Improving Parental Investments in Children: Experimental Evidence from The Gambia[1]

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Abstract

We study two early childhood programs in The Gambia for children between 0 and 3 years of age. The basic version of the program, called Baby Friendly Community Initiative (BFCI), provides parents with child health and nutrition information delivered through home visits and community meetings. A second version, called BFCI+, is center-based and adds cognitive stimulation to the basic version of the program through activities with children. Villages were randomly assigned to one of two versions of the program or to a control group that received neither. The BFCI+ program had moderate impacts on parental investments in children in terms of resources and time. Child language development improved for well-off parents or parents in the more well-off region. Poorer parents invested more in time spent with the children, whereas those who were more materially well-off spent more financial resources on the children. The basic version of the program, the BFCI, had no detectable impacts.

JEL Codes: I25, I38, O15, O22
Keywords: early childhood development; cognitive stimulation; teacher training; The Gambia; randomized controlled trials; Malawi Developmental Assessment Tool

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1. Introduction

Children's first years greatly influence their life trajectory (e.g., Nores and Barnett 2010; Currie and Almond 2011; Tanner, Candland, and Odden 2015). It is estimated that over 40% of children below the age of 5 in developing countries, and an even larger share in Africa, are at risk of not achieving their developmental potential (Black et al. 2017). During this period, most investments in children occur privately within the family, where the quality of parenting, attachment, and interactions could form nurturing environments (O. P. Attanasio 2015; Heckman and Mosso 2014; Araujo, Dormal, and Schady 2018). Early childhood development (ECD) programs can also influence these interactions (Engle et al. 2007; 2011; Vegas and Santibáñez 2009; Berlinski and Schady 2015). Some of the most remarkable success stories involve high-quality preschool or home-visiting programs implemented on a small scale (e.g., Schweinhart et al. 2005; Walker et al. 2006).

Nevertheless, several important questions about ECD interventions remain unanswered. First, can we replicate their success at a large scale,[2] presumably with less fidelity to the original ideas? Second, what is the relative importance of a nutrition and health intervention compared to cognitive stimulation? These issues are related since understanding the main mechanisms through which these programs operate will help identify what drives their success and the extent to which they can be implemented in large-scale programs.

For example, a large-scale home visiting program in Colombia produced significant developmental gains in young children (O. Attanasio et al. 2015). However, the main mechanism was an increase in parental investments in children. Similarly, large-scale group parenting sessions in Chile led to both changes in parenting practices and developmental gains for children (Carneiro et al., 2019). Although both studies were randomized controlled trials (RCTs), they occurred in upper-middle-income and high-income countries, respectively, where household resources and institutional capacity are relatively high. Experimental evidence on large-scale programs in low-income settings, where households and institutions face severe constraints, is currently lacking.

We help to fill this gap by studying a large-scale parenting and child cognitive stimulation program implemented in The Gambia, a low-income country in Africa, via RCT. We focus on

[2] By small scale, we mean programs implemented by private or non-profit providers or public providers but only in a pilot or local setting. By large scale, we mean programs implemented using the existing public infrastructure beyond a local setting. Small-scale programs are, therefore, not widely accessible nor representative of the implementation quality that would prevail under the public provision. Large-scale programs are widely available or otherwise approximate program conditions when scaled up.

the program's impact on children's motor skills, language development, and parental investments in time and resources. There are two versions of the program, one targeting child health and nutrition practices and another that adds a focus on child cognitive stimulation. Therefore, the RCT we study has two treatments (corresponding to the two versions of the program) and a control, with treatments randomly assigned at the village level. The Gambian government designed the programs and implemented the experiment in regions 2 and 6, geographic units roughly equivalent to provinces, with the intention of scaling the more effective version to the entire country. The regions were chosen to capture the socioeconomic disparities in the country, with region 2 being significantly more well-off than region 6. To adhere to the desire to scale up the program, the study also accommodated all eligible children (defined by the age bracket) in each village in the study sample.

The basic version of this program, the Baby Friendly Community Initiative (BFCI), educates parents on childhood health and nutrition through home visits and community meetings led by trained community members. The program is public and has operated in selected communities outside the study area since 1995, mostly in rural and poorer areas.

The enriched version of the BFCI, called BFCI+, included early cognitive stimulation to ensure the child's holistic development. Activities involving parenting education and direct child cognitive stimulation were scheduled three times per week in each settlement under a shed specially built for this purpose. BFCI+ also included information on child cognitive stimulation in-home visits as in the BFCI. Therefore, BFCI+ provided a richer message and a more intense schedule of activities than BFCI.

We find that the BFCI+, which addresses both health and cognitive stimulation, led to moderate increases in parental investments in children in time and goods. The increase in goods investments was driven by the richer region 2. The estimates of heterogeneity in time investments are imprecise but suggest increased time investments primarily in region 6, the poorer of the two regions in the study. These findings suggest that parental investments were limited to the domains in which parents were least constrained.

Regarding child outcomes, we find moderate impacts of the BFCI+ on children's language skills, but only in the richer region. These impacts, further confirmed when broken down by families' socio-economic status, could result from the additional parental investments, an increase in the productivity of those investments, or higher productivity of the direct stimulation activities provided by the program local to that region. There are no significant

program impacts on children's fine motor skills or language development, on average. The least intensive version of the program, the BFCI, focusing only on child health and nutrition, did not show substantial impacts on any dimension of parental knowledge, parental investments, or child development. Our null estimates on child development outcomes are often sufficiently precise to rule out meaningful effects.

Our study makes three main contributions to the literature. First, we contribute to the thin evidence on the impacts of large-scale early childhood programs in very poor settings. Experimental studies of large-scale programs for young children are largely limited to middle- and high-income countries (Gowani et al. 2014; O. Attanasio et al. 2015; 2018; Carneiro et al. 2019; Cardenas, Evans, and Holland forthcoming). By contrast, the setting we study is typical of many parts of Sub-Saharan Africa, where most of the world's poorest children reside. In these areas, children face very challenging environments; therefore, there are potentially high returns to supporting poor families and their investments in children (Heckman 2006; Heckman and Masterov 2007; Berlinski and Schady 2015; Holla et al. 2021).

However, very poor settings also present significant implementation constraints. Because of the severe scarcity of government resources and the need to serve a large number of families, the program we study must be implemented by residents of the communities (who receive some training), not by professional social or health workers. Many of these community workers may lack the education and preparation to apply the program's guidelines effectively. Because of competing activities, they may also be unable to devote the necessary time to the program to guarantee that all families and children are adequately served. Relying on community health workers or integrating parenting programs into services provided by local health clinics has shown promise in promoting children's cognitive development in other low-income settings (Hamadani et al. 2019; Mehrin et al. 2022; Luo et al. 2019) and aligns with international recommendations to enhance the nurturing environment for poor children at scale (Britto et al. 2017). Yet results are sometimes mixed (Rockers et al. 2016); even in these cases, the paraprofessionals delivering the intervention have some prior experience. This study, therefore, provides important evidence on program impacts when the public sector faces a large trade-off between program scale and implementation quality (Davis et al. 2017; Martinez, Naudeau, and Pereira 2017; Muralidharan and Niehaus 2017; List 2022).

Second, we present evidence about a relatively unique approach to promoting parental investment in children. Among the options to support poor families' investments in children,

the traditional emphasis has been on financial resources. We now recognize that this approach is largely insufficient. Poor parents do suffer from a lack of resources. Still, even when these are made available, their use greatly depends on parental preferences (and attitudes) towards alternative uses of resources (both time and money), information on the best use of resources, and expectations of returns to investments in children (Cunha, Elo, and Culhane 2013; Fernal et al. 2017; Araujo et al. 2018). The program we study in this paper has the potential to affect all these factors.

Programs to promote investment in children via parental education have relied on two main modes of delivery. The first is home visits, building on the successful Jamaica study (S. M. Grantham-McGregor et al. 1991; Walker et al. 2006; Gertler et al. 2014). Home visiting programs have spread and shown promise elsewhere (Hamadani et al. 2006; Nahar et al. 2012; Vazir et al. 2013; O. P. Attanasio et al. 2014; Betancourt et al. 2020; Murray et al. 2016; Rockers et al. 2016; Jensen et al. 2021; Andrew et al. 2020; Heckman et al. 2020). Similarly, Jervis et al. (2023) conducted a meta-analysis of 18 such studies and found positive effects on children's cognition and language skills. A review of interventions to improve learning across all stages of youth-rated parent-directed early stimulation programs is a global "best buy" based on their cost-effectiveness (Global Education Evidence Advisory Panel 2023). Despite these successes, home visiting programs are relatively high cost to scale.[3]

The second delivery mode is group parenting sessions, which are relatively low-cost but have shown mixed results (Aboud and Akhter 2011; Yousafzai et al. 2014; Singla, Kumbakumba, and Aboud 2015; Aboud and Yousafzai 2015; Hamadani et al. 2019; Mehrin et al. 2022; Cardenas, Evans, and Holland forthcoming). Studies comparing these two delivery modes directly have also found mixed results (Rosero and Oosterbeek 2011; Bernal et al. 2019; S. Grantham-McGregor et al. 2020; Luoto et al. 2021; Garcia, Saya, and Luoto 2021; Lopez Garcia et al. 2023), with one meta-analysis finding no significant differences in effect size based on delivery mode (Jeong et al. 2021). A second meta-analysis found that home visits delivered in combination with group sessions increased the effect on cognition relative to home visits alone (Zhang et al. 2021). This result suggests the BFCI+ approach we test in this study might be particularly promising for Gambian children.

The basic version of the program we study (BFCI) uses home visits, while the augmented version (BFCI+) includes both home visits and group sessions. In our case, BFCI+

[3] Though see Araujo et al. (2021) for an example of a successfully scaled home visiting program in Peru.

was relatively high cost. The sheds where the early stimulation activities took place had to be constructed in every village participating in BFCI+, requiring a significant capital investment relative to local wealth. In addition, group sessions were frequent and, when combined with home visits, required substantial time investments by parents and program workers. A systematic review found that parenting support interventions are most effective when 1) focused on disadvantaged populations, 2) implemented using systematic curricula and provider training, and 3) actively promote positive parent-child interactions (Engle et al. 2011). BFCI+ includes each of these elements. Our findings of only moderate and localized program impacts are somewhat disappointing and important to report.

Finally, we contribute to the literature on "integrated" child development programs, i.e., those that combine a health and nutrition program with a child development intervention, as in BFCI+. A systematic review of this literature found that the nutrition and stimulation components usually benefitted these domains separately but found little evidence of "synergistic interaction," or complementarity, of integrated programs in combination (S. M. Grantham-McGregor et al. 2014).[4] A more recent RCT in Guatemala also failed to demonstrate the complementary effects of nutrition and stimulation (Kowalski et al. 2023). The integrated programs we study differ in that the nutrition component is purely educational, without food or other direct supplementation. Despite the increasing prevalence of such programs, well-identified studies of their effects are relatively few (Zhang et al. 2021). Our finding of benefits to language skills in BFCI+ but not BFCI, although limited in scope, is therefore important.

The rest of the paper proceeds as follows. In section 2, we describe the context and the programs we evaluate. Section 3 presents the research design, including the data, documenting the basic characteristics of our study's population, and shows a balance in the characteristics of the villages allocated to each of the three experimental arms of this study. Section 4 then presents and discusses our main findings and offers some concluding remarks in section 5.

2. Context and program description

2.1. Context

The Gambia is a coastal West African country, the smallest by land size on the African mainland. It was one of the 20 poorest countries in the world by GDP per capita (PPP) in 2012

[4] Observational studies have documented strong negative associations between malnutrition, food insecurity, and cognitive development (Shankar, Chung, and Frank 2017; Suryawan et al. 2022). While food supplementation programs lead to robust gains in children's physical development, evidence of improvements on cognitive development is mixed (Kristjansson et al. 2015).

and 2013, the years of the study (World Bank 2022). The population was estimated at 2.6 million in 2021, and the human development index is low, ranking 174th in the world and 38th among the 55 African countries (United Nations Development Programme 2022). The Gambia is administratively centralized, with the Ministry of Basic and Secondary (MoBSE) overseeing the K-12 education system. Its education system is divided into six administrative regions, each headed by a regional director reporting to the Ministry. Region 1 is the capital, Banjul, on the Atlantic coast, with regions 2-6 located in increasingly remote areas toward the East. Regions generally are more rural and poorer as one goes further from the capital. As in most African countries, region 1 (the capital) is more developed and houses the government, the parliament, and most national institutions. Each region is administratively subdivided into districts. Districts are composed of villages, also often called settlements, which are our administrative units of interest in the sampling. Dwellers of settlements are referred to as community members. In this paper, we use the terms village, settlement, and community interchangeably.

Other than informal home care, ECD services exist in three forms in The Gambia: 1) private centers, located mostly in relatively urban areas and serving richer children; 2) public centers, which are built as annexes to primary schools; and 3) community-based centers, which are publicly run, stand-alone facilities located in communities without primary schools, or whose primary school lacks an annex. These ECD facilities cater to children in preschool ages, leaving out children between 0 and 3 years old, a gap the government is committed to filling.

ECD access has significantly expanded in recent years, which is in line with the government's goal of integrating ECD programs into the standard primary school sequence. Gross enrolment in ECD programs grew from 22% in 2007 to 37% in 2013, the year this study concluded (Zoyem 2010; Gambia Ministry of Basic and Secondary Education 2017).

Promoting ECD access also aims to improve learning outcomes in early grades. Schooling is compulsory in The Gambia from ages 7-12 but rarely enforced for many reasons, including the lack of effective enforcement mechanisms and cultural reasons in parts of the country where parents prefer religious education. Nevertheless, primary enrollment has risen over the last two decades, with net primary enrollment reaching 77% in 2018. Learning outcomes, however, have remained poor.

The Gambian government decided to mainstream all children below school age (0-6) into primary education. The first program concerns children aged 3-6 and consists of preschool programs (Blimpo et al., 2022). The second program concerns children aged 0-3, the object

of this study and a pioneering effort to integrate this age group into the formal education system.

2.2. BFCI, BFCI+, and implementation

The Baby Friendly Community Initiative (BFCI) is a comprehensive health and nutrition program that has been running on a small scale in The Gambia since 1995. This study is part of the government's efforts to evaluate, strengthen, and expand BFCI to areas not previously covered. It was implemented by the National Nutrition Agency (NaNA), led by the country's vice president's office. The program operates in selected communities throughout the country, focusing on rural areas. BFCI provides parenting education to mothers, fathers, and other caregivers. It has four components: Maternal Nutrition, Infant and Young Child Nutrition, Personal/Environmental Hygiene, and Growth Monitoring. NaNA trains trainers who are mainly health workers and other extension workers. They, in turn, train community representatives (recruited in the communities served by the program) as Village Support Groups (VSG). A VSG consists of five women and three men, including a community health worker and traditional birth attendant, whose role is to educate parents on the different messages of BFCI. The activities of the VSGs during the implementation of the BFCI components are flexible, and there is no specific number of households permanently assigned to any member of the VSG. In addition, the VSGs also hold regular group meetings within their communities, with frequency ranging from monthly to twice per year.

The BFCI+ is an initiative of the Ministry of Basic and Secondary Education (MoBSE), in collaboration with other stakeholders, to ensure children's readiness for preschool by their third birthday. BFCI+ includes all the components of the BFCI home visits and adds three elements focused on cognitive stimulation. First, BFCI+ provides structured activities for young children under a purpose-built shed in the community, with a curriculum focused on physical and cognitive development.[5] Sessions occur nine months per year, three times per week, for three hours per day, facilitated by a member of the VSG. All children three years or younger in the communities are eligible to attend. The children always attend these sessions with at least one parent or caregiver, giving parents hands-on exposure to stimulating activities for their children. Each facilitator received at least two weeks of training on the syllabus, spread over three sessions during the year. In addition to the VSG, a committee of five community members managed the activities at the BFCI+ sheds.

[5] Appendix 3 gives an overview of the curriculum followed in the BFCI+.

Second, BFCI+ included information on child stimulation in-home visits that were not included in BFCI. This information focused on positive interactions between parents and children, gender equity in the parental treatment of children, the inclusion of children with disabilities, and the child's transition to center-based care. Third, BFCI+ also conducted group meetings more frequently than BFCI.

In other words, BFCI+ provided multiple opportunities for improved child outcomes relative to BFCI. Children in BFCI+ could benefit directly from exposure to the more intensive version of the program or indirectly through additional investments their parents might make in response.

Several challenges affected the quality of BFCI+ program delivery, particularly the staffing. Although the program initially intended to rely on community volunteers who met a minimum schooling requirement to staff the program, several exceptions had to be made. To recruit facilitators who had completed at least 10 years of schooling, the program offered a monthly stipend of about USD40, roughly equal to Gambian per capita income. Most facilitators were in their late twenties or early thirties, married, and had other primary occupations to provide for their families. In addition, many of them were not paid their stipends for several months after the start of the program because of administrative delays. The first time all the facilitators were paid was six months after the start of the program, including retroactive payments. After this, they were paid monthly. Other less pronounced implementation challenges include delays in making materials such as printouts available or facilitators' temporary absences. While some of these challenges impeded the uniformity of the implementation, they were not severe enough to question the overall program implementation. Appendix 4 reports a more detailed description of the implementation, showing the comprehensiveness of the implementation efforts.

The implementing partner agencies were NaNA, Child Fund (an international NGO), and the government's ECD unit, which is housed in the Ministry of Basic and Secondary Education and responsible for the overall coordination and monitoring. The facilitators' training proceeded in a cascade. First, there was comprehensive training of trainers in the capital city coordinated by the implementing agencies and international child development consultants. A screening evaluation was implemented at the end to select those who qualified. Then, the selected trainers led the training at the district and settlement levels. The fieldworkers' training was also comprehensive, including field pilots, revisions of the survey instrument, and a test at

the end of the training to select only qualified enumerators. The training was delivered in English, with extensive practice in administering it in the main local languages (Mandinka, Wolof, and Fula), given that a large share of children and parents do not speak English.

2.3. Theory of change

In thinking about the mechanism through which these programs may affect child outcomes, we start from the idea that parental decisions about investments in children are driven by their preferences, information about the production function of skill, expectations of returns to their investments, human and financial endowments, and prices (of goods and time). Our main hypothesis is that parenting-type programs such as BFCI and BFCI+ primarily affect parents' information about best parenting practices, their expectations of returns to different investments, and perhaps their preferences (which could also be attitudes). Therefore, in addition to direct measurement of child outcomes, key outcomes of interest include parental attitudes towards investments in children, information about parenting practices, and home environments. Additionally, the connection between information and preferences and action may be constrained by material resources available to the household (in terms of time and goods). Therefore, the two main transmission channels run through parents' overall socioeconomic status.

3. Research Design

3.1. Sampling and randomization

The target population for these two programs is children below three years of age in two regions of The Gambia (Regions 2 and 6). These two regions have distinct socioeconomic characteristics. Aside from the capital city of Banjul, region 2 is the most affluent in the country. Its residents are relatively educated, and there are several urban communities. Region 6 is at the opposite end of the spectrum.

The study sample included 150 communities not previously exposed to BFCI from these two regions. Each of the two programs (BFCI and BFCI+) was randomly assigned to a set of 50 communities or settlements, totalling 100 treatment communities. The remaining 50 communities served as a control group. The communities' sampling and the randomization procedure were stratified by region.

The program was at scale within communities, as all children in the community within the required age group were eligible (there were no income or wealth requirements). Because we did not possess a household sampling frame, some sampling operations were implemented

during the baseline data collection. At the village level, the selection of participant households was based on the list of households provided by the village chief. The lists were also used to help the survey enumerators identify all eligible households before randomly selecting 15 households per village to become part of the study sample. In small settlements with fewer than 15 eligible households, all children within the age group were included. Survey enumerators increased the sample in larger communities to compensate. For example, all households were included in communities where the eligible members marginally exceeded the set number. The overall expected sample at baseline was 1,600, and the actual sample was 1,615. Additionally, to simplify training for the child development assessments and remain within budget, we restricted the child development assessment to households with children between 12 and 23 months, reducing the sample of children with development measures. The expected number of observations with child development measures was 1,200, and the actual was 1,067. Community members participated enthusiastically in the study, and there were no reports of refusal to participate in the program or the survey.

3.2. Data

We collected two rounds of surveys, first at baseline (June 2012) and an endline 17 months later. Program delivery began in August 2012. There are three components to the survey. First, there are child assessments. Given the nature of the intervention, we put special emphasis on measuring behaviour and language development. We used the Malawi Developmental Assessment Tool (MDAT), an assessment developed for children in rural African settings (Gladstone et al. 2010).[6] It has two components: fine motor skills and language development. We grouped children in two cohorts, each defined by a 6-month interval (12-17 and 18-23), to administer developmentally appropriate versions of the MDAT to each. In addition, we collected anthropometric information on the children.

Second, there is a detailed caregiver survey, which includes basic household demographics, labour supply, income, and expenditure/consumption. The survey pays particular attention to investments in children in terms of parental time and material resources. The survey also included measures of the home environment, such as family background variables including parental education, employment, income, marital status, family size, and the like; quality of the home, such as availability of water, electricity, etc. We also ask about the number of books, toys, TV, radio, musical instruments, computers, etc. Finally, there was a module focused on

[6] See Appendix 2 for a brief overview of the MDAT.

caregiver knowledge about parenting practices and their importance for child development, attitudes towards child rearing, sources of support to parenting, and expectations for their children's future.

We consider several child and parent outcomes. These include z-scores for the child's performance in the MDAT (language and fine motor skills), z-scores for height and weight, an index of child health, indices of parental investments in time and goods, and indices of parental knowledge, attitudes, and practices (KAP) towards their children. All the variables used for the analysis are described in Table 7.

The economic status of a household is likely a key driver of investments in children. To assess this association, we first constructed an index of socio-economic status at baseline, capturing housing quality and ownership of durable assets (Table A1c in the Appendix). Then, we ran a simple regression of this index on the key outcome variables presented in this paper. We find that the presence of children's books in the household, expenditures on the children, MDAT language score, and the caregiver's knowledge and attitude on child development are all positively related to higher socioeconomic status, with coefficients significant at the 5% level. However, caregivers of higher socioeconomic status spend less time playing with the children. We found no statistically significant association between socio-economic status and child health, height, weight, or the MDAT fine motor skills score.[7]

3.3. Identification

The key identifying assumption of this study is that randomization eliminates potential biases between the households that received the program and those that did not. To assess this claim, we compare the two treatment groups and the control group according to baseline values of the outcome variables used in the analysis. The first three columns of Table 1 present the means and the standard deviations of nine such variables. Column 7 is the p-value of an F-test that jointly compares the three means. Colum 6 reports the mean value of the entire sample. Overall, the three groups were comparable at the baseline along these variables, except that children in the control group scored lower on the fine motor component of the MDAT. The last row of column 7 reports the omnibus test of the hypothesis that the variables jointly explain

[7] One possible explanation for this lack of correlation between socio-economic status and the anthropometric measures (e.g., height and weight) may be noise and measurement error. For example, it was challenging to measure the children's heights, and small differences or noise have large implications on child development at this age. However, because of the consistency of the measurement across groups, we are still able to compare across groups.

the assignment to the two treatment and the control groups. The p-value of the F-test is 0.29, failing to reject the null hypothesis.

Table 1 also shows baseline differences between the two regions covered in the study. Column 8 reports the test of the null hypothesis that the two regions are statistically the same with respect to the various variables. For example, children in region 2 scored 0.39 standard deviations higher on the language development component of the MDAT and 0.18 standard deviations in fine motor skills, which are all statistically significant at the conventional levels. Similarly, the caregivers' knowledge (KAP) score is ten percentage points higher than for region 2, with a higher socio-economic status index. As expected, the omnibus test rejects the null hypothesis that the two regions are identical. These differences underscore the broader socio-economic status differences between the study's two regions. The regions were chosen to capture the variations in the overall socioeconomic disparities across the country.

Of the 1,615 households surveyed at baseline, we successfully tracked 1,228 at the endline for an attrition rate of 24 percent. Attrition was 27 percent in the control group, 23 percent in BFCI, and 21 percent in BFCI+. The main reasons for attrition were not household non-response but coding errors preventing a match between baseline and endline surveys. To assess the extent to which the attrition may bias the results, we ran a probit regression of an attrition indicator on treatment dummies. Neither treatment variable has a statistically significant association with the attrition variable, as reported in Table A1a, column 1 in the appendix. We add additional key variables measured at the baseline (columns (2)-(4)). None of the variables included has a statistically significant association with the attrition variable. Furthermore, we reanalyzed the balance test, restricting the baseline sample to only those successfully tracked at the endline (Table A1b in the appendix). The results remain the same as those from the full sample in Table 1. This suggests that the attrition follows mostly a random pattern.

Where possible, households not successfully tracked at the endline were replaced with randomly selected participants from the same community. We use this larger sample in the analysis to maximize statistical power.

3.4. Empirical strategy

Because the program was randomly assigned, a simple comparison of mean values of parental and child outcomes across treatment arms should yield unbiased estimates of the average impacts of BFCI and BFCI+. However, the analysis must account for the treatment stratification to ensure that we use the random variation in treatment assignment. In addition,

the age and gender of each child are likely to be important predictors of child outcomes and parental behaviours. Therefore, we also include controls for child age (dummies for month-year of birth) and gender in all our models to increase the precision of estimates. Including or excluding these controls has little impact on results.

Therefore, we estimate the following models:

$$Y_{is} = \alpha + \beta BFCI_s + \gamma BFCI_s^{+} + X_{is}\delta + \varepsilon_{is} \quad (1)$$

Where Y_{is} is the outcome of interest for child/parent *i* in settlement *s*, $BFCI_s$ is an indicator variable taking value 1 if settlement *s* was randomly assigned BFCI, $BFCI_s^{+}$ is an indicator variable taking value 1 if settlement *s* was randomly assigned BFCI+, X_{is} is a vector of controls including indicators for gender and age of the child, as well as region dummy variables to account for treatment stratification and regional differences, and ε_{is} is an error term. We estimate this equation by ordinary least squares and cluster the standard errors at the settlement level.

The parameters of interest are β and γ, which measure the intent to treat (ITT) effects of living in a settlement to which either BFCI or BFCI+ was assigned (respectively). Unfortunately, we do not observe precise attendance records of household *i* in the activities of the program, although (as mentioned above) report from the field by the government ECD unit is that participation rates among the eligible children and families were very high in all villages. The total number of eligible children ranged from 10 in smaller villages to over 100 in larger villages. Because of capacity limitations, in a small set of very large villages, the program could only accommodate some children, and slots were allocated randomly among the eligible children who signed up. Therefore, throughout the rest of the paper, what we refer to as the impact of BFCI and BFCI+ should be interpreted as the ITT.

We also consider models where we allow the ITT parameters to vary by region, a policy question of interest to the government. In effect, this interaction mirrors heterogeneity analysis along household socio-economic status as region 2 is much more well-off than region 6. For example, in Table 1, while socio-economic status is balanced among the study groups, it is higher and statistically significant in region 2 compared to region 6. Since our study only takes place in regions 2 and 6, let R_s^2 be an indicator variable taking value 1 if settlement *s* is in Region 2, and let R_s^6 be an indicator variable taking value 1 if the settlement is in region 6

($R_s^2 = 1 - R_s^6$). We then estimate the following models by ordinary least squares, clustering the standard errors at the settlement level:

$$Y_{is} = \alpha + \beta_2 BFCI_s * R_s^2 + \gamma_2 BFCI_s^+ * R_s^2 + \beta_6 BFCI_s * R_s^6 + \gamma_6 BFCI_s^+ * R_s^6 + X_{is}\delta + \varepsilon_{is} \quad (2)$$

In this case, the parameters of interest are β_2, γ_2, β_6, and γ_6, which measure the ITT impacts of BFCI and BFCI+ in regions 2 and 6, respectively.

4. Results

4.1. Intent to Treat Effects

4.1.1. Impact on parents' investment

We start by documenting the impacts of BFCI and BFCI+ on parental investments in children. Table 2 shows estimates of β and γ from equation (1), where the dependent variable measures either goods or time investments. Specifically, we measure program effects on the total number of books in the home (including schoolbooks but excluding picture books for children), the number of children's books in the house, the number of magazines and newspapers in the home, an index of toys and play materials, time spent on activities where the child was present (hours/day), and time spent playing with the child (hours/day). These variables are aggregated into indexes using factor analysis.

Columns (1) and (2) show no statistically significant impact of BFCI but a positive and statistically significant effect of the BFCI+ the time the caregiver spends with the child in general (column 1) and for play (column 2).[8] When we aggregate investments in time and material (column 5), the result remains statistically significant at the 10% level for the BFCI+. The total expenditure on children has also increased in the BFCI+ group, but it is statistically significant only at the 10 percent level.

The overall message of Table 2 is that BFCI+ led to moderate increases in parental investments in children, both in time and goods. In other words, large-scale parenting programs can change parental practices, even when delivered by community residents to their neighboring families in impoverished settings (for example, Engle et al., 2007, 2011, Attanasio et al., 2015, Bedregal et al., 2016). However, this is only true in the intensive program, which complemented home visits with frequent group sessions for parents and children. This structure

[8] Note that these self-reported investments in children may be prone to some reporting bias owing to the participation in the program. Because of these limitations, we put more weight on child development outcomes in our interpretation of the overall findings.

requires significant time investments by community workers and parents. Table A2a in the appendix unpacks the indexes and uses individual variables on the types of materials and engagement with the children. Having children's books in the household is statistically significant for the BFCI+.

Even with all this effort, the impacts of BFCI+ on measured parental investments in children are relatively small. This may have happened because the programs could have been more successful in convincing parents of the importance of investing in their children. However, it is also possible that the moderate response in parental investments is a consequence of parents having severe constraints in using their time and financial resources.[9] In this scenario, even if parents update their beliefs about the importance of investments in children, they are still trying to translate this belief change into practice.

It is impossible to rule out that the program substantially affects unobserved investments. However, this is unlikely given our very weak estimates of the program's impacts on children's development.

4.1.2. Child development

Table 3 documents the estimated impacts of BFCI and BFCI+ on children's fine motor and language development index (Columns 1, 2, and 8) as well as subcomponents of the MDAT measurements (columns 3-7).[10] We do not find any statistically significant average impact of BFCI or BFCI+ across any of these dimensions of child development.

The program may have small impacts that our study is not able to detect. For example, the point estimate for language and hearing skills is 0.10 standard deviations, but it is not statistically significant. This would be consistent with our findings of moderate effects on parental behaviours.

Moreover, our results also say that large direct impacts of the child stimulation sessions taking place under BFCI+ are unlikely unless a powerful unobserved input is moving exactly in the opposite direction. This offsetting input is theoretically possible if parents try to

[9] Tables A2b and A2c in the appendix assess the impact of the programs on the caregiver's knowledge and practices about childcare. None of the two interventions led to a statistically significant increase in this measure overall or in either region.

[10] The drop in the number of observations in Table 3 relative to Table 2 reflects that, as reported earlier, the MDAT test was restricted to a subsample of eligible children for more effective implementation. All tables with intermediate outcomes include the full sample (about 1,600). Those with the child outcomes report less than 1,000 children tested. The tables with any further drop in the observations reflect missing values of the variables included.

substitute away from their own inputs in response to the inputs provided by BFCI+ (e.g., Becker and Tomes, 1976). However, this is unlikely in light of the evidence in Table 2, which points to an increase, not a decrease, in parental inputs. Furthermore, at least in what concerns early childhood programs, the existing literature does not generally find strong substitution behaviours by parents (e.g., Attanasio et al., 2013, Attanasio et al., 2015, Gelber and Isem, 2013, Carneiro and Ginja, 2014).

We can also rule out large impacts of either version of the BFCI on child outcomes, given that our estimates are relatively precise. We can rule out effects larger than 0.22 sd in fine motor skills and 0.21 sd in language for the BFCI. Even if we take the more intensive BFCI+, at the 5% significance level, we can rule out impacts larger than 0.26 sd in fine motor skills, but we cannot rule out effects as large as 0.36 sd in language (Table 3, columns 1 and 2) . In other words, even the high ends of our confidence intervals represent moderate to small effects. These average treatment effects may, however, mask heterogeneity. The socio-economic background of the parents or families, in terms of material well-being and education, could be the prime transmission channel. In the next section, we explore these channels of transmission, which are consistent with the theory of change.

4.2. Heterogeneity along socioeconomic background

4.2.1. Did the impact on parents' investment vary by regional disparity?

The average impacts of BFCI and BFCI+ discussed above may mask substantial regional heterogeneity, which is important to uncover. As described above, these programs were implemented in Region 2 and Region 6 of The Gambia. As reported earlier, young children in region 2 have substantially better levels of development than those in region 6, as assessed by our baseline surveys (namely, differences of 0.39 sd in MDAT language and 0.18 sd for fine motor skills). As mentioned in section 3.3, these differences reflect dramatic regional disparities in the types of families these children grow up in.

Therefore, it is reasonable to expect the BFCI and BFCI+ to have different impacts in these regions. This could happen for several reasons. The programs could have a larger impact on the most disadvantaged children, given that they are so far behind at such a young age. In addition, parents in region 6 are less educated and probably less well-informed about adequate health and stimulation practices than those in region 2. Therefore, they may benefit more from receiving basic information on these topics.

On the other hand, larger program benefits might occur in region 2 instead. Since the levels of education and literacy are so low in region 6, parents in that region may not be able to absorb the information provided by the BFCI programs, contrary to parents in region 2. In addition, it is easier to find qualified community workers for these programs in region 2 than in region 6 because the population is more educated. Therefore, we may expect the quality of program delivery to be better in region 2 than in region 6.

Table 4 shows the impacts of BFCI and BFCI+ on parental expenditures in children in each region. Columns 4 and 6 suggest that both programs led to increases in parental total expenditures in children in region 2 but not in region 6, with the effect size nearly double for the BFCI+ relative to the BFCI. Similarly, the investment in materials is statistically significant at the 10 percent level in region 2 for the BFCI+. These effects reflect the fact reported earlier that region 2 is socio-economically better off. The estimates on the time spent with the children and activities with the children are imprecise for this heterogeneity analysis. However, the aggregated index (column 5) is statistically significant at the 10 percent level for the BFCI+ in region 6, likely driven by the larger and imprecise point estimates on the time commitments with the children. Table A4a in the appendix breaks down the investment indices into specific variables, such as children's books or types of engagement with the child. This analysis reveals that the BFCI+ investments in regions 2 went through more investments in reading materials such as children's books (Columns 1-2) and engagement with children in activities such as drawing or having various shaped toys (Columns 8-9) – all of which is consistent with the hypothesis that more well-off parents are more likely to make these material investments.

In summary, it is plausible that the relative wealth in region 2 allowed parents to respond more to the interventions by investing in books and other play materials, while in the poorer Region 6, parents likely invested in terms of time commitment to the child. We explore the potential implications for child outcomes along the same lines in the next section.

4.2.2. Did the impact on child outcome vary by socio-economic status?

We have previously reported that the modest increases in parental investment did not translate into commensurate child outcomes in fine motor, language, and hearing in the full sample. However, the previous section suggests substantial heterogeneity in parents' investment. It is, therefore, possible that child outcomes carry similar variation. This section explores these outcomes along with socio-economic backgrounds.

Table 5 presents program impacts on child outcomes for each region. Starting with the MDAT fine motor scores in column (1), we continue to see point estimates that are relatively small across regions, although the standard errors of these estimates are a bit larger than when we aggregate the two regions together. Interestingly, column (2) shows larger point estimates of 0.26 sd significant at the 5% level for the impact of BFCI+ on MDAT-language in region 2. These estimates suggest that BFCI+ moderately impacted language scores in region 2. Regarding the subcomponents of MDAT, the effect is statistically significant at the 10 percent level for the subsection consisting of naming objects (Column 7). The aggregated MDAT score, combining both fine motor and language, shows a statistically significant effect of 0.22 standard deviations in region 2 for the BFCI+.

In light of the hypotheses laid out at the beginning of this section, one way to interpret our regional impact estimates is the following. Families in severe poverty face strong constraints to investing in children. Faced with new information about desirable parenting practices and the importance of investments in children, all parents may want to respond but can only do so with available resources. In addition, more educated parents may be able to understand these more effectively and live in regions where the pool of program workers is of better quality.

To further ascertain that these regional disparities are consistent with our interpretation, we use a different proxy for socioeconomic disparities measured by the household housing quality and possession of durables, irrespective of the region. We then created a dummy variable grouping the household above and below the median value. The regressions also include the main effects of each treatment and above-median household SES, the age and gender of the child, and the regional dummy variable as control variables. For simplicity, we only report the coefficients on the interaction terms. Table 6 reveals a clear and consistent pattern of large positive and statistically significant effects of the BFCI+, the more intensive version, on virtually all measures of child development among households with above median socio-economic status. There is no significant effect of the BFCI.

We have previously reported that socioeconomic status operated through increased material investments in children. Consistent with our theory of change, we explored whether similar variations exist along parents' education or baseline human capital. First, we check whether the program increased an index of parents' knowledge and practices (KAP) of child development. We found no average effect of either treatment on KAP (Table A2b). We also did not find regional variation (Table A2c). We also found mostly null interactions between

treatment and education of mothers or heads of households (Tables A2d-A2e). However, Table A2f shows a positive impact of the BFCI on the child development component of the KAP of parents above median socio-economic status, but a negative effect for the BFCI+ counterpart on the nutrition subcomponent of KAP. Overall, the effect on the KAP is limited at best.

Although the program did not increase parents' knowledge, the program may nonetheless have made practices to promote child development more salient. The program may also interact with other dimensions of parental human capital. To test these hypotheses, we interact the treatment variables with the head of household or the caregiver's education, measured by a dummy variable indicating if he or she ever attended school, controlling for the baseline socioeconomic status. We also use the baseline KAP score as proxy of parents' human capital, alternative to schooling. As reported in Tables A6a, A6b, and A6c, we found no consistent effect, except for the subcomponent of the MDAT test where children were asked to identify patterns (Table A6a, column 6). The lack of effect operating through the parental education channel can be explained for two reasons.[11] On the one hand, households with high socioeconomic statuses likely have substantial knowledge about child development already. On the other hand, low socio-economic status, even when there is a knowledge deficit, may not be in a good position to act on them once provided.

These findings suggest a likelihood of strong complementarities between BFCI-type programs and the education and financial resources available in the target communities. Conversely, programs of this type may not be effective in extremely poor communities if they are not accompanied by some relief from their resource constraints and adequate resources to communicate the knowledge to less educated parents. In the context of this study, the resource channel is likely the more binding constraint on parents' ability to benefit from the program.

Conclusion

This paper studies the impact of two parenting and child cognitive stimulation interventions for children aged 0-3 years in The Gambia. The most intensive of these two interventions, BFCI+, requires substantial resources to build and staff community-based childcare for direct child cognitive stimulation, in addition to what may be induced through parental education about child development. Despite this public investment, the average

[11] The variable measuring the parent's years of education was used to create a dummy variable separating zero years of schooling from any year of schooling. The number of observations dropped by over 10% due to missing values for parents' years of education because many responded by "do not know." The results do not change qualitatively by inputting all missing values by 0 or 1.

program impact on parental investments is moderate in magnitude, with material investment concentrated among more well-off families and more time commitment with the children among poorer families. The average impacts on child development are statistically indistinguishable from zero. However, the heterogeneity analysis shows that the BFCI+ increased children's language skills in the more well-off region and more generally among households above median socioeconomic status, as proxied by their housing quality and the possession of durable goods.

The findings prompt two plausible lessons about the importance of context for the effectiveness of these types of interventions, especially with respect to the overall socio-economic status of the concerned areas. First, childcare programs like the BFCI+ may be more effective in relatively well-off areas, positively impacting children's language development in Region 2 and in high socio-economic status subgroups. This suggests that there are complementarities at play and calls for bundled interventions for poorer communities. Second, while knowledge and information constraints are often emphasized in these programs, we find differentiated effects by parental material resources but no heterogeneity by parental education. This suggests that the resource constraint is binding, at least in our context, and similar outcomes may arise in similar low-income contexts. Taken together, these results suggest that parenting education programs may be insufficient to promote early childhood development among the poorest households in the absence of additional resources, allowing parents to absorb and act upon the information effectively.

There are at least three limitations of this study that future research should consider. First, given the complementary between information, parents' human capital, and their wealth or earnings, it will be particularly useful for designing future studies to disentangle these different channels. Our heterogeneity analysis provided some insights indicating that material constraints likely limited parents' ability to turn information into effective investments and support for child development. Second, supplementing random assignment with measures of the fidelity of program implementation, such as attendance and content delivered, would enrich the interpretation of the intention to treat effect. Would the interventions yield a stronger effect with better implementation? Systematically measuring the intensity and program implementation will inform whether adjustment should be on the intervention's content, implementation, or both. Third, this paper reports the short-term impact of the intervention, measured less than two years into the program. Change may take longer to materialize, especially for children starting with larger deficits in household resources. Future studies

should consider longer term outcomes -- perhaps lack of impact in the short term may not always be cause for discontinuing such programs.

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Tables

Table 1: Intervention groups and regional comparison at the Baseline

VARIABLES	(1) CONTROL	(2) BFCI	(3) BFCI+	(4) Region 2	(5) Region 6	(6) All	(7) p-value Treat.	(8) p-value Regions
# of Books	2.34	2.15	2.43	2.65	1.95	2.31	0.53	0.00
	(2.79)	(2.87)	(2.84)	(2.93)	(2.68)	(2.83)		
# of Children's Books	0.39	0.20	0.33	0.43	0.18	0.31	0.09	0.00
	(1.23)	(0.95)	(1.10)	(1.32)	(0.81)	(1.11)		
Time Playing with Child	1.75	1.59	1.75	1.67	1.73	1.70	0.19	0.65
	(1.05)	(1.05)	(1.09)	(1.05)	(1.08)	(1.07)		
MDAT Language	-0.10	-0.01	0.11	0.19	-0.20	0.00	0.22	0.00
	(1.01)	(1.03)	(0.95)	(0.94)	(1.02)	(1.00)		
MDAT Fine Motor	-0.19	0.09	0.09	0.09	-0.09	0.00	0.02	0.06
	(1.02)	(0.96)	(1.00)	(0.98)	(1.01)	(1.00)		
Height - cm	76.30	76.76	77.15	77.18	76.28	76.75	0.51	0.55
	(9.68)	(7.22)	(6.66)	(8.13)	(7.66)	(7.92)		
Weight - kg	9.49	9.73	10.01	10.13	9.35	9.75	0.37	0.16
	(2.55)	(4.57)	(6.83)	(6.11)	(3.46)	(5.01)		
Gender (Child)	0.54	0.49	0.54	0.52	0.53	0.53	0.32	0.94
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)		
Age (Child)	35.23	35.54	35.40	35.13	35.62	35.39	0.56	0.09
	(3.86)	(3.75)	(4.64)	(3.41)	(4.65)	(4.11)		
Child Health	0.47	0.48	0.46	0.46	0.48	0.47	0.29	0.15
	(0.15)	(0.15)	(0.13)	(0.15)	(0.14)	(0.14)		
Knowledge and Practices (KAP)	0.52	0.53	0.52	0.57	0.47	0.52	0.91	0.00
	(0.15)	(0.15)	(0.15)	(0.15)	(0.13)	(0.15)		
Socio-economic status index	8.8	8.3	8.2	9.26	7.61	8.46	0.63	0.02
	(5.3)	(5)	(4.9)	(5.5)	(4.4)	(5.01)		
Observations	563	512	540	829	786	1615		
P-value Omnibus test - Treatment							0.29	
P-value Omnibus test - Regions								0.00

This table reports the mean values of the baseline counterpart key outcome variables across treatments groups, and regions. The p-value Treat. is that of a regression where the dependent variable is the variable in the first column, and the independent variables are the treatment variables. The omnibus test is a F-test of a regression where the dependent variable is the treatment variable, and the independent variables are all the variables listed in this table. Similarly, the "p-value Regions" and the "p-value Omnibus test – Regions" are equivalent analyses comparing the regions. The standard deviations are in parentheses.

Table 2 - Average Impacts of BFCI and BFCI+ on Parental Investments in Children

VARIABLES	(1) Total time (hrs) with child	(2) Time (hrs) playing with child	(3) Activities factor	(4) Materials factor	(5) Parental investment all factor[(a)]	(6) Total Expenditure in children
BFCI	0.48	0.23	0.04	-0.04	0.08	344.49
	(0.44)	(0.31)	(0.15)	(0.10)	(0.16)	(254.34)
BFCI+	0.89*	0.56*	0.18	0.21	0.31*	483.67*
	(0.46)	(0.32)	(0.16)	(0.15)	(0.17)	(288.43)
Observations	1,601	1,601	1,596	1,515	1,511	1,601
R-squared	0.03	0.02	0.07	0.05	0.04	0.03
Mean Dep. Var.	4.727	3.136	-0.0705	-0.0588	-0.131	2510
Std. Dev. Dep. Var.	3.640	2.921	1.234	1.003	1.283	3304

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of parental investments in children on indicators for whether BFCI or BFCI+ was offered in each settlement, and a set of control variables which include the age and gender of the child, and region dummy variables. Parental investment variable includes Activities, Materials and the time playing with the child. "factor" refers to the first factor of the principal component analysis of a set of related variables on the subject. The table also presents each dependent variable's mean and standard deviation, respectively.

Table 3 - Average Impacts of BFCI and BFCI+ on Child Development

VARIABLES	(1) Fine Motor	(2) Language and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI	0.00	-0.04	-0.03	0.00	-0.03	0.02	-0.07	-0.02
	(0.11)	(0.13)	(0.11)	(0.09)	(0.11)	(0.12)	(0.23)	(0.12)
BFCI+	0.02	0.10	-0.00	-0.01	0.08	0.04	0.10	0.08
	(0.12)	(0.14)	(0.11)	(0.10)	(0.12)	(0.12)	(0.24)	(0.13)
Observations	960	957	960	960	960	960	960	957
R-squared	0.03	0.11	0.05	0.03	0.03	0.02	0.21	0.09
Mean Dep. Var.	0	0	0	0	0	0	4.324	0
Std. Dev. Dep. Var.	1	1	1	1	1	1	1.913	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered in each settlement, and a set of control variables which include the age and gender of the child, and region dummy variables. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" variable includes Fine Motor and Language and Hearing. The table also presents, μ_Y and σ_Y, which are the mean and standard deviation of each dependent variable, respectively.

Table 4 - Average Impacts of BFCI and BFCI+ on Parental Investments in Children by Region

VARIABLES	(1) Total time (hrs) with child	(2) Time (hrs) playing with child	(3) Activities factor	(4) Materials factor	(5) Parental investments all factors[(a)]	(6) Total Expenditure on children
BFCI X Region 2 dummy	0.14	0.06	-0.02	0.16	0.04	567.76**
	(0.62)	(0.48)	(0.24)	(0.13)	(0.24)	(282.89)
BFCI+ X Region 2 dummy	0.84	0.45	0.08	0.30*	0.25	998.16**
	(0.63)	(0.48)	(0.26)	(0.17)	(0.26)	(431.81)
BFCI X Region 6 dummy	0.82	0.40	0.10	-0.24	0.12	121.93
	(0.63)	(0.40)	(0.19)	(0.14)	(0.20)	(411.80)
BFCI+ X Region 6 dummy	0.95	0.66	0.28	0.12	0.37*	-32.93
	(0.67)	(0.42)	(0.21)	(0.25)	(0.21)	(357.46)
Observations	1,601	1,601	1,596	1,515	1,511	1,601
R-squared	0.03	0.02	0.07	0.06	0.04	0.04
Mean Dep. Var.	4.727	3.136	-0.0705	-0.0588	-0.131	2510
Std. Dev. Dep. Var.	3.640	2.921	1.234	1.003	1.283	3304

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of parental investments in children on indicators for whether BFCI or BFCI+ was in region 2 or Region 6 and a set of control variables, which include the age and gender of the child. "factor" refers to the first factor of the principal component analysis of a set of related variables on the subject. [(a)] Parental investment variables includes Activities with the child, Materials, and the time spent playing with the child. The table also presents each dependent variable's mean and standard deviation.

Table 5 - Average Impacts of BFCI and BFCI+ on Child Development by region

VARIABLES	(1) Fine Motor	(2) Language and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI X Region 2 dummy	-0.06	0.12	0.02	-0.04	0.06	-0.16	0.13	0.05
	(0.13)	(0.14)	(0.11)	(0.14)	(0.13)	(0.16)	(0.29)	(0.12)
BFCI+ X Region 2 dummy	0.08	0.26**	0.19	-0.10	0.15	-0.00	0.43*	0.22**
	(0.15)	(0.12)	(0.11)	(0.15)	(0.14)	(0.18)	(0.26)	(0.10)
BFCI X Region 6 dummy	0.05	-0.18	-0.10	0.05	-0.10	0.19	-0.25	-0.10
	(0.17)	(0.22)	(0.18)	(0.12)	(0.18)	(0.18)	(0.34)	(0.21)
BFCI+ X Region 6 dummy	-0.06	-0.06	-0.23	0.07	0.03	0.06	-0.27	-0.06
	(0.20)	(0.25)	(0.19)	(0.15)	(0.21)	(0.17)	(0.39)	(0.26)
Observations	960	957	960	960	960	960	960	957
R-squared	0.03	0.11	0.06	0.03	0.04	0.02	0.22	0.10
Mean Dep. Var.	0	0	0	0	0	0	4.324	0
Std. Dev. Dep. Var.	1	1	1	1	1	1	1.913	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered in region 2 or Region 6 and a set of control variables, which include the age and gender of the child. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" includes fine motor skills, language, and hearing. The table also presents each dependent variable's mean and standard deviation, respectively.

Table 6: Average Impacts of BFCI and BFCI+ on Child Development by family's socio-economic status

VARIABLES	(1) Fine Motor	(2) Languages and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI x Above median socio-economic status	-0.06	-0.06	0.08	0.18	-0.03	-0.14	-0.25	-0.06
	(0.18)	(0.19)	(0.21)	(0.17)	(0.16)	(0.19)	(0.33)	(0.19)
BFCI+ x Above median socio-economic status	0.38**	0.33*	0.34*	0.36**	-0.03	0.43**	0.58*	0.42**
	(0.18)	(0.19)	(0.18)	(0.18)	(0.18)	(0.20)	(0.33)	(0.19)
Observations	960	957	960	960	960	960	960	957
R-squared	0.03	0.11	0.05	0.02	0.02	0.02	0.22	0.10
Mean Dep. Var.	0	0	0	0	0	0	4.324	0
Std. Dev. Dep. Var.	1	1	1	1	1	1	1.913	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered interacted with the child family's socio-economic status measured by the housing quality and the possession of durables. The table reports only the interaction coefficients. The regression includes the treatment variables, the interacted variable, the age and gender of the child, and the regions dummy variable as control variables. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" includes fine motor skills, language, and hearing. The table also presents each dependent variable's mean and standard deviation, respectively.

Table 7 - Description of the Variables used in the Analysis.

#	Variable name as presented in the tables	Definition
1	# of Books	Discrete variable that indicates the number of books available in the household. It is meant to capture reading opportunity within the household. The original questions offered four option that we recoded in the following way: None= 0, 1-2 = 2, 3-5 = 4, and 6 or more = 7.
2	# Children's Books	This variable is the same as # of books except that it focuses on books that are only for children below the age of 7.
3	# Magazines and Newspapers	This variable is the same as in # of books and children's books except that it accounts only for magazines and newspapers.
4	Toys and Play Materials The variables Play: movement, Play: role, Play: toy sound, Play: stack toys, Play: drawing, Play: shape toys, Play: story telling are the different types of play materials available to the child.	This variable is coded by taking the mean of the following ten dummy variables where the caregiver where asked whether the child plays with each of the following ten items: i. Homemade toys ii. Household everyday objects iii. Objects and materials from outside the household iv. Toys that make music v. Blocks or toys that can stack vi. Toys for drawing and writing vii. Toys that can be rolled or pushed along viii. Dolls or pretend cups ix. Children books x. Toys for shapes and colours
5	Total time with child	This variable sums the time in hours on the day prior to the survey that the caregiver reports spending together with the child on the following seven items: i. Playing with the child alone ii. Playing with the child together with other children iii. Telling a story to the child alone iv. Telling a story to the child with other children v. Caring for the child vi. Playing with the child outside of the house vii. Spent with child at the clinic
6	Time playing with child	This variable is the same as in total time with child except that items 5 and 7 are dropped, so that it reflect only the time volunteered to play and interact with the child.
7	Knowledge and Practices (KAP) KAP health, KAP health (factor), KAP hygiene, KAP hygiene (factor), KAP nutrition, KAP nutrition, KAP child dev. Are submodules of KAP. The factor variables are the first factor of the principal component analysis.	This variables measure the caregivers' knowledge, attitude, and practices as a mean value of the following dummy variables. Each dummy variable takes the value 1 for the desirable outcome, and 0 otherwise: (i) respond to child's misbehaviour non-violently (ii) responsive to the child's cries (iii) spends time with the child just for fun (iv) knows the definition of exclusive breastfeeding (v) knows the timing of first solid food given to the child (vi) washing of raw food (vii) separation of cooked and uncooked food (viii) know how to care for diarrhoea

		(ix) handling waste water (x) making drinkable water out of unclean water (xi) hand washing practices.
8	MDAT – Fine Motor	This variable is the standardized test score on the fine motor component of the MDAT test (described in the text). Each correctly answered question received 1 point. The total score is standardized.
9	MDAT – Language and hearing	This variable is the standardized test score on the language development component of the MDAT test (described in the text). Each correctly answered question received 1 point. The total score is standardized.
10	MDAT all (Blocks, Pegs, Concepts, Patterns, Names are subcomponents of the MDAT test.)	This variable is the standardized test score on all components of the MDAT test (described in the text). Each correctly answered question received 1 point. The total score is standardized.
11	Z-Score Height	This variable is the height of the child using the World Health Organization child development chart on height for age.
12	Z-Score Weight	This variable is the weight of the child using the World Health Organization child development chart on weight for age.
13	Child Health	This variable is an index indicating the overall health status of the child at the time of the survey. It takes the mean of the following dummy variables that were coded such that 1 always represent the desirable outcome: i. Was the child confine to bed the past 7 days (1 if no, 0 otherwise) ii. The child had headache the past 7 days iii. The child had cough the past 7 days iv. The child's vitamin A intake is up to date v. The child had malaria at some point the past 3 months vi. The child currently sleeps under a bed net
14	Expenditure on children	This variable aggregates reported expenditures related to child's health, schooling or childcare, other education related, and toys.
15	BFCI	This variable is the treatment dummy for the BFCI
16	BFCI+	This variable is the treatment dummy for the BFCI+
17	Child gender	This is the child's gender.
18	Child age	This is the age of the child (month-year dummies).
20	Region	This variable is the region within which a given observation is located
BASELINE VARIABLES		
1	Socio-economic index - baseline Above median socio-economic status (Baseline) is a dummy that takes value 1 if the household is above the median of raw score measuring the SES.	This variable is a proxy measure of households' socio-economic status. It is measured by an index capture the housing quality and the possession of certain durable assets. The variables include: The household has tap water, separate bathroom, own dwelling, higher quality wall, higher quality floor, higher quality roof, Fan, watch, air conditioner, sofa, mobile telephone, television, refrigerator, car or truck, cattle, residential land, farmland, horse

2	Head of household's education	This variable is a dummy variable that take value 1 if the head of household's years of educations is not zero.
3	Mother's education	This variable is a dummy variable that take value 1 if the mother's years of educations is not zero.
4	Above Median KAP (Baseline)	This variable is the baseline KAP raw scored used to create a dummy variable that take value 1 if the household scores above the median.

Notes: All child development outcomes come from the MDAT test, and anthropometric measures are taken separately. The KAP variables are responses from the primary caregiver's survey. All other variables about household characteristics come from households survey whose respondent is mainly the head of household but assisted with other members of the household, especially the caregiver.

Appendix

Appendix 1: Additional tables

Table A1a: Pattern of attrition

	(1)	(2)	(3)	(4)
BFCI	-0.034	-0.034	-0.033	-0.033
	(0.049)	(0.049)	(0.049)	(0.050)
BFCI+	-0.056	-0.055	-0.056	-0.054
	(0.047)	(0.047)	(0.046)	(0.045)
SES at Baseline	-	0.001	0.001	-0.000
		(0.003)	(0.003)	(0.003)
Child Health at Baseline	-	-	-0.124	-0.128
			(0.085)	(0.087)
KAP Baseline	-	-	-	0.064
				(0.135)
Play time - Child and Caregiver	-	-	-	-0.023
				(0.039)
Caregiver's wellbeing	-	-	-	-0.091
				(0.143)
Home environment	-	-	-	0.068
				(0.080)
Mean Dep. Var. Control Grp.	0.79			
N	1,615	1,615	1,615	1,574

* $p<0.1$; ** $p<0.05$; *** $p<0.01$. Standard errors clustered at the settlement level. The dependent variable is a dummy variable that take value 1 if the household were not tracked at the endline and zero otherwise.

Table A1b: Intervention groups and regional comparison at the Baseline – accounting for endline attrition

VARIABLES	(1) CONTROL	(2) BFCI	(3) BFCI+	(4) Region 2	(5) Region 6	(6) All	(7) p-value Treat.	(8) p-value Regions
# of Books	2.46	2.21	2.42	2.80	1.97	2.37	0.63	0.00
	(2.84)	(2.88)	(2.85)	(2.97)	(2.69)	(2.86)		
# of Children's Books	0.29	0.16	0.29	0.36	0.15	0.25	0.11	0.00
	(0.99)	(0.82)	(1.07)	(1.21)	(0.67)	(0.97)		
Time Playing with Child	1.79	1.56	1.75	1.68	1.73	1.70	0.08	0.65
	(1.02)	(1.06)	(1.09)	(1.05)	(1.08)	(1.06)		
MDAT Language	-0.11	-0.03	0.09	0.20	-0.21	-0.01	0.32	0.00
	(1.01)	(1.09)	(0.96)	(0.97)	(1.03)	(1.02)		
MDAT Fine Motor	-0.17	0.08	0.08	0.09	-0.09	0.00	0.06	0.06
	(1.01)	(0.99)	(1.00)	(1.00)	(1.00)	(1.00)		
Height - cm	76.46	76.53	76.61	76.71	76.38	76.54	0.97	0.57
	(8.73)	(7.95)	(6.31)	(8.18)	(7.14)	(7.66)		
Weight – kg	9.37	9.88	9.77	9.96	9.43	9.68	0.30	0.17
	(1.35)	(5.22)	(5.97)	(5.53)	(3.79)	(4.72)		
Gender (Child)	0.54	0.49	0.54	0.52	0.53	0.53	0.51	0.94
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)		
Age (Child)	35.23	35.54	35.40	35.13	35.62	35.39	0.37	0.09
	(3.86)	(3.75)	(4.64)	(3.41)	(4.65)	(4.11)		
Child Health	0.47	0.48	0.46	0.46	0.48	0.47	0.27	0.15
	(0.15)	(0.15)	(0.13)	(0.15)	(0.14)	(0.14)		
Knowledge and Practices (KAP)	0.52	0.52	0.51	0.57	0.48	0.52	0.83	0.00
	(0.14)	(0.15)	(0.15)	(0.15)	(0.13)	(0.15)		
Socio-economic status index	8.66	8.24	8.35	9.13	7.76	8.42	0.84	0.02
	(5.10)	(4.87)	(5.13)	(5.41)	(4.57)	(5.04)		
Observations	411	392	425	589	639	1228		
P-value Omnibus test – Treatment							0.29	
P-value Omnibus test – Regions								0.00

This table reports the mean values of the baseline counterpart key outcome variables across treatments groups, and regions, restricting the baseline sample to only those who were successfully tracked at the endline. The p-value Treat. is that of a regression where the dependent variable is the variable in the first column, and the independent variables are the treatment variables. The omnibus test is a F-test of a regression where the dependent variable is the treatment variable, and the independents variables are all the variables listed in this table. Similarly, the "p-value Regions" and the "p-value Omnibus test – Regions" are equivalent analyses comparing the regions. The standard deviations are in parentheses.

Table A1c: Correlations between families' socioeconomic status and selected outcomes

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MDAT language	0.88***									0.98***
	(0.24)									(0.20)
MDAT fine motor		0.07								-0.38
		(0.25)								(0.23)
Expenditures on Child			0.00**							0.00**
			(0.00)							(0.00)
Time Playing with Child				-0.19						-0.36**
				(0.14)						(0.17)
Caregiver's KAP score					3.27**					5.20***
					(1.46)					(1.52)
Children's book in the house						0.41***				0.34**
						(0.13)				(0.13)
Child weight							0.07			-0.22
							(0.12)			(0.18)
Child height								0.07		0.12**
								(0.05)		(0.06)
Child health index									-1.27	-0.76
									(1.05)	(1.46)
Observations	723	726	1,615	1,578	1,228	1,228	770	768	1,228	708
R-squared	0.04	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.12

This table report the regression between families' socio-economic status and selected intermediate and final outcomes listed in each row. Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered at the settlement level.

Table A2a: Treatment effect on selected intermediate outcomes

VARIABLES	(1) All books	(2) Children's books	(3) Magazines	(4) Play: movement	(5) Play: roles	(6) Play: toy sound	(7) Play: stack toys	(8) Play: drawing	(9) Play: shape toys	(10) Play: story telling
BFCI	0.22	0.15	0.11	-0.03	-0.03	-0.04	-0.02	-0.02	0.00	0.01
	(0.26)	(0.17)	(0.08)	(0.04)	(0.04)	(0.03)	(0.02)	(0.02)	(0.02)	(0.05)
BFCI+	0.31	0.34*	0.13	0.03	0.02	0.02	0.04	0.04	0.05	0.05
	(0.28)	(0.18)	(0.08)	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
Observations	1,599	1,599	1,600	1,598	1,597	1,597	1,597	1,597	1,516	1,600
R-squared	0.10	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.06
Mean Dep. Var.	2.018	0.717	0.240	0.163	0.179	0.150	0.0779	0.0833	0.0400	0.435
Std. Dev. Dep. Var.	2.727	1.679	0.984	0.369	0.384	0.357	0.268	0.277	0.196	0.496

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of parental investments in children on indicators for whether BFCI or BFCI+ was offered, and a set of control variables which include the age and gender of the child, and region dummy variables. Parental investment variable includes Activities with the child, Materials and the time playing with the child. The table also presents each dependent variable's mean and standard deviation.

Table A2b: Treatment effect on knowledge and practices (KAP)

VARIABLES	(1) KAP health	(2) KAP health (factor)	(3) KAP hygiene	(4) KAP hygiene (factor)	(5) KAP nutrition	(6) KAP nutrition (factor	(7) KAP child dev.	(8) KAP child dev. (factor)
BFCI	-0.06	-0.43	0.02	0.34	-0.02	-0.22	0.25	0.15
	(0.05)	(0.38)	(0.02)	(0.24)	(0.03)	(0.16)	(0.22)	(0.14)
BFCI+	-0.06	-0.45	0.02	0.20	-0.00	-0.12	-0.06	-0.01
	(0.04)	(0.34)	(0.02)	(0.25)	(0.03)	(0.15)	(0.18)	(0.11)
Observations	1,600	1,595	1,600	1,584	1,600	1,588	1,601	1,598
R-squared	0.03	0.03	0.01	0.01	0.02	0.02	0.05	0.05
Mean Dep. Var.	0.770	0.297	0.876	-0.175	0.713	0.108	8.926	-0.0408
Std. Dev. Dep. Var.	0.293	2.343	0.146	2.170	0.233	1.353	1.712	1.047

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different parental knowledge and practice measures on indicators for whether BFCI or BFCI+ was offered and a set of control variables, which include the age and gender of the child. All variables included in the factors constructed are described in Table 7. The raw scores are the sum of the dummy variable indicating correct answers. The factors are the first factor of the principal component analysis. The table also presents each dependent variable's mean and standard deviation.

Table A2c: Treatment effect on knowledge and practices (KAP) by region

VARIABLES	(1) KAP health	(2) KAP health (factor)	(3) KAP hygiene	(4) KAP hygiene (factor)	(5) KAP nutrition	(6) KAP nutrition (factor	(7) KAP child dev.	(8) KAP child dev. (factor)
BFCI X Region 2 dummy	-0.07	-0.51	0.02	0.26	-0.01	-0.19	-0.01	-0.02
	(0.08)	(0.64)	(0.03)	(0.38)	(0.04)	(0.24)	(0.23)	(0.12)
BFCI+ X Region 2 dummy	-0.03	-0.21	0.02	0.24	-0.01	-0.28	-0.12	-0.06
	(0.07)	(0.53)	(0.02)	(0.37)	(0.03)	(0.21)	(0.18)	(0.10)
BFCI X Region 6 dummy	-0.05	-0.36	0.02	0.43	-0.03	-0.24	0.50	0.33
	(0.05)	(0.41)	(0.02)	(0.29)	(0.04)	(0.20)	(0.37)	(0.24)
BFCI+ X Region 6 dummy	-0.09	-0.69	0.01	0.15	0.01	0.03	0.00	0.03
	(0.05)	(0.43)	(0.02)	(0.35)	(0.04)	(0.21)	(0.31)	(0.20)
Observations	1,600	1,595	1,600	1,584	1,600	1,588	1,601	1,598
R-squared	0.03	0.03	0.01	0.01	0.02	0.03	0.05	0.06
Mean Dep. Var.	0.770	0.297	0.876	-0.175	0.713	0.108	8.926	-0.0408
Std. Dev. Dep. Var.	0.293	2.343	0.146	2.170	0.233	1.353	1.712	1.047

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different parental knowledge and practice measures on indicators for whether BFCI or BFCI+ was in region 2 or Region 6 and a set of control variables, which include the age and gender of the child. All variables included in the factors constructed are described in Table 7. The raw scores are the sum of the dummy variable indicating correct answers. The factors are the first factor of the principal component analysis. The table also presents each dependent variable's mean and standard deviation.

Table A2d: Treatment effect on knowledge and practices by mother's education

VARIABLES	(1) KAP health	(2) KAP health (factor)	(3) KAP hygiene	(4) KAP hygiene (factor)	(5) KAP nutrition	(6) KAP nutrition (factor	(7) KAP child dev.	(8) KAP child dev. (factor)
BFCI x Mother's education	0.01	0.12	-0.01	-0.04	0.05*	0.29	0.07	0.03
	(0.05)	(0.39)	(0.02)	(0.25)	(0.03)	(0.18)	(0.30)	(0.19)
BFCI+ x Mother's education	0.07	0.64*	0.00	0.12	0.01	-0.13	-0.22	-0.22
	(0.04)	(0.34)	(0.02)	(0.34)	(0.03)	(0.20)	(0.29)	(0.18)
Observations	1,195	1,191	1,195	1,182	1,195	1,186	1,195	1,193
R-squared	0.04	0.04	0.01	0.01	0.02	0.03	0.04	0.05
Mean Dep. Var.	0.779	0.382	0.873	-0.222	0.718	0.107	8.894	-0.0527
Std. Dev. Dep. Var.	0.279	2.244	0.152	2.279	0.231	1.335	1.637	1.034

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different parental knowledge and practice measures on indicators for whether BFCI or BFCI+ was offered interacted with the mother's education (a dummy variable indicating if the child mother ever attended school). The table reports only the interaction coefficients. The regression includes the treatment variables, the interacted variable, the age and gender of the child, and the regions dummy variable as control variables. All variables included in the factors constructed are described in Table 7. The raw scores are the sum of the dummy variable indicating correct answers. The factors are the first factor of the principal component analysis. The table also presents each dependent variable's mean and standard deviation.

Table A2e: Treatment effect on knowledge and practices by head of household's education

VARIABLES	(1) KAP health	(2) KAP health (factor)	(3) KAP hygiene	(4) KAP hygiene (factor)	(5) KAP nutrition	(6) KAP nutrition (factor	(7) KAP child dev.	(8) KAP child dev. (factor)
BFCI x Head of Household Education	0.02	0.16	-0.02	-0.02	0.06	0.23	-0.03	-0.05
	(0.05)	(0.40)	(0.03)	(0.43)	(0.04)	(0.22)	(0.26)	(0.16)
BFCI+ x Head of Household Education	0.05	0.45	0.01	0.25	0.04	0.03	0.24	0.14
	(0.05)	(0.41)	(0.03)	(0.39)	(0.04)	(0.21)	(0.30)	(0.19)
Observations	1,227	1,223	1,227	1,214	1,227	1,217	1,227	1,225
R-squared	0.04	0.04	0.01	0.01	0.02	0.03	0.05	0.05
Mean Dep. Var.	0.776	0.362	0.874	-0.209	0.719	0.124	8.891	-0.0575
Std. Dev. Dep. Var.	0.282	2.271	0.152	2.267	0.230	1.342	1.629	1.027

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different parental knowledge and practice measures on indicators for whether BFCI or BFCI+ was offered interacted with the head of household's education (a dummy variable indicating if the head of household ever attended school). The table reports only the interaction coefficients. The regression includes the treatment variables, the interacted variable, the age and gender of the child, and the regions dummy variable as control variables. All variables included in the factors constructed are described in Table 7. The raw scores are the sum of the dummy variable indicating correct answers. The factors are the first factor of the principal component analysis. The table also presents each dependent variable's mean and standard deviation.

Table A2f: Treatment effect on knowledge and practices by socio-economic status

VARIABLES	(1) KAP health	(2) KAP health (factor)	(3) KAP hygiene	(4) KAP hygiene (factor)	(5) KAP nutrition	(6) KAP nutrition (factor)	(7) KAP child dev.	(8) KAP child dev. (factor)
BFCI x Above median socio-economic status	0.01	0.13	0.03	0.50*	-0.02	-0.07	0.44*	0.36**
	(0.04)	(0.35)	(0.02)	(0.26)	(0.03)	(0.18)	(0.26)	(0.16)
BFCI+ x Above median socio-economic status	0.04	0.34	0.02	0.32	-0.06**	-0.41**	0.39	0.27
	(0.04)	(0.36)	(0.02)	(0.27)	(0.03)	(0.19)	(0.29)	(0.18)
Observations	1,600	1,595	1,600	1,584	1,600	1,588	1,601	1,598
R-squared	0.04	0.04	0.01	0.01	0.02	0.03	0.05	0.06
Mean Dep. Var.	0.770	0.297	0.876	-0.175	0.713	0.108	8.926	-0.0408
Std. Dev. Dep. Var.	0.293	2.343	0.146	2.170	0.233	1.353	1.712	1.047

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different parental knowledge and practice measures on indicators for whether BFCI or BFCI+ was offered interacted with the household's socioeconomic (measured by housing quality and the possession of durables). The table reports only the interaction coefficient. The table reports only the interaction coefficients. The regression includes the treatment variables, the interacted variable, the age and gender of the child, and the regions dummy variable as control variables. All variables included in the factors constructed are described in Table 7. The raw scores are the sum of the dummy variable indicating correct answers. The factors are the first factor of the principal component analysis. The table also presents each dependent variable's mean and standard deviation.

Table A4a: Treatment effect on selected intermediate outcomes

VARIABLES	(1) All books	(2) Children books	(3) Magazines	(4) Play: movement	(5) Play: roles	(6) Play: toy sound	(7) Play: stack toys	(8) Play: drawing	(9) Play: shape toys	(10) Play: story telling
BFCI X Region 2 dummy	0.70*	0.34	0.20	0.03	0.05	0.04	0.04	0.03	0.04	0.00
	(0.37)	(0.29)	(0.15)	(0.05)	(0.06)	(0.04)	(0.04)	(0.03)	(0.02)	(0.08)
BFCI+ X Region 2 dummy	0.85**	0.58**	0.15	0.08	0.04	0.03	0.05	0.08**	0.06*	0.05
	(0.41)	(0.28)	(0.14)	(0.06)	(0.07)	(0.04)	(0.04)	(0.04)	(0.03)	(0.08)
BFCI X Region 6 dummy	-0.26	-0.03	0.01	-0.09	-0.10*	-0.13***	-0.07**	-0.07*	-0.03	0.01
	(0.34)	(0.18)	(0.08)	(0.05)	(0.06)	(0.05)	(0.03)	(0.03)	(0.03)	(0.05)
BFCI+ X Region 6 dummy	-0.23	0.09	0.11	-0.03	-0.01	0.01	0.04	0.00	0.04	0.05
	(0.34)	(0.22)	(0.09)	(0.07)	(0.07)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)
Observations	1,599	1,599	1,600	1,598	1,597	1,597	1,597	1,597	1,516	1,600
R-squared	0.11	0.05	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.06
Mean Dep. Var.	2.018	0.717	0.240	0.163	0.179	0.150	0.0779	0.0833	0.0400	0.435
Std. Dev. Dep. Var.	2.727	1.679	0.984	0.369	0.384	0.357	0.268	0.277	0.196	0.496

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of parental investments in children on indicators for whether BFCI or BFCI+ was in region 2 or Region 6 and a set of control variables, which include the age and gender of the child. The table also presents each dependent variable's mean and standard deviation.

Table A6a: Average Impacts of BFCI and BFCI+ on Child Development by head of household's education

VARIABLES	(1) Fine Motor	(2) Languages and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI x Head of Household Education	-0.08	0.07	-0.08	-0.09	-0.24	0.20	-0.04	0.00
	(0.18)	(0.22)	(0.20)	(0.22)	(0.19)	(0.18)	(0.39)	(0.21)
BFCI+ x Head of Household Education	0.11	-0.05	-0.15	-0.13	-0.19	0.49**	-0.07	0.01
	(0.22)	(0.23)	(0.21)	(0.24)	(0.20)	(0.20)	(0.41)	(0.22)
Observations	725	722	725	725	725	725	725	722
R-squared	0.04	0.13	0.07	0.03	0.02	0.02	0.23	0.11
Mean Dep. Var.	-0.0332	0.00476	-0.0251	-0.0145	0.0119	-0.0489	4.357	-0.0127
Std. Dev. Dep. Var.	1.036	1.031	1.040	1.024	1.014	0.979	1.928	1.028

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered interacted with the head of household's education measured by a dummy variable indicating if he or she ever attended school. The control variables include the age and gender of the child and the regions dummy variables. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" includes fine motor skills, language, and hearing. The table also presents each dependent variable's mean and standard deviation, respectively.

Table A6b: Average Impacts of BFCI and BFCI+ on Child Development by mother's education

VARIABLES	(1) Fine Motor	(2) Languages and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI x Mother's education	0.12	0.22	0.06	0.22	-0.07	0.24	0.24	0.22
	(0.20)	(0.22)	(0.20)	(0.19)	(0.16)	(0.21)	(0.40)	(0.18)
BFCI+ x Mother's education	-0.02	0.27	-0.20	-0.04	0.01	0.13	0.50	0.20
	(0.21)	(0.21)	(0.19)	(0.19)	(0.20)	(0.21)	(0.35)	(0.18)
Observations	707	704	707	707	707	707	707	704
R-squared	0.03	0.14	0.07	0.03	0.02	0.01	0.23	0.12
Mean Dep. Var.	-0.0340	-0.00106	-0.0296	-0.00802	0.00783	-0.0457	4.347	-0.0175
Std. Dev. Dep. Var.	1.037	1.032	1.042	1.026	1.016	0.982	1.928	1.031

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered interacted with the mother's education measured by a dummy variable indicating if she ever attended school. The control variables include the age and gender of the child and the regions dummy variables. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" includes fine motor skills, language, and hearing. The table also presents each dependent variable's mean and standard deviation, respectively.

Table A6c: Average Impacts of BFCI and BFCI+ on Child Development by mother's knowledge and practices (KAP)

VARIABLES	(1) Fine Motor	(2) Languages and Hearing	(3) Blocks	(4) Pegs	(5) Concepts	(6) Patterns	(7) Names	(8) All MDAT[a]
BFCI x Above Median KAP	0.21	0.13	0.25	-0.12	0.27	0.06	0.05	0.20
	(0.18)	(0.18)	(0.15)	(0.16)	(0.17)	(0.21)	(0.32)	(0.18)
BFCI+ x Above Median KAP	0.05	0.22	-0.06	-0.17	0.25	0.16	0.41	0.19
	(0.19)	(0.18)	(0.16)	(0.16)	(0.17)	(0.19)	(0.30)	(0.17)
Observations	960	957	960	960	960	960	960	957
R-squared	0.03	0.10	0.06	0.02	0.02	0.01	0.21	0.09
Mean Dep. Var.	0	0	0	0	0	0	4.324	0
Std. Dev. Dep. Var.	1	1	1	1	1	1	1.913	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0. Standard errors clustered at the settlement level. This table reports coefficients of regressions of different measures of child development on indicators for whether BFCI or BFCI+ was offered interacted with the mother's knowledge and practices score on childcare measured at the baseline. The control variables include the age and gender of the child and the regions dummy variables. All variables scaled to have a mean of zero and standard deviation of one in the control group. In columns 3-7 the dependent variables are subcomponent of the MDAT test. [(a)] "All MDAT" includes fine motor skills, language, and hearing. The table also presents each dependent variable's mean and standard deviation, respectively.

Appendix 2: Malawi Developmental Assessment Tool (MDAT)

The MDAT is an adaptation of other tests designed to assess the skills and capabilities of young children. These types of tests are used to identify children who are not developing well for their age, or to help evaluate research projects. Dr. Melissa Gladstone and colleagues in Blantyre created the MDAT in the interest of having a child assessment tool appropriate for use in rural Malawi. The MDAT includes culturally valued developmental milestones and uses locally available and familiar objects to entice children into demonstrating easily observable behaviors. Items are administered directly to the child. Most children enjoy the MDAT tasks. The MDAT has been slightly modified for use in The Gambia.

Materials for MDAT Kit

1. Objects for Naming (13 of them -- can also use mobile, mat)
1) Broom (copy of larger one)
2) Matchbox
3) Plastic bottle (water)
4) Plate (plastic from market)
5) Cup (plastic from market)
6) Spoon (plastic from market)
7) Soap
8) Pencil or ball point pen
9) 12 Bottle tops (8 of one color, 4 of contrasting color)
10) Bicycle
11) Car (plastic from market)
12) Motorbike
13) Cloth
14) Blocks – 12 (square one inch size)
15) Plain paper
16) 2 wooden containers looking the same but of different weights (one hollow and one with sand)
17) Sticks of two different lengths
18) Wooden board with eight pegs to put in
19) Basket (for carrying all test materials)
20) Paper with four circles of different colors (for naming colors)
21) Book

Overview of MDAT Items

The MDAT is divided into 2 sections: fine motor and visual-perceptual performance, and language and hearing. These are the items that will be administered.

SECTION 1. FINE MOTOR AND VISUAL-PERCEPTUAL PERFORMANCE

1. Builds tower of 2 blocks
2. Puts pegs into board in up to 2 minutes.
3. Builds tower of 4 blocks
4. Builds a tower of 6 blocks
5. Puts pegs into board in up to 30 secs.

6. Copies a vertical line (as drawn by the examiner) with charcoal/chalk within about 30 degrees
7. Picks longest stick 3 times out of 3 tries
8. Picks heaviest box 3 time out of 3 tries – is the child able to tell you which box is the heaviest?
9. Can make a bridge with blocks
10. Copies a circle (needs to be complete) with pen, chalk or in the sand with a stick
11. Copies a cross with chalk, pen, or stick
12. Can draw a square
13. Can make a bridge with 6 blocks
14. Can make stairs with 6 blocks
15. Can copy a pattern of 4 bottle tops.
16. Can copy a pattern of 6 bottle tops.
17. Can copy one letter.
18. Can copy 3 letters.
19. Can copy all letters.
20. Child is able to fold paper into quarters.
21. Child is able to color within lines of square or circle.

SECTION 2. LANGUAGE/HEARING

1. Two stage command
2. Child speaks in complete sentences.
3. Names 3 or more body parts.
4. Names 5 objects.

5. Child can tell you his/her name.
6. Names 10 objects.
7. Tells 3 foods or 3 animals.
8. Child knows 2 of 3 questions relating to the understanding of certain concepts: hungry, tired,
9. cold.
10. Child understands the adjectives such as “faster” and “bigger.”
11. Child can understand prepositions and follow tasks related to this.
12. Child understands the concept of opposites.
13. Child can count to three.
14. Child can count to five.
15. Child can count to ten.
16. Child knows how old they are. Can answer the question “How old are you?” correctly
17. Child names red, blue, yellow, and green
18. Child names one letter in first name
19. Child names two letters in first name
20. Child names three or more letters in first name
21. Child can tell you where s/he currently lives
22. Child can tell you what things are made of
23. Child can move one block on request
24. Child can move 3 blocks on request
25. Child can move 5 blocks on request
26. Child knows orientation of book.
27. Child knows where first page in book is.
28. Child knows where first word on a page is.

Appendix 3: Structure of the ECD 0-3 curriculum

Structure

The program will be implemented to groups of children 0-3 and their families. The content will be delivered by facilitators. They will plan for play and learning and deliver the content to parents in the presence of the children.

The Curriculum covers nine months. It occurs in three cycles and each cycle lasts 12-weeks (about 3 months). Each cycle covers the following 10 topics.

1. Play and toys (2 weeks – Weeks 1 & 2)

2. Physical Development (Week 3)

3. Language and Communication (Week 4)

4. Feelings, Behaviours, Discipline, and Self-esteem (Week 5)

5. Social Development and Social Skills (Week 6)

6. How Children Learn (Brain Development) (Week 7)

7. How Children Learn Numbers and Maths (Week 8)

8. Literacy: The Foundations of Reading (Week 9)

9. Literacy: The Foundations of Writing (Week 10)

10.Creativity: Singing, Dancing, Drawing, and More (2 weeks – Weeks 11 & 12)

Concurrently with the PPRHC Curriculum (above), the BFCI home-visiting program will occur with the following additions:
1. Safety & Protection (HIV, crises)

2. Nutrition areas not covered by current version of BFCI

3. Health

4. Toileting and self-help

5. Transition to nursery – center-based care

6. Self-care for families (stress reduction)

7. Include cross-cutting issues (see below)

Appendix 4: Program implementation

Sensitization pre-intervention:

NaNA supported MoBSE in sensitizing 50 BFCI and 50 BFCI+ communities on the project and the role of the various actors. Key among the messages emphasized during this activity was the communities' part in providing land on which the sheds could be built (this applied only to the BFCI+ sites), leadership for the management and sustenance of the program, and personnel for the delivery of the services.

Recruitment and or training of the Village Support Group

After the communities were sensitized, eight hundred (800) VSG members were recruited taking note of the criteria for the membership to include in each five (5) women and three (3) men with potential to mobilize and train community members. The selected groups included traditional birth attendants, and traditional communicators. These have had to be trained to enable them function effectively in their roles. The training of the VSGs for the implementation of the BFCI program depended on the availability of trained traditional communicators and Community Health Nurses who could do the step-down training through which the VSGs on the BFCI program are trained. Thus, MoBSE agreed that NaNA should train two hundred (200) traditional communicators and thirty-seven (37) community health nurses. The trained Community Health Nurses in-turn trained seven-hundred and ninety-nine (799) Village Support Groups (VSG). NaNA supervised the trainings of the Village Support Groups which were conducted by the Community Health Nurses. These trainings were conducted over a period of five (5) days. Various sites were used to conduct cluster trainings consisting of 48 participants. The strategies used in the dissemination of key components of the BFCI programme, in each of the trainings, were lectures, group discussions and activities and plenary sessions. The main topics were expounded using various subtopics as follows:

- Maternal Nutrition: Nutrients - sources and functions, traditional practices that affect maternal nutrition, relationship between maternal nutrition and infant health and nutrition.
- Infant and young child nutrition: the importance of breastfeeding, breast conditions and their remedies, breastfeeding and family planning, bottle feeding, wet nursing, breastfeeding and the working mother, complementary feeding.
- Personal hygiene/environmental sanitation: the relationship between a clean environment and good health, the basic principles of personal hygiene
- Growth monitoring and promotion: The importance of growth monitoring, the appropriate use of MUAC tape
- Early learning and stimulation in the context of the BFCI program: Linkages, the importance of play in child development.

Supplies:

The supply of sanitary and environmental implements was part of the BFCI/BFCI+ programme. These supplies were meant to provide support to the affected communities for the implementation of the sanitary and environmental hygiene component of the BFCI programme. The total amount of materials procured were five hundred (500) wheelbarrows, nine hundred (900) cutlasses, nine-hundred (900) spades and nine-hundred (900) rakes. These were distributed to the fifty (50) BFCI communities. The numbers of each of these items supplied to the communities varied according to the size of the community.

The BFCI+ related activities

The second component of the 0-3 programme, the BFCI+ required, in addition to the Mobilization of the 50 BFCI+ Communities the completion of the following:

- Training of 50 facilitators (24 facilitators in region 6 and 26 in region 2 - URR 3 trainings and WCR 2 trainings)
- Monitoring and supervision (1 visit per quarter for each site for 18 months and monthly visits of selected sites for 18 months)

Facilitator training.

The staff of the ECD Unit, NaNA and the Curriculum Directorate of MoBSE as well as Futures Training Foundation, jointly Trained of 24 facilitators in region 6 and 26 in region 2. Gambia College, community development and other teachers from the school system also provided support in this regard in the later stages of the implementation.

The trainings of the BFCI+ facilitators centered around the following themes according to the Partnering with Parents to Raise Happy Children, parenting education syllabuses cycle 1 Foundation, cycle 2, Growing and cycle 3 Connections –.

1. Play and toys.
2. Physical Development
3. Language and communication
4. Feelings, behaviours, discipline, self-esteem
5. Creativity (singing, dance, drawing, etc.)
6. Social development and social skills
7. How children learn (brain development) and numeracy
8. Literacy (foundations of reading and writing) (PPHRC, 2012p.2)
9. cross-cutting issues such as equity, gender, special needs, abuse, and health and safety

The facilitators were oriented to the three (3) cycles in three different trainings. All the training processes involved:

- Trainers Introducing the facilitators to the relevant cycles of the BFCI+ programme - Partnering with Parents to Raise Happy Children through presentations on the structure of the materials- Principles, themes, additional topics, cross-cutting issues and roles around which the material is organized.
- Trainers introducing the facilitators to the routines of the relevant syllabus through demonstrations using theme one, day one of week one
- Facilitators work in small groups to review the materials in small groups, by reading the text aloud, sharing their verbal interpretations and giving practical examples.
- Trainers guiding the selection of topics and routines by providing a broad range of topics ensuring a wide coverage of the materials during each training
- Facilitators working in their groups on different themes, and days and weeks assigned by the trainers to plan for play and learning, selecting relevant materials, and practice working with parents according to the activities outlined in the materials within their small groups
- Facilitators presenting planned lessons, at plenary, and each team member playing a role in the delivery and facilitation of the lessons to allow for intergroup learning
- Facilitators and trainers demonstrating home visit sceneries alternatively and reviewing the role plays

- Facilitators producing play things using low-cost and locally available safe and re-usable materials with the help of team members and trainers
- Trainers, and observing facilitators providing commendations, commentaries after and during each presentation to allow for corrections and exemplification of appropriate practices
- Trainers coaching facilitators on field translation and bilingual teaching through practical examples
- Recognizing and rewarding outstanding facilitators

Monitoring activities

Nana, ChildFund, and the ECD Unit shared the monitoring and support responsibilities. NaNA conduction a Total of 174 sites visits during the implementation period. Each monitoring activity included a five-day visit to a sample of the total number of sites. Monthly visits by NaNA were limited to 5-8 communities, and sometimes, the same communities were visited in sequence for two months. ChildFund, The Gambia conducted 3 quarterly monitoring visits in region 2 and 2 in region 6. The ECD unit conducted two visits to all the program sites. Most of the reports focused on the availability of facilitators, payment of allowances to facilitators, supply of toys and play materials, construction of sheds, and some enrolment. Observation of sessions was not often reported.