childhood education is defined as support to boost the child's skills and physical and social abilities, and to provide an early intervention to improve their language, sense of direction, balance and general physical maturity and co-existence.

The word 'game' took on a special meaning in the activities of the programme. For mothers, it represented an opportunity to learn ways to get along with their children. This was considered a strategy to learn to 'endure' the children's demands for attention. In

addition to games, the beneficiaries referred to the programme's regular activities in meetings: singing; drawing; crafts; exhibitions; lectures (or classes) for mothers; and guidance to promote the healthy development of their children through nutritional care, health and exercise.

In certain cases, there was mention of activities for the development of children's language and motor skills (ball games, practising balancing, whole-word enunciation, etc.) as being perceived to be directly associated with the development of the child. The seven groups considered it useful and important to carry out such activities.

The process of enrolment and incorporation into the programme was perceived to be simple, according to the seven focus groups. Additionally, it did not pose any difficulty for the beneficiaries. That is, the programme does not exclude anyone interested in participating, even if they are unable to present the appropriate documentation for registration. This shows that the programme is easy for the population to access. However, there may be some obstacles when following up on beneficiaries and measuring the effects on children. The lack of complete records for participants and incomplete reports could lead to estimates that differ from reality.

In general, it is possible to identify the motivation of the beneficiaries for entering the programme and staying in it. The incentives were promotion of the development of their children's skills and improvements in their relationships with them, and for the mothers to feel satisfied in their role.

Perceived changes: attitudes, practices and motivations
Actions taken by the PEI focus on rural and indigenous communities characterised by high levels of marginalisation with great educational and social backwardness. Here, educational interventions in early childhood represent an opportunity to improve conditions for the development of children and possibly reduce the inequality of learning conditions.

The beneficiaries participating in the focus groups recognised the opportunity provided by the programme. For them, it was important to help their children grow and develop as well as possible. For the mothers, it was easy to identify the effects of the programme on their children, especially compared with other children of the same age who did not attend the sessions. Attitudes and behaviours highlighted by mothers related to socialisation skills. In this context, these are understood to be a decreased feeling of fear that the child may have in the presence of, or interaction with, people outside the family, whether this means other children or adults.

According to the beneficiaries, they hope to see these skills reflected in the behaviour and reaction of their children when entering pre-school; there should be a smooth and pleasant transition that does not cause feelings of insecurity and neglect. Many beneficiaries mentioned this concern because of previous experiences in which their older children, who were not part of the programme, took a long time to adapt to the school environment.

Another change highly valued by mothers was the perceived development of cognitive, motor and language skills in their children as a result of their participation in the PEI. This made the mothers happy and proud. Additionally, the mothers observed a change in

their own emotions and interactions with their children after participating in the programme. The beneficiaries explained how, previously, performing their daily household chores, usually with more than 1 child (some households had as many as 10), and attending to their children's multiple needs caused them to lose patience quickly. This was reflected in their relationships with their children. Now, because of the early childhood education sessions, they have discovered ways of maintaining their patience using strategies to resolve difficult situations with their children serenely without leading to undesirable reactions.

For mothers, changes in their behaviour include:

- more patience, less scolding
- changes in co-existence; they are more outspoken and talkative
- playing with their children more
- new ways of correcting undesirable behaviour in their children
- establishing routines and schedules to help their children
- consistently expressing their love to their children.

It is very important to note that many mothers, beyond having greater tolerance and calmness when interacting with their children, perceived changes in their own development as individuals and members of their community. Some expressed how, by meeting regularly in the programme sessions, they have learned to speak in public. They have reduced their fear of expressing their thoughts to others and their fear of the situations they face. The vast majority of mothers do not have a place to meet with other mothers outside of their family; some say they do not leave their homes. Thus, this common space also provides a place that encourages the development of the skills and abilities of the mothers. This is definitely a positive element of the programme, worthy of recognition, and adding value to it.

The role of fathers in their children's care is of great importance for the PEI. The programme makes an effort to include father figures. It recognises not only the need for a more equitable sharing of tasks, regardless of gender, but also the positive outcomes that may result from the greater participation and involvement of fathers in their children's education. However, few results could be observed from the focus groups, partly because no fathers or father figures were included in them.

This could be explained by the characteristics of the communities in which the programme is implemented. In these areas of high poverty, high marginalisation and difficult access, working conditions are precarious and economic activity occurs in distant locations that require men to travel outside their community for work. In the best case, one is able to return home the same day, although this requires long commutes. In other situations, where agricultural activity requires being at specific locations during harvest time, the fathers' absences are longer.

Thus, the role of the father is perceived to be mostly recreational rather than educational. While recreational activities are also training, the few spaces available to fathers are reserved for activities that appeal to children. The father is often considered a 'relief', taking over from the mother when she cannot attend to the children for some reason, rather than as a partner in the shared task of parenting.

Fathers know and recognise the benefits of the programme and support or enable the mother's participation in the programme's actions. According to the beneficiaries, fathers see the positive effects of early childhood education on the development of their children, and this strengthens the continuity of mothers and children in the programme.

Interaction with other participants

One of the most important figures or elements in the successful implementation of the proposed educational model for early childhood is the *promotora* or promoter.[24]

In all groups, it was observed that the figure of the *promotora* is key to communication. The *promotora* provides information about the programme by answering questions, organising sessions (place and schedule only), and offering guidance and leadership. It is not surprising that, in all the communities, participants referred to the *promotora* as the teacher. Thus, the *promotora* also becomes a social agent with great influence in the community. For the beneficiaries, the *promotora* is the expert – the one who knows how to run the meetings and coordinate activities using the materials available.

In addition to the beneficiaries recognising the *promotora*'s knowledge, they also valued the *promotora*'s patience with them. It is important to note that sessions are not suspended when there is insufficient or a complete lack of work materials. The *promotoras* are constantly identifying, constructing and reproducing alternative material for use during the sessions, even when this involves use of their own private resources.

Thus, a large number of beneficiaries were unaware that there is material that should be provided by the programme. In its absence, the *promotora* seeks solutions and addresses the problem through alternative means. In some communities, part of the session even focuses on beneficiaries creating their own materials.

The community values the *promotora* for her closeness and familiarity with both mothers and children. For beneficiaries, the programme rests upon the figure of the *promotora*. It is appropriate to note that some supervisors mentioned that the rules of the programme, which require the *promotora* to be a member of the community in which they perform their functions, were a constraint that sometimes had a direct effect on programme outcomes. It was not always possible for the person in the community with the most skills and abilities in these matters to have the time to act as *promotora*. This forced them to select community members who were available regardless of their merits. Further exploration of this situation is recommended.

From the perspective of the beneficiaries, it was not possible to come to an agreement on the role of programme supervisors. While to some communities, the figure of supervisor was almost as familiar as the *promotora*, in other cases the supervisor was seen only once, and thus their relationship to the programme was unknown.

Although the distances and access to communities represent a significant constraint for frequent visits by educational figures, the fact that the existence of the supervisor was not known in some focus groups is significant.

[24] Most of these educational figures are women, but to make the reading of this document more agile, we will refer to both genders.

Therefore, it was observed that the supervisors' level of influence, involvement and effectiveness in the communities were largely a result of their willingness to accomplish their task.

Participation barriers

Beneficiaries described potential barriers to the programme participation process that could limit their participation and the introduction of new mothers or caregivers into it. Participants in all the sessions agreed that time availability sometimes complicated their attendance and participation. This restriction was mainly influenced by household chores and caring for the family. For example, parent–teacher meetings (if their other children already attended school), food preparation, house cleaning, or the health of a family member could reduce the chances that the beneficiary would attend sessions regularly and punctually.

Participants also reported that another factor limiting the integration or constant participation of beneficiaries in the PEI was the responsibility they had to support all their children. The higher the number of children in the family, the less time they had for sessions. One of the characteristics of the communities where the programme is implemented is that women usually have more than two children. Thus, when only one or some of the children are participating in the programme, mothers face the problem of who will care for their other children who do not attend the sessions. In some cases, they choose to bring all their children, and this becomes a distraction during the session.

Occasionally, programme attendance coincides with meetings of other social programmes (such as PROSPERA and *Seguro Popular*) where attendance is mandatory in order to continue receiving benefits (cash and support).

Although the beneficiaries considered the availability of time as a determinant of participation in the PEI, they agreed that participation is more a question of willingness. That type of will is cultivated by the information beneficiaries receive. Five of the seven groups reported that they did not know exactly what the objectives were. Not knowing prevents clarity about the benefits they can gain from joining and staying in the programme.

However, the limiting factor mentioned most often by beneficiaries was the lack of materials or their late delivery. This lack of resources reduces the mothers' participation in activities. The absence of books, teaching resources and work materials meant that, on several occasions, each participant was required to obtain their own tools or materials. This connects the conditions of attendance to the family's economic situation. Sometimes an additional constraint was the lack of suitable space (building and furnishings) in which to carry out the tasks.

Suggested improvements

During the focus groups, it was possible to perceive a positive assessment by the PEI beneficiaries. The programme has been of great help to all participants, even when compared with other social programmes that provide material or financial resources.

Fondness towards the PEI was clear. However, many of the beneficiaries were participating, without having enough information about the benefits they and their children could receive, because acquaintances had recommended it.

Among the proposals mentioned by mothers and caregivers to increase the benefits of the programme was the participation of a child development specialist, such as a paediatrician or psychologist. Although the *promotoras* have a very positive reputation within their communities, specifically in the undertaking of sessions, the recipients were clearly aware of the benefits that specialised services and consulting would offer.

Beneficiaries did not seem to be able to make any specific recommendations regarding implementation of the programme. For them, it all seemed to work as expected. This argument makes sense when remembering that the answers were unclear and imprecise when we talked about the objectives and operation of the programme.

However, participants in all the focus groups suggested actions to improve the implementation of PEI sessions and the activities performed. These included:

- improve facilities to organise physical activities with the children
- increase awareness of the programme and the objectives and activities to be undertaken in each session
- promote the integration of new mothers and encourage them to attend and participate regularly
- promote activities that strengthen emotional expressions between mothers and their children within the sessions
- increase the number of sessions per week or their duration
- promote sessions for children over the age of five, as the beneficiaries expressed the need for a place to attend with children of that age
- provide more crafts that stimulate creativity (handcrafts)
- deliver the materials to the *promotora* in a timely manner
- have sufficient materials available (educational materials, books, stories, colours, toys and stationery goods, among others) to work with during the sessions.

These suggestions relate to the individual experience that each beneficiary has had in the sessions, how they perceive them and the interests they have developed from their participation. The suggestions expressed what they felt should be happening in the sessions and why, without a reference point.

The positive perception of the programme is evident among the beneficiaries. However, it is also possible to identify a set of elements (some indirect) from the focus groups that limit the proper implementation of the early childhood education programme. One of the factors in the programme's fragility is the lack of clarity in the transmission of its objectives. The beneficiaries appeared to have incomplete information and were unsure of what could be achieved by early childhood education. This could be affecting both the implementation and operation of the programme, such as adding participants, including fathers.

The lack of knowledge among users regarding the institutional and operational aspects of the programme represents an undesirable condition for any educational and social programme. If the recipient does not know what to expect, communication channels and mechanisms for improved implementation are severely limited. This is especially so where mothers and caregivers are the first links and key factors in the early childhood education transformation process and are the leading figures in promoting the programme.

The complete, or perceived, absence of curricular planning can prevent activities in the regular sessions of the programme from being linked to early childhood learning goals and the development of children. This in turn renders the programme meaningless for current and potential beneficiaries.

The lack of available and properly equipped spaces[25] for programme activities and the inadequate and untimely delivery of materials are issues that can be argued from two sides. These shortages have been discouraging for some as they have meant that activities could not be conducted as planned (one cannot work without resources). For others, the shortage has produced an opposite reaction. The effort to search for materials has generated feelings of goodwill, achievement, community cooperation (among beneficiaries), and has improved the bond between mothers and children. It has also provided a meaning to what they are doing: for the sake of the child.

This dual perception of the recipients of the conditions they face in the programme is due in part to the lack of knowledge of the purpose, objectives and players of the early childhood education programme. Whether these are known or not, the socio-economic characteristics and the particular needs of each participant leads to an environment of uneven implementation. Even if the programme is well promoted and the delivery of materials is adequate, financial, cultural and family conditions do not allow participants to gain the maximum amount of knowledge and, to a lesser degree, to see the relevance of activities to their daily lives.

The figure of the *promotora* is one of the strengths of the programme in the creation of the sense of community and a social space for the beneficiaries. In all groups, maintaining cohesive and consistent participation has been achieved through the initiative and commitment of the *promotora*.

Additionally, one of the most significant changes for the beneficiaries and their children is the creation of a living space. Although not a formal objective of the programme, an indirect positive impact on women has been observed. Beneficiaries reported changes in the way they perceive themselves and how they interact in the community. They also see different ways of teaching tolerance and respect to their children. Their knowledge of how to look after their children in a healthy manner is improved, as is their desire for the best cognitive, physical, social and emotional development for their children.

These changes impact parenting practices so substantially that the beneficiaries seek to implement what they have learned in the sessions in their daily lives. They share what they have learned with the rest of their family as much as possible, especially with the father figure. The father seems to want to become more involved in this process, despite being absent because of the characteristics of the communities, financial needs and marked social roles.
Therefore, some recommendations that could improve the operation and effects of the programme are listed below:

- Secure mechanisms, relevant and formal, for the transmission of information to the beneficiaries and the community at large should be put in place. Before and during participation in the programme, it is important that all those directly

[25] The spaces are borrowed (from schools, health centres, municipal buildings, parks, soccer fields, etc.) and, therefore, subject to availability according to the needs of the primary occupants.

involved have a common base of knowledge of the programme. This will help consolidate the meaning of why and how to participate in such an initiative;

- Promote awareness of the programme, the aims pursued and the benefits offered to the different target populations with specific emphasis on the incorporation of father figures;
- Keep a record of who takes part in the programme to facilitate monitoring their progress. Apart from being a useful tool to assess the effects of the programme, monitoring is a service to programme beneficiaries themselves;
- Ensure the supply of materials (of all types, but special attention must be placed on bibliographic materials) is timely and of an appropriate quantity so that all adult participants and their children can make effective use of the regular sessions;
- Condition the spaces where the meetings are held. This will strengthen the sense of belonging;
- Clearly inform the beneficiaries of the work plan of each session and the objectives of each activity. This will allow for a direct association between supplies and results;
- Include information on family planning. This has been a factor that directly impacts child rearing and the involvement of the beneficiaries in CONAFE communities;
- Create alternative ways of including fathers in the programme (not necessarily face-to-face activities). Establish the gradual participation of fathers through in-home activities as an objective;
- Strengthen the training processes for *promotoras*;
- Revise the rules established for *promotora* selection, considering ability, merit and availability. This will provide opportunities for members of nearby communities to take on this role;
- Promote supportive conditions for the educational structure (supervisors) to provide support to *promotoras* and communities. Develop mechanisms to ensure the role of the supervisor is uniformly effective among communities; and
- Consider the participation of health and child development specialists in some sessions (for parents and children).

4. Policy implications and next steps

Implementation of the PEI for almost two decades without an impact evaluation has resulted in the institutionalisation of practices and criteria without adequate evidence to support them. Based on the information collected (qualitative and quantitative), the interpretation of findings and interactions with public officials, we identified the following implications as key aspects to be considered in a potential redesign of the programme.

4.1 Implication 1: Targeting

Based on the information collected and the analysis conducted during our evaluation, it seems that the PEI must revise the criteria used to select communities in which this programme can be implemented. Furthermore, it seems that there is a problem of self-selection that may result in deeper inequalities in these communities because organised communities are usually selected to be part of the PEI. As has been mentioned, explicit

and public formulas or calculations to identify potential communities may result in a more effective implementation of this programme. In addition, by defining targeting criteria, overlap with other programmes could possibly be reduced.

4.2 Implication 2: Local capacities

Just as in any other programme implemented in Mexico through collaboration with state or local units, there is a huge variation across local groups regarding expertise, experience, commitment and formal training. This factor may indeed explain variations regarding implementation fidelity and quality of services. Thus, it is urgent to intervene and implement professional development programmes for local staff from CONAFE. The objective of this intervention would be to foster coordination and increase the capacity to support rural communities included in the PEI.

4.3 Implication 3: Implementation

As has been mentioned, one of the key aspects to be addressed in future evaluations is the provision of further information addressing how to improve the implementation of the PEI. Based on the information collected, it seems that CONAFE has not put enough resources into improving the implementation of the PEI, resulting in inefficiencies.

Furthermore, it came to our attention that organisational structures across CONAFE's state offices throughout the country vary, making it even more difficult to ensure appropriate implementation of the PEI. An analysis is needed to identify how to improve collaboration within CONAFE and with state governments across the country.

4.4 Implication 4: Incentives and coordination with other programmes

An important point mentioned during the focus groups and observation visits in the PEI communities was the difficulty in organising PEI sessions in communities where CCT programmes are implemented. This suggests that it might be necessary to encourage further collaboration and coordination with other federal agencies to ensure an efficient distribution of public resources and the inclusion of more beneficiaries.

4.5 Implication 5: Local cultures

Even though the participatory component of the PEI may result in an intervention reflecting local cultures and conditions, we observed how some traditions in rural communities may affect the implementation of the programme. For instance, we observed how parents may reject *promotoras* who have studied outside of their communities.

This is only one example of several possible reactions to the programme that will require either adaptations of curriculum or modifications of the suggested procedures to organise weekly meetings.

4.6 Implication 6: Type of skills and the magnitude of effects

Data from the impact evaluation suggest that the programme has achieved some moderate results regardless of the low take-up and the problems observed during the implementation of the PEI. However, the group of skills in which we observed significant

differences could be considered to be of low complexity. This would suggest that it might be necessary to carefully analyse whether achieving different effects and magnitudes should become a short-term goal.

In addition, results may suggest that it is necessary to analyse carefully the theory of change of the PEI to understand whether it must be redesigned or reoriented.

4.7 Implication 7: Construction of an education management information system

Based on the quality of information available at CONAFE, it might be necessary to evaluate whether the construction of an information system is required. This intervention will help not only to design and conduct impact evaluations in the near future, but also reorganise databases and administrative information that is currently ignored during the policy design and implementation processes.

Appendix: Tables

Table A1: Balance between treated and controls in the baseline

Households	
Number of members	0.7178***
Under 60 months	0.0336***
Pregnant women	0.0049
Members that speak Spanish	0.0002
Members that can read and write	0.0001
Housing conditions	
Cement roof	1.1113
Dirt floor	0.0452*
Walls	0.1026
Total rooms	0.0431
Total bedrooms	0.1551***
Days with electrical power	0.0094
Drainage	0.2052**
Goods	
Gas stove	0.0345
Wood stove	0.0556*
Water tank	0.0148
Boiler	0.017
Cistern	0.017
Shower	0.0355
Power meter	0.0434*
Automobile	0.0332
Internet	0.0085
Computer	0.017
Telephone	0.0138
Cellular phone	0.0167
Washer	0.0061
Refrigerator	0.0007
Television	0.009
Radio	0.0069

Caregivers	
Age of the child	0.0233
Time living in the community	0.9353
Mentioned a second caregiver	0.0304
PROSPERA recipient	0.0763***
Seguro Popular recipient	0.0121
Procampo recipient	0.0095
Scholarship recipient	0.012
Senior citizen recipient	0.0063
Economic support from someone in the country	0.0033
Economic support from someone outside the country	0.0016
Was treated in a government clinic	0.0304
0 to 36 months	
Children's books	0.061
Stories	0.4009***
Plush toys	0.0252
Pull toys	0.0803
Parents live together	0.0066
Frequency with which the child eats with father	0.0849

Frequency of speaking with the child	0.0936
Closeness of the child with father	0.0241
Closeness of the child with mother	0.0176
Corporal punishment	0.0808
36 to 42 months	
Children's books	0.0944
Stories	0.6328***
Magazines	0.0773
Device for listening to music	0.0255
Helps child learn numbers	0.0091
Helps child learn letters	0.017
Helps child learn colours	0.0432
Helps child learn shapes and sizes	0.0584
Child chooses what to eat	0.3534**
Visits museums and historical sites	0.3011**
Parents live together	0.1105**
Frequency with which the child eats with father	0.1921
Frequency of speaking with the child	0.0277
Closeness of the child with father	0.0501
Closeness of the child with mother	0.1456**
Corporal punishment	0.0171
Child rearing practices	
Medical check-ups	0.0122
Plays with the child	0.015
Sings with the child	0.0277
Musical instrument	0.0058
Child illness	0.0419
Educational achievement expectations	0.0665
Pre-school registration	0.0065
Age at pre-school registration	0.0122

Pregnant women	
Economic support	
PROSPERA recipient	0.019
Seguro Popular recipient	
Procampo recipient	
Scholarship recipient	
Support from persons living in another country	
Months since delivery	
Care during pregnancy	
Medical check-ups	0.16
Non-prescribed medicine	0.037
Drinks alcoholic beverages	0.051
Drinks coffee	0.087
Drinks soft drinks	0.269
Someone smokes inside the dwelling	0.021
Change of diet	0.115
Care after pregnancy	
Breastfeeding	0.004

Months of lactation	0.974
Babies are aware of what is going on around them	N/A
Pre-school registration	1.022
Expectation of achieving more than a basic education	0.174
Fathers	
Time living in the community	1.366
Medical check-ups	0.015
Plays with the child	0
Sings with the child	0.026
Helps in preparing the child's meals	0.119
Helps to feed the child	0.169***
Helps to dress the child	0.096
Carries the child	0.024
Closeness to the child	0.376***
Educational achievement expectations	0.156
Pre-school registration	0
Social behaviour	
Smokes	0.067
Smokes in the home	0.286
Decides spending without asking	0.020
Has financial problems	0.151
Speaks with family to solve problems	0.061
Speaks with family when sad	0.033
Speaks with family when angry	0.083
Drinks alcoholic beverages	0.002
Argues with spouse	0.036
Speaks about children with other parents	0.223

Table A2: Impact on observed parenting practices on children aged 0–3 years

Variable	Wave	P-values	Q-values
Together with child	T1	0.114	0.143
	T2	0.176	0.176
Spoke to child	T1	0.335	0.419
	T2	0.879	0.879
Responded to child	T1	0.021	0.053
	T2	0.586	0.586
Hugged/kissed child	T1	0.284	0.355
	T2	0.089	0.149
Spankings	T1	0.318	0.428
	T2	0.342	0.428
Interfered with child's actions	T1	0.472	0.590
	T2	0.793	0.793
Gave games	T1	0.538	0.538
	T2	0.154	0.192
Kept child in sight	T1	0.264	0.330
	T2	0.575	0.575
Safe place to play	T1	0.254	0.418
	T2	0.745	0.745

Table A3: Impact on observed parenting practices on children aged 3–6 years

Outcome	Wave	P-value	Q-value
Together with child	T1	0.275	0.459
	T2	0.034	0.084
Spoke to child	T1	0.741	0.741
	T2	0.184	0.460
Responded to child	T1	0.531	0.681
	T2	0.330	0.681
Hugged/kissed child	T1	0.753	0.970
	T2	0.970	0.970
Introduced children	T1	0.637	0.756
	T2	0.756	0.756
Restricted child's actions	T1	0.078	0.142
	T2	0.203	0.254
Spanking	T1	0.807	0.807
	T2	0.803	0.807
Positive attitude	T1	0.300	0.300
	T2	0.073	0.091
Safe play place	T1	0.910	0.910
	T2	0.623	0.910
Dark house	T1	0.178	0.242
	T2	0.193	0.242
Clean rooms	T1	0.424	0.530
	T2	0.793	0.793
House not packed	T1	0.195	0.243
	T2	0.752	0.752

Table A4: Impact on observed parenting practices on children aged 0–6 years

Outcome	Wave	P-value	Q-value
Together with child	T1	0.212	0.265
	T2	0.757	0.757
Spoke to child	T1	0.295	0.492
	T2	0.579	0.579
Responded to child	T1	0.042	0.106
	T2	0.576	0.576
Hugged/kissed child	T1	0.695	0.695
	T2	0.508	0.635
Spankings	T1	0.245	0.409
	T2	0.896	0.896
Interfered with child's actions	T1	0.267	0.334
	T2	0.737	0.737
Safe play place	T1	0.325	0.542
	T2	0.715	0.715

Table A5: Impact on reported parenting practices on children aged 3–6 years

Outcome	Wave	P-value	Q-value
Told stories at least once a week	T1	0.609	0.609
	T2	0.303	0.379
The child had more than one book	T1	0.965	0.965
	T2	0.083	0.104
There was a magazine at home	T1	0.740	0.911
	T2	0.911	0.911
The child has an instrument to listen to music	T1	0.099	0.166
	T2	0.238	0.238
The child could listen to tapes	T1	0.133	0.166
	T2	0.246	0.246
Helped learn numbers	T1	0.172	0.215
	T2	0.257	0.257
Helped learn letters	T1	0.301	0.301
	T2	0.210	0.263
Helped learn colours	T1	0.599	0.599
	T2	0.279	0.348
Helped learn shapes and dimensions	T1	0.967	0.967
	T2	0.483	0.604
Allowed the child to choose food	T1	0.691	0.864
	T2	0.317	0.792
Took the child out several times a week	T1	0.375	0.469
	T2	0.275	0.459
Took the child to a historic place or museum last year	T1	0.543	0.931
	T2	0.690	0.931
How much TV was watched at home on weekdays? (hours)	T1	0.674	0.843
	T2	0.906	0.906
How much TV was watched somewhere else on weekdays? (hours)	T1	0.569	0.896
	T2	0.807	0.896
How much TV was watched at home on weekends? (hours)	T1	0.494	0.818
	T2	0.615	0.818
How much TV was watched somewhere else on weekend? (hours)	T1	0.582	0.582
	T2	0.387	0.582
How long is the TV on? (hours)	T1	0.701	0.843
	T2	0.843	0.843
Parents lived together	T1	0.378	0.378
	T2	0.095	0.187
The child saw the father every day	T1	0.940	0.940
	T2	0.909	0.940
The child ate with the parents more than once a day	T1	0.336	0.560
	T2	0.741	0.741
The child was very attached to the father	T1	0.135	0.168
	T2	0.751	0.751
Responded to children when they required attention even if busy	T1	0.176	0.441
	T2	0.507	0.845
The child was very attached to the mother	T1	0.594	0.742
	T2	0.909	0.909
How many spankings were given in the past week?	T1	0.099	0.247
	T2	0.795	0.795

Table A6: Impact on child development

Skills	Wave	P-value	Q-value
Communication	T1	**0.095**	**0.239**
	T2	0.299	0.373
Gross motor	T1	**0.085**	**0.141**
	T2	0.333	0.417
Fine motor	T1	0.384	0.842
	T2	0.508	0.842
Problem solving	T1	0.896	0.896
	T2	0.362	0.830
Social	T1	0.676	0.981
	T2	0.981	0.981
Total	T1	0.195	0.487
	T2	0.952	0.952

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The study shows that the take-up of the programme by families was very low. It had a positive impact on parenting practices. Direct effects on childhood development were observed for younger children. However, the effects were more muted in the second year and among three- and four-year olds.

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