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Title: Effects of Online Parent Coaching on Filipino Children's Skills

Running Title: Online Parent Coaching on Filipino Children

Abstract

Technology today can possibly help make early childhood interventions more accessible to young children in need. In the present study, we conducted all assessment and training of both parents and children entirely online to examine the effectiveness of an online parental coaching programme in facilitating young Filipino children's language, literacy, and numeracy skills. Ninety-four families with 3-to 5-year-old Cebuano-speaking children were randomly assigned into either the intervention group or a waitlist control group. The 13-week long online intervention group showed significant improvement in their receptive vocabulary, syllable matching, letter name knowledge, numeral identification, object counting, rote counting, missing number identification, numerical magnitude comparison and addition skills but not in their expressive vocabulary and syllable deletion relative to the waitlist control group. No moderation effect of socioeconomic status (SES) on the online intervention outcome was found. For the intervention group, a main effect for parental involvement on rote counting, missing number identification, and addition was found, with higher levels of participation in the coaching programme translating to greater gains. The present study underscores the validity and feasibility of an online format of intervention and assessment procedure, in a low-to-middle-income country context (LMIC). The current findings demonstrate the possible added benefits of an online intervention format and the importance of an integrated cross-domains intervention format.

Keywords: online intervention, literacy and numeracy intervention, virtual assessment, pandemic, Philippines

Effects of Online Parent Coaching on Filipino Children's Skills

Parents are the primary teachers from whom very young children learn. The roles that parental coaching and tutoring play in children's literacy and numeracy skills have been repeatedly shown in meta-analyses (e.g., Erion, 2006; Petersen-Brown et al., 2023; Sénéchal & Young, 2008). However, as discussed in a previous recent meta-analysis (e.g., Y.-S. G. Kim et al., 2020), while the majority of literacy interventions have focused on the school context, only a few of them have focused on the home context. Additionally, Y.-S. G. Kim et al. (2020) observed a smaller effect size in intervention outcomes in studies conducted in Southeast Asia regions as compared to other LMIC regions (e.g., Latin America).

With the rise in technology advancements, an online format of intervention might help parents and children in the LMIC context via a decrease in both monetary and time cost (J. Kim, 2020). The closure of distance and opportunity gaps that online interventions provide is crucial, as research in an LMIC context has illustrated the association between long travel time to school and poor learning outcomes (Afoakwah & Koomson, 2021). Coincidentally, the COVID-19 pandemic provided us with an interesting opportunity to examine the effects of an online intervention. The increase in parental participation in home learning environments (Aram et al., 2022) and the prolonged closure of schools in LMIC countries in comparison to other countries (e.g., Gutierrez, 2022) during the pandemic have underscored the potential importance of online interventions: A focus on coaching parents to support the learning progress of their young children is important so as to minimize the difference in skills gaps between children owing to potential learning loss (e.g., Donnelley & Patrinos, 2021).

The present study represents one of the first studies conducted on parental training and children's learning outcomes conducted entirely online. Given the importance of language, literacy, and numeracy skills for children's subsequent academic achievement (e.g.,

Betts et al., 2009; Duncan et al., 2007; Kagitcibasi et al., 2009), the challenges and potential benefits of conducting an online intervention are clear. Moreover, particularly in the pandemic and LMIC context, it is essential to understand the extent to which online assessments and training can be effective for children and their families.

In the present study, we cast a relatively wide net in order to understand the effects of an online intervention on children's learning. The role of SES and parental involvement was additionally considered. The study took place in an LMIC context – Cebu, Philippines with families of varying socioeconomic backgrounds.

Importance of Early Skills for Later Development

Learning is a cumulative and ongoing developmental process whereby the skills acquired in early childhood are the foundation to build upon in acquiring new skills (Newport et al., 2001). Research on home learning environments has collectively suggested that early exposure to both literacy and numeracy concepts at home is crucial to the development of children's language, literacy, and numeracy skills, especially before the beginning of formal education (e.g., LeFevre et al., 2010; Sénéchal & LeFevre, 2002; 2014). Consequently, due to varying levels of language, print, and numeracy exposure at the home level, the initial skills expressed by children may be different, and such differences may persist into later development (see Pfof et al., 2014). Particularly, the cumulative effect of those with better initial literacy and numeracy skills may continue to facilitate greater gains compared to those with lower initial skills (see Stanovich, 2009). Therefore, it is imperative for young children to acquire solid language, literacy, and numeracy skills in early childhood.

Effects of Parental Coaching

Parental coaching programmes can be categorized into two main types – broad-based and domain-specific programmes, with the latter appearing to be more beneficial to children's acquisition of language, literacy, and numeracy skills (see Cheung et al., 2021).

While broad-based parental coaching interventions tend to focus on general parenting skills, domain-specific parental coaching interventions are typically focused primarily and specifically only on aspects of language, literacy, and numeracy skills acquisition (Cheung et al., 2021). Generally, a parental coaching programme that draws the attention of the parent to the teaching principles of children's literacy and numeracy skills can help to develop their competencies in them (e.g., Niklas et al., 2016; Niklas & Schneider, 2017).

Research has highlighted the success of domain-specific parental coaching interventions. For example, a review by Reese et al. (2010) suggested that parental coaching training has met with great success in improving both the language (i.e., vocabulary, phonological, lexical, syntactic, and narrative) and literacy skills (i.e., print concepts and writing of letters) of young children. For example, a dialogic reading intervention, an intervention where parents are taught parent-child reading techniques to promote children usage of increasingly complex language via scaffolded interactions in the context of picture book reading (Zevenbergen & Whitehurst, 2003), has shown promising effects on enhancing children's language development (Arnold et al., 1994; Dowdall et al., 2020). Similar success has been demonstrated in Asia. Dialogic reading has been successful in enhancing both Chinese (L1) and English (L2) language skills and literacy skills in Hong Kong preschool children (Chow et al., 2008; Chow et al., 2010). The importance of parental coaching was further highlighted by Cheung and McBride (2015) and Dulay et al. (2019), who demonstrated that Filipino parents who received domain-specific coaching were able to better support their child's learning as compared to those who did not receive such coaching. However, in the study conducted by Niklas et al. (2016) in Australia, despite coaching on principles of counting and dialogic reading, the intervention group only showed significant gains in verbal comprehension and home literacy environment, but not in their literacy and numeracy skills, as compared to those in the uncoached group. These nonsignificant results

may be attributable both to the possible influence of migration background of the sample as well as to the non-intensive nature of intervention: Indeed, the intervention group only participated in one information session and one individualized coaching session, respectively. In the present study, we focused on the effects of domain-specific parental coaching in an online context.

Online Synchronous vs Asynchronous Intervention

One advantage of online learning as compared to face-to-face in-person learning is that online learning might increase the participation rate by decreasing the participation cost of travelling (J. Kim, 2020). However, online learning is not all alike. Online learning can be broadly categorized as either synchronous or asynchronous (Hrastinski, 2008a). Synchronous online learning takes place via an online videoconferencing platform (e.g., Zoom) where immediate feedback can be provided, while asynchronous online learning resembles self-directed learning where learners study at their own pace via the designated online platform (e.g., discussion board) which may only allow for delayed feedback (Hrastinski, 2008a). Hrastinski (2008b) suggested that synchronous as compared to asynchronous learning could better support participation, thereby increasing motivation and learning.

We have noted an increase in the adoption of an online synchronous intervention format, possibly due to the constraints posed by the COVID-19 pandemic (e.g., Akemoglu et al., 2021; Lunskey et al., 2021; Wattanawongwan et al., 2020). A rapid review by Furlong et al. (2021) suggested that online synchronous interventions targeting reading and spelling acquisition in children have been found to be reliable and successful. Although Furlong et al. (2021) suggested that both online and offline interventions have been equally effective, most of the studies reviewed lacked a randomized control group; they also typically included only a small sample size. Moreover, little to no research to date has set out to evaluate the effectiveness of an online synchronous numeracy intervention.

Only a handful of studies have evaluated the efficacy of an online synchronous parental coaching programme. Pierson et al. (2021) administered an online parental coaching intervention on dialogic reading to a group of young children with developmental disabilities. Although no significant improvement in the language skills of children was found, their research showed that parents were able to successfully acquire the skills needed to implement dialogic reading via the online coaching intervention with a high level of fidelity (Pierson et al., 2021). On the other hand, Akemoglu et al. (2021) found that the online format of parental coaching using a shared reading intervention was both feasible and successful in promoting parental modelling behaviour and children's language outcomes. Hence, parents are able to be coached successfully via an online format. To maximize the potential benefits of intervention and avoid the fadeout effect in intervention, the intervention needs to be sustained for a long period (Bailey et al., 2016). One way of counteracting a fadeout effect is by emphasizing the continued efforts on parental teaching of children's early skills at home by equipping parents with the necessary skills. The important role that parents play in promoting children's skills is sometimes described in terms of home literacy and numeracy environments (see Cheung et al., 2021). In the present study, we evaluated the efficacy of an online synchronous parental coaching intervention on the language, literacy, and numeracy skills of three to five-year-old children in Cebu, Philippines – a Southeast Asian LMIC context. Due to the overlapping nature and co-development of language, literacy, and numeracy (see Purpura et al., 2019), we integrated the teaching of all three domains of language, literacy, and numeracy in our present online parental coaching programme.

Role of SES and Parental Involvement

SES contributes to the development of language, literacy, and numeracy skills in young children, with those with a relatively higher SES often manifesting greater skills (e.g., Kluczniok, 2017; Lee & Otaiba, 2015; Walker et al., 1994). The discrepancy gap in early

skills caused by SES also tends to widen during early childhood (Duncan et al., 2012; Klein et al., 2008). Duncan and Magnuson (2011) have previously shown that the gap in scores of early math skills by low versus high-income young US children could be as large as 1.3 standard deviations apart. Thus, the implementation of parental coaching programmes might be influenced by SES. Across meta-analyses, children from disadvantaged backgrounds appeared to benefit less from parental coaching interventions as compared to those from more advantaged families (e.g., Manz et al., 2010; Mol et al., 2008). Particularly, families of high SES may have increased affordances and knowledge to provide higher quality home learning activities and resources to better benefit their children's learning (e.g., Davis-Kean et al., 2021; Neumann, 2016; Susperreguy et al., 2021). Together, these research findings suggest that SES might play a moderating role on possible intervention outcomes.

Previous research on parental involvement suggests that a higher level of parental involvement is generally positively related to children having better learning outcomes (e.g., Ma et al., 2016). Furthermore, in the parental coaching intervention conducted by Dulay and colleagues (2019), children whose parents were more involved in the intervention programme were more likely to attain higher scores in the post-test assessment. Hence, the present study also evaluated the potential main effect of parental involvement.

Present Study

Few studies have set out to investigate the effect of parental coaching intervention in an LMIC context (e.g., Y.-S. G. Kim et al., 2020), especially, of an online nature. Home learning environments are known to be less favourable in LMIC contexts (Park, 2008). The need for a parental coaching intervention programme in an LMIC context is exemplified by Ghazali et al. (2021), who found that parents in Malaysia generally possess an awareness of the important role that they play in their children's early skills acquisition. However, most parents lack the knowledge and effective instructional strategies to facilitate their children's

learning at home. A similar sentiment was echoed by Philippines parents of urban poor communities with a low literacy level; they have also expressed the desire to participate in the development process of their children's literacy development but do not necessarily possess the knowledge to do so (Pado, 2006). As similar parental coaching interventions have been found to be successful in LMIC contexts (Philippines: Dulay et al., 2019; Turkey: Ergül et al., 2016), we chose Cebu, Philippines as our target in which to adopt an online parental coaching intervention in the Philippines.

The present study set out to evaluate the effectiveness of an online synchronous version of a parental coaching programme on children's language, literacy, and numeracy skills in a sample of 3-to-5-year-old Cebuano children. The present study was an extension of work by [redacted for review] who previously demonstrated the efficacy of an in-person face-to-face format of parental coaching programme in promoting children's language, literacy, and numeracy skills in Cebu, Philippines. In the present study, the intervention was conducted in an online synchronous format that included a combination of numeracy, phonological awareness, letter naming knowledge and dialogic reading training. Importantly, the Philippines experienced one of the longest lockdowns in the world during the COVID-19 pandemic; the two-and-a half-year-long lockdown may have impeded learning and schooling opportunities (Gutierrez, 2022). We hypothesized that with the children's gender, age, and preschool experience statistically controlled, children in the intervention group were expected to express significant gains in their early language, literacy, and numeracy skills as compared to the waitlist control group.

Furthermore, the present study also examined the potential moderating effect of SES and parental involvement on the effectiveness of the intervention programme. We hypothesized that children with higher SES and parental involvement in the intervention programme would demonstrate greater gains.

Method

Study Design

The present study utilized an online videoconferencing platform for both assessments and intervention administration. The study design was approved by the [redacted for review] Human Research Ethics Committee. The children were assessed on their language, literacy, and numeracy skills at both pre- and post-test timepoints. With the technical support and assistance that the parents provided, the children were tested individually by trained psychometricians via an online approach at their home at both time points. Each testing session lasted roughly 40 minutes. As noted in our pilot study, some parents would try to provide hints or answers to the child. Hence, the psychometricians reminded parents to refrain from coaching their children before the start of the data collection procedure. Upon completing the pre-assessment, the participants were then informed regarding their group assignment into either the intervention or waitlist control group. After the 13-week intervention, families in both the intervention and waitlist control group were scheduled to perform the post-test assessment. Upon the completion of the post-test assessment by all participants, families in the waitlist control group were then invited to participate in the 13-week long intervention.

Participants

The recruitment work of the participants was managed by a non-governmental organization (NGO) in the Philippines with whom we collaborated. Initially, 122 families (59 intervention, 63 waitlist control) fully completed the pre-assessment. However, there was some attrition. Reasons for attrition among the intervention groups included non-attendance in the intervention orientation ($n=2$), failure to complete the 13-week long intervention ($n=5$), and incomplete post-assessment ($n=2$), while 19 families from the waitlist control group declined to participate in the post-assessment. The final sample consisted of 94 families (50

intervention; 44 waitlist control group) who fully participated and completed both the pre-and post-assessment procedure. The demographic information of the final sample is presented in Table 1. Notably, the majority of the children did not have any form of preschool education (78.7%) while only a small fraction of children was either currently attending their first year (8.5%) or had completed one or more years of preschool education (11.7%). Only 5 of the children (4 waitlist control group) had previous experience with online learning. All children were native Cebuano speakers; however, due to the prevalence of code-switching and multilingual learning environment presented in the Philippines, the primary medium of instruction adopted by our study was both Cebuano and English. It should be noted that children were not prohibited from using Filipino in their responses to both psychometricians and teachers.

Parents were also invited to complete a parental questionnaire consisting of demographic information on parental educational level, income, and child's level of preschool education.

Measures

The same set of assessment materials of parental questionnaires and child assessments was used across both pre-and post-assessments. Additionally, data on parental involvement and teacher performance were extracted from the reports of program implementation. The children's assessments materials adopted consisted of measures that were previously devised by [redacted for review] which was administered to a large sample of 673 Cebuano-speaking children of similar ages, where strong psychometric properties were noted. The online data collection was conducted via a video-conferencing platform with native Cebuano-speaking psychometricians who were blinded to the group assignment of the participants. We chose to adopt the approach of presenting the digitalized version of paper assessment measures using

the screen sharing function during the online assessment, a practice that was similarly adopted by L. J. Thomas et al. (2022).

Children's Assessment

Language measures. The children were tested on both their receptive and expressive vocabulary measures. The receptive vocabulary task consisted of a 20-item task whereby the psychometrician read aloud a word in Cebuano and used their computer mouse to individually point to the four pictures shown to the child. The child was asked to respond “yes” when the computer mouse pointed to the picture that corresponded to the word read by the psychometrician. A stop criterion of 5 consecutive wrong responses was put in place for this task. Next, the expressive vocabulary task consisted of 10 items wherein the child was asked to name the picture that was shown to them aloud. In this task, although the child was encouraged to answer in Cebuano, both Filipino and English responses were accepted too, and one point was awarded for each correct answer, regardless of the language choice.

Literacy measures. The literacy measures consisted of a syllable matching task, syllable deletion task, and letter name knowledge task. The syllable matching task consisted of 10 items; for each, the children heard either a two- or three-syllable Cebuano word and they would have to choose which of the next two words share a similar beginning sound as the first Cebuano word heard. A stop criterion of five consecutive wrong responses was put in place for this task. Next, the syllable deletion task consisted of 12 items with a similar five wrong response stop criterion established. The children were asked to either delete the beginning, middle or last syllable of a two- or three-syllable Cebuano word heard. For example, when the two-syllable word “buka” is heard, the children were asked to delete the syllable “bu” and answer only the remaining syllable “-ka”. Finally, the 28-item letter name knowledge task required the children to name all the randomized 28 letters of the Filipino alphabets. A stop criterion of 10 consecutive incorrect responses was put in place.

Numeracy measures. The numeracy measures consisted of six tasks in total, namely, the numeral identification, object counting task, rote counting, missing number task, numeral magnitude comparison task and the addition task. In the numeral identification task, the child was asked to identify 10 of each single- and double-digit number, with a total of 20 numbers. A stop rule of five consecutive wrong responses was established for this task. Next, in the object counting task, the child was asked to count aloud a sequence of animals printed on a booklet for a total of 14 trials. A four-consecutive-wrong response stop rule was enacted for this task. In the 4-item rote counting task, the child was required to count out aloud a sequence of 10 numbers and one point was awarded for each correct number count after the beginning number where the child could obtain a maximum possible score of 9 points per item. No stop rule was put in place for this task. Next, in the 12-item missing number task, the child was shown a sequence of three numbers, with either the first, middle or last positioned number missing. The child was asked to say aloud the missing number. A stop rule of four consecutive incorrect responses was put in place. In the 10-item numerical magnitude comparison task, the child was shown a total of two numbers side-by-side and the child was asked to indicate which of the number is bigger than the other. A stop rule of three consecutive wrong responses was established. Finally, in the 6-item addition task, the child was asked to add up two single-digit numbers and say aloud their answer. Similarly, a stopping rule of three consecutive incorrect responses was established.

Demographic Information

Both the mother's and father's educational level and both the daily and monthly income of the family were also collected via the usage of a parental questionnaire. Factor scores were computed to create a composite score for SES. The level of parental education was rated on an 8-point scale (1 = elementary level, 2 = elementary graduate, 3 = high school level, 4 = high school graduate, 5 = vocational graduate, 6 = college level, 7 = college

graduate, 8 = professional or postgraduate degree). The family income was reported in Philippine pesos (₱). In instances where monthly income was not reported, the reported daily income was multiplied by 21.75 days to create a consistent measure of monthly parental income (e.g., Cheung et al., 2020).

Parents were also required to specify their child's current level of preschool education as well as the total number of formal school years completed. To create an overall index for preschool attendance, the reported level of preschool education was coded into 0 to 2 (0 = no previous experience of preschool education, 1 = currently attending the first year of preschool education and 2 = completed one or more than one year of preschool education).

Intervention-Related Measures

Parental involvement. At the start of each intervention session, parents were asked by teachers to self-report, in minutes, the time spent practicing the learned coaching activities with their children during out-of-intervention sessions. An overall index for parental involvement was devised by summing up the averaged parent self-report time in minutes per week and then dividing them by the total number of intervention weeks participated.

Teacher effects. A 20-item teacher performance appraisal form that was previously reported in [redacted for review] was adopted to allow lead teachers to evaluate the teachers' performance. The 20-item questionnaire used a 5-point scale, ranging from 0 (unsatisfactory) to 4 (very good). The items in the questionnaire examined the teacher's time management skills, effective teaching strategies, quality of session preparation and communication skills.

Parental Coaching Intervention

The parental coaching programme was held from May to August 2021. In the current parental coaching intervention, we aimed to adopt and adapt the content used in the previous parental coaching programme [redacted for review] to be an online synchronous version, and to concurrently coach on all three domains of numeracy, early literacy, and dialogic reading.

The parental coaching intervention consisted of a teacher implementing a strategy of providing modelling, practice, and feedback on the intervention carried out by participating parents on ways to provide higher-quality scaffolding in numeracy, literacy, and language-related interactions with their children, in efforts to increase their competency in learning [redacted for review] following principles from Bandura's social learning theory and Vygotsky's sociocultural theory (Bandura & Walters, 1963; Vygotsky, 1978).

The parental coaching intervention lasted for a total of 13 weeks long with each individualized coaching session lasting for around 45 to 60 minutes, where, in the first 15 minutes, teacher taught the parents the components and strategy of conducting the coaching activities. After this, the parents were asked to model the teacher's teaching behaviour. For the remaining time, the teacher observed, facilitated, and supported the parents in their implementation of coaching activities that was learnt. Each family had undergone a minimum of two (e.g., Monday-Wednesday or Tuesday-Thursday sessions) and a maximum of three coaching sessions (e.g., alternate Friday sessions) with the teacher per week. The structure of the 13-week long intervention is summarized in Table 2. Notably, the intervention programme was separated into three focus areas on first developing numeracy skills, followed by literacy and language skills, where the skills are built upon progressively (i.e., 1st-5th week: numeracy training; 6th-10th week: numeracy and literacy training; 11th-13th week: numeracy, literacy, and dialogic reading). The structure and content of the intervention were developed together with the collaborating NGO, following consultation with the research team. During the intervention, a weekly parental guide was distributed to the intervention group via email to serve as a reference for parents in coaching their children.

In-Charge Teacher Assignment

Six native Cebuano-speaking teachers with a bachelor's degree in elementary education were in charge of implementing the intervention procedure. All teachers were

trained by the collaborating NGO to be proficient in all parts of the parent coaching intervention programme. Each teacher was responsible for 8 to 10 families.

Treatment Fidelity

To ensure treatment fidelity, three levels of monitoring were used in the current study which were led by the lead teachers. Lead teachers were tasked with supervising and evaluating the teachers' performances but not with implementing the intervention directly.

Individual teacher records. In-charge teachers were required to submit checklists and narrative reports regarding each child's progress in their learning milestones. Checklists and narrative reports were completed weekly and submitted to the lead teachers for review. With the option of rescheduling lessons, the majority of the families in the intervention group ($N= 43$; 86.0%) fully completed and participated in the 32 coaching sessions available. The remaining 7 families (14.0%) in the intervention group had missed a single coaching session, with only 2 families missing two and three sessions respectively.

Team-level monitoring. Weekly meetings between teachers and the lead teachers were conducted to discuss issues and concerns that had arisen from the implementation of the parental coaching intervention. The lead teachers also conducted refresher courses to provide additional support on the teaching materials that the in-charge teachers may have experienced problems with.

Centralized on-site monitoring. Lead teachers joined the coaching sessions at random times to observe the in-charge teachers' performance. The lead teachers provided immediate feedback and assistance to teachers in helping to address the potential concerns that they might have had. Finally, the research team was consulted via email by the NGO if any concerns regarding the intervention programme arose.

Teacher evaluation. The lead teachers evaluated the teachers' performance via online observations made and the submission of teacher records. Our data suggested that the

teachers' performance were relatively comparable, with their scores ranging from 3.15 to 3.45 ($M = 3.24$, $SD = 0.11$) on the 20-item teacher performance appraisal form.

Statistical Analysis

The descriptive statistics, including the means, standard deviations, skewness, ranges, and internal reliabilities of children measures and demographics variables in both pre-and post-assessment, were computed first. Next, one-way analyses of covariance (ANCOVA) with children's gender, age, preschool experience, and pre-test scores controlled were performed to test the effectiveness of parental coaching programme in improving children's language, literacy, and numeracy skills across the intervention and waitlist control group. Next, hierarchical regression analyses were performed to examine the potential moderating effect of SES on the effectiveness of the intervention programme. The first block of the hierarchical regression analyses consisted of a base model comprising of variables used in the previous significant ANCOVA analyses, the second block consisted of the main effect model that included the SES factor score, and the third block consisted of the interaction model by computing an interaction term between the SES factor score and group to test the potential moderating effect. To examine the potential effect of parental involvement, a hierarchical regression analysis was used as well. The first block consisted of the age, gender, preschool education, pre-test scores and teacher effect while the second block consisted of parental involvement to evaluate the main effect of parental involvement. Across all analyses, for instances where missing data occurred, such cases were excluded from the corresponding analyses.

Results

The means, standard deviations, skewness, ranges, and reliabilities for children's measures are presented in Table 3. The skewness of most children measures in both groups across both time points were well in the acceptable range of -2 and +2 (Hair et al., 2022)

which suggests an acceptable distribution, except for the syllable deletion task at the pre-test timepoint of both groups, which was found to be positively skewed; in addition, the object counting task at the post-test timepoint for the intervention group was negatively skewed. The reliabilities of most child measures in both the pre-and post-test showed good internal reliabilities ($\alpha \geq 0.81$), with the exception of the expressive vocabulary task which had lower but acceptable values of $\alpha = 0.72$ and $\alpha = 0.63$ across both time points. The SES profiles of the current sample are reported in Table 4. Following the income bracket classification adopted by the Philippine government (Domingo, 2020), our sample consisted of primarily families from ‘poor’ and ‘low-income but not poor background’, and of high paternal ($M = 5.69$, $SD = 1.33$) and maternal ($M = 6.03$, $SD = 1.20$) educational level.

Due to random assignment and efforts to establish pre-test group equivalence, the effects of groups on the children’s performance in the pre-test assessment were examined using ANCOVAs with gender, age, and preschool attendance as covariates. The results are reported in Table 5. With gender, age and preschool attendance controlled, no significant differences across groups were found, apart from the higher level of receptive vocabulary skills shown by the waitlist control group as compared to the intervention group ($p = .001$). Both groups also did not differ significantly in their SES factor scores ($p = .580$). Furthermore, chi-square analyses showed that both groups did not differ significantly in children’s gender distribution ($\chi^2(1) = 1.16$, $p = .282$) and preschool education level ($\chi^2(1) = 3.62$, $p = .164$).

Effects of Intervention

One-way ANCOVA analyses were performed on all children’s language, literacy, and numeracy skills, with covariates of pre-test scores, children’s gender, age, and preschool attendance. The results of the intervention are shown in Table 6. For language and literacy measures, significant gains were demonstrated by the intervention group as compared to the

waitlist group for receptive vocabulary, syllable matching and letter name knowledge ($ps \leq .045$) but not for expressive vocabulary and syllable deletion ($ps \geq .102$). Significant gains were found for all numeracy measures ($ps \leq .005$). For all the significant gains expressed by the intervention group relative to the waitlist control group, a medium-to-large effect was consistently found across children's language, literacy, and numeracy skills ($\eta_p^2 = .09-.15$), except for syllable matching ($\eta_p^2 = .05$).

Potential Moderating Effect of SES on Intervention Gains

In efforts to evaluate the potential moderating factor of SES, hierarchical regression analyses were performed. A summary of the results is presented in Table 7.

As shown by the nonsignificant interaction terms of SES with group, no moderation effects were observed on any of the children's language, literacy, and numeracy skills by SES ($ps \geq .257$). Furthermore, the inclusion of SES as a main effect did not result in significant R^2 changes to the regression models of all of the children's language, literacy and numeracy skills (SES, $ps \geq .214$) except for the SES main effect found on letter name knowledge ($p = .043$). Taken together, the results suggest a trend whereby children with higher SES irrespective of group assignment scored higher only on the letter name knowledge measures ($\beta = .22$) while no similar trend was observed with the other children's skills.

The Potential Influence of Parental Involvement on Intervention

As parents were the key figures ensuring the intervention's success, the intervention gains observed from the intervention could be attributed to the level of parental involvement in practising the coaching activities via out-of-intervention sessions. Hence, the influence of parental involvement on the effects of intervention was examined using hierarchical regression analyses only with the samples from the intervention group.

Parents in the intervention group reported spending 26.4 to 94.9 minutes ($M = 45.1$, $SD = 12.9$) practicing the coaching activities out-of-intervention sessions with the children per week.

The results of hierarchical regression using parental involvement are shown in Table 8. Significant main effects of parental involvement were observed for children's numeracy skills of rote counting, missing number identification and addition ($ps \leq .038$) while non-significant main effects of parental involvement were observed for children's literacy and language skills ($ps \geq .128$) and the numeracy domains of numeral identification, object counting and numerical magnitude comparison ($ps \geq .070$). The results suggest that the higher the parental involvement in the coaching programme, the greater the gains that were made in children's rote counting, missing number identification, and addition skills.

Discussion

The present study examined the effectiveness of an online synchronous parental coaching study in improving children's language, literacy and numeracy skills in Cebu, Philippines. The current study showed that the 13-week long online parental coaching study was successful in promoting language, literacy, and numeracy skills of children in the intervention group as compared to children in the waitlist control group. The intervention effect was shown to not be moderated by SES. Finally, for the intervention group, the higher the level of parental involvement in the coaching activities, the higher the gain in children's skills of rote counting, missing number identification, and addition but not language and literacy skills.

Effects of the Online Parental Coaching Programme

Significant gains in all domains of language, literacy and numeracy skills were observed for the intervention group, except for skills in expressive vocabulary and syllable deletion. Our study demonstrated the success of an online parental coaching intervention in

promoting young children's skills in Cebu, Philippines. The effect size of our online programme outcomes was moderate-to-large, especially for numeracy skills ($\eta_p^2 = .09-.15$) while a small-to-medium effect size was found for language and literacy skills ($\eta_p^2 = .05-.10$). The effect sizes in the present study were generally higher than those observed previously in a face-to-face format of the intervention programme which only showed a small effect size across all three domains ($\omega^2 = .009-.058$; [redacted for review]). Our findings are also in line with previous findings showing similar effectiveness between the coaching activities implemented in either a face-to-face or an online format (Beschoner & Hutchison, 2016). However, it is important to note that in the present online study, we have combined all three specific intervention programmes of language, literacy, and numeracy presented in [redacted for review], with a strong focus on numeracy learning. Furthermore, the higher effect size shown in our study may be attributed to the overlapping nature of development in language, literacy, and numeracy skills (see Purpura et al., 2019). A previous meta-analysis has shown that even with initial skills of reading and numeracy controlled, both domains still consequently predict the development of one another (Peng et al., 2020). Furthermore, Nelson et al. (2021) found that at-risk kindergartners who received both literacy and numeracy support showed significant improvement in their literacy ability, scoring an estimated 23.81 points higher than those who only received literacy support. However, the smaller effect size shown in [redacted for review] as compared to the current study, may have been indicative of a possible "scale-up" effect, i.e., a decrease in effect size when a much larger sample size was adopted (see J. Thomas et al., 2018). Nevertheless, our study has demonstrated that online parental coaching can be a successful method to promote young children's language, literacy, and numeracy abilities.

Though parental coaching has previously been shown to improve children's vocabulary and phonological awareness (e.g., Bus & van Ijzendoorn, 1999; Marulis &

Neuman, 2013), limited gains in such skills were found in the present study. Children were only found to express significant gains in both receptive vocabulary and syllable matching tasks but not in expressive vocabulary and syllable deletion. Moreover, we believe that the nonsignificant gains found are likely attributable to the tasks being relatively difficult and unfamiliar to the group of young Cebuano children. Another possible reason for the nonsignificant gains found might be due to the dosage effect, as training on phonological skills and dialogic reading was only implemented in the later parts of the intervention, therefore leading to significant gains in the comparatively easier language and literacy tasks of receptive vocabulary and syllable matching only.

Importantly, the present study also was successful in showing that online data collection of children's measures via an online video call format can be a viable alternative to onsite in-person data collection. Previously, L. J. Thomas et al. (2022) in their Head Start study claimed success in performing the data collection in a similar format, though reliability estimates were not examined. In contrast, our study was able to further show that such a method of data collection of children's measures can yield high validity and reliability indicators and is possibly comparable to previous face-to-face data collection ($\alpha = 0.63-0.98$ in this study vs $0.63-0.99$ in [redacted for review]), demonstrating the strong utility and feasibility of an online data collection format with young children and in low-and-middle-income country contexts.

Surprisingly, no moderation effects of SES on children's skills were found, despite previous research suggesting that differences in children's language, reading, math, and even science abilities exist across SES (see Zhang et al., 2019). The current study seemingly suggests that the intervention outcome may not be particularly influenced by SES. Results from a recent meta-analysis of shared book reading similarly pointed to similar results where no SES moderation effect was found (Noble et al., 2019). Furthermore, a recent study by

Lurie et al. (2021) found that cognitive stimulation that parents provided in the home learning environment could mediate the relationship between SES and child language, thereby highlighting the possible role parents may play in addressing SES-related disparities in children's skills. These results may also be due to the reduced cost of participation in an online format (e.g., J. Kim, 2020) which incidentally minimizes the potential moderation effect of SES. Additionally, Davis-Kean et al. (2021) have suggested that parental educational attainment as compared to other SES indicators such as family income, may play a greater role in influencing children's development. Highly educated parents may have greater capability and capacity to provide opportunities that enrich children's environment and learning (Davis-Kean et al., 2021). As our current sample consisted primarily of families with high educational attainment, this may have contributed to the lack of SES moderation effect found in the present study.

Furthermore, our online parent coaching intervention appeared to work better for parents who were more involved in practicing coaching activities for several numeracy measures. Interestingly, a higher level of out-of-session parental involvement was shown by the present intervention families as compared to the previous face-to-face format of intervention ($M = 45.1$ minutes, $SD = 12.9$ in the present study vs $M = 19.3$ minutes, $SD = 7.78$ in [redacted for review]). One possible reason for the high level of parental involvement observed may be due to the multi-domain focus of the online intervention, which covered language, literacy, and numeracy in a single program, in contrast to the face-to-face intervention, wherein families focused on a single domain. The greater variety of coaching activities may have produced higher levels of interest, motivation, and engagement in the current sample. Another possible reason might be owing to the long COVID lockdown period in the Philippines (Gutierrez, 2022). This may have incidentally increased parents' availability to provide coaching and possibly parents may have viewed the coaching activities

as the sole educational opportunity that their child had at the time. Together, our findings suggest that regardless of parental SES level, as long as parents involve themselves in the intervention, the intervention effects are likely to be particularly strong for the numeracy skills of rote counting, missing number identification and addition.

Limitations and Future Directions

Several limitations should be noted in the present study. First, due to the combined coaching of children's language, literacy, and numeracy skills and an unequal distribution of focus (i.e., primary focus on numeracy domain), the current study was unable to disentangle the effects of specific intervention programme components. As research suggests a potential linkage between early language, literacy, and numeracy skills in young children (see Purpura et al., 2019), the present study was not able to determine the extent to which the significant gains observed in each domain can be attributed to the occurrence of specific domain skills training or due to the potential cross-domain training. For example, significant gains in vocabulary skills observed in the present study may not be solely accounted for by our 3-week long dialogic reading intervention but via numeracy training as past research suggests that gains in vocabulary skills could potentially be attributed to the reciprocal co-development of better numeracy performance (e.g., Kwok et al., 2021).

As there was a relatively large portion of dropouts from the waitlist control group in the post-test assessment, we have additionally examined the pre-test performance between the 19 dropouts and the 44 retained participants in the waitlist control group. The results of the descriptive statistics and ANCOVA analyses are reported in Appendix A. With gender, age and preschool attendance controlled, the one-way ANCOVA analyses revealed that, compared to the retained participants, the dropouts were significantly weaker in their performance on language and literacy measures ($ps \leq .049$), but not in their performance on letter name knowledge and numeracy skills ($ps \geq .059$). Future studies could possibly

consider adopting a run-in period, providing participants a sneak peek into the intervention contents to help decrease attrition rates and increase commitment in completing the study (Ulmer et al., 2008).

It is important to note that the present study only explored the role of receptive and expressive vocabulary in our examination of language measures, which consequently only covers a small subset of the language construct. Future studies could consider testing for other language-related constructs to further extend the examination of the possible beneficial gains of parental coaching on other language skills, apart from vocabulary skills, as previous studies have shown the possible relations between parent-child shared reading, morphological knowledge, and syntax comprehension (e.g., Mol & Bus, 2011; Sénéchal et al., 2008).

Additionally, we faced both expected and unexpected challenges due to the unique circumstances (i.e., pandemic) and the online format of data collection in a low-to-middle-income country. Due to relatively poor connectivity and expensive fees for internet in the Philippines, our study may not be representative of low-income Filipino families as we had to exclude participants who could not afford to have internet access or a stable one.

Furthermore, due to the unstable nature of the internet, we expected that calls might get disconnected during sessions. Hence, we opted for a lenient and flexible scheduling framework in which participants who were absent or where instances of unexpected multiple disconnections occurred, the participants were recontacted by the NGO to allow for another assessment or coaching intervention session to be scheduled. Moreover, as some participants were unfamiliar with or did not have the resources to handle digital documents, some parents found it difficult to affix their e-signature to the consent forms. To overcome this issue, we opted for a version of the consent form on Google Forms, where parents were only required to provide their details and consent without the need to affix their signature. We consistently

opted to use the most ecologically valid approach when coming up with solutions to the challenges of online training.

Future studies could further evaluate the efficacy of an online intervention study via the examination of the retention effect of the intervention's beneficial outcomes. As the positive effect of intervention might be diminished over the course of time (Bailey et al., 2016), future studies could conduct a follow-up assessment of the children's skills to examine the possible retention of intervention benefits. Furthermore, future studies could also try to examine a parental coaching intervention of different weightings of focus (e.g., numeracy vs language), in an effort to examine the potential cross-domain benefits of the intervention outcomes in relation to children's skills across domains. Future studies could also consider collecting ratings of both parents' and children's levels of programme engagement as an additional form of implementation fidelity. Nelson et al. (2020) noted that among different indicators of implementation fidelity of a mathematical intervention (i.e., delivery quality, engagement, and adherence), only student engagement was found to be significantly associated with their math performance. Though the present study ensured a high quality of intervention delivery, future studies could measure both parents' and children's level of engagement during the coaching activities.

Despite the limitations and multitude of challenges faced, the present study was able to showcase the effectiveness of an online parenting coaching programme in an LMIC context. The present online parental coaching intervention was successful in assisting young children to learn and develop in the comfort and safety of their homes. With the additional benefits obtained from the online nature in reducing the opportunity cost of participation such as travel and monetary cost, this online intervention appears to be a feasible alternative form of intervention, possibly unlocking future exciting possibilities of an online intervention as a high level of out-of-session parental involvement was observed in the present study.

Furthermore, the online intervention presented promising results that may mitigate the potential moderating effect of SES. Finally, our findings again underscore the importance of parental involvement and the role that parents play in the development of their children's language, literacy, and numeracy skills in the Philippines.

References

- Afoakwah, C., & Koomson, I. (2021). How does school travel time impact children's learning outcomes in a developing country?. *Review of Economics of the Household* 19, 1077–1097. <https://doi.org/10.1007/s11150-020-09533-8>
- Akemoglu, Y., Hinton, V., Laroue, D., & Jefferson, V. (2021). A Parent-Implemented Shared Reading Intervention via Telepractice. *Journal of Early Intervention*, 44(2), 190–210. <https://doi.org/10.1177/10538151211032211>
- Aram, D., Croitoru-Cohen, T., Karabanov, G. M., & Mor, L. (2022). Shared book reading at home and at school prior to and since the COVID-19 outbreak. OMEP: Theory into Practice N° 5-2022.
- Arnold, D. H., Lonigan, C. J., Whitehurst, G. J., & Epstein, J. N. (1994). Accelerating language development through picture book reading: Replication and extension to a videotape training format. *Journal of Educational Psychology*, 86(2), 235–243. <https://doi.org/10.1037/0022-0663.86.2.235>
- Bailey, D. H., Nguyen, T., Jenkins, J. M., Domina, T., Clements, D. H., & Sarama, J. S. (2016). Fadeout in an early mathematics intervention: Constraining content or preexisting differences?. *Developmental Psychology*, 52(9), 1457–1469. <https://doi.org/10.1037/dev0000188>
- Bandura, A., & Walters, R. H. (1963). *Social learning and personality development*. Holt, Rinehart and Winston.

- Beschorner, B., & Hutchison, A. (2016). Parent education for dialogic reading: Online and face-to-face delivery methods. *Journal of Research in Childhood Education*, 30(3), 374–388. <https://doi.org/10.1080/02568543.2016.1178197>
- Betts, J., Pickart, M., & Heistad, D. (2009). Construct and predictive validity evidence for curriculum-based measures of early literacy and numeracy skills in kindergarten. *Journal of Psychoeducational Assessment*, 27(2), 83–95. <https://doi.org/10.1177/0734282908323398>
- Bus, A. G., & van Ijzendoorn, M. H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology*, 91(3), 403–414. <https://doi.org/10.1037/0022-0663.91.3.403>
- Cheung, S. K., & McBride, C. (2015). Evaluation of a parent training program for promoting Filipino young children's number sense with number card games. *Child Studies in Asia-Pacific Contexts*, 5(1), 39–49. <https://doi.org/10.5723/csac.2015.5.1.039>
- Cheung, S. K., Dulay, K. M., & McBride, C. (2020). Parents' characteristics, the home environment, and children's numeracy skills: How are they related in low- to middle-income families in the Philippines? *Journal of Experimental Child Psychology*, 192, 1–19. <https://doi.org/10.1016/j.jecp.2019.104780>
- Cheung, S. K., Dulay, K. M., Yang, X., Mohseni, F., & McBride, C. (2021). Home literacy and numeracy environments in Asia. *Frontiers in Psychology*, 12, 1–20. <https://doi.org/10.3389/fpsyg.2021.578764>
- Chow, B. W.-Y., McBride-Chang, C., & Cheung, H. (2010). Parent-child reading in English as a second language: Effects on language and literacy development of Chinese

kindergarteners. *Journal of Research in Reading*, 33(3), 284–301.

<https://doi.org/10.1111/j.1467-9817.2009.01414.x>

Chow, B. W.-Y., McBride-Chang, C., Cheung, H., & Chow, C. S.-L. (2008). Dialogic reading and morphology training in Chinese children: Effects on language and literacy. *Developmental Psychology*, 44(1), 233–244. <https://doi.org/10.1037/0012-1649.44.1.233>

Davis-Kean, P. E., Tighe, L. A., & Waters, N. E. (2021). The role of parent educational attainment in parenting and children's development. *Current Directions in Psychological Science*, 30(2), 186–192. <https://doi.org/10.1177/0963721421993116>

Domingo, K. (2020, September 17). Who are identified rich, poor? Gov't shows income class brackets in PH. *ABS-CBN News*. <https://news.abs-cbn.com/news/09/17/20/who-are-identified-rich-poor-govt-shows-income-class-brackets-in-ph>

Donnelly, R., & Patrinos, H. A. (2021). Learning loss during Covid-19: An early systematic review. *Prospects*, 1–9. <https://doi.org/10.1007/s11125-021-09582-6>

Dowdall, N., Melendez-Torres, G. J., Murray, L., Gardner, F., Hartford, L., & Cooper, P. J. (2020). Shared picture book reading interventions for child language development: A systematic review and meta-analysis. *Child Development*, 91(2), e383–e399. <https://doi.org/10.1111/cdev.13225>

Dulay, K. M., Cheung, S. K., Reyes, P., & McBride, C. (2019). Effects of parent coaching on Filipino children's numeracy, language, and literacy skills. *Journal of Educational Psychology*, 111(4), 641–662. <https://doi.org/10.1037/edu0000315>

- Duncan, G. J., & Magnuson, K. (2011). The nature and impact of early achievement skills, attention skills, and behavior problems. In G. J. Duncan & R. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 47– 69). Russell Sage Foundation.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446. <https://doi.org/10.1037/0012-1649.43.6.1428>
- Duncan, G. J., Magnuson, K., Kalil, A., & Ziol-Guest, K. (2012). The importance of early childhood poverty. *Social Indicators Research*, 108(1), 87–98. <https://doi.org/10.1007/s11205-011-9867-9>
- Ergül, C., Akoglu, G., Sarica, A. D., Karaman, G., Tufan, M., Bahap-Kudret, Z., & Zülfikar, D. (2016). An Adapted Dialogic Reading Program for Turkish Kindergarteners from Low Socio-Economic Backgrounds. *Journal of Education and Training Studies*, 4(7), 169–184. <https://doi.org/10.11114/jets.v4i7.1565>
- Erion, J. (2006). Parent tutoring: A meta-analysis. *Education and Treatment of Children*, 29(1), 79–106.
- Furlong, L., Serry, T., Bridgman, K., & Erickson, S. (2021). An evidence-based synthesis of instructional reading and spelling procedures using telepractice: A rapid review in the context of COVID-19. *International Journal of Language & Communication Disorders*, 1–17. <https://doi.org/10.1111/1460-6984.12619>

- Ghazali, M., Mustafa, Z., Rabiatal-Adawiah, A. R., & Amzah, F. (2021). Parental involvement in young children's learning of numeracy. *International Journal of Learning, Teaching and Educational Research*, 20(1), 199–222.
<https://doi.org/10.26803/ijlter.20.1.11>
- Gutierrez, J. (2022, August 22). Philippines Returns to School, Ending One of World's Longest Shutdowns. *The New York Times*.
<https://www.nytimes.com/2022/08/22/world/asia/philippines-covid-school-shutdown-ends.html>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage.
- Hrastinski, S. (2008a). Asynchronous and synchronous e-learning. *Educause Quaterly*, 4, 51–55.
- Hrastinski, S. (2008b). The potential of synchronous communication to enhance participation in online discussions: A case study of two e-learning courses. *Information & Management*, 45(7), 499–506. <https://doi.org/10.1016/j.im.2008.07.005>
- Kagitcibasi, C., Sunar, D., Bekman, S., Baydar, N., & Cemalcilar, Z. (2009). Continuing effects of early enrichment in adult life: The Turkish Early Enrichment Project 22 years later. *Journal of Applied Developmental Psychology*, 30(6), 764–779.
<https://doi.org/10.1016/j.appdev.2009.05.003>
- Kim, Y.-S. G., Lee, H., & Zuilkowski, S. S. (2020). Impact of literacy interventions on reading skills in low-and middle-income countries: A meta-analysis. *Child development*, 91(2), 638–660. <https://doi.org/10.1111/cdev.13204>

- Kim, J. (2020). Learning and teaching online during Covid-19: Experiences of student teachers in an early childhood education practicum. *International Journal of Early Childhood*, 52(2), 145–158. <https://doi.org/10.1007/s13158-020-00272-6>
- Klein, A., Starkey, P., Clements, D., Sarama, J., & Iyer, R. (2008). Effects of a pre-kindergarten mathematics intervention: A randomized experiment. *Journal of Research on Educational Effectiveness*, 1(3), 155–178. <https://doi.org/10.1080/19345740802114533>
- Kluczniok, K. (2017). Early family risk factors and home learning environment as predictors of children's early numeracy skills through preschool. *SAGE Open*, 7(2), 1–13. <https://doi.org/10.1177/2158244017702197>
- Kwok, F. Y., Bull, R., & Muñez, D. (2021). Cross-and Within-Domain Associations of Early Reading and Mathematical Skills: Changes Across the Preschool Years. *Frontiers in Psychology*, 12, 1–14. <https://doi.org/10.3389/fpsyg.2021.710470>
- Lee, J. A. C., & Otaiba, S. A. (2015). Socioeconomic and gender group differences in early literacy skills: A multiple-group confirmatory factor analysis approach. *Educational Research and Evaluation*, 21(1), 40–59. <https://doi.org/10.1080/13803611.2015.1010545>
- LeFevre, J.-A., Polyzoi, E., Skwarchuk, S. L., Fast, L., & Sowinski, C. (2010). Do home numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children? *International Journal of Early Years Education*, 18(1), 55–70. <https://doi.org/10.1080/09669761003693926>
- Lunsky, Y., Albaum, C., Baskin, A., Hastings, R. P., Hutton, S., Steel, L., Wang, W., & Weiss, J. (2021). Group virtual mindfulness-based intervention for parents of autistic

- adolescents and adults. *Journal of Autism and Developmental Disorders*, 51, 3959–3969. <https://doi.org/10.1007/s10803-020-04835-3>
- Lurie, L. A., Hagen, M. P., McLaughlin, K. A., Sheridan, M. A., Meltzoff, A. N., & Rosen, M. L. (2021). Mechanisms linking socioeconomic status and academic achievement in early childhood: Cognitive stimulation and language. *Cognitive Development*, 58, 101045. <https://doi.org/10.1016/j.cogdev.2021.101045>
- Ma, X., Shen, J., Krenn, H. Y., Hu, S., & Yuan, J. (2016). A meta-analysis of the relationship between learning outcomes and parental involvement during early childhood education and early elementary education. *Educational Psychology Review*, 28(4), 771–801. <https://doi.org/10.1007/s10648-015-9351-1>
- Manz, P. H., Hughes, C., Barnabas, E., Bracaliello, C., & Ginsburg-Block, M. (2010). A descriptive review and meta-analysis of family-based emergent literacy interventions: To what extent is the research applicable to low-income, ethnic-minority or linguistically-diverse young children?. *Early Childhood Research Quarterly*, 25(4), 409–431. <https://doi.org/10.1016/j.ecresq.2010.03.002>
- Marulis, L. M., & Neuman, S. B. (2013). How vocabulary interventions affect young children at risk: A meta-analytic review. *Journal of Research on Educational Effectiveness*, 6(3), 223–262. <https://doi.org/10.1080/19345747.2012.755591>
- Mol, S. E., & Bus, A. G. (2011). To read or not to read: A meta-analysis of print exposure from infancy to early adulthood. *Psychological Bulletin*, 137(2), 267–296. <https://doi.org/10.1037/a0021890>
- Mol, S. E., Bus, A. G., de Jong, M. T., & Smeets, D. J. (2008). Added value of dialogic parent–child book readings: A meta-analysis. *Early Education and Development*, 19(1), 7–26. <https://doi.org/10.1080/10409280701838603>

- Nelson, P. M., Klingbeil, D. A., & Parker, D. C. (2021). An evaluation of the incremental impact of math intervention on early literacy performance. *Psychology in the Schools*, 58(3), 431–442. <https://doi.org/10.1002/pits.22455>
- Nelson, P. M., Pulles, S. M., Parker, D. C., & Kluft, J. (2020). Implementation fidelity for math intervention: Basic quality ratings to supplement adherence. *School Psychology*, 35(1), 72–79. <https://doi.org/10.1037/spq0000338>
- Newport, E.L., Bavelier, D. & Neville, H.J. (2001). Critical thinking about critical periods: Perspectives on a critical period for language acquisition. In E. Doupoux (Ed.). *Language, brain and cognitive development: Essays in honor of Jacques Mehler*, (pp. 481–502). MIT Press.
- Niklas, F., & Schneider, W. (2017). Intervention in the home literacy environment and kindergarten children's vocabulary and phonological awareness. *First Language*, 37(5), 433–452. <https://doi.org/10.1177/0142723717698838>
- Niklas, F., Cohrssen, C., & Tayler, C. (2016). Parents supporting learning: A non-intensive intervention supporting literacy and numeracy in the home learning environment. *International Journal of Early Years Education*, 24(2), 121–142. <https://doi.org/10.1080/09669760.2016.1155147>
- Neumann, M. M. (2016). A socioeconomic comparison of emergent literacy and home literacy in Australian preschoolers. *European Early Childhood Education Research Journal*, 24(4), 555–566. <https://doi.org/10.1080/1350293X.2016.1189722>
- Noble, C., Sala, G., Peter, M., Lingwood, J., Rowland, C., Gobet, F., & Pine, J. (2019). The impact of shared book reading on children's language skills: A meta-analysis. *Educational Research Review*, 28, 100290. <https://doi.org/10.1016/j.edurev.2019.100290>

- Pado, F. E. (2006). Developing young children's literacy: Family literacy practices. *CELEA Journal Bimonthly*, 29(1), 93–98.
- Park, H. (2008). Home literacy environments and children's reading performance: A comparative study of 25 countries. *Educational Research and Evaluation*, 14(6), 489–505. <https://doi.org/10.1080/13803610802576734>
- Petersen-Brown, S., Kinsey Hawley, E., Fischer, E., & Schneider, M. (2023). A review and meta-analysis of literacy interventions implemented by caregivers at home. *Preventing School Failure: Alternative Education for Children and Youth*, 1–11. <https://doi.org/10.1080/1045988X.2022.2158161>
- Peng, P., Lin, X., Ünal, Z. E., Lee, K., Namkung, J., Chow, J., & Sales, A. (2020). Examining the mutual relations between language and mathematics: A meta-analysis. *Psychological Bulletin*, 146(7), 595–634. <https://doi.org/10.1037/bul0000231>
- Pfost, M., Hattie, J., Dörfler, T., & Artelt, C. (2014). Individual differences in reading development: A review of 25 years of empirical research on Matthew effects in reading. *Review of Educational Research*, 84(2), 203–244. <https://doi.org/10.3102/0034654313509492>
- Pierson, L. M., Thompson, J. L., Ganz, J. B., Wattanawongwan, S., Haas, A. N., & Yllades, V. (2021). Coaching parents of children with developmental disabilities to implement a modified dialogic reading intervention using low technology via telepractice. *American Journal of Speech-Language Pathology*, 30(1), 119–136. https://doi.org/10.1044/2020_ajslp-20-00037
- Purpura, D. J., Litkowski, E. C., & Knopik, V. (2019). Mathematics and reading develop together in young children: practical and policy considerations. *Policy Insights from*

the Behavioral and Brain Sciences, 6(1), 12–20.

<https://doi.org/10.1177/2372732218815923>

Reese, E., Sparks, A., & Leyva, D. (2010). A review of parent interventions for preschool children's language and emergent literacy. *Journal of Early Childhood Literacy*, 10(1), 97–117. <https://doi.org/10.1177/1468798409356987>

Sénéchal, M., & LeFevre, J.-A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development*, 73(2), 445–460. <https://doi.org/10.1111/1467-8624.00417>

Sénéchal, M., & LeFevre, J.-A. (2014). Continuity and change in the home literacy environment as predictors of growth in vocabulary and reading. *Child Development*, 85(4), 1552–1568. <https://doi.org/10.1111/cdev.12222>

Sénéchal, M., Pagan, S., Lever, R., & Ouellette, G. P. (2008). Relations among the frequency of shared reading and 4-year-old children's vocabulary, morphological and syntax comprehension, and narrative skills. *Early Education and Development*, 19(1), 27–44. <https://doi.org/10.1080/10409280701838710>

Sénéchal, M., & Young, L. (2008). The effect of family literacy interventions on children's acquisition of reading from kindergarten to grade 3: A meta-analytic review. *Review of Educational Research*, 78(4), 880–907. <https://doi.org/10.3102/0034654308320319>

Stanovich, K. E. (2009). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Journal of Education*, 189(1-2), 23–55. <https://doi.org/10.1177/0022057409189001-204>

- Susperreguy, M. I., Lira, C. J., Xu, C., LeFevre, J.-A., Vega, H. B., Pando, E. V. B., & Contreras, M. O. (2021). Home learning environments of children in Mexico in relation to socioeconomic status. *Frontiers in Psychology, 12*.
<https://doi.org/10.3389/fpsyg.2021.626159>
- Thomas, L. J., Lee, M. G., Todd, C. S., Lynch, K., Loeb, S., McConnell, S., & Carlis, L. (2022). Navigating Virtual Delivery of Assessments for Head Start Children During the COVID-19 Pandemic. *Journal of Early Intervention, 44*(2), 151–167.
<https://doi.org/10.1177/10538151221085942>
- Thomas, J., Cook, T. D., Klein, A., Starkey, P., & DeFlorio, L. (2018). The sequential scale-up of an evidence-based intervention: A case study. *Evaluation Review, 42*(3), 318–357. <https://doi.org/10.1177/0193841X18786818>
- Ulmer, M., Robinaugh, D., Friedberg, J. P., Lipsitz, S. R., & Natarajan, S. (2008). Usefulness of a run-in period to reduce drop-outs in a randomized controlled trial of a behavioral intervention. *Contemporary Clinical Trials, 29*(5), 705–710.
<https://doi.org/10.1016/j.cct.2008.04.005>
- Vygotsky, L. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds.), *Mind and society: The development of higher psychological processes* (2nd ed., pp. 79–91). Harvard University Press.
- Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65*(2), 606–621. <https://doi.org/10.2307/1131404>

Wattanawongwan, S., Ganz, J. B., Pierson, L., Yllades, V., Liao, C.-Y., & Ura, S. K. (2020).

Communication intervention implementation via telepractice parent coaching:

Parent implementation outcomes. *Journal of Special Education Technology*, 37(1),

35–48. <https://doi.org/10.1177/0162643420950026>

Whitehurst, G. J., Epstein, J. N., Angell, A. L., Payne, A. C., Crone, D. A., & Fischel, J. E.

(1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of*

Educational Psychology, 86(4), 542–555. <https://doi.org/10.1037/0022->

0663.86.4.542

Zevenbergen, A. A. & Whitehurst, G. J. (2003). Dialogic reading: A shared picture book

reading intervention for preschoolers. In A. Van Kleeck, E. B. Bauer & S. A. Stahl

(Eds.), *On reading books to children: Parents and teachers* (pp. 170–192).

Lawrence Erlbaum Associates Publishers.

Zhang, X., Hu, B. Y., Ren, L., & Zhang, L. (2019). Family socioeconomic status and Chinese

children's early academic development: Examining child-level

mechanisms. *Contemporary Educational Psychology*, 59, 101792.

<https://doi.org/10.1016/j.cedpsych.2019.101792>

Table 1*Demographics Information of the Final Sample (N = 94)*

Demographic Variable	Classifications	<u>Whole Sample (N= 94)</u>	<u>Intervention (N = 50)</u>	<u>Waitlist Control (N = 44)</u>
		Percentage (n)	Percentage (n)	Percentage (n)
Age	3	24.5% (23)	30.0% (15)	18.2% (8)
	4	39.4% (37)	44.0% (22)	34.1% (15)
	5	36.2% (34)	26.0% (13)	47.7% (21)
	Total	100% (94)	100% (50)	100% (44)
	Mean (SD)	53.35 (9.41)	54.38 (9.34)	56.46 (9.48)
Gender	Male	53.2% (50)	52% (24)	59.1% (26)
	Female	46.8% (44)	48% (26)	40.9% (18)
	Total	100% (94)	100% (50)	100% (44)
	Mean (SD)	1.47(0.50)	1.52(0.50)	1.41(0.50)
Preschool Education	None	78.7% (74)	84% (42)	72.7% (32)
	1 year	8.5% (8)	10% (5)	6.8% (3)
	More than 1 year	11.7% (11)	6% (3)	18.2% (8)
	Total	98.9% (93)	100% (50)	97.7% (43)
	Mean (SD)	0.32(0.68)	0.22(0.55)	0.44(0.80)
Parent-Child Dyad	Father-Child	5.3% (5)	6% (3)	4.5% (2)
	Mother-Child	94.7% (89)	94% (47)	95.5% (42)
	Total	100% (94)	100% (50)	100% (44)
	Mean (SD)	1.95(0.23)	1.94(0.24)	1.95(0.21)

Table 2*Breakdown of the Primary Focus of the Parental Coaching Programme*

Primary focus	<u>1st – 5th Week</u>	<u>6th – 10th Week</u>	<u>11th – 13th Week</u>
	Numeracy training	Literacy training	Dialogic reading
Individualized one-on-one parental coaching lessons with parent-child dyads	- Coached a total of 6 numeracy components using the set of cards consisting of printed animals on one side, and the numeral correspond to the total number of animals printed on the side of the card. The numeral quantities on the card ranged from 1-20. - Coached (1) rote counting, (2) numeral identification, (3) object counting via counting of animals presented on the cards. - Coached (4) missing numbers by identifying missing numbers in a sequence. - Coached (5) numerical magnitude comparison through comparison of animal presented on two cards. - Coached (6) simple addition skills through summing up total number of animals presented on cards.	- Continued numeracy training. - Coached PA skills using three different activities of syllable matching, syllable clapping and syllable deletion. - Coached child to identify word pairs which share similar beginning syllable sounds with a parent-generated word list. - Coached to break words into syllables by clapping (e.g., clap twice when saying each syllable in the two-syllable word). - Taught to delete a single syllable (i.e., onset, middle and last syllable) from a two or three-syllable words via say aloud the corresponding sound. - Additionally, coached on letter names and letter sounds of the 28 Filipino alphabets. The training began with teaching the letter name and sounds that correspond to the child's name, and end when all the 28 Filipino alphabets were taught.	- Continued numeracy and literacy training. - Coached dialogic reading techniques using existing storybooks that families have at home. - Teachers modelled and taught parents the key principles of dialogic reading such as the PEER sequence (e.g., Prompt, Evaluate, Expand, and Repeat sequences) and CROWD prompts (e.g., completion, Recall, Open-ended prompts, Wh-prompts and Distancing prompting method; see, Whitehurst et al., 1994), to enable the child to be able to eventually become the storyteller instead.

Table 3*Descriptive Statistics of Children Measures Across Two Time Points (N = 94)*

Variable (Max)	Time	<u>Intervention</u> (N= 50)			<u>Waitlist Control</u> (N = 44)			Reliability
		Mean (SD)	Range	Skewness	Mean (SD)	Range	Skewness	
Receptive Vocabulary (20)	Pre	9.14(5.81)	1-20	0.33	13.52(5.45)	1-20	-0.69	0.93
	Post	17.66(1.84)	14-20	-0.441	15.68(4.03)	1-20	-1.67	0.81
Expressive Vocabulary (10)	Pre	5.44(2.52)	0-10	-0.21	6.30(2.19)	2-10	0.03	0.72
	Post	7.64(2.06)	1-10	-1.03	7.25(1.88)	3-10	-0.23	0.63
Syllable Matching (10)	Pre	2.36(3.06)	0-10	1.06	3.30(3.41)	0-9	0.36	0.91
	Post	5.96(3.38)	0-10	-0.51	4.86(3.97)	0-10	-0.15	0.92
Syllable Deletion (12)	Pre	0.62(1.94)	0-10	3.45	1.43(3.01)	0-11	2.07	0.93
	Post	4.82(4.70)	0-12	0.17	4.00(5.09)	0-12	0.61	0.97
Letter Name Knowledge (28)	Pre	11.24(10.97)	0-28	0.43	15.46(11.59)	0-28	-0.40	0.98
	Post	20.76(8.18)	0-28	-1.45	15.98(11.41)	0-28	-0.45	0.98
Numeral Identification (20)	Pre	8.08(6.66)	0-20	0.49	10.48(7.49)	0-20	-0.07	0.97
	Post	14.88(5.64)	0-20	-1.08	12.36(7.30)	0-20	-0.61	0.96
Object Counting (14)	Pre	5.90(4.36)	0-14	0.15	6.91(4.85)	0-14	-0.13	0.93
	Post	12.26(2.59)	0-14	-2.76	9.82(4.63)	0-14	-0.99	0.92
Rote Counting (36)	Pre	7.62(9.70)	0-33	1.39	12.59(13.23)	0-36	0.79	0.87
	Post	28.26(10.35)	5-36	-0.97	21.98(12.65)	0-36	-0.03	0.83
Missing Number Identification (12)	Pre	3.28(3.82)	0-12	1.19	4.84(4.47)	0-12	0.37	0.94
	Post	8.58(3.86)	0-12	-0.90	5.93(4.63)	0-12	0.02	0.94
Numerical Magnitude Comparison (10)	Pre	3.10(3.51)	0-10	0.76	4.14(3.64)	0-10	0.27	0.92
	Post	7.42(3.29)	0-10	-1.32	5.80(3.98)	0-10	-0.43	0.94
Addition (6)	Pre	1.54(1.88)	0-6	0.84	2.09(2.21)	0-6	0.50	0.87
	Post	4.38(2.33)	0-6	-1.17	2.75(2.59)	0-6	0.14	0.94

Table 4*Descriptive Statistics of Monthly Income, Parental and Maternal Education Level (N = 94)*

SES Indicators	Classifications	<u>Whole Sample (N= 94)</u>	<u>Intervention (N = 50)</u>	<u>Waitlist Control (N = 44)</u>
		Percentage (n)	Percentage (n)	Percentage (n)
Monthly Income	Poor	26.6% (25)	24.0% (12)	29.5% (13)
	Low-income but not poor	38.3% (36)	44.0% (22)	31.8% (14)
	Lower middle	25.5% (24)	24.0% (12)	27.3% (12)
	Middle	4.3% (4)	4.0% (2)	4.5% (2)
	Upper middle	2.1% (2)	-	4.5% (2)
	Upper Middle but not rich	1.1% (1)	-	2.3% (1)
	Total	97.9% (92)	96% (48)	100% (44)
	Mean (SD)	₱22236.14(23460.46)	₱19355.98(11784.24)	₱25378.13(31522.02)
Paternal Education	Elementary Level (1)	1.1% (1)	2.0% (1)	-
	High school (3)	5.3% (5)	8.0% (4)	2.3% (1)
	High school graduate (4)	13.8% (13)	14.0% (7)	13.6% (6)
	Vocational graduate (5)	16.0% (15)	18.0% (9)	13.6% (6)
	College level (6)	27.7% (26)	18.0% (9)	38.6% (17)
	College graduate (7)	34.0% (32)	36.0% (18)	31.8% (14)
	Total	97.9% (92)	96% (48)	100% (44)
	Mean (SD)	5.69(1.33)	5.54(1.50)	5.84(1.10)
Maternal Education	High school level (3)	2.1% (2)	4.0% (2)	-
	High school graduate (4)	17.0% (16)	20.0% (10)	13.6% (6)
	Vocational graduate (5)	4.3% (4)	-	9.1% (4)
	College level (6)	29.8% (28)	28.0% (14)	31.8% (14)
	College graduate (7)	45.7% (43)	48.0% (24)	43.2% (19)
	Professional/post degree (8)	1.1% (1)	-	2.3% (1)
	Total	100% (94)	100% (50)	100% (44)
	Mean (SD)	6.03(1.20)	5.96 (1.29)	6.11(1.08)

Table 5*ANCOVA Results of Group Equivalence (Pre-Test Differences Only) (N= 93)*

Measure	ANCOVA	Effect Size
Language Measure		
Receptive Vocabulary	$F(1, 88)=12.19, p=.001$	$\eta_p^2=.12$
Expressive Vocabulary	$F(1, 88)=1.61, p=.208$	$\eta_p^2=.02$
Literacy Measures		
Syllable Matching	$F(1, 88)=.93, p=.337$	$\eta_p^2=.01$
Syllable Deletion	$F(1, 88)=1.05, p=.307$	$\eta_p^2=.01$
Letter Name Knowledge	$F(1, 88)=1.63, p=.206$	$\eta_p^2=.02$
Numeracy Measures		
Numeral Identification	$F(1, 88)=.74, p=.391$	$\eta_p^2=.01$
Object Counting	$F(1, 88)=.69, p=.409$	$\eta_p^2=.01$
Rote Counting	$F(1, 88)=3.90, p=.051$	$\eta_p^2=.04$
Missing Number Identification	$F(1, 88)=1.55, p=.216$	$\eta_p^2=.02$
Numerical Magnitude Comparison	$F(1, 88)=.76, p=.387$	$\eta_p^2=.01$
Addition	$F(1, 88)=.54, p=.467$	$\eta_p^2=.01$

Table 6*ANCOVA Results of Intervention Outcome (Post-test differences covarying for pretest skills)**(N= 93)*

Measure	ANCOVA	Effect Size
Language Measure		
Receptive Vocabulary	$F(1, 87)=8.07, p=.006$	$\eta_p^2=.09$
Expressive Vocabulary	$F(1, 87)=2.73, p=.102$	$\eta_p^2=.03$
Literacy Measures		
Syllable Matching	$F(1, 87)=4.13, p=.045$	$\eta_p^2=.05$
Syllable Deletion	$F(1, 87)=2.69, p=.104$	$\eta_p^2=.03$
Letter Name Knowledge	$F(1, 87)=9.66, p=.003$	$\eta_p^2=.10$
Numeracy Measures		
Numeral Identification	$F(1, 87)=8.39, p=.005$	$\eta_p^2=.09$
Object Counting	$F(1, 87)=9.79, p=.002$	$\eta_p^2=.10$
Rote Counting	$F(1, 87)=11.47, p=.001$	$\eta_p^2=.12$
Missing Number Identification	$F(1, 87)=15.84, p<.001$	$\eta_p^2=.15$
Numerical Magnitude Comparison	$F(1, 87)=8.13, p=.005$	$\eta_p^2=.09$
Addition	$F(1, 87)=15.88, p<.001$	$\eta_p^2=.15$

Table 7*Moderation of SES Against Intervention Outcome (N= 90)*

Measure	Covariate	SES Main Effect		SES x Group	
	R^2	ΔR^2	$\Delta F(1, 83)$	ΔR^2	$\Delta F(1, 82)$
Language Measure					
Receptive Vocabulary	.13	.00	.22	.00	.40
Literacy Measures					
Syllable Matching	.20	.00	.38	.01	.72
Letter Name Knowledge	.17	.04	4.21*	.00	.32
Numeracy Measures					
Numeral Identification	.25	.00	.27	.00	.07
Object Counting	.13	.00	.32	.00	.10
Rote Counting	.21	.00	.00	.00	.07
Missing Number Identification	.32	.01	1.57	.00	.01
Numerical Magnitude Comparison	.26	.00	.00	.00	.00
Addition	.35	.00	.01	.01	1.30

* $p \leq .05$ **Table 8***Main Effect of Parental Involvement on Intervention Outcome (N= 50)*

Measure	Covariate	Parental Involvement Main Effect	
	R^2	ΔR^2	$\Delta F(1,43)$
Language Measure			
Receptive Vocabulary	.08	.05	2.22
Literacy Measures			
Syllable Matching	.15	.03	1.58
Letter Name Knowledge	.13	.05	2.40
Numeracy Measures			
Numeral Identification	.11	.07	3.45
Object Counting	.16	.02	.90
Rote Counting	.14	.09	5.13*
Missing Number Identification	.18	.08	4.56*
Numerical Magnitude Comparison	.19	.04	2.02
Addition	.30	.08	5.90*

* $p \leq .05$

Appendix A

*Descriptive Statistics of the Dropout and Retained in Waitlist Control Group (Pre-Test**Scores Only) (N= 63)*

Variable (Max)	<u>Dropout</u> (N= 19)	Range	<u>Retained</u> (N = 44)	Range
	Mean (SD)		Mean (SD)	
Receptive Vocabulary (20)	8.79(7.74)	0-20	13.52(5.45)	1-20
Expressive Vocabulary (10)	4.05(2.84)	0-10	6.30(2.19)	2-10
Syllable Matching (10)	1.47(2.09)	0-6	3.30(3.41)	0-9
Syllable Deletion (12)	0.26(1.15)	0-5	1.43(3.01)	0-11
Letter Name Knowledge (28)	9.90(11.92)	0-28	15.46(11.59)	0-28
Numeral Identification (20)	6.68(7.32)	0-20	10.48(7.49)	0-20
Object Counting (14)	5.90(5.12)	0-14	6.91(4.85)	0-14
Rote Counting (36)	6.90(12.72)	0-36	12.59(13.23)	0-36
Missing Number Identification (12)	3.11(5.14)	0-12	4.84(4.47)	0-12
Numerical Magnitude Comparison (10)	2.90(3.96)	0-10	4.14(3.64)	0-10
Addition (6)	1.68(2.16)	0-6	2.09(2.21)	0-6

*ANCOVA Results of Dropout and Retained in Waitlist Control Group Equivalence (Pre-Test**Differences Only) (N=62)*

Measure	ANCOVA	Effect Size
Language Measure		
Receptive Vocabulary	$F(1, 57)=6.91, p=.011$	$\eta_p^2=.11$
Expressive Vocabulary	$F(1, 57)=11.40, p=.001$	$\eta_p^2=.17$
Literacy Measures		
Syllable Matching	$F(1, 57)=6.18, p=.016$	$\eta_p^2=.10$
Syllable Deletion	$F(1, 57)=4.06, p=.049$	$\eta_p^2=.07$
Letter Name Knowledge	$F(1, 57)=2.96, p=.091$	$\eta_p^2=.05$
Numeracy Measures		
Numeral Identification	$F(1, 57)=3.70, p=.059$	$\eta_p^2=.06$
Object Counting	$F(1, 57)=.190, p=.665$	$\eta_p^2=.00$
Rote Counting	$F(1, 57)=1.88, p=.176$	$\eta_p^2=.03$
Missing Number Identification	$F(1, 57)=2.93, p=.092$	$\eta_p^2=.05$
Numerical Magnitude Comparison	$F(1, 57)=2.23, p=.141$	$\eta_p^2=.04$
Addition	$F(1, 57)=.94, p=.335$	$\eta_p^2=.02$