Preliminary Analysis of Data Collected from Lifting Infants and Toddlers Through Language-rich Environments (LITTLE) Grants

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Introduction

Lifting Infants and Toddlers Through Language-rich Environments (LITTLE) grants, from Georgia's Department of Early Care and Learning (DECAL), are designed to support language and literacy instruction in high-quality infant and toddler classrooms throughout Georgia by providing on-site coaching, professional learning opportunities, and materials.[1] LITTLE grants began in 2017 for licensed Child Care Learning Centers (CCLCs), with a plan to include Family Child Care Learning Homes (FCCLHs) at a later time.[2] Currently, CCLCs that earn 2- or 3-star ratings in Quality Rated—Georgia's tiered Quality Rating and Improvement System (QRIS)—can apply to receive these grants.

Participating CCLCs identify one employee from their teaching staff to serve as a Peer Coach. Peer Coaches receive intensive professional development and coaching from DECAL's Infant/Toddler Language and Literacy Specialists so that they can, in turn, provide coaching to infant and toddler teachers within their centers to promote language learning and early literacy skills. LITTLE grants cover the Peer Coach's salary for the first year of the grant, and CCLCs are eligible to apply for the grant for a second year. During the second year, the grant covers the salary for a full- or part-time Peer Coach depending on the number of classrooms in the grant.

Additionally, DECAL staff and Peer Coaches are tasked with some data collection to support professional development activities. DECAL's Infant/Toddler Language and Literacy Specialists conduct systematic observations of teacher-child interactions multiple times (both formally and informally to inform coaching) within the grant year using the Classroom Assessment Scoring System – Infant (CLASS-Infant, LaParo, Hamre, & Pianta, 2011) or CLASS-Toddler (LaParo, Hamre, & Pianta, 2012). Informal observations to inform coaching are conducted by the Infant/Toddler Language and Literacy Specialist working with that CCLC. To ensure objectivity, an Infant/Toddler Language and Literacy Specialist who is different from the one assigned to that CCLC conducts the formal CLASS observations. Both CLASS-Infant and CLASS-Toddler observation tools include items designed to measure developmentally appropriate language support. Peer Coaches also help teachers in participating classrooms use the LENA (Language Environment Analysis) Grow system to monitor language interactions. LENA Grow involves placing a small audio recorder on each child that automatically tracks the amount of language the child hears during the classroom day (Xu, Yapanel, & Gray, 2009). Peer Coaches and Infant/Toddler Language and Literacy Specialists use the CLASS and LENA data to provide feedback to teachers and tailor their professional development.

[1] For more information, see http://www.decal.ga.gov/InstructionalSupports/EarlyLanguageandLiteracy.aspx
[2] LITTLE grants expanded to FCCLHs in 2019. Only CCLCs are included in this report.

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The primary purpose of this report is to summarize Child Trends' analysis of DECAL's data collection, as a first step in evaluating the LITTLE grants. The research questions were as follows:

1. What were the characteristics of the Peer Coaches, directors, lead teachers, and assistant teachers that worked in the CCLCs participating in LITTLE grants?
2. Did the teacher-child interactions, as measured by the CLASS-Infant and CLASS-Toddler, improve over the course of the LITTLE grant years?
3. Did the number of words the adults spoke and the number of back-and-forth conversational turns between adults and children increase over the course of the LITTLE grant years?

Because these data were not intended for research purposes and participating individuals (e.g., teachers, coaches) did not have unique identifiers, all results are aggregated for each center prior to analysis. We provide recommendations for improved data collection and further evaluation toward the end of this brief.

Summary of key findings

LITTLE grants provide professional development support to enhance language learning and promote early literacy skills in high-quality infant and toddler classrooms in Georgia. This report provides a summary of some demographic characteristics of LITTLE grant participants and examines changes in classroom practices and language environment over time for the first two years of the program, using data collected by DECAL for the purpose of professional development. Key findings include:

- In infant classrooms, Responsive Caregiving, as measured by the CLASS-Infant, increased significantly.
- In toddler classrooms, Emotional and Behavioral Support and Engaged Support for Learning, as measured by the CLASS-Toddler, also increased significantly.
- There were no significant differences in the language environment over the course of either year, as measured by LENA recordings.

Methodology and Data

This report focuses on data DECAL collected during the first two years of the LITTLE grants from the 15 centers that participated in Year 1 (2017-2018) and the 43 centers that participated in Year 2 (2018-2019).[3] DECAL collected surveys of directors, Peer Coaches, lead teachers, and assistant teachers; classroom observations using CLASS; and quantitative information about the language environment collected using LENA devices. CLASS and LENA data are divided into Year 1 and Year 2; however, Year 2 included 13 CCLCs that also participated in Year 1 since programs are eligible to apply for the grant for two years. It is possible, however, that different teachers and classrooms participated in the professional development in the second year.

Participant surveys. At the beginning of each grant year, DECAL asked all staff at the participating programs to complete a brief demographic questionnaire. Child Trends received scanned copies of 377 paper surveys, which we double-entered, cleaned, and analyzed descriptively. Staff member names were written on the surveys, so we were able to eliminate duplicate information for individuals who took part in

[3] Year 3 of LITTLE took place in the 2019-2020 school year with 60 participating licensed child care centers. CLASS observations, LENA recordings, and demographic surveys were collected until March 2020, when the COVID-19 pandemic began to disrupt normal child care activities. DECAL plans to finish data collection with Year 3 participants in the fall of 2020, if normal operations resume and if health and safety regulations allow. Data from Year 3 are not included in this report.

both years. The number of questionnaires distributed was not recorded, so the response rates are unknown.

Teacher-child interactions. CLASS-Infant is designed for use in classrooms serving primarily children from birth to 18 months. It focuses on verbal and physical interactions, as well as teachers' sensitivity and interactive skills. CLASS-Infant includes four dimensions, which make up one domain called Responsive Caregiving. CLASS-Toddler assesses the quality of the interactions between teachers and children in classrooms serving primarily children ages 15 to 36 months. It includes eight dimensions organized into two domains: (1) Engaged Support for Learning and (2) Emotional and Behavioral Support. For both CLASS-Infant and CLASS-Toddler, observers scored each dimension on a 7-point scale, with scores of 1 and 2 considered low quality; 3, 4, and 5 considered mid-range quality; and 6 and 7 considered high quality.

In Year 1 (2017-2018), CLASS observations were conducted at three timepoints: early in the school year (here, called "Pre"), midway through the school year (here, called "Mid"), and close to the end of the school year (here, called "Post"). In Year 2 (2018-2019), CLASS observations were conducted twice: at the beginning and end of the school year ("Pre" and "Post"). We used paired *t*-tests to compare CLASS scores at each timepoint. Observations were conducted at the classroom level but aggregated to the center level for statistical tests due to issues with linking scores across timepoints for individual classrooms. Aggregating to the center level resulted in small sample sizes, which meant that even large differences did not reach statistical significance at the traditional $p < .05$ level. For this reason, we refer to a *p*-value of less than .10 as significant.

Language environment. LENA devices record all sound and then use an algorithm to differentiate between adult speech, child speech, and electronic media or noise from a television (Xu, Yapanel, & Gray, 2009). The devices provide two automated language measures for each recording: *adult word count* and *conversational turns*. Adult word count is an estimate of the number of words adults spoke to the child over the course of a day, which we then converted to a per hour average for this brief. Conversational turns is an estimate of the number of times the child has a back-and-forth exchange of language with an adult during the day, which again we used to create an hourly average for this brief. Zimmerman and colleagues (2009) found that the number of conversational turns children engaged in with adults in their home environment was more strongly linked to their language development than the sheer number of words a child hears in a typical day.

As with the CLASS, for the analysis of the LENA data, we also aggregated the data at the center level because it was not possible to link teachers and individual classrooms across timepoints. Because the number and timing of the LENA recordings varied by classroom and center, we created two analysis timepoints for each center: the first three recordings of the grant year ("Pre") and the last three recordings of the grant year ("Post"). The three recordings may be from one, two, or three different classrooms as we used any of the daily recordings documented at each center. We conducted paired *t*-tests between the average values at the center level for adult word count and conversational turns. As with the CLASS, we refer to a *p*-value of less than .10 as significant due to the small sample sizes.

Findings

Participants

Table 1 shows demographic characteristics from surveys of directors, Peer Coaches, lead teachers, and assistant teachers who participated in the LITTLE grant in Years 1 and 2. All respondents except for two directors were female (not tabled). A majority of Peer Coaches, lead teachers, and assistant teachers were Black or African American, while 50 percent of directors were White. Few respondents were of Hispanic

origin and almost all spoke English as their first language. Level of education and specialized training varied across the participants.

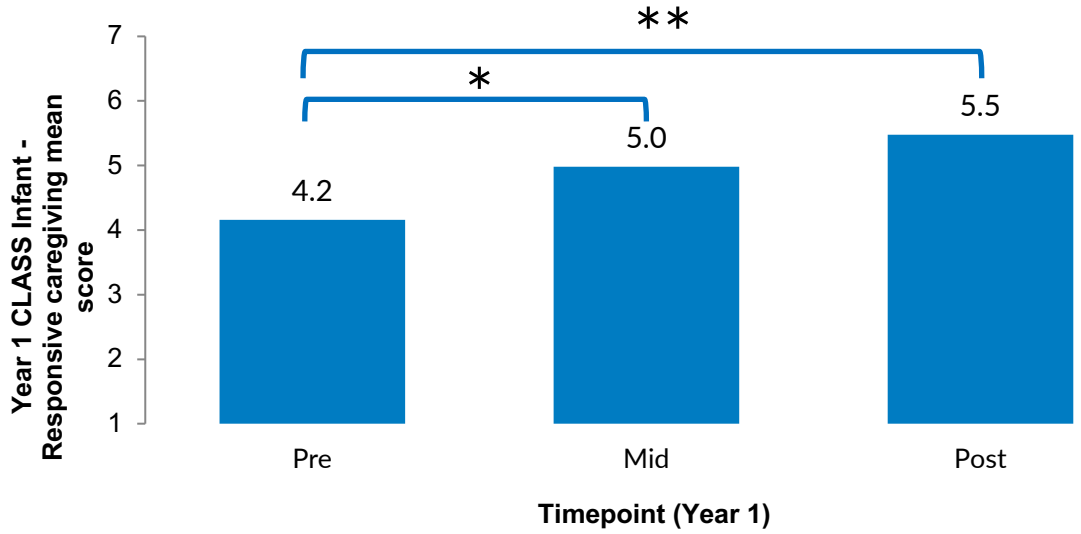
Table 1. Survey of Peer Coaches, teachers, and providers, years 1 and 2 combined

	Director (n = 40)		Peer Coach (n = 36)		Lead Teacher (n = 151)		Assistant Teacher (n = 150)	
	n	%	n	%	n	%	n	%
What is your race?								
White	20	50%	13	37%	38	26%	52	36%
Asian	0	0%	1	3%	1	1%	1	1%
Black or African American	18	45%	21	60%	98	68%	85	60%
Two or more races	2	5%	0	0%	7	5%	5	3%
Is your ethnicity Hispanic/Latino/Spanish Origin, regardless of race?								
Yes	2	5%	2	6%	15	10%	15	10%
Is English your first language?								
Yes	40	100%	34	94%	143	95%	135	90%
What is the highest educational level you have completed?								
Some high school	0	0%	0	0%	3	2%	10	7%
High school diploma or GED	2	5%	4	11%	23	15%	46	31%
Some college, CDA, TCC, TCD, or Montessori diploma	13	33%	10	28%	76	50%	71	48%
Associate degree (AA/AS)	6	15%	10	28%	28	19%	7	5%
Bachelor's degree (BA/BS)	7	18%	7	19%	14	9%	11	7%
Beyond bachelor's degree	12	30%	5	14%	7	5%	2	1%
Other than a degree or credential, do you have any specialized training in working with infants and/or toddlers?								
Yes	8	24%	7	23%	41	32%	44	34%

Teacher-child interactions

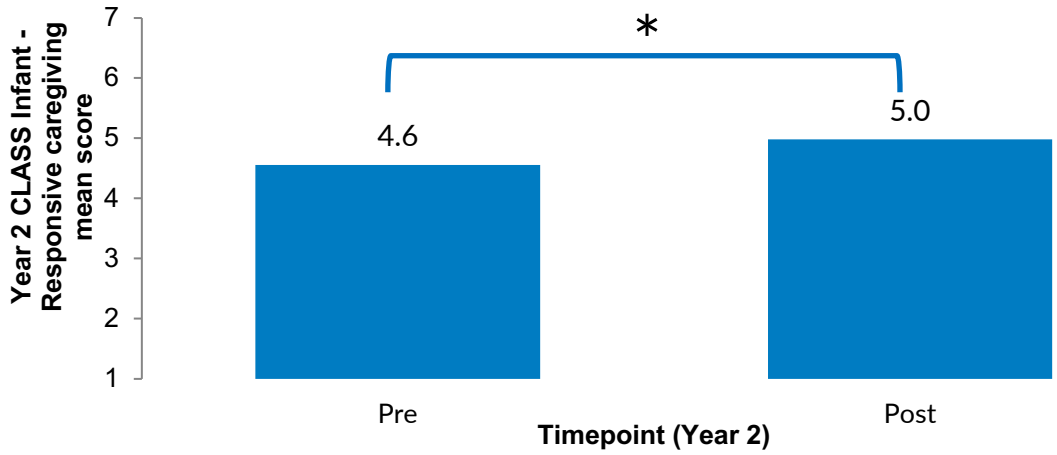
Figures 1 and 2 show the CLASS-Infant scores for the two years of formal observations. CLASS-Infant scores started and ended in the mid-range of quality but did increase over time. Specifically, in Year 1, average Responsive Caregiving was significantly higher at Mid and Post timepoints compared to the Pre timepoint. In Year 2, average scores at the Post timepoint were significantly higher than Pre.

Figure 1. Year 1 CLASS-Infant Responsive Caregiving scores over time (n = 8)[4]



Source: Child Trends analysis of DECAL data (2017-2018)
*p<.10; ** p<.05

Figure 2. Year 2 CLASS-Infant Responsive Caregiving scores over time (n = 32)



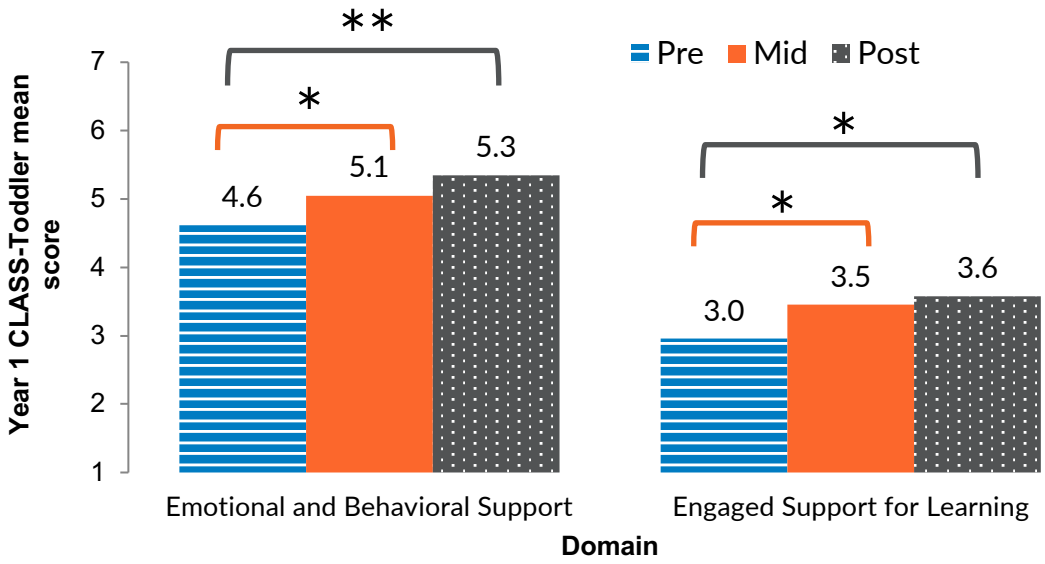
Source: Child Trends analysis of DECAL data (2018-2019)
*p<.10

Figures 3 and 4 show the CLASS-Toddler scores for Years 1 and 2. As with the CLASS-Infant scores, CLASS-Toddler scores generally started and ended in the mid-range of quality but did increase over time. In Year 1, Emotional and Behavioral Support average scores increased significantly from Pre (mean of 4.6) to Mid (mean of 5.1) and from Pre to Post (mean of 5.3). As a comparison, toddler classrooms in 2-star CCLCs that participated in the Quality Rated Validation Study, a previous study of Georgia's QRIS conducted by Child Trends, had an average score of 5.0 and 3-star programs had an average score of 5.4 (Early et al., 2019).

[4] Although 15 CCLCs participated in Year 1 and 43 CCLCs participated in Year 2, the n's presented for the analysis of the CLASS represent the CCLCs with an observation in all of the timepoints.

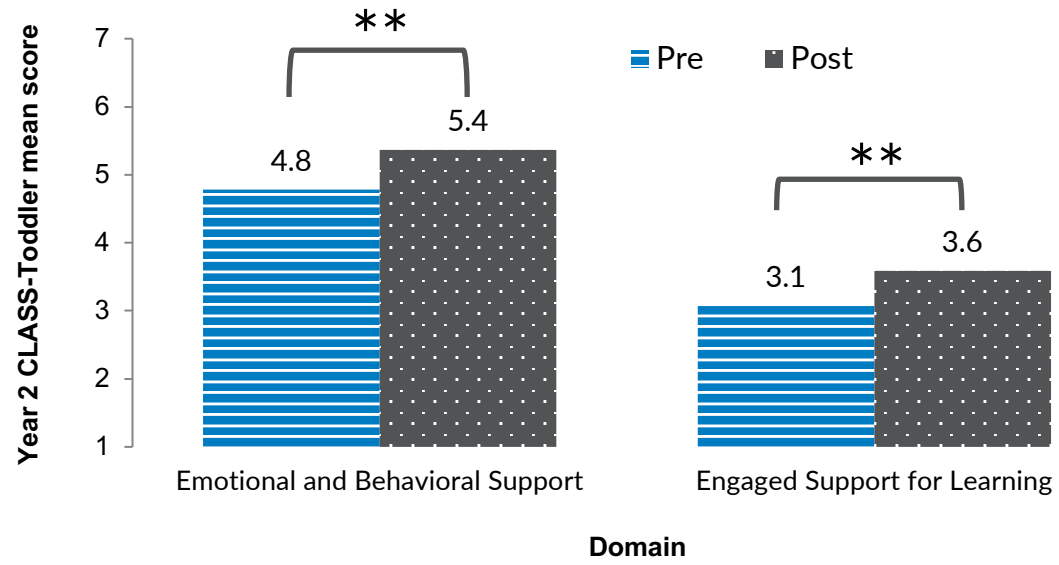
Similarly, in the programs taking part in LITTLE, there was a significant increase in Engaged Support for Learning scores from Pre (mean of 3.0) to Mid (mean of 3.5) and from Pre to Post (mean of 3.6). As a comparison, toddler classrooms in 2-star CCLCs that participated in the validation study had an average score of 2.6 and toddler classrooms in 3-star CCLCs had an average score of 3.0 (Early et al., 2019). Likewise, in Year 2, CLASS-Toddler scores in LITTLE programs increased significantly from Pre to Post in both domains.

Figure 3. Year 1 CLASS-Toddler scores over time (*n* = 13)



Source: Child Trends analysis of DECAL data (2017-2018)
*p<.10; **p<.05

Figure 4. Year 2 CLASS-Toddler scores over time (*n* = 35)



Source: Child Trends analysis of DECAL data (2018-2019)
**p<.05

Language environment

Tables 2 and 3 show results from the LENA language recordings for the two years. There was no significant difference between the Pre and Post timepoints on either adult word count or conversational turns in either year. In addition, the minimum and maximum values from each time period show a wide range of variability in the language environment.

Further, the average values seen in the LITTLE classrooms are lower than the typical average values indicated in past research. Though we do not yet have national norms, Gilkerson and colleagues (2017) found that 12-month-olds in their home environment heard, on average, 14,136 adult words per 12-hour day—an hourly rate of about 1,178 adult words per hour. For conversational turns, the average value was 341 per day, or about 28 per hour.

Table 2. Year 1 LENA results

Variable (*n* = 15)	Pre mean	Pre min	Pre max	Post mean	Post min	Post max	Comparison
Adult Word Count per hour	870.7	416.0	1,332.3	911.6	385.6	1,767.1	n.s.
Conversational Turns per hour	19.5	9.9	30.9	20.9	9.3	34.4	n.s.

Source: Child Trends analysis of DECAL data (2017-2018)

Table 3. Year 2 LENA results

Variable (*n* = 43)	Pre	Pre min	Pre max	Post	Post min	Post max	Comparison
Adult Word Count per hour	833.5	256.9	1,357.5	822.8	300.0	1,390.6	n.s.
Conversational Turns per hour	17.0	6.0	36.7	16.9	8.0	30.8	n.s.

Source: Child Trends analysis of DECAL data (2018-2019)

Limitations

These data provide an early glimpse at changes that occurred in CCLCs taking part in the first two years of the LITTLE grants, but this evaluation had significant limitations. Because these data were collected for professional development purposes and not for research, they lacked unique numeric identifiers (IDs) for teachers and classrooms that would be necessary for use in more rigorous analyses. This lack of IDs meant that we were unable to link classroom-level data to a particular teacher or to link teachers or classrooms across timepoints, leading to several limitations in our analyses.

First, lacking IDs meant that we could not know how many classrooms took part in LITTLE nor could we measure teacher turnover. Second, all information had to be aggregated to the center level at each timepoint. This reduced the number of data points, decreasing the power to find significant differences over time. Third, for the Year 2 analyses, we could not separate CCLCs and teachers in their first versus second year of LITTLE participation. If we had been able to make this distinction (and the sample size had been sufficient), we might have been able to find out if classes tended to improve more, less, or the same amount each year. Fourth, being able to link classroom-level data to individual teachers might have allowed for comparisons of teacher-child interactions or comparisons of language environment between teachers with varying levels of education, specialized infant or toddler training, or amount of coaching

through LITTLE. Finally, although we might expect fewer conversational turns in infant classrooms as compared with toddler classrooms, we could not investigate this possibility because we could not distinguish infant from toddler classrooms in the LENA data.

In addition, this study did not include a comparison group of centers or teachers who were not taking part in LITTLE, so we cannot know that the changes were the result of the LITTLE grants.

Recommendations for Future Evaluation Efforts

This preliminary evaluation relied on data that DECAL collected as part of the LITTLE grants. We offer some recommendations for strengthening data collection and future evaluation efforts.

We suggest establishing an ID system that would allow linkages between children, teachers, and classrooms so future evaluations can provide a more detailed picture of program implementation and change over time. Additionally, in LENA data, clearly labeling whether a recording is from an infant or a toddler classroom would allow for separate analyses of language quantity for the two different age groups.

Finally, we suggest standardizing data collection timepoints across years of implementation so that further research can reliably examine trends and patterns across time. For example, Pre data could be collected from August to November and Post data could be collected from March to May.

Child Trends hopes to partner with DECAL in the future to continue to evaluate LITTLE grants; however, the plans are in flux due to the ongoing uncertainty of the COVID-19 pandemic. Possible future evaluation activities include qualitative interviews with directors, language and literacy coaches, and teachers who are currently participating in LITTLE to learn about their experiences possible follow-up with those who have completed their participation with LITTLE to learn how they think LITTLE affected their practice. Eventually, we hope to conduct a randomized control trial with additional data collection measures to test the effectiveness of the intervention.

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