IES Institute of Education Sciences

APPENDIXES
November 2021

Regional Educational Laboratory Mid-Atlantic
At Mathematica

Impacts of Home Visits on Students in District of Columbia Public Schools

See https://go.usa.gov/xertp for the full report.

Appendix A. Literature review

Structured relationship-building teacher home visits have emerged as a promising method to increase parent engagement and improve student outcomes, but there is limited evidence on their effectiveness. Two meta-analyses found that family engagement programs, including those focused on parent-teacher relationships, collaboration, and communication, positively impacted student academic achievement and social-emotional and mental health outcomes. But the analyses were not restricted to studies with rigorous designs, and many of the studies had small sample sizes (Jeynes, 2012; Sheridan et al., 2019). Based on interviews and debriefing sessions with parents and teachers participating in home visits, another study suggested that home visits have positive effects on students' feelings about their school and their teachers (Goff Pejsa & Associates, 2014). Among the small number of more rigorous studies, a matched comparison group study of a home visit program in a Texas charter school system found that the students who received home visits had higher math and English language arts course grades, higher levels of positive classroom behavior, and parents who logged into the system's parent portal more frequently (Wright et al., 2018). However, a matched comparison study and a related random assignment study of a home visit program implemented in the St. Louis, Missouri, area found inconsistent results. Some of the matched comparison analyses found positive results on student attendance and reading assessment scores, while the random assignment analyses and some of the matched comparison analyses found no statistically significant impacts on attendance, reading assessment scores, or disciplinary referrals (Scher, 2016; Scher & Lauver, in press).

Two studies have involved home visits from the Family Engagement Partnership (FEP) or its home visit model. A Johns Hopkins University study on the FEP in the District of Columbia found that students whose families received home visits had better attendance and were more likely to score above grade-level proficiency targets on a reading comprehension test than students whose families did not receive a visit (Sheldon & Jung, 2015). The study also found that teachers who received FEP training scored better on some components of the district's teacher observation measure (leading well-organized objective-driven lessons, providing students multiple ways to move toward mastery, responding to student understanding, and developing higher-level understanding). The study focused on 12 schools and did not use a rigorously matched comparison group. Another Johns Hopkins University study examined home visits in four districts. The home visits were based on the Parent Teacher Home Visits model that the FEP is also based on. The study found that the home visits were associated with lower rates of chronic

absenteeism and higher rates of proficiency on math and English language arts assessments (Sheldon & Jung, 2018). The study involved a comparison group but did not demonstrate that the students and schools in the comparison group were similar to those in the home visit group.

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Appendix B. Methods

This appendix discusses the study's data sources, sample, and methodology.

Data sources

The study team obtained data on Family Engagement Partnership (FEP) home visits; student demographics, enrollment, achievement, attendance, and disciplinary incidents; and census block group characteristics (table B1). The data covered the 2012/13–2016/17 school years, except the home visit data, which covered the 2014/15–2016/17 school years.[1] The study focused on students in grades 1–5 during the three years of the study period; however, the study also obtained kindergarten data to use as baseline data for matching. The Flamboyan Foundation owns the FEP data and provided the data to the study team via District of Columbia Public Schools (DCPS). DCPS owns and provided all other data, except for the census block group characteristics, which are publicly available on the U.S. Census Bureau website (https://data.census.gov). The study team matched FEP home visit data to DCPS administrative data using student name and other information.

The study also obtained DCPS administrative data on teacher background characteristics and teaching assignments. Ultimately, the study found that teachers and students could not be reliably linked, so the study did not include teacher characteristics in the analysis.

Table B1. Study data, by type of variable

Type	Description
Treatment variable	
Family Engagement Partnership home visit data	Name, grade, and school of students who received home visits, names of teachers who provided those visits, and the dates of the visits. The study team obtained similar data on Family Engagement Collaborative visits, but the analysis of visits under that program was dropped from the study (see appendix D).
Background variables	
Census block group characteristics	Five-year averages of the percentage of individuals age 25 and older by highest educational attainment for each census block group. The study team attempted to match students to their census block group characteristics using student home address data.
Student demographics	Student-level race/ethnicity, gender, age, free or reduced-price lunch status, special education status, English learner status, and home address.
Student enrollment	Student-level grade, school, admission date, withdrawal date, membership days (number of days enrolled), excused absences, and unexcused absences.

[1] The study team obtained home visit data for the 2013/14–2016/17 school years. However, the FEP data system did not maintain the dates of 2013/14 FEP visits. Restricting the sample of visited students to those who received their first FEP visit of a given school year during the summer before the start of that school year thus resulted in excluding 2013/14 as a study year.

Type	Description
Outcome variables	
Student achievement	Student-level math and English language arts *z*-scores on the District of Columbia Comprehensive Assessment System (DC CAS) and Partnership for Assessment of Readiness for College and Careers (PARCC) assessment, which were the annual standardized assessments DCPS administered during the study period. Scores are from the DC CAS for the 2012/13 and 2013/14 school years and from the PARCC assessment for the 2014/15–2016/17 school years. The analysis included test scores for students in grades 3 (baseline for grade 4), 4, and 5. To express scores in a common unit, DC CAS and PARCC scale scores for the District of Columbia Public Schools (DCPS) test-taking population were converted to *z*-scores using the means and standard deviations for each assessment. Specifically, the study team calculated math and English language arts scale score means and standard deviations by grade-year among all full school year students who had a valid test score and were tested on grade level. Subtracting the mean score of this population from an individual student's scale score and then dividing that difference by the standard deviation of scores in the population yields a *z*-score. *Z*-scores have a mean of 0 and a standard deviation of 1 within each grade-year. Impacts on *z*-scores thus represent changes to achievement expressed in standard deviations within the referenced DCPS test-taking population.
Student attendance rate	Calculated from student enrollment data noted above as: $\left(1 - \frac{excused\ absences + unexcused\ absences}{membership\ days}\right) \times 100$
Student disciplinary incidents	Date and tier of each disciplinary incident. DCPS categorizes incidents into five tiers based on the severity of the incident and prescribed consequences: • Tier 1 incidents (for example, behaviors that disrupt or interfere with classroom teaching and learning; running in the classroom, hall, or building; directing profanity or obscene or offensive gestures toward peers) result in classroom-level discipline, but teachers can seek a disciplinary response from an administrator or a school-level committee if the behavior continues. • Tier 2 incidents (for example, inappropriate or disruptive physical contact between students; intentional misuse of school equipment, supplies, or facilities; documented pattern of persistent Tier 1 behavior) lead to an administrative or school-based administrative response. • Tier 3 incidents (for example, engaging in reckless behavior that may cause harm to self or others; fighting where there is no injury and no weapon; bullying, or using humiliating or intimidating language or behavior) could result in suspension (either onsite or offsite). • Tier 4 incidents (for example, possession of a weapon or replica or imitation of a weapon, fighting that creates substantial risk of or results in minor injury, sexual harassment) could lead to offsite suspension. • Tier 5 incidents (for example, use, threatened use, or transfer of any weapon; assault or physical attack on student or staff; possession of drug paraphernalia or controlled substance) could result in offsite suspension or expulsion. The study team used these data to create three measures for each student-year: • A binary indicator for whether a student had a disciplinary incident (an incident that falls under any of the five tiers). • A binary indicator for whether the student had a serious disciplinary incident (an incident that falls under Tier 3, 4, or 5). • The number of days that a student had a disciplinary incident during a given school year.

Source: Authors' compilation.

Sample

The study sample included DCPS students who were in grades 1–5 at any point during the 2014/15–2016/17 school years. To be included in the sample for a given school year, a student had to be enrolled in a traditional DCPS school—that is, a school not designated as an adult education, special education, or youth engagement school—and must have remained in the same school from October 1 through June 1 of that school year. The latter enrollment criterion helped ensure that students were present in the school long enough to see any initial impacts

from the home visits. The study excluded from the eligible sample student-year observations identified as being tested off grade, missing current-year demographic variables, or missing valid outcome data. The analysis further restricted the sample of visited students to those who received the first FEP visit of a given school year during the summer before the start of that school year. Focusing on summer FEP visits ensured that neither visited nor comparison students had a disciplinary incident before the first visit of the school year. Additional restrictions to the sample resulted from the matching process, described below, which resulted in home visit and comparison groups that were similar at baseline (see appendix C). The demographics of FEP-visited students in the analytic sample were broadly similar to those of DCPS students as a whole on several characteristics, but there were differences of more than 5 percentage points between the two groups in the percentages of students who were Black, Hispanic, English learner students, or free lunch recipients (table B2).

Table B2. Demographic characteristics of Family Engagement Partnership (FEP)–visited students and all District of Columbia Public Schools (DCPS) students in grades 1–5

	Mean (percent)	
Characteristic	FEP	All DCPS
Male	51.56	51.59
Black	54.79	62.12
Hispanic	30.39	19.23
White	11.29	14.32
Other race/ethnicity	3.53	4.33
English learner student	18.95	11.69
Received free lunch	83.97	77.50
Was a special education student	16.08	14.15
Over age for grade	1.66	1.19
Number of student-year observations	1,984	59,764–62,451

Note: The FEP group consists of FEP-visited students in the analytic sample, which excludes student-year observations that were missing demographic data. Sample sizes for the all DCPS group differ across characteristics because the number of student-year observations missing demographic data varies across characteristics.
Source: Authors' analysis of District of Columbia Public Schools administrative data and Flamboyan Foundation data on Family Engagement Partnership home visits.

Methodology

The study team used propensity score matching at the student level to estimate the impact of receiving a home visit. Specifically, student data were used to match students who received a home visit (the home visit group) to similar students who did not receive a visit (the comparison group), thereby creating visited and nonvisited groups that were equivalent on observed preintervention (that is, baseline) measures. The impact of home visits was then estimated using regression analysis to compare outcomes for the two groups. The analyses combined all student-year observations across the three school years of the study period to estimate an average impact of the home visits in the year immediately following a summer home visit.

Imputation. Before conducting propensity score matching, the study team used multiple imputation to impute missing student background characteristics and baseline measures of the outcomes. Missing outcome data were not imputed; as noted above, students missing valid outcome data were excluded from the sample. The Stata MI suite of commands was used to estimate imputation regression models separately by intervention status (home visit or comparison), grade group (grades 1–3 or grades 4 and 5), and year. These imputation models included all

the variables used as covariates in the impact estimation models, as well as the outcome variables.[2] Five sets of imputations and the Stata MI commands were then used to estimate impacts. Using multiple sets of imputations enabled the study team to adjust standard errors for the variability created by imputing data. Table B3 shows the percentage of each baseline characteristic that was imputed for the main analytic sample.

Table B3. Percentages of baseline characteristic data that were imputed

Baseline characteristic	Grades 1–3	Grades 4 and 5
Number of days with disciplinary incidents	5.37	3.09
Attendance rate	5.45	3.09
Math achievement	na	6.49
English language arts achievement	na	6.86
Male	0	0
Black	0	0
Hispanic	0	0
White	0	0
Other race/ethnicity	0	0
English learner student	4.92	2.34
Received free lunch	4.35	2.34
Was a special education student	5.22	2.79
Over age for grade	3.41	1.66
Percentage of individuals in the census block group who did not have a high school diploma or GED	4.39	3.09
Number of student-year observations	2,670	1,326

na is not applicable.
Note: Percentages were calculated using weights to account for some home visit students being matched to multiple comparison students.
Source: Authors' analysis of District of Columbia Public Schools administrative data, U.S. Census Bureau data files, and Flamboyan Foundation data on Family Engagement Partnership home visits.

Propensity score matching. The process for matching individuals and selecting comparison groups consisted of several steps. First, the study team estimated grade group–by-year logistic regression models that predicted the probability of students receiving a home visit, where the grade group is grades 1–3 or grades 4 and 5. For each of the three years of outcome data, the pool of eligible comparison group members was restricted to students in the same grade group as the home visit students. The dependent variable of the logistic model of propensity to receive a home visit was an indicator coded as 1 for students who received a visit in that year and 0 for students who did not. Each grade group–by-year logistic regression model included the following variables:

[2] Specifically, variables in the imputation regression models included student gender, race/ethnicity, grade, and outcomes; baseline measures of the student's outcome, free lunch status, English learner status, over-age for grade status, the percentage of individuals in the student's census block group who did not have a high school diploma or GED, the percentage of individuals in the student's census block group who had a bachelor's degree or higher, and the percentage of individuals in the student's census block group who were below 185 percent of the poverty level; school-grade-year means of gender, race/ethnicity, and the preceding baseline characteristics; and a baseline measure of the student's special education status. The imputation regression models for grades 1–3 did not include student achievement outcomes; the models for grades 4 and 5 included student achievement outcomes as right-hand-side variables and baseline measures of those student achievement outcomes as left-hand-side variables.

At the student level (for student i *in grade* g *in school* s*)*

- Number of days with disciplinary incidents in the prior year.
- Prior-year attendance rate.
- Prior-year math achievement *z*-score (for grades 4 and 5 only).
- Prior-year English language arts achievement *z*-score (for grades 4 and 5 only).
- Indicator for male.
- Race/ethnicity indicators.
- Indicator for being an English learner student in the prior year.
- Indicator for receiving free lunch in the prior year.
- Indicator for being a special education student in the prior year.
- Percentage of individuals age 25 and older in the prior year census block group who did not have a high school diploma or GED.
- Grade indicators.

At the school-grade level

- Mean attendance rate for the same cohort (school *s*, grade $g - 1$) in the prior year.
- Mean number of days with disciplinary incidents for the same cohort in the prior year.
- Mean math achievement *z*-score for same cohort in the prior year (for grades 4 and 5 only).
- Mean English language arts achievement *z*-score for same cohort in the prior year (for grades 4 and 5 only).
- Mean percentage of individuals age 25 and older in census block group who did not have a high school diploma or GED for the same cohort in the prior year.

Estimating these logistic regression models produced a set of predicted probabilities (propensity scores) for each of the five imputations. The study team then calculated the mean propensity score across imputations for each grade group–year.

Next, the study team applied a matching algorithm—nearest neighbor without replacement—to the estimated mean propensity scores to create a comparison group for the home visit group. Matching was conducted separately for each grade-year, thus ensuring that comparison group students were in the same grade in a given outcome year as the home visit students to whom they were matched. For the analysis of FEP, students who received an FEP visit after the start of a given school year and students who received an FEC visit at any point during that school year were excluded from the potential comparison group. The frame for the comparison group thus included all nonvisited students in traditional DCPS schools who met the sample grade and enrollment criteria.

Before reviewing any outcome data, the study team selected nearest neighbor without replacement as the matching algorithm. Each home visit student was matched to the nonvisited student with the most similar propensity score. A nonvisited student could be a nearest neighbor for only one treatment student. In the event of ties (multiple nonvisited nearest neighbors for a given visited student), all nonvisited nearest neighbors were included, and the weights for the set of nearest neighbors were normalized to 1. This approach produced home visit and comparison groups that were intended to meet What Works Clearinghouse version 4.1 baseline equivalence standards for all five outcomes of interest in each of the three outcome years (see appendix C).

Impact estimation. The study team estimated the impact of home visits by comparing the outcomes for home visit students to the outcomes for the matched students using regressions.

Impacts on student disciplinary incidents, attendance, and achievement were estimated using the following equation:

$$y_{it} = \alpha + X_i\beta + \delta T_{it} + \text{year dummy variables} + \varepsilon_{it}$$

where y_{it} is the outcome for student i in year t; α is the intercept term; X_i is a vector of baseline student and school-grade characteristics (including a baseline measure of the outcome, demographic characteristics, grade indicators, and census block group characteristics data for students); T_{it} is a treatment indicator that equals 1 if the student received a home visit in that year and 0 otherwise; ε_{it} is a random error term that reflects the influence of unobserved factors on the outcome; and α, β, and δ are parameters to be estimated. The parameter δ represents the impact of a home visit.

The study team estimated the models with ordinary least squares using robust standard errors that accounted for the clustering of students within school-grade-years. Data for the three outcome years were stacked to create a single estimate of the impact of a home visit for the school year immediately following the summer home visit. The analytic weights applied accounted for each home visit student potentially having multiple matched comparison students. Stata MI commands were used to adjust standard errors for variability within and between imputations, as well as the number of imputations (in this case, five).

Appendix C. Baseline equivalence

This appendix provides analyses showing that the home visit and matched comparison groups were similar on key measures before teachers visited Family Engagement Partnership students (that is, at baseline). Tables C1 and C2 present differences in baseline means between the analytic home visit and comparison groups. Table C3 reports data in support of the study's intention to meet What Works Clearinghouse version 4.1 baseline equivalence standards for all five outcomes of interest in each of the three outcome years.

Table C1. Baseline characteristics of analytic samples for impacts of Family Engagement Partnership summer visits on disciplinary incidents and student attendance in grades 1–5

Baseline characteristic	Mean		Difference in means	Standard error	*p*-value
	Home visit	Comparison			
Student level					
Number of days with disciplinary incidents	0.19	0.22	–0.03	0.05	.574
Attendance rate	95.15	95.09	0.06	0.22	.770
Male	51.56	50.30	1.26	1.63	.439
Black	54.79	56.50	–1.71	3.86	.657
Hispanic	30.39	31.05	–0.66	3.89	.866
White	11.29	8.87	2.42	2.20	.272
Other race/ethnicity	3.53	3.58	–0.05	0.71	.943
English learner student	22.24	22.25	–0.01	3.35	.998
Received free lunch	83.25	86.39	–3.15	3.38	.352
Was a special education student	15.40	15.79	–0.38	1.47	.795
Over age for grade	1.46	0.90	0.56	0.36	.116
Percentage of individuals in census block group who do not have a high school diploma or GED	15.40	15.55	–0.15	0.62	.809
School-grade level					
Number of days with disciplinary incidents	0.21	0.20	0.01	0.03	.797
Attendance rate	93.72	93.74	–0.02	0.29	.948
Male	50.46	50.59	–0.13	0.64	.839
Black	60.36	64.09	–3.73	3.43	.277
Hispanic	27.02	24.72	2.30	3.39	.498
White	9.00	8.08	0.92	1.79	.610
Other race/ethnicity	3.62	3.10	0.52	0.42	.222
English learner students	19.59	19.13	0.46	2.81	.869
Received free lunch	84.98	86.90	–1.92	3.02	.525
Special education students	13.92	12.68	1.24*	0.63	.049
over age for grade	1.18	1.03	0.15	0.18	.412
Percentage of individuals in census block group who do not have a high school diploma or GED	15.45	15.59	–0.14	0.54	.796
Number of student-year observations	1,984	2,012			

* Significant at $p < .05$.

Note: Home visit and comparison means are unadjusted. For disciplinary incidents, means and differences in means are in days. For all other characteristics, means are in percentages, and differences in means are in percentage points. The estimation of the difference in means used robust standard errors that accounted for clustering of students within school-grade-years and a weight to ensure that standard errors accounted for some home visit students being matched to multiple comparison students.

Source: Authors' analysis of District of Columbia Public Schools administrative data, U.S. Census Bureau data files, and Flamboyan Foundation data on Family Engagement Partnership home visits.

Table C2. Baseline characteristics of analytic samples for impacts of Family Engagement Partnership summer visits on math and English language arts achievement in grades 4 and 5

Baseline characteristic	Mean		Difference in means	Standard error	*p*-value
	Home visit	Comparison			
Student level					
Math achievement	–0.11	–0.07	–0.04	0.08	.674
English language arts achievement	–0.16	–0.18	0.02	0.09	.796
Male	52.64	50.98	1.66	3.10	.593
Black	63.05	63.20	–0.15	6.52	.982
Hispanic	27.00	28.96	–1.96	6.29	.755
White	7.69	5.88	1.81	2.78	.515
Other race/ethnicity	2.26	1.96	0.30	0.85	.724
English learner student	13.82	14.66	–0.84	4.38	.847
Received free lunch	88.05	89.68	–1.63	4.66	.727
Was a special education student	14.48	14.63	–0.15	2.53	.952
Over age for grade	2.56	1.51	1.06	0.77	.173
Percentage of individuals in census block group who do not have a high school diploma or GED	16.07	15.75	0.31	0.83	.706
School-grade level					
Math achievement	–0.17	–0.16	0.00	0.06	.961
English language arts achievement	–0.24	–0.23	–0.01	0.06	.889
Male	51.28	50.26	1.02	1.33	.444
Black	67.63	68.90	–1.27	5.72	.824
Hispanic	24.82	23.07	1.76	5.53	.751
White	4.81	5.32	–0.50	1.80	.779
Other race/ethnicity	2.74	2.72	0.02	0.52	.970
English learner students	14.09	15.01	–0.93	3.88	.811
Received free lunch	90.40	90.64	–0.24	3.71	.948
Special education students	15.36	13.61	1.74	0.95	.067
Over age for grade	2.10	1.72	0.39	0.38	.312
Percentage of individuals in census block group who do not have a high school diploma or GED	16.41	16.31	0.10	0.74	.890
Number of student-year observations	663	663			

Note: Home visit and comparison means do not differ by a statistically significant margin at $p < .05$ for any characteristic. Achievement refers to scores on the District of Columbia Comprehensive Assessment System (DC CAS) for the 2013/14 school year and scores on the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment for the 2014/15–2016/17 school years. To express scores in a common unit, DC CAS and PARCC scale scores for the DCPS test-taking population were converted to *z*-scores using the means and standard deviations for each assessment. *Z*-scores have a mean of 0 and a standard deviation of 1 within each grade-year. Home visit and comparison means are unadjusted. For math and English language arts achievement, means and differences in means are in *z*-scores. For all other characteristics, means are in percentages, and differences in means are in percentage points. The estimation of the difference in means used robust standard errors that accounted for clustering of students within school-grade-years and a weight to ensure that standard errors accounted for some home visit students being matched to multiple comparison students.

Source: Authors' analysis of District of Columbia Public Schools administrative data, U.S. Census Bureau data files, and Flamboyan Foundation data on Family Engagement Partnership home visits.

Table C3. Characteristics used to assess What Works Clearinghouse baseline equivalence requirements for analysis of the impacts of Family Engagement Partnership summer visits

	Home visit group							Comparison group							Correlation between baseline and outcome (observed baseline sample)
	Sample size		Outcome			Baseline		Sample size		Outcome			Baseline		
			Full sample							Full sample					
Outcome variable	Full sample	Observed baseline sample	Mean	Standard deviation	Observed baseline sample mean	Full sample mean	Observed baseline sample standard deviation	Full sample	Observed baseline sample	Mean	Standard deviation	Observed baseline sample mean	Full sample mean	Observed baseline sample standard deviation	
2014/15															
Had a disciplinary incident	778	757	0.095	0.294	0.094	0.188	1.127	788	735	0.129	0.336	0.126	0.245	1.533	0.259
Had a serious disciplinary incident	778	757	0.089	0.284	0.087	0.188	1.127	788	735	0.101	0.301	0.100	0.245	1.533	0.268
Attendance rate	778	757	0.950	0.057	0.949	0.953	0.048	788	735	0.951	0.047	0.950	0.952	0.044	0.619
ELA achievement	202	193	–0.093	0.885	–0.062	–0.050	0.910	202	184	–0.180	0.839	–0.183	–0.145	0.894	0.797
Math achievement	202	193	0.125	0.948	0.154	0.033	0.882	202	185	–0.076	0.827	–0.077	0.018	0.823	0.792
2015/16															
Had a disciplinary incident	843	816	0.071	0.257	0.071	0.187	1.166	857	792	0.101	0.301	0.103	0.201	1.559	0.242
Had a serious disciplinary incident	843	816	0.065	0.247	0.066	0.187	1.166	857	792	0.077	0.267	0.078	0.201	1.559	0.264
Attendance rate	843	816	0.959	0.038	0.959	0.951	0.044	857	790	0.951	0.045	0.951	0.948	0.046	0.615
ELA achievement	294	275	–0.109	0.889	–0.079	–0.179	0.888	294	260	–0.180	0.918	–0.168	–0.212	0.928	0.833
Math achievement	294	278	–0.032	0.952	–0.014	–0.137	0.904	294	261	–0.075	0.902	–0.050	–0.078	0.901	0.853
2016/17															
Had a disciplinary incident	363	354	0.138	0.345	0.141	0.201	0.804	367	359	0.157	0.364	0.158	0.193	0.929	0.332
Had a serious disciplinary incident	363	354	0.094	0.292	0.096	0.201	0.804	367	359	0.096	0.296	0.096	0.193	0.929	0.355
Attendance rate	363	354	0.949	0.044	0.949	0.951	0.045	367	359	0.943	0.054	0.943	0.954	0.039	0.611
ELA achievement	167	165	–0.266	0.930	–0.265	–0.256	0.910	167	158	–0.161	0.811	–0.142	–0.173	0.839	0.833
Math achievement	167	165	–0.100	0.865	–0.095	–0.228	0.894	167	158	–0.105	0.916	–0.053	–0.175	0.946	0.854

ELA is English language arts.

Note: Achievement refers to scores on the District of Columbia Comprehensive Assessment System (DC CAS) for the 2013/14 school year and scores on the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment for the 2014/15–2016/17 school years. To express scores in a common unit, DC CAS and PARCC scale scores for the DCPS test-taking population were converted to *z*-scores using the means and standard deviations for each assessment. *Z*-scores have a mean of 0 and a standard deviation of 1 within each grade-year.

Source: Authors' analysis of District of Columbia Public Schools administrative data and Flamboyan Foundation data on Family Engagement Partnership home visits.

Appendix D. Explanation for dropping the analysis of Family Engagement Collaborative home visits

The study originally attempted to include structured, relationship-building home visits from a second DCPS program—the Family Engagement Collaborative (FEC)—in analyzing the impacts of home visits on student disciplinary incidents, attendance, and achievement (research questions 1–3) and to answer two additional secondary research questions:

4. Do the impacts of the home visits differ by home visit program?
5. Do home visits conducted earlier in the school year impact student disciplinary incidents and attendance differently than home visits conducted later in the school year?

Although the Family Engagement Partnership (FEP) and the FEC have important differences, including program components beyond home visits and whether the programs are schoolwide (FEP) or teacher level (FEC), the programs' home visit training and procedures are identical. DCPS expressed interest in the impacts of the visits regardless of program context, and evaluating the impacts of the home visits from both programs together would have increased the statistical power of the analysis. Questions 4 and 5 focused on potentially actionable aspects of the programs for which DCPS did not have clear expectations. The similarity between the home visit components of the FEP and FEC made it unclear whether to expect different impacts by program (question 4). Regarding visit timing, on the one hand, an early start at relationship-building might result in earlier visits having a greater impact than later ones; on the other hand, conducting visits later in the school year might enable teachers to leverage their experiences to date with their students and use the visits strategically to better encourage positive behaviors and discourage negative behaviors (question 5).

The study team excluded FEC visits from the analysis after finding evidence suggesting that teachers might have selected students to visit in a given school year based, at least in part, on their observations of students during that school year. Such selection would have biased estimated impacts of home visits conducted during the school year, even if the groups of visited and comparison students were equivalent on measured characteristics at baseline (before the start of the school year). Restricting the impact analysis to summer visits eliminated this particular mechanism for selection bias. However, this restriction could not be applied to FEC visits because of the relatively small FEC sample size (table D1); as a result, the study team dropped question 4 and examined questions 1–3 only for the (larger) FEP program. The selection bias evidently associated with visits conducted during the school year meant that the study could not produce a credible analysis of the impact of visit timing, leading to question 5 being dropped as well.

Table D1. Roughly 10 percent of visited students in the eligible study sample received a Family Engagement Collaborative home visit, and 90 percent received a Family Engagement Partnership visit

	Visited students, by school year							
	2014/15		2015/16		2016/17		2014/15–2016/17	
Home visit program	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Family Engagement Collaborative[a]	14.87	466	9.03	318	6.12	310	9.33	1,094
Family Engagement Partnership	85.13	2,668	90.97	3,203	93.88	4,757	90.67	10,628

a. Includes visits by Family Engagement Collaborative Masters teachers.
Source: Authors' analysis of District of Columbia Public Schools administrative data and data on Family Engagement Collaborative home visits and Flamboyan Foundation data on Family Engagement Partnership.

After describing the FEC program, the remainder of this appendix provides additional details about the decision to drop FEC visits from the analysis.

Description of the Family Engagement Collaborative program

Developed by DCPS in partnership with the Flamboyan Foundation, the FEC is a teacher-level program available to pairs of preschool–grade 5 teachers not in FEP schools. The FEC involves the same home visit training and procedures as the FEP but does not include any of the FEP's other components (table D2). The FEC also involves professional learning communities for participating teachers. Teachers must apply to participate in the FEC in pairs from the same school. DCPS accepts almost all applicants; however, a small number of applicants are rejected due to capacity constraints or an inability to find a partner teacher with whom to participate. In addition to the home visit training, FEC teachers can participate in six, two-hour professional learning community meetings facilitated by former FEC teachers that cover the following topics: starting off the year right; ongoing communication; goal setting; the role of race, class, and culture in family engagement; family engagement innovation; and reflecting on the year. The FEC also has a yearlong FEC Masters fellowship program for teachers who complete the initial FEC program. The FEC Masters program involves home visits, additional professional learning community meetings, and a school family engagement project. FEC and FEC Masters teachers who attend at least five of the six professional learning community meetings and conduct 10–24 home visits during the program year receive $1,500. FEC and FEC Masters teachers are allowed to visit the same student's family more than once, but repeat visits are rare (less than 1 percent of all visits). As a teacher-level program the FEC is much smaller than the FEP, conducting about 500 home visits per year compared with about 11,000 home visits conducted through the FEP annually (Hagan, personal communication, May 25, 2021).

Table D2. Family Engagement Collaborative (FEC) program components

Component	Details
Program level	Pairs of teachers (FEC Masters also allows groups of three or more)
Home visit training provider	District of Columbia Public School and Flamboyan Foundation staff
Home visit training content	• Based on Parent Teacher Home Visits model • Lasts two to three hours • Takes place over the summer • Involves: ○ Parents and teachers sharing home visit experiences ○ Key components of home visits ○ How to approach, plan, schedule, and conduct visits ○ How to sustain families' trust and maintain communication after visits ○ How to overcome common challenges
Home visit procedure	• Home visits are voluntary for both teachers and families. • Teachers select who to visit and when. • General expectation is one visit per family. • Teachers conduct visits in pairs. • Visits typically last 30 minutes. • Visits take place over the summer or during the school year. • Visits involve: ○ Introductions and getting to know each other. ○ Parents' hopes and dreams for their child's future. ○ Parents' expectations for their child's education. ○ An invitation to continue building a relationship. ○ Parents' communication preferences.
Additional program components and training during the school year	• Six, two-hour professional learning community meetings on the following topics: ○ Starting off the year right ○ Ongoing communication ○ Goal setting ○ The role of race, class, and culture in family engagement ○ Family engagement innovation ○ Reflecting on the year
Compensation	• Teachers receive $1,500 if they attend at least five professional learning community meetings and conduct the required number of home visits per year: o 24 visits for a pair of FEC teachers. o 10 visits for a pair of FEC Masters teachers. o 18 visits for a group of three or more FEC Masters teachers. • Repeat visits to same student's family count toward the visits.

Source: Based on training materials provided by and conversations with District of Columbia Public School staff.

Reasons for dropping the Family Engagement Collaborative program from the analysis

In attempting to analyze the impacts of both FEP and FEC home visits, the study team created an FEP-visited group, an FEC-visited group, and a matched comparison group for each program using the same methods described in appendix B with two exceptions: all visited students who met the sample criteria, regardless of visit timing, were included (rather than restricting the sample to students who received summer visits), and data from four outcome years were used (2013/14–2016/17, rather than excluding the first outcome year because FEP visit dates for

2013/14 were unavailable).[1] After estimating the grade group–by-year logistic regression model described in appendix B separately for the FEP and the FEC, the study team used the nearest neighbor matching without replacement algorithm to produce a comparison group for each program. The resulting home visit and comparison groups were intended to meet What Works Clearinghouse version 4.1 baseline equivalence standards for all five outcomes of interest—had a disciplinary incident, had a serious disciplinary incident, attendance rate, math achievement, and English language arts achievement—in all four outcome years for the FEP analysis and in all outcome years except 2013/14 for the FEC analysis.[2]

However, comparing the percentages of home visit and comparison students who had disciplinary incidents before the first visit of the school year yielded evidence that undermined the credibility of an analysis of visits conducted during the school year. For this comparison the study team identified the first home visit date of the school year for each visited student and examined whether visited students and their matched comparison students had a disciplinary incident before that visit date. More than 13 percent of students visited by FEC teachers had a disciplinary incident before the visit compared with nearly 9 percent of matched comparison students, a statistically significant difference of more than 4 percentage points (table D3). Any estimated impact of the FEC visits could be biased by students who had disciplinary incidents being more likely to receive a visit than students who did not have disciplinary incidents. The more modest yet also statistically significant difference found for FEP suggested selection bias in the opposite direction—that is, FEP students were about 1 percentage point less likely than their matched comparison students to have had a disciplinary incident by the time of the visit.

Table D3. Relative to their matched comparison students, Family Engagement Collaborative students were more likely and Family Engagement Partnership students were less likely to have had a disciplinary incident by the time of the visited student's first visit of the school year

Outcome	Mean (percent)		Difference (percentage points)	Standard error	*p*-value
	Home visit	Comparison			
Family Engagement Collaborative (FEC)[a]					
Had a disciplinary incident before the FEC student's visit	13.09	8.55	4.54***	1.27	< .001
Number of student-year observations	1,094	1,101			
Family Engagement Partnership (FEP)					
Had a disciplinary incident before the FEP student's visit	2.56	3.71	–1.16***	0.33	< .001
Number of student-year observations	10,628	10,732			

*** Significant at $p < .001$.

Note: The comparison group mean is the unadjusted mean outcome for the comparison group. The home visit mean is the regression-adjusted mean outcome for the home visit group and is equal to the comparison group mean plus the difference estimate. The regressions used to estimate differences controlled for student gender, race/ethnicity, and grade; baseline measures of the student's outcome, free lunch status, English learner status, over-age for grade status, and the percentage of individuals in the student's census block group who did not have a high school diploma or GED; school-grade-year means of gender, race/ethnicity, and the preceding baseline characteristics; a baseline measure of the student's special education status; and year. The regressions used robust standard errors that accounted for clustering of students within school-grade-years and a weight to ensure that standard errors accounted for some home visit students being matched to more than one comparison student.

a. Includes visits by Family Engagement Collaborative Masters teachers.

Source: Authors' analysis of District of Columbia Public Schools administrative data and data on Family Engagement Collaborative home visits and Flamboyan Foundation data on Family Engagement Partnership and .

[1] As noted in appendix B, propensity score matching for the FEP analysis excluded from the potential comparison group for a given school year students who received FEC visits at any point during that school year. The FEC analysis implemented the analogous exclusion—that is, matching for the FEC analysis dropped FEP-visited students from the comparison group.

[2] For 2013/14 the study team's calculations indicated that the FEC visit and comparison groups met the What Works Clearinghouse baseline equivalence standard for had a disciplinary incident, attendance rate, and English language arts achievement but not for had a serious disciplinary incident or math achievement. The study team ordinarily would have attempted to adjust the propensity score matching model or algorithm to achieve baseline equivalence for all five outcomes in all four outcome years but did not do so in this case after finding evidence of selection bias when analyzing only outcome years that met the baseline equivalence standards.

For the FEP analysis the study team addressed this potential selection bias by restricting the sample to students who were visited before the start of the school year and their matched comparison students. Teachers could not have selected students for these summer visits based on student disciplinary incidents (or any other experiences with students) that happened during the subsequent school year. Across the three outcome years for which FEP visit dates are available, 1,984 FEP student-year observations, nearly 20 percent of the eligible FEP sample, received a summer visit (table D4).

Table D4. Nearly 20 percent of Family Engagement Partnership students in the eligible study sample received their first visit during the summer before the school year started

	Visited students, by school year							
	2014/15		2015/16		2016/17		2014/15–2016/17	
Timing of first visit of school year	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Before start of the school year	29.16	778	26.32	843	7.63	363	18.67	1,984
During the school year	70.84	1,890	73.68	2,360	92.37	4,394	81.33	8,644

Source: Authors' analysis of District of Columbia Public Schools administrative data and Flamboyan Foundation data on Family Engagement Partnership home visits.

This summer visit approach, however, could not be used for the smaller FEC program. Across all four outcome years, only 85 FEC student-year observations (7 percent of the eligible FEC sample) received a visit before the start of the school year, rendering the sample too small for meaningful analysis (table D5).

Table D5. Roughly 7 percent of Family Engagement Collaborative students in the eligible study sample received their first visit during the summer before the school year started

	Visited students, by school year									
	2013/14		2014/15		2015/16		2016/17		2013/14–2016/17	
Timing of first visit of school year	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Before start of the school year	12.92	27	7.73	36	6.92	22	0.00	0	6.52	85
During the school year	87.08	182	92.27	430	93.08	296	100.00	310	93.48	1,218

Note: Includes visits by Family Engagement Collaborative Masters teachers.
Source: Authors' analysis of District of Columbia Public Schools administrative data and data on Family Engagement Collaborative home visits.