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Acelero Learning: Annual Report

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This report provides highlights of a program evaluation of Acelero Learning ("Acelero") programs, conducted by the Annenberg Institute at Brown University.

OVERVIEW

During the 2020-2021 school year, researchers at the Annenberg Institute at Brown University evaluated growth in school readiness outcomes among young children attending Acelero Learning's Head Start and Early Head Start programs as a part of the research practice partnership between the two organizations.

The purpose of the Acelero Program Evaluation was to examine young children's growth on school readiness outcomes over the course of the academic year. Specifically, the research team used assessment data, administrative data, and family survey responses to address pre-determined research questions on the change in early learning outcomes among young children. During this school year, Acelero enrolled children in both center-based (in-person) and home-based (virtual) learning models. Given the unique circumstances of this year, understanding students' progress at Acelero was unusually important for serving families.

IMPLEMENTATION

The research team used random sampling to identify a group of Acelero students to assess throughout the school year, as not every student could be assessed with the available resources. We randomly selected a subsample of Head Start children from each learning model and delegate combination (i.e., from children enrolled in home- and center-based learning models in each of the four delegates). For Early Head Start, the research team partnered with Acelero central staff to determine proportions for random sampling. One-third of students enrolled in home-based models within each delegate were randomly selected to participate. Among Early Head Start students enrolled in center-based models across the four delegates, one-third were randomly selected to be recorded at home in addition to in the classroom, while the remaining two-thirds were recorded in the classroom only. The table below shows the number of children evaluated in the fall, winter, and spring by program and learning model.

Total Count of Student Assessments by Assessment Period, Group and Learning Model

	Center	Home	All
Head Start			
Fall 2020	196	140	336
Winter 2021	186	114	300
Spring 2021	188	92	280
Early Head Start			
Winter 2021	230	34	264
Spring 2021	187	9	196

For the purposes of evaluation, the research team administered the following direct assessments for Head Start children on skills of executive functioning, print knowledge, and early numeracy, respectively: Minnesota Executive Function Scale (MEFS), Test of Preschool Early Literacy – Print Knowledge subtest (TOPEL), and Individual Growth and Development Indicators (IGDI) – Early Numeracy subtests.

MEFS is a standardized, child-friendly game designed to assess working memory, inhibitory control, and cognitive flexibility. The MEFS application is administered individually on a tablet and items increase in difficulty until a child consecutively answers 10 items incorrectly. Items were scored, automatically computed and converted to a standard score for same-age comparisons. The TOPEL Print Knowledge subtest examines children's understanding of print concepts, such as letter and word recognition, using a 26-item digital flipbook of words, letters, and pictures. We summed all items for a total raw score and converted to a standard score for same-age comparisons. Lastly, IGDI subtests assess children's ability to count, identify, and compare numbers (Oral Counting, Number Naming, and Quantity Comparison, respectively). Raw scores in each subtest indicate counts of correctly counted/identified numbers within 60 seconds.

To measure the language interactions and acquisition of Early Head Start children, the research team used LENA SP and the LENA Developmental Snapshot, respectively. LENA SP uses low-powered, child-sized vests to capture language interactions such as conversational turns, number of adult words, electronic background noise (such as radio or television), and child vocalizations throughout the day. The LENA Developmental Snapshot is a 52-item parent-reported assessment of a child's language acquisition progress.

To accommodate for the two different learning models and in response to pandemic-induced restrictions, Program Evaluation for Head Start children consisted of entirely remote assessment administration. Assessors were available remotely via Zoom, and they made use of fully digital assessment materials rather than paper-based ones, regardless of student's learning model.

Mean Scores by Group and Attrition Status

	Fall + Spring	Fall Only	Difference
Executive Functioning	97.58	95.08	2.51
Print Knowledge	**95.55**	**90.20**	**5.35**
Oral Counting	11.56	10.71	0.85
Number Naming	16.68	13.45	3.22
Quantity Comparison	**7.36**	**8.64**	**-1.28**
N	280	56	
	Winter + Spring	Winter Only	Difference
Adult Word Count	**1037.22**	**903.95**	**133.27**
Conversational Turns	23.92	24.95	-1.03
Child Vocalizations	**94.41**	**109.95**	**-15.54**
Electronic Noise	10.70	9.40	1.29
Developmental Snapshot	34.95	46.10	-11.14
N	196	68	

Note: N indicates total number of students for whom there is a minimum of one of the listed assessments or LENA measures for the corresponding sample. Column one indicates those who were observed across both the fall and spring assessments (Head Start, top) or in both Winter and Spring LENA recording periods (Early Head Start, bottom). Boldfaced text indicates statistical significance in difference of scores or recording variables below p=0.05.

Program Evaluation for Early Head Start children consisted of traditional LENA recordings led by teachers in classrooms and by caregivers at home. For two consecutive days, children wore LENA recording vests, followed by a Developmental Snapshot survey distributed to caregivers via a digital access code.

As the school year progressed, the number of assessments conducted steadily decreased for both Head Start and Early Head Start programs for various reasons. Many children withdrew from the program, while others were unreachable virtually or did not attend their scheduled virtual assessment appointments. In some cases, students switched programs (e.g., from Early Head Start to Head Start), which made continued assessments unfeasible. Families also had the option to opt out of assessments at any time throughout the school year, resulting in incomplete assessments for some students. All of these factors contributed to our overall attrition rate.

> **Key Findings:**
>
> - Across age groups and both learning settings, Head Start students made significant gains in domains of print knowledge and numeracy.
> - Head Start students enrolled in center-based models made larger gains on executive functioning, print knowledge, and oral counting compared to those enrolled in home-based models, despite starting at a lower average baseline level in the fall.
> - Early Head Start students demonstrated an increase in parent-reported Developmental Snapshots between winter and spring.
> - Several sociodemographic indicators (e.g., indicators for receiving government care/subsidies, single parent households, etc.; see Supplementary Descriptive Statistics tables for full list) are consistently negatively associated with learning and skill development for both Head Start and Early Head Start students.

Children who attrited performed similarly at baseline when compared to children who were observed throughout the full duration of the Program Evaluation, with a few exceptions. Head Start students who were not observed in the winter or spring had different baseline scores in Print Knowledge and one numeracy subtest (quantity comparison) than those observed yearlong. Among Early Head Start children with both winter and spring LENA recordings, adult word count and child vocalizations were different between attritors and non-attritors. However, there is no other meaningful difference in baseline scores or initial LENA recordings between students observed once and students observed throughout the remainder of the Program Evaluation period.

Notably, the decrease in sample size was especially prevalent among the Early Head Start sample: 26 families opted out of LENA recordings after random sampling occurred in the winter, and 23 families opted out in the spring, with the vast majority being families completing recordings in the home. Additionally, many home-based children were re-enrolled into center-based learning models as an increasing number of Acelero centers reopened for regular operations. Ultimately, a very small number of Early Head Start students initially assigned to a home-based learning model participated in LENA recordings during the spring assessment period (n=9; see table on pg. 1). As a result, the analysis below does not include comparisons of home- and center-based models for Early Head Start children.

RESULTS

Question 1: To what extent are enrolled Head Start children learning in executive function, literacy and math over the course of the school year? Do these rates of learning differ across our center- and home-based models? If so, in what ways do these rates differ and to what extent?

On average, center-based Head Start students started at a lower baseline level at the beginning of the school year on nearly all measures compared to home-based students. Center-based students had fall scores of 95.79 and 95.16 on executive functioning and print knowledge, respectively, while home-based students scored 100.76 and 96.82 on the two measures. Center-based students also scored 3-4 points lower than home-based students on two out of three measures of numeracy (oral counting and number naming) in the fall. Students in the fall scored similarly on quantity comparison regardless of their learning model (7.37 vs 7.34 for home- and center-based students).

We observed gains between fall and spring of this school year across most measures of learning and skill development among all Head Start children. Center-based children made significant gains across all three measures (executive functioning, print knowledge, and numeracy), while home-based children made significant gains on two out of the three measures (print knowledge and numeracy).
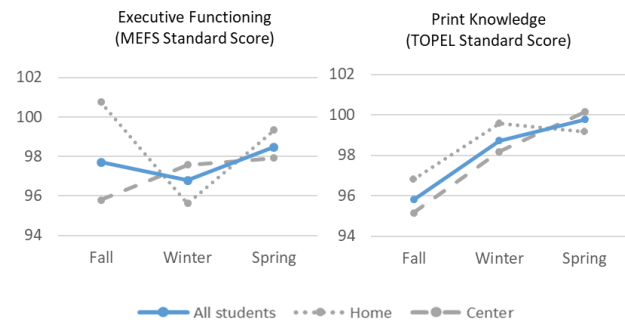
Fall Mean Scores and SD, by Subgroup

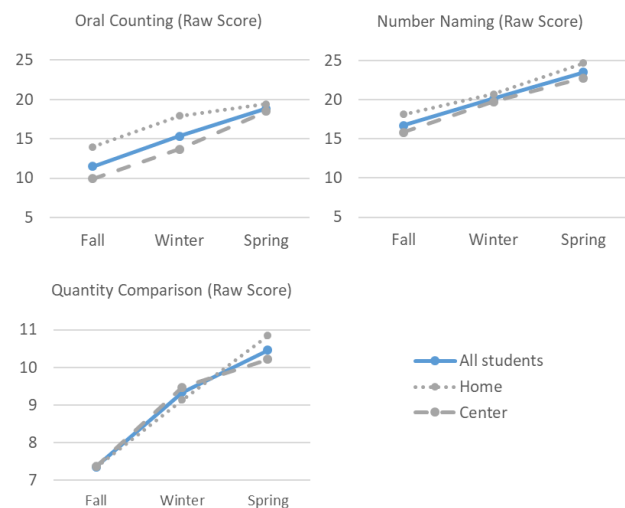|	All	Home	Center	Hispanic	Age 4
Executive Functioning					
MEFS	97.70	100.76	95.79	97.18	97.83
	(7.88)	(6.25)	(8.20)	(8.12)	(7.98)
	260	*100*	*160*	*129*	*183*
Print Knowledge					
TOPEL	95.81	96.82	95.16	91.86	96.03
	(14.91)	(14.68)	(15.06)	(14.15)	(15.11)
	261	*102*	*159*	*127*	*185*
Numeracy					
IGDI-Oral Counting	11.48	13.99	9.94	9.89	11.52
	(10.12)	(10.59)	(9.53)	(7.80)	(10.09)
	268	*102*	*166*	*130*	*186*
IGDI-Number Naming	16.69	18.11	15.81	14.65	16.54
	(14.67)	(16.02)	(13.75)	(12.16)	(15.04)
	265	*101*	*164*	*127*	*184*
IGDI-Quantity Comparison	7.36	7.34	7.37	7.68	7.16
	(4.49)	(4.20)	(4.67)	(4.48)	(4.29)
	268	*102*	*166*	*130*	*186*

Note: SD in parentheses and sample sizes italicized. MEFS and TOPEL are measured using standard scores, which take child age into account. Numeracy subtests are raw scores. Table is restricted to Head Start students with non-missing values for each corresponding assessment in the fall and spring. Not all subgroups shown.

Mean Scores for Executive Functioning and Print Knowledge


Mean Scores for Numeracy Subtests

Note: Mean scores of executive functioning and print knowledge are restricted to Head Start students with non-missing values for either assessment in fall and spring. N=260 for executive functioning and N=261 for print knowledge. Mean scores of numeracy subtests are restricted to Head Start students with non-missing values for each subtest in fall and spring. N=268 for oral counting and quantity comparison. N=265 for number naming subtest. Comparisons are made using initial assignment to center or home learning model during fall assessments.

Center-based students made larger gains in most areas of learning and skill development compared to home-based students, despite having started at a lower score threshold than home-based students. Center-based students made an average gain of 2.13 points on executive functioning, while home-based students made an average gain of -1.43 points. Similarly, center-based students made an average gain of 4.99 points on print knowledge while home-based students made an average gain of 2.34 points. On oral counting, center-based students made an average gain of 8.54 points while home-based students made an average gain of 5.44. Across all three of the aforementioned measures, students in center-based learning models made progress at a significantly higher rate than students in home-based learning models. Students enrolled in the two learning models made similar gains on the quantity comparison and number naming subtests of numeracy.

Learning models varied in average gains. Center-based students demonstrated larger spring-fall score gains than home-based students in executive functioning, regardless of demographic background. Among two subgroups (Hispanic students and students who speak Spanish at home), center-based students experienced significantly greater gains in print knowledge relative to home-based students. Hispanic students and older students (four-year-olds) enrolled in centers also had significantly larger gains in oral counting relative to their counterparts in homes.

Spring-Fall Gains Among Head Start Students
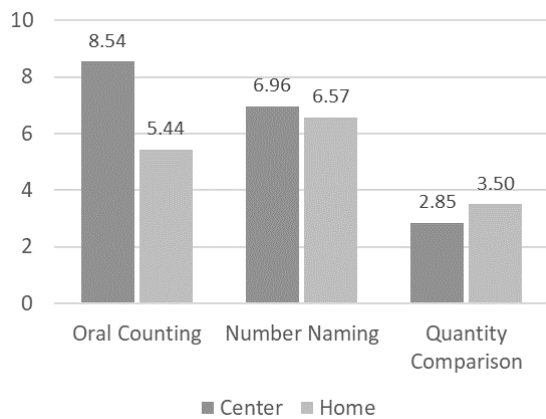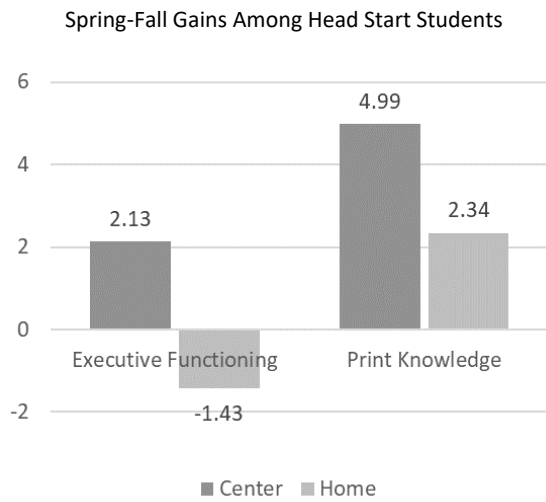
Note: Gain scores are calculated by taking the difference between spring and fall scores on each assessment or assessment subtest. Gain score analyses restricted to Head Start students with non-missing values for each assessment in fall and spring. Comparisons are made using initial assignment to center or home learning model during fall assessments.

The table on the right indicates color band movements for the three numeracy subtests, which account for child age when taking raw scores into account. Results echo gain score analyses shown previously: More center-based students move forward in oral counting skills between fall and spring (i.e., 18 center-based students progress from red to orange, 3 from red to green and 27 from orange to green). Progress rates look similar across center- and home-based students for number naming and quantity comparison.

IGDI Color Band Movements between Fall and Spring

Oral Counting:

		Spring			
		Green	Orange	Red	Total
Fall	Green	16	8	2	26
		13	7	1	21
	Orange	27	76	9	112
		8	56	6	70
	Red	3	18	7	28
		0	8	2	10
	Total	46	102	18	166
		21	71	9	101

Number Naming:

		Spring			
		Green	Orange	Red	Total
Fall	Green	79	16	2	97
		46	10	0	56
	Orange	26	37	4	67
		17	16	9	42
	Red	0	0	0	0
		1	0	1	2
	Total	105	53	6	164
		64	26	10	100

Quantity Comparison:

		Spring			
		Green	Orange	Red	Total
Fall	Green	0	0	4	4
		0	0	0	0
	Orange	0	6	18	24
		0	2	6	8
	Red	0	3	131	134
		0	5	85	90
	Total	0	9	153	162
		0	7	91	98

Note: White boxes display counts for center-based students while gray boxes display counts for home-based students. Color bands correspond to the following norms: Green: Tier I or Strong Progress; Orange: Cut Range or Moderate Progress; Red: Tier II/III or At-risk Progress. Home and Center differentiation based on fall assignment. Tabulations above are restricted to Head Start students with non-missing scores, test dates, age, and color band assignment for each assessment in fall and spring.

Question 2: To what extent are our enrolled Early Head Start children learning in language over the course of the school year? Do these rates of learning differ across our center- and home-based models? If so, in what ways do these rates differ and to what extent?; and

Question 3: To what extent are our enrolled EHS families engaged in back-and-forth conversations? In what ways do adult-child conversation differ across our center- and home-based models?

LENA recordings of Early Head Start children indicate that in an average hour between 8am and 5pm, adults near these young children speak about a thousand words; children experience approximately 24 conversational turns between an adult and the child; children make an average of nearly one hundred vocalizations; and children are exposed to approximately ten minutes of electronic background noise (TV or other modes of media). LENA has demonstrated an average of 15 conversational turns in childcare settings and recommends a benchmark of 40 conversational turns per hour for caregivers, indicating that conversational turns in centers are well above par while those occurring in homes are below the targeted benchmark.[i]

Average Measures on Two-Day LENA Recordings

	All	Center	Home
Winter 2021			
Adult Words Spoken	1037	1042	949
Conversational Turns	24	24	28
Child Vocalizations	94	94	111
Electronic Noise	11	11	9
Dev. Snapshot (%)	36	41	36
Spring 2021			
Adult Words Spoken	907	905	930
Conversational Turns	24	24	19
Child Vocalizations	105	106	86
Electronic Noise	11	11	7
Dev. Snapshot (%)	41	40	42
N (LENA SP)	175	166	9
N (Dev. Snapshot)	110	105	5

Notably, parent-reported developmental snapshots improved between the two periods. Additionally, the number of child vocalizations increased for the entirety of the Early Head Start sample. The change in child vocalizations appears to be driven by students enrolled in center-based learning models. Between the winter and spring, adults' word count declined, children experienced similar numbers of conversational turns, and children were exposed to about the same amount of electronic background noise in the two time periods. These results are practical and developmentally appropriate given that young children are expected to make incremental gains in language over time, whereas conversational turns and electronic background noise are less likely to change without providing additional caregiver supports or instruction.

Unfortunately, not enough students experienced the home condition to warrant making comparisons between the home and center-based students. While home-based students in the sample had *fewer* conversational turns and vocalizations in the spring, we could not draw conclusions about whether home-based students and center-based students are progressing in significantly different ways from one another due to the small sample size.

Question 4: What factors influence rates of learning? Including: teacher characteristics (gender, ethnicity, years of experience); attendance (virtual or in-person); sociodemographic indicators linked to lower learning outcomes (i.e., homelessness, foster child status, indicators for various types of government care/subsidy/services), parent-reported data (parent-child interactions, home learning, child experiences, and size of social network).

<u>Teacher Characteristics</u>: Among Head Start children, those with more experienced teachers showed *lower* gains in oral counting and quantity comparison. No other correlations between teacher characteristics and learning or skill development are evident among Head Start or Early Head Start children.

<u>Attendance</u>: Among center-based Head Start students, those with higher rates of absences and tardiness had lower gains in oral counting and number naming. There are no correlations between attendance and executive functioning, print knowledge, or quantity comparisons for center-based Head Start students. Student

attendance is not consistently correlated with gains among home-based Head Start students, or outcomes as measured by LENA for Early Head Start students.

Sociodemographic Indicators: Head Start students who have flags for one or more sociodemographic indicators have lower gains, on average. For instance, children with a primary parent without a high school degree made lower gains in numeracy; their gains were 1.8 to 3.1 points smaller in magnitude than their counterparts'. Similarly, the total number of sociodemographic indicators is correlated with a lower gain score for print knowledge (0.78 points), oral counting (-1.3 points) and quantity comparison (0.54 points), controlling for child and family demographics. While we observe some differences by foster child status, the program evaluation sample has a very small number of foster children (two and four percent of Head Start and Early Head Start students, respectively, are in foster care) and thus drawing a conclusion on whether foster child status is correlated with gain scores is difficult.

Among Early Head Start students, sociodemographic indicators are not consistently correlated with outcomes measured using LENA, such as conversational turns or child vocalizations. However, several sociodemographic indicators (receiving SSI, WIC; having a primary parent without a high school degree) are associated with lower average percentiles on the Spring 2021 parent-reported Developmental Snapshots.

Parent-Reported Data: Among Head Start students, parent survey items measuring parent-child interactions, home learning frequency, and size of social network were not consistently correlated with spring-fall gains in learning or executive functioning. While items asking about parent-child interactions appear positively associated with Developmental Snapshots of Early Head Start students as measured in Spring 2021, results are not consistent (i.e., the items are *not* correlated with Developmental Snapshot scores from Winter 2021).

CONCLUSION

In summary, Head Start children demonstrated significant growth on outcomes of print knowledge and early numeracy over the 2020-2021 school year, despite adjustments to learning contexts imposed by the COVID-19 pandemic. Similarly, children in Early Head Start showed improvement in average number of vocalizations throughout the school day. Early Head Start children continued to be exposed to language interaction with adults over time, which is essential for early language acquisition.

Although the purpose of the Program Evaluation was to examine young children's school readiness growth, these findings also have practical implications for future instruction. For example, Head Start children made smaller gains on direct assessments of executive functioning. As a result, a focus of future instruction on bolstering young children's working memory, inhibitory control, and cognitive flexibility through explicit and repeated instruction could be beneficial.[ii] Classroom activities such as storytelling and movement games contribute to working memory and inhibitory control; matching and sorting activities using rules (e.g. by color) promotes cognitive flexibility.[iii] Students enrolled in the center-based and home-based learning models also showed measurable differences in learning. These findings suggest that day-to-day learning context can make a considerable difference for young students and their skill development over a long time period.

Children in Early Head Start were exposed to less adult input over time, so it may be useful to provide additional supports for caregivers and teachers to encourage language use throughout the day. Research indicates that an increase of two conversational turns per hour up to 40 turns per hour is associated with a one-point increase in IQ by middle school.[iv] Encouraging adults to engage in meaningful interactions through book reading and child-directed conversations can help increase conversational turns.[v] This support may be particularly important for children with sociodemographic factors that are associated with lower outcomes.

Overall, children in Head Start and Early Head Start benefited from programming in both learning models over the course of the school year. Keeping classrooms open (and responding quickly to COVID-related closures)

and ensuring children show up regularly appear to be important factors for children and their associated learning outcomes. Understanding young children's early skill development is critically important, particularly for identifying post-pandemic opportunities to support children's academic future, given that little is known about learning in early childhood in general during the 2020-2021 year.[vi] This program evaluation serves as an essential example for assessing Head Start and Early Head Start children during this unique and unprecedented time.

Supplementary Descriptive Statistics of Head Start Students: Child and Family Demographics

	All	Center	Home
White (Non-Hispanic)	0.08	0.09	0.06
Black (Non-Hispanic)	0.37	0.38	0.36
Hispanic (Any Race)	0.48	0.47	0.49
Asian/PI (Non-Hispanic)	0.05	0.04	0.07
Other Race (Non-Hispanic)	0.02	0.03	0.01
Home Language - English	0.66	0.68	0.62
Home Language - Spanish	0.28	0.28	0.28
Home Language - Other	0.07	0.04	0.10
Second or Third Year in Program	0.71	0.67	0.76
Age at K Cutoff - 3 Years Old	0.29	0.31	0.28
Age at K Cutoff - 4 Years Old	0.71	0.69	0.72
First Year in Program	0.29	0.33	0.24
Number of Days Absent	24.50	24.50	N/A
Number of Days Absent or Late	30.60	30.60	N/A
Number of Virtual Meetings Attended	N/A	N/A	19.40
Sociodemographic Indicators for Learning			
Social Security Income Recipient	0.10	0.09	0.11
TANF Recipient	0.08	0.09	0.06
WIC Recipient	0.52	0.53	0.51
SNAP Recipient	0.53	0.57	0.47
Parent Without High School Degree	0.19	0.19	0.19
Single Parent Household	0.64	0.69	0.56
Parent Unemployed	0.42	0.37	0.49
Foster Child	0.02	0.02	0.03
Homeless Flag	0.11	0.11	0.11
Total Number of Sociodemographic Indicators	2.61	2.66	2.53
N	336	196	140

Notes: Table shows means of nonmissing demographic variables for Head Start students who participated in fall data collection. Proportions shown for race/ethnicity, language, age or year in program, and sociodemographic indicators (e.g., 0.08 for White indicates 8 percent of students in the program evaluation were White). Means shown for count variables (attendance and total number of sociodemographic indicators). Sociodemographic indicators are set to 1 if experienced by child at either start or end of enrollment period.

Supplementary Descriptive Statistics of Head Start Students: Survey Item Responses

	All	Center	Home
Parent-Child Interaction			
Paused to connect with your child before starting an activity	2.89	2.90	2.87
Used open-ended questions during activities with your child	3.36	3.36	3.36
Let your child make a mistake … in order to succeed	3.35	3.36	3.34
Talked with your child about an activity after you completed it	3.34	3.32	3.35
Increased the difficulty of activity already mastered to make it more challenging	2.72	2.76	2.67
Home Learning Frequency			
Shine At Home website	2.34	2.18	2.55
PEER Activity cards	3.19	3.44	2.86
Epic Library app	2.91	2.76	3.12
Khan Academy	2.23	1.79	2.83
Other assignments from teachers	3.10	2.94	3.30
Social Network			
I would be willing to ASK for help to support my child's home learning	2.09	2.06	2.14
I would be willing to ASK for help watching my child for an hour	1.98	2.00	1.96
I would be willing to ASK for help with information about housing or a job	2.00	2.02	1.97
I would be willing to ASK for help with a temporary loan or borrowing money	1.56	1.60	1.50
I would be willing to OFFER help to support my child's home learning	2.14	2.23	2.02
I would be willing to OFFER help watching a child for an hour	2.10	2.13	2.05
I would be willing to OFFER help with information about housing or a job	2.27	2.35	2.15
I would be willing to OFFER help with a temporary loan or borrowing money	1.71	1.75	1.66
Parent-Child Interaction Scale	0.01	0.02	0.00
Home Learning Scale	0.01	-0.08	0.13
Social Network Scale	-0.03	0.01	-0.08
N	259	150	109

Notes: Table restricted to Head Start students who participated in program evaluation and had nonmissing parent survey data. Parent-Child Interaction item response range is as follows: 1 "None" 2 "Once" 3 "Twice" 4 "More than twice". Home Learning Frequency item response range is as follows: 1 "Not at all" 2 "1-2x Month" 3 "1-2x Week" 4 "3-4x Week" 5 "Almost every day". Social Network item response range is as follows: 1 "No one" 2 "1-2 friends/family" 3 "3-4 friends/family" 4 "4 or more friends or family". Scales are standardized averages of all corresponding items.

Supplementary Descriptive Statistics of Early Head Start Students: Child and Family Demographics

	All	Center	Home
White (Non-Hispanic)	0.09	0.10	0.03
Black (Non-Hispanic)	0.46	0.48	0.38
Hispanic (Any Race)	0.43	0.40	0.56
Asian/PI (Non-Hispanic)	0.01	0.01	0.00
Other Race (Non-Hispanic)	0.01	0.01	0.03
Home Language - English	0.77	0.78	0.71
Home Language - Spanish	0.19	0.18	0.24
Home Language - Other	0.04	0.04	0.06
Number of Days Absent	22.57	22.21	N/A
Number of Days Absent or Late	30.66	30.75	N/A
Number of Virtual Meetings Attended	N/A	N/A	14.50
Sociodemographic Indicators for Learning			
Social Security Income Recipient	0.19	0.20	0.18
TANF Recipient	0.11	0.11	0.03
WIC Recipient	0.78	0.78	0.76
SNAP Recipient	0.70	0.70	0.74
Parent Without High School Degree	0.13	0.12	0.15
Single Parent Household	0.66	0.67	0.62
Parent Unemployed	0.38	0.35	0.62
Foster Child	0.04	0.05	0.00
Homeless Flag	0.18	0.19	0.15
Total Number of Sociodemographic Indicators	3.18	3.17	3.24
N	264	230	34

Notes: Table shows means of nonmissing demographic variables for Early Head Start students with nonmissing winter and/or spring LENA recordings. Proportions shown for race/ethnicity, language, age or year in program, and sociodemographic indicators (e.g., 0.09 for White indicates 9 percent of students in the program evaluation were White). Means shown for count variables (attendance and total number of sociodemographic indicators). Sociodemographic indicators are set to 1 if experienced by child at either start or end of enrollment period.

Supplementary Descriptive Statistics of Early Head Start Students: Survey Item Responses

	All	Center	Home
Parent-Child Interaction			
Paused to connect with your child before starting an activity	3.00	3.02	2.81
Used open-ended questions during activities with your child	3.54	3.55	3.38
Let your child make a mistake … in order to succeed	3.52	3.53	3.48
Talked with your child about an activity after you completed it	3.38	3.39	3.24
Increased the difficulty of activity already mastered to make it more challenging	2.93	2.92	2.95
Home Learning Frequency			
Shine At Home website	2.30	2.28	2.43
PEER Activity cards	3.47	3.50	3.00
Epic Library app	2.62	2.61	2.62
Khan Academy	1.45	1.41	1.71
Other assignments from teachers	2.81	2.81	2.90
Social Network			
I would be willing to ASK for help to support my child's home learning	2.32	2.34	2.05
I would be willing to ASK for help watching my child for an hour	2.19	2.21	1.95
I would be willing to ASK for help with information about housing or a job	2.11	2.11	1.90
I would be willing to ASK for help with a temporary loan or borrowing money	1.71	1.74	1.29
I would be willing to OFFER help to support my child's home learning	2.36	2.35	2.29
I would be willing to OFFER help watching a child for an hour	2.23	2.26	1.86
I would be willing to OFFER help with information about housing or a job	2.43	2.44	2.19
I would be willing to OFFER help with a temporary loan or borrowing money	1.93	1.99	1.38
Parent-Child Interaction Scale	0.14	0.15	0.04
Home Learning Scale	-0.14	-0.15	-0.15
Social Network Scale	0.18	0.20	-0.17
N	196	175	21

Notes: Table restricted to Early Head Start students with nonmissing LENA data for at least one time period and nonmissing parent survey data. Parent-Child Interaction item response range is as follows: 1 "None" 2 "Once" 3 "Twice" 4 "More than twice". Home Learning Frequency item response range is as follows: 1 "Not at all" 2 "1-2x Month" 3 "1-2x Week" 4 "3-4x Week" 5 "Almost every day". Social Network item response range is as follows: 1 "No one" 2 "1-2 friends/family" 3 "3-4 friends/family" 4 "4 or more friends or family". Scales are standardized averages of all corresponding items.

Supplementary Results: Winter and Spring Mean Scores and SD, by Subgroup

	Winter					Spring				
	All	Home	Center	Hispanic	Age 4	All	Home	Center	Hispanic	Age 4
Executive Functioning										
MEFS	96.78	95.99	97.27	96.12	97.30	98.34	99.22	97.78	97.34	98.77
	(10.28)	(13.06)	(8.08)	(11.01)	(10.06)	(6.39)	(6.30)	(6.40)	(6.12)	(6.33)
	257	*99*	*158*	*127*	*182*	*277*	*108*	*169*	*135*	*194*
Print Knowledge										
TOPEL	98.72	99.59	98.18	94.49	99.01	99.82	99.22	100.21	97.18	99.84
	(14.48)	(14.38)	(14.56)	(13.67)	(14.36)	(14.60)	(14.54)	(14.67)	(14.56)	(14.75)
	265	*102*	*163*	*131*	*187*	*268*	*104*	*164*	*131*	*189*
Numeracy										
IGDI Oral Counting	15.34	17.72	13.87	12.79	15.24	18.86	19.48	18.49	15.95	19.07
	(12.37)	(13.76)	(11.21)	(9.88)	(12.24)	(14.83)	(15.42)	(14.48)	(12.56)	(15.26)
	267	*102*	*165*	*132*	*185*	*274*	*105*	*169*	*134*	*190*
IGDI Number Naming	20.09	21.07	19.48	17.45	19.03	23.24	24.20	22.65	21.58	22.97
	(16.80)	(17.03)	(16.68)	(15.35)	(17.22)	(17.44)	(17.55)	(17.39)	(17.44)	(17.87)
	267	*102*	*165*	*132*	*185*	*274*	*105*	*169*	*134*	*190*
IGDI Quantity Comparison	9.49	9.34	9.58	9.24	9.30	10.45	10.76	10.25	10.25	10.37
	(4.33)	(4.10)	(4.47)	(4.63)	(4.03)	(4.76)	(4.61)	(4.86)	(4.55)	(4.65)
	267	*102*	*165*	*132*	*185*	*274*	*105*	*169*	*134*	*190*

Note: Format parallels table containing fall means on p.3. SD in parentheses and sample sizes are italicized. MEFS and TOPEL are measured using standard scores, which take child age into account. Numeracy subtests are raw scores. Table is restricted to Head Start students with non-missing values for each corresponding assessment and time period. Not all subgroups shown.

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