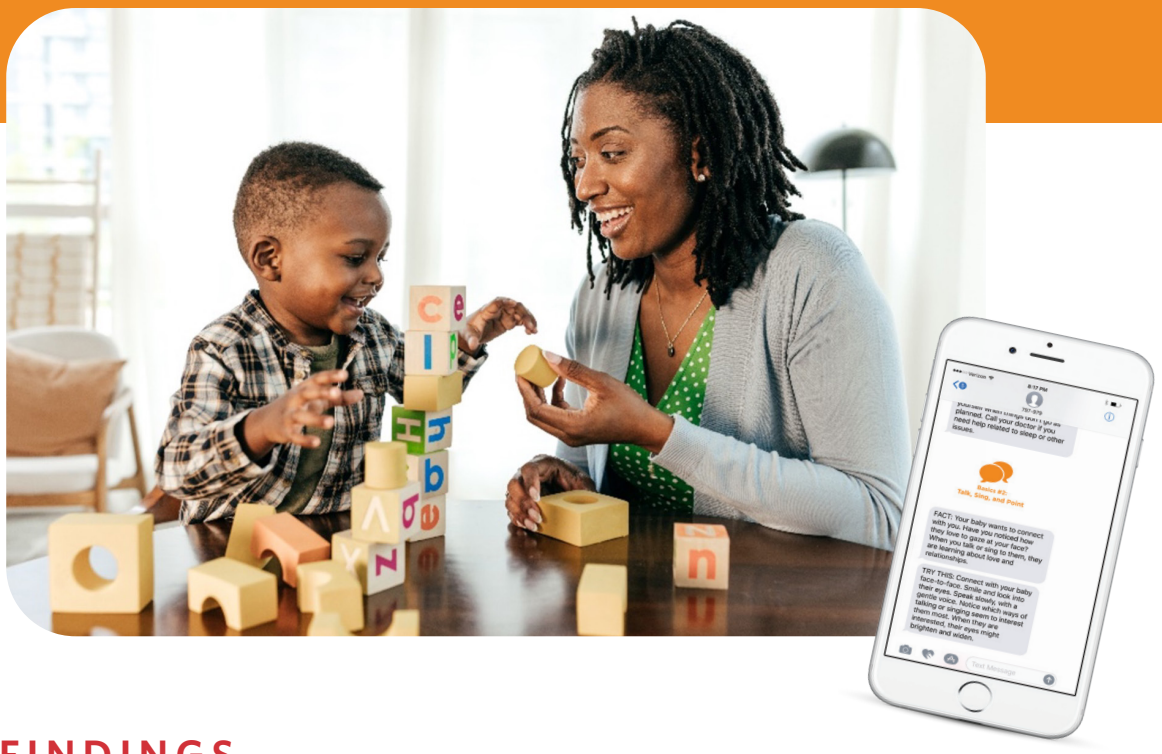
Evidence that Basics Insights Text Messaging has Positive Impacts on Child Development



KEY FINDINGS

Data for this brief come from The Basics Parental Assessment of Child Development Status, which includes a battery of items pertaining to children's skills. Respondents were parents who enrolled to receive Basics Insights text messages beginning at least 6 months before the survey and whose children were between 18 and 60 months of age at the time of the survey. Dosage is measured by the length of time the parent had been enrolled at the time of the survey, controlling for the child's age at that time and other background variables.

- The estimated impact on child development of a parent's Basics Insights enrollment over the 30-month period from the age of 18 months to 48 months is **28% more growth on a measure of social-emotional and cognitive skills** compared to normal age-related maturation.

- This 28% impact equates to **8.4 months of additional maturation** during those 30 months, over and above normal age-related development and any impacts before the child is 18 months old.

This impact is a policy-relevant magnitude for stakeholders concerned about kindergarten readiness and developmental equity. The results are for children who have not been diagnosed with developmental delays or disabilities.

The Basics Principles

Maximize Love, Manage Stress

Talk, Sing, and Point

Count, Group, and Compare

Explore through Movement and Play

Read and Discuss Stories

INTRODUCTION

This Issue Brief concerns how Basics Insights (BI) text messaging affects skill development in young children. Parents may register as early as the child's birth, typically through community-based organizations, and the messages arrive twice-weekly until the child's fifth birthday.

The Basics Principles provide the framework for the texts and the broader Basics Strategy. The strategy works through community-based organizations whose staff are often trusted messengers to the families they serve. These staff help enroll families to receive BI and provide relational support with information, encouragement, and reminders to make The Basics Principles daily routines.

A 2023 report by Boston College Professor Shaun Dougherty concludes that BI produces:

> "*a discernible and policy relevant increase in reported caregiving practices known from past research to be associated with more favorable child development. Estimated impacts range from 0.150 standard deviation for hugging and cuddling (which is extremely high even at baseline) to 0.332 standard deviation for counting and talking about numbers*" (Dougherty, 2023).

Data for this report come from The Basics Parental Assessment of Child Development Status (PADCS), which is administered annually online beginning in 2023. The standard BI message stream delivers two messages weekly. The invitation to complete the survey is sent as a third message during a week in May, to parents with children aged from 18 to 60 months at the time, and who have been enrolled for at least 6 months.

The PADCS was developed by The Basics, Inc. in collaboration with early childhood scholars and expert practitioners affiliated with the Boston Opportunity Agenda and the Boston Public Schools.

The methodology for the analysis reported here relies on cross-sectional variation between children of different age groups to simulate change over time. The fact that parents enroll when their children are of different ages makes it possible to distinguish normal maturation from the impact of longer BI enrollment (with the length of BI enrollment as a dosage measure for BI-informed caregiving).

We refer to *parents* to signify parents, grandparents, and other caregivers.

PRIOR EVIDENCE ON TEXT MESSAGING

Text messaging programs for parents of young children have been shown to bring about positive changes in parenting practices and help parents support their children's development. Multiple randomized controlled trials and quasi-experimental studies have found that parents who received mobile messages are more likely to engage in activities that promote school readiness compared to those who did not (Carta et al., 2013; Gennetian et al., 2019; Lefever et al., 2017). These activities include reading with their child (Garcia et al., 2022; Mayer et al., 2019) and other home-based interactions, such as reciting nursery rhymes and looking at pictures in books (York et al., 2019).

Text messaging has also been found to increase responsive parenting behaviors (e.g., sensitivity, setting reasonable expectations, and providing supportive directions) (Carta et al., 2013; Lefever et al., 2017) and enhance parenting self-efficacy regarding discipline and setting boundaries (Jelley et al., 2016). Additionally, the dosage of text messages appears to matter, as receiving more messages is associated with increases in parent engagement and the use of effective parenting strategies (Bigelow et al., 2020).

Due to its effects on parenting, text messaging has also been shown to positively impact child development. Several randomized controlled studies have documented the role of text messaging in promoting socio-emotional development, including improved self-regulation (Jelley et al., 2016), cooperative and adaptive behaviors (Carta et al., 2013), and fewer externalizing problems (Lefever et al., 2017). On the other hand, findings regarding cognitive outcomes are less consistent. Some studies have found that text messaging programs lead to higher scores on early literacy assessments (Jimenez et al., 2021; York et al., 2019) whereas others have found no significant differences in language and communication skills between children whose parents received the messages and those whose parents did not (Bigelow et al., 2020; Garcia et al., 2022).

In summary, research shows that text messaging programs for parents of young children can improve parenting practices, leading to more responsive parenting behaviors and greater engagement in activities that support school readiness. These programs have also been linked to positive socio-emotional outcomes in children, though evidence on some cognitive benefits, such as early literacy, is mixed.

SAMPLE

Parents become BI users when local partner organizations in communities of the multi-city Basics Learning Network invite them to enroll.[1] In some cases, the parent is given a QR code to register online on their own. In other cases, after securing parents' permission, the organization submits an encrypted bulk upload file to the BI platform with registration information for multiple individuals.

Parents covered by this report registered through 100 organizations in communities from more than a dozen states. Organizations with at least 10 subscribers responding are in Florida, Georgia, Illinois, Maryland, Massachusetts, North Carolina, Rhode Island, and Vermont. Our statistical methodology accommodates this multilevel structure.[2]

The overall response rate was about 10 percent of eligible respondents (i.e., users registered for at least 6 months with children aged 18-months and older) and tabulations indicate they were generally representative of the group under consideration.[3] Respondents comprise 30 percent Massachusetts users and 70 percent from other states.[4]

As introduced above, the featured impact variable for the analysis is Length of Time Enrolled (LTE). Calculating it requires the PADCS survey date and the initial enrollment date. Respondents to both 2023 and 2024 PADCS surveys were asked to supply their phone number and approximately 90 percent did for each. With that phone number as the matching variable, the date of enrollment could be retrieved from registration data so that the LTE could be calculated.

Findings cover 1,410 responses from parents whose children had not been diagnosed with a developmental disability, who had been enrolled for up to 48 months, and who completed the survey in either English (83%) or Spanish (17%).[5]

Race/ethnicity and native language are controlled for in the statistical estimates with intercept terms for each group. In addition, tests for racial/ethnic differences on the impact of LTE (which is a slope term measured by the regression coefficient on LTE, controlling for the child's age) were conducted.

COGNITIVE AND SOCIAL-EMOTIONAL SKILL

The measure of child development discussed in the body of the paper is a combination of cognitive and social-emotional skills. While a confirmatory factor analysis provides evidence for two distinct latent variables, the discussion here in the body of the report combines them for brevity and simplicity. See the Appendix for a discussion of the two separately.

The items are listed in Exhibit 1.

EXHIBIT 1 | Child Development Items

MY CHILD

Social Emotional

- Shows ability to build positive relationships through appropriate interactions with adults and peers. Tries to make people feel happy.
- Enjoys playing with other children.
- Is good at calming down on their own if they're upset.
- Shows ability to cooperate in groups and helps to find a solution if the group has a problem.

Cognitive

- Can say how many there are, when a group has between 1 and 5 things in it.
- Can compare and sort objects...can put things into groups of the same type (for example, put the spoons with the spoons and the socks with the socks).
- If you say a word, can tell you a word that rhymes with it (e.g., "cat" and "hat")
- When confused, tries more than one way to figure something out.
- Can follow directions that have multiple steps (e.g., "pick up your shirt and give it to me").

The Cronbach's alpha for the nine items is 0.81 and item analysis indicates that each item contributes to it. [6]

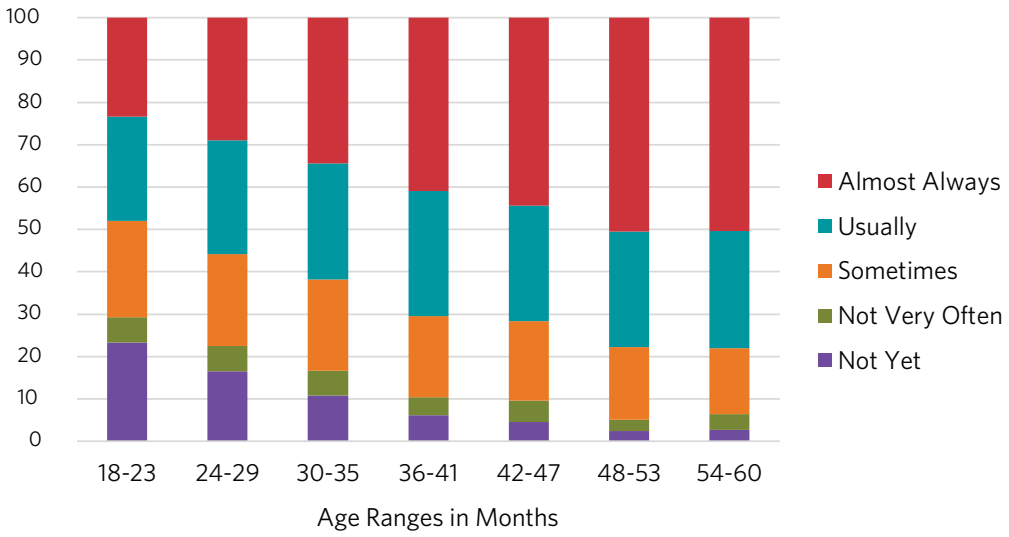
As introduced above, we use variation in the child's age at the time of the parent's registration as a basis for simulating development over time. Our central hypothesis is that parental responses to the PACDS for children of the same age should indicate greater maturity on the part of children whose parents have received BI for longer.

Exhibit 2 shows how responses on the child development items differ across age groups. For each age group and response option, ranging from "Almost Always" to "Not Yet", the percentage that selected that response option is averaged across the 9 items listed above. So, for example, the 23% for "Almost Always" at 18-23 months is the average across all 9 items in the percent providing that response. The purpose of Exhibit 2 is simply to demonstrate that parents' responses show overall child maturity increasing across the age range. There is a clear, and expected, pattern: as children grow older, the average percentage of responses indicating "Almost Always" increases, rising from 23% among 18- to 23-month-olds to 50% among 4-year olds. Conversely, only 3% of 4-year olds were rated by parents as "Not Yet," compared to 23% in the younger age group, where children's development is less mature and they are expected to show these behaviors less frequently.

For the impact analysis, responses to the social-emotional and cognitive survey items were converted to a single mean value for each respondent and coded for the full sample to have a mean of zero and standard deviation of 1. That standardized measure is the dependent variable for the impact findings below.

EXHIBIT 2 | Aggregate of Responses to Skill Items by Age Range

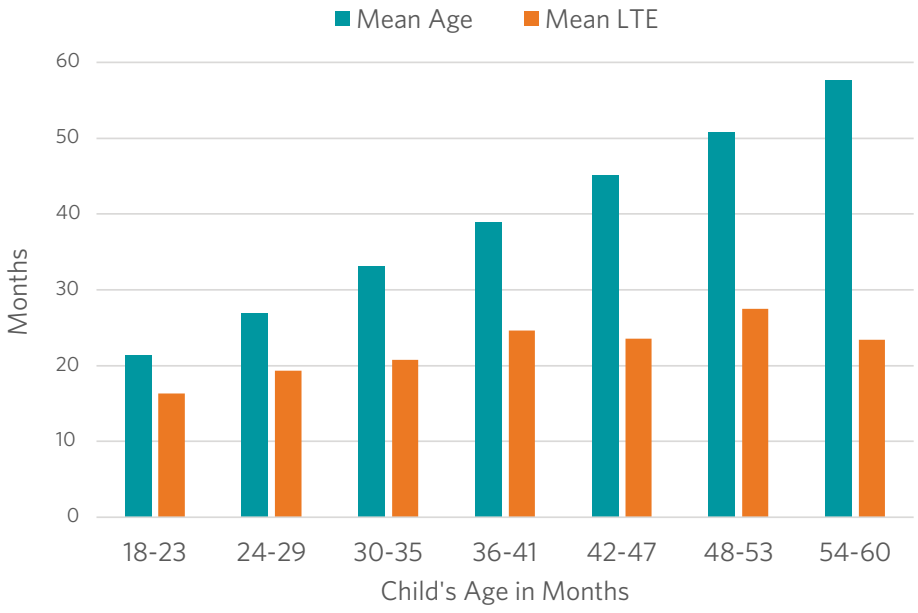
(Each bar adds to 100% for that age group.)



Finally, Exhibit 3 shows the relationship between the child's age and LTE. The height of each bar for age shows the mean age of children in each respective age range represented on the horizontal axis. The height of each bar for LTE shows the mean length of time that parents have been enrolled whose children are in that age range. The pattern shows that while related, age and LTE do not follow the same pattern and appear to be sufficiently distinct that their separate effects can be estimated.

Recall that parents can register to receive Basics Insights anytime beginning from when their child is born up until they turn 5 years of age. Consequently, the LTE does not increase linearly with age because parents enroll their children at different points in time. Some parents may sign up early in their child's life, while others enroll much later, leading to variability in LTE, holding age constant. This explains why the graph does not show a straightforward linear increase in LTE as children age.

EXHIBIT 3 | Mean Age and Length of Enrollment | Within 6-Month Age Ranges



THE IMPACT OF BI DOSAGE

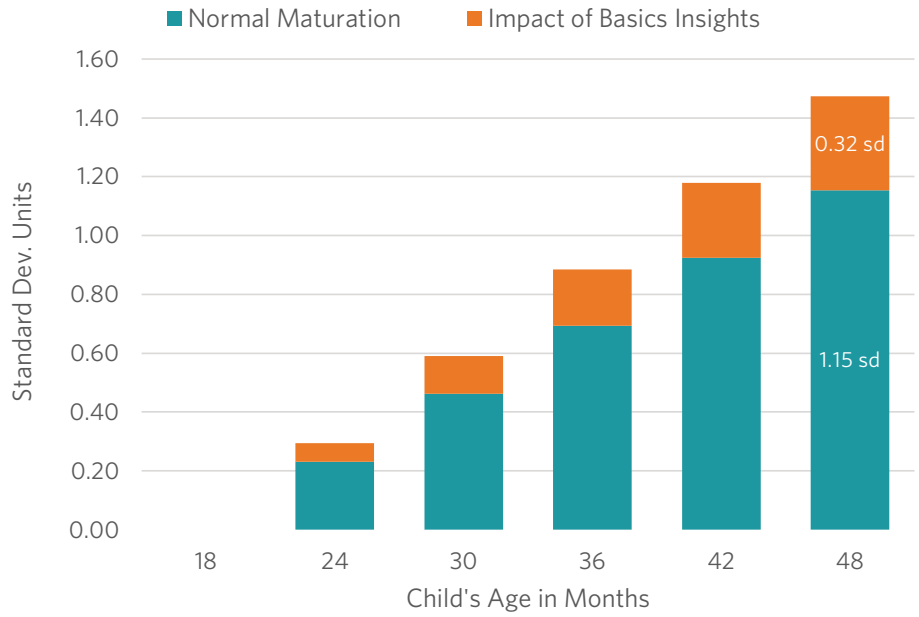
Any impact estimate requires a "counterfactual" estimate of what the outcome of interest would have been if the treatment had not taken place. The counterfactual here represents normal growth as children get older and the impact of BI is growth over and above normal growth associated with how long their parents have been receiving BI.

The impact estimate is highly statistically significant and of policy relevant magnitude. Table A1 (*see Appendix*) shows fixed effects regression coefficients and standard errors, along with 95% confidence intervals for "Child's Age in Months" and "LTE Dosage: Months Enrolled."

In addition, Table A2 (*see Appendix*) shows results separately for Whites and BIPOC (which stands for Black, Indigenous, and People of color) and also for college graduates and noncollege graduates. Estimates show a tendency toward larger LTE impacts for BIPOC Children, compared to Whites, and for college graduates compared to non-college graduates, but the differences between these groupings are not statistically significant.[7] Therefore the discussion of impact results in the body of the paper covers the average impact for all groups combined.

Exhibit 4 simulates a child's cumulative growth in skills between 18 and 48 months of age, based on the coefficient estimates in Table A1. Each bar on the exhibit has two sections. The lower section represents Normal Maturation while the top segment represents the Impact of Basics Insights. The heights of the bars represent changes from the 18-month old starting point, which is why the height at 18 months is set at zero.

EXHIBIT 4 | Cumulative Skill Levels From 18 to 48 Months of Age



By 48 months, Normal Maturation is 1.15 standard deviation higher than at the 18-month starting point and the Impact of Basics Insights is 0.32 standard deviation above that.

Row 1 of Table 1 (*see next page)* shows the cumulative impact at 48 months (i.e., 0.32 sd) and **Row 2** shows the "Lower" and "Upper" tails of the 95% confidence interval around the 0.32 estimate.[8]

Row 3 shows the percentages that the numbers on Row 1 and Row 2 are of normal growth (i.e., percentages of 1.15 sd). The middle number on Row 3 indicates that BI enrollment predicts 27.9% more skill growth between 18- and 48-months of age compared to normal maturation (calculated as 0.32 standard deviations divided by 1.15 standard deviations, the normal maturation rate). **Row 4** indicates that this equates to an impact of 8.4 months of maturation over 30 months, which translates to 3.4 months of extra skill development per year compared to what would be considered normal, based simply on age-related growth.

TABLE 1 | The Cumulative Change in Development from 18 to 48 Months of Age

	Estimated Cumulative Impact Over 30 Months		
1	0.32 sd		
	95% Confidence Interval		
2	**Lower Tail**	**Upper Tail**	
	0.144 sd	0.495 sd	
	Impact as a % of Normal Growth*		
3	11.6%	27.9%	43.0%
	Impact in Months of Growth Over 30 Months**		
4	4.4 Months	8.4 Months	12.9 Months

* *Normal growth from 18 to 48 months of age is 1.15 sd, which is 30 months times the estimated normal monthly growth of 0.0385 sd from Table A1.*

** *Row 3 times 30 months (the period from 18 to 48 months of age).*

The confidence interval on Table 1 is a reminder that the estimated impact may either overstate or understate the true impact, but the evidence for impact is strong. The standard errors on regression coefficients in Appendix Table A1 indicate that the likelihood of zero impact is less than 0.001.

LIMITATIONS

It is possible that LTE predicts parental perceptions of child development for reasons other than the causal interpretation offered here. For example, there could be a systematic under- or over-representation of families with children in a particular part of the skill distribution at different LTE levels.[9] Another possibility is that parents with longer LTE become more observant and therefore more likely to notice and report small developmental changes that might otherwise have gone unnoticed. However, the possibility that this propensity would increase monthly as long as the parent was enrolled in BI seems unlikely. Finally, it is possible that the finding is the result of nonlinearities in normal growth and that the LTE variable is somehow compensating for those nonlinearities. Analyses to explore that possibility did not find evidence to alter the findings reported here.

CONCLUSION

Taking the estimated trend in normal age-related skill growth as the counterfactual, this brief measures the impact of BI using the length of time enrolled as a dosage measure, while holding the child's age constant.

The finding that there is a positive relationship of dosage to child development is consistent with previous research in concluding that messaging delivered regularly via mobile technology can have positive influences on parenting behavior and, through it, children's development.

Enrolling parents in BI across whole neighborhoods and supplementing their enrollment with personal encouragement and reminders—as the Basics Learning Network is striving to do—could have long term impacts for children, families, and whole communities.

EXAMPLES OF PARENT TESTIMONIALS

Submitted at the end of the PACDS Survey

- **Love the Messages.** They have been very helpful and I have learnt so much from them. I have recommended these to others as well. Keep them coming!
- This is my second grandson I have used it with. **Invaluable!!!**
- **You guys are a God given help.** Everything is insightful, meaningful, and clear. Thank you so much for helping a first-time mom go through the rides of child development. Please continue to bless me with your tools & knowledge. Forever grateful!
- **Love it!** Soooooo helpful!!!
- **I love Basics,** it's informative, gives great ideas and helps me understand and help my little one. Because as a parent you might feel we are doing things wrong since parenting didn't come with a manual. So I look forward to my weekly text to try anything new to me that I've read.

APPENDIX

TABLE A1 | Fixed Effects Regression Coefficients for LTE Dosage and Child's Age in Months
(Robust standard errors in parentheses; 95% confidence intervals in brackets

Dependent variable is Child Developmental Status in Standard Deviation Units Fixed Effects for 100 Organizations	
LTE Dosage: Months Enrolled	0.0107*** (0.0029) 95% CI: [0.0048, 0.0165]
Child's Age in Months	0.0385*** (0.0028) 95% CI: [0.0330, 0.0440]
Note: Statistical control variables were included for race/ethnicity, parents' self-reported caregiving practices, parental years of education, and a constant term.	
N	1410
R2_Within	0.306
R2_Between	0.472
R2_Overall	0.323
Intraclass Correlation	0.274

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

EXPLANATION OF TABLE A2

Results presented in Table A2 show the key regression coefficients separately for Cognitive Skills and Social-Emotional Skills, for Whites and BIPOC, and for college graduates and noncollege graduates. All results are from fixed effects regressions with the same general structure and control variables as Table A1.

In standard deviation terms, the index of Cognitive Skills shows more normal age-related growth than the index of Social-Emotional Skills, while the estimated impact of LTE is similar in standard deviation terms for both skill indices.

Because the normal growth in Cognitive Skills is greater than for Social-Emotional Skills, but LTE-related growth is more similar, LTE-related growth is a larger percentage of total growth for Social-Emotional Skills than for Cognitive.

The results in Table A2 suggest a clear pattern, that LTE is a stronger predictor of child outcomes for the BIPOC children than for Whites (and for more educated respondents with regard to their child's cognitive skills).

However, with current sample sizes, the differences between racial/ethnic and parental-education groups are not statistically significant; the estimated differences could occur by chance.

As larger samples become available from future administrations of the PACDS, the precision of the estimates will grow, thereby increasing the statistical power of the analysis.

Future research will focus more on these potential differences.

Table A2 | Regression Coefficients on "Child's Age in Months" and "LTE Dosage: Months Enrolled"

Three Dependent Variables: Composite of Cognitive and Social-Emotional Skills (Panel A), Cognitive Skills (Panel B), and Social-Emotional Skills (Panel C). Note that Column 1 of Panel A repeats the coefficients from Table A1 and the other 14 regressions represented have the same control variables as in Table A1.

	(1) Full Sample	(2) Whites Only	(3) BIPOC	(4) Less than 4-Year College Grad	(5) 4-Year College Grad or More
Panel A: Dependent Variable: Composite of Cognitive and Social-Emotional Skills					
Child's Age in Months	0.0383*** (0.0028)	0.0428*** (0.0038)	0.0355*** (0.0037)	0.0338*** (0.0032)	0.0428*** (0.0037)
LTE Dosage: Months Enrolled	0.0107*** (0.0029)	0.0079+ (0.0043)	0.0128*** (0.0032)	0.0092* (0.0046)	0.0097*** (0.0033)
Panel B: Dependent Variable: Cognitive Skills(z)					
Child's Age in Months	0.0436*** (0.0029)	0.0489*** (0.0039)	0.0404*** (0.0036)	0.0389*** (0.0032)	0.0492*** (0.0041)
LTE Dosage: Months Enrolled	0.0099*** (0.0032)	0.0082+ (0.0043)	0.0106*** (0.0037)	0.0071 (0.0049)	0.0089*** (0.0031)
Panel C: Dependent Variable: Social-Emotional Skills(z)					
Child's Age in Months	0.0198*** (0.0023)	0.0217*** (0.0034)	0.0183*** (0.0030)	0.0168*** (0.0031)	0.0215*** (0.0032)
LTE Dosage: Months Enrolled	0.0087*** (0.0029)	0.0056 (0.0042)	0.0123*** (0.0033)	0.0090* (0.0037)	0.0082+ (0.0045)
Sample Size:	1410	542	868	675	735

*+ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

REFERENCES

Bigelow, K. M., Walker, D., Jia, F., Irvin, D., & Turcotte, A. (2020). Text messaging as an enhancement to home visiting: Building parents' capacity to improve child language-learning environments. *Early Childhood Research Quarterly*, 51, 416–429. doi.org/10.1016/j.ecresq.2019.12.010

Carta, J. J., Lefever, J. B., Bigelow, K., Borkowski, J., & Warren, S. F. (2013). Randomized trial of a cellular phone-enhanced home visitation parenting intervention. *Pediatrics*, 132 (Supplement 2), S167–S173. doi.org/10.1542/peds.2013-1021q

Garcia, E., Gerard, S. N., Christensen, C., Tiruke, T., Zamora, M. C., & Grindal, T. (2022). Sparking connections: Evaluations of mobile messaging on responsive caregiving. *SRI International*

Gennetian, L. A., Marti, M., Kennedy, J. L., Kim, J. H., & Duch, H. (2019). Supporting parent engagement in a school readiness program: Experimental evidence applying insights from behavioral economics. *Journal of Applied Developmental Psychology*, 62, 1–10. doi.org/10.1016/j.appdev.2018.12.006

Jelley, F., Sylva, K., & Karemaker, A. (2016). EasyPeasy parenting app: Findings from an efficacy trial on parent engagement and school readiness skills. *The Sutton Trust*. ora.ox.ac.uk/objects/uuid:618d7b4a-2fb1-4640-aeac-53de523d3852/files/m1e3946d2a7a84ddabae75f6f964a5dec

Jimenez, M. E., Crabtree, B. F., Hudson, S. V., Mendelsohn, A. L., Lima, D., Shelton, P. A., Veras, J., Lin, Y., Pellerano, M., Morrow, L., & Strom, B. L. (2021). Enhancing Reach Out and Read with a video and text messages: A randomized trial in a low-income predominantly Latino sample. *Academic Pediatrics*, 21(6), 968–976. doi.org/10.1016/j.acap.2021.02.011

Lefever, J. E. B., Bigelow, K. M., Carta, J. J., Borkowski, J. G., Grandfield, E., McCune, L., Irvin, D. W., & Warren, S. F. (2017). Long-term impact of a cell phone–enhanced parenting intervention. *Child Maltreatment,* 22(4), 305–314.

Mayer, S. E., Kalil, A., Oreopoulos, P., & Gallegos, S. (2019). Using behavioral insights to increase parental engagement: The parents and children together intervention. *The Journal of Human Resources*, 54(4), 900–925. doi.org/10.3368/jhr.54.4.0617.8835R

York, B. N., Loeb, S., & Doss, C. (2019). One step at a time: The effects of an early literacy text-messaging program for parents of preschoolers. *The Journal of Human Resources*, 54(3), 537–566. doi.org/10.3368/jhr.54.3.0517-8756R

ENDNOTES

1 The Basics Learning Network (BLN) is a community of practice with local "backbone organizations" in dozens of communities in the US, Australia, Brazil, Bermuda, and Canada. It emerged as communities learned about the work that began in Boston in 2016 and sought to join. See: thebasics.org.

2 These organizations do important work in spreading The Basics message. However, because our focus is on the impact of BI messaging, not the impact of services rendered by partner organizations, results reported in this brief focus on Length of Time Enrolled (LTE) variation within organizations (not between them) to predict what parents report about children's cognitive and social-emotional skills.

3 For example, the difference in parental education is only 0.25 years more years of schooling for PADCS respondents compared to the average on the baseline survey that roughly a third of users complete. Also the response rate among eligible users is consistent across years of enrollment.

4 Massachusetts respondents were slightly overrepresented..

5 The PACDS was administered in 2023 and 2024 and 109 parents responded in both years. Robust standard errors are used to adjust for that fact.

6 A confirmatory factor analysis indicates distinct social-emotional and cognitive latent variables, but we treat them here as a single index.

7 Regressions were run for each racial/ethnic group testing whether the slope terms for child age and LTE for that group differed from the slope terms for the other groups combined. Some of the differences were quantitatively large enough to be meaningful, but none were statistically significant at the 0.05 level. In other words, we could not reject the null hypothesis of no difference for any group compared to the composite for all others.

8 Analogous tables could be constructed for the other ages. To do so for a particular age, one would multiply the associated coefficient estimate on Table A1 in the appendix by the difference between that age and 18 months.

9 We used indicator variables for whether the respondent had completed the baseline and 3.5-month follow-up (post-baseline) surveys as instruments in applying Heckman's sample selection bias method but found no evidence of selection bias using that method.

ACKNOWLEDGEMENTS

Special thanks to the sponsors who make this work possible, especially Boston Children's Hospital for commissioning the report, the Eastern Bank Foundation for its ongoing partnership, and our technology partner MyBliss, whose support makes the Basics Insights text messaging service possible.

Thanks also to the Black Philanthropy Fund, the Liberty Mutual Foundation, The Boston Foundation, The Baupost Group, the A. C. Ratshesky Foundation, The Nordblom Family Foundation, and our other sponsors, our board members, and to the many partner organizations that help register parents for Basics Insights and support making The Basics Principles daily routines.

SUGGESTED CITATION

Ronald F. Ferguson and Ji Hye (Esther) Park. "*Child Development Impacts of Basics Insights Text Messaging: New Evidence of Dosage Effects.*" The Basics, Inc., Issue Brief. November 2024.

The Basics®

CONTACT
The Basics, Inc.
1-844-574-6285
info@thebasics.org