Outcomes of a District-wide Extended School Year Program for High School Students

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Abstract

Across the United States, school districts offer extended school year (ESY) programs to K–12 students. These programs are designed to address learning gaps, provide opportunities for credit recovery, and enhance skills for students with disabilities. This study investigates the impact of one such program, implemented for high school students throughout a Florida public school district, on student academic performance and graduation outcomes in the subsequent academic year. Due to selection criteria that resulted in potential baseline differences between participants and non-participants, this study employs a non-experimental, retrospective, pre/post design. Students who participated in ESY generally had lower initial standardized test scores than their non-ESY peers. ESY students showed statistically significant year-on-year growth as measured by repeated end-of-course exams in Algebra 1 ($d = .20$) and Geometry ($d = .48$), but small declines in English Language Arts from grades 9 to 10 ($d = -.23$). However, controlling for prior achievement and socioeconomic status, we found no significant association between days of ESY attendance and final test scores. Beyond test scores, we further explored seniors' graduation pathways. For seniors at risk of not meeting graduation requirements with their cohort, 67% of ESY participants had successfully graduated by the next spring.

Keywords: academic achievement, graduation, high school, extended school year

Introduction

School districts throughout the United States offer extended school year (ESY) programs to students in grades K–12. Summer programs have been a part of learning for at least 60 years, though their purpose has changed over time. In the 1960s, the primary purpose of summer schools was delinquency prevention (Roberts, 2004). This changed with the passage of the Elementary and Secondary Education Act (U.S., 1965), which funded summer programs through Title I to address the educational needs of disadvantaged students during the summer break. By the 1970s, the funding remained, but the objectives shifted toward prevention and enrichment.

While summer learning programs have become a common strategy to address summer slide, evidence from empirical research on their effectiveness has been mixed. Austin et al. (1972) presented evidence that summer learning had a modest impact on academic achievement. In the 1980s, researchers found little return on the investment from ESY, and identified management and operational problems as barriers to success (Ascher, 1988; Heyns, 1986). A meta-analysis of summer programs from 1966 to 1998 reported mixed results but recommended that researchers clarify selection criteria and conduct randomized, controlled trials where feasible (Cooper et al., 2000). McCoombs et al. (2011) reported that

ESY programs had the potential to mitigate summer slide, the learning loss that can occur over summer break, and contribute to academic gains. McCoombs et al. (2014) expanded their research to a large-scale randomized, controlled trial (RCT) in five urban school districts that identified key characteristics of successful summer programming, finding a positive association between program attendance and mathematics outcomes and a positive association between instructional quality during the program and reading outcomes during the subsequent year. A research review by McCoombs et al. (2019) found 22 studies of summer programs with evidence of a signifcant and positive effect on academic outcomes, but 20 of these were correlational, and most were focused on the elementary school level. More recently, a meta-analysis of 37 experimental and quasi-experimental studies of the impacts of K–12 summer mathematics programs, published from 1998 to 2022, estimated an average weighted impact of +0.1 standard deviation on student mathematics achievement (Lynch et al., 2022).

Recommendations regarding the duration of summer programs vary widely. McLaughlin and Pitcock (2009) examined programs operated by diverse organizations and found programs that lasted from one to twelve weeks, with school-based programs ranging from four to six weeks, and quality programs determined to be at least 80 hours in length. Upward Bound programs funded by the federal TRIO program are required to provide annual summer institutes for high school students lasting at least six weeks, five days per week, approximately eight hours per day, to a total of 240 hours (U.S. Department of Education, 2022). Winship et al. (2005) specified programs of nine hours per day, five days per week, over eight weeks. Augustine et al. (2016) found that summer programs need to last at least five weeks to allow time to present content sufficient to elicit change in academic outcomes. Despite these recommendations, there is not yet a clear consensus on the impacts of ESY or the relationship between program duration and academic outcomes (Atteberry & McEachin, 2021).

In Florida, extended school year (ESY) programs have been a part of the state's allocation to school districts to provide supplemental instruction to support students' academic progress and graduation since 2018. Under Florida Statutes Chapter 1011.62 (2022), the state allows funding to provide:

> an extended school year; intensive skills development in summer school … and other methods of improving student achievement. ESY programs that meet students' credit recovery needs have been critical during the pandemic and the return to in-person school.

Also, as noted in the statute, the need for extended instructional time became acute due to instructional modifications needed during the COVID-19 pandemic that students experienced in 2020 and 2021 (FS, 2022).

The setting of this study is a public school district located in Florida that serves over 80,000 students in grades pre-K through 12, hereafter referred to as "the District." Each year, the District also operates a range of ESY programs during the summer for students in elementary, middle, high, and alternative schools. At the high school level, ESY programs provide 24 days of summer instruction and support.

In April 2020, in response to a statewide stay-at-home order, Florida's school districts moved to online instruction (Florida Department of State, 2020). In June 2020, the District introduced a reopening plan that allowed families to choose one of three options: traditional instruction, remote learning through their enrolled school, or virtual instruction through an eSchool (District, 2020). On March 30, 2021, the District announced that the mySchool Online option would be discontinued in fall 2022. By spring 2021, 76% of the District's students were learning in person, 22% were online, and 2% were enrolled in the traditional virtual eSchool (Florida Department of Education, 2021).

Modifications needed in response to COVID-19 had a historical impact on academic achievement in language arts and mathematics, as measured by state assessments. From spring 2011 to spring 2022, Florida measured language arts and mathematics achievement through the Florida Standards Assessments (FSA) in English Language Arts (ELA) and Math and the End-of-Course (EOC) assessments in Algebra I, Geometry, and Algebra II. The FSAs and EOCs convert scale scores to achievement levels from 1 to 5, with 1 being *Inadequate* and 5 indicating *Mastery.* From 2019 to 2022, the percentage of students with a

3 or higher fell from 54% to 50% across Florida, while the same metric decreased from 55% to 50% in the District. The percentage of students proficient in Algebra I (3 or higher) fell from 44% to 33% for the state, and from 50% to 39% for the District.

Although the District's students continued to score at or above statewide levels, all Florida districts experienced learning losses. In 2021, the District planned a variety of extended school year programs, including a 24-day in-person ESY to provide differentiated instruction, career exploration, credit recovery, and assistance with graduation requirements for high school students. In spring 2021, high schools invited students who needed academic assistance, credit recovery, or who were not on track for on-time graduation to participate in ESY, using the eligibility criteria listed in Table 1.

Table 1. *ESY Eligibility Criteria by High School Grade, 2021.*

Grade Level	Criteria
Grade 9	ELA: Course Grade ≤ D and FSA ≤ 2, Lexile < 1040L Math: Course Grade ≤ D and NWEA < 25%ile, SAVVAS ≤25% Other: Attendance < 85%, Course recovery for graduation requirements
Grade 10	AVID Summer Bridge participants Any current 10th-grader
Grade 11	Course Recovery: Math, English, Science, Social studies Credits: ≥ 0.5 credits behind graduation cohort
Grade 12	Course Recovery: Math, English, Science, Social studies Credits: ≥ 0.5 credits behind graduation cohort

By June 2021, 2,107 students from all 14 full-service high schools had registered for ESY. For students in Grades 9 through 11, this provided the opportunity to shore up academic skills, recover credits lost during the academic year, and get back on track to graduate with their grade-level peers. For students in Grade 12 who were missing the necessary requirements to graduate with their cohort, ESY provided tailored support to identify and facilitate alternative pathways to graduation. Students who did not register for ESY could have chosen from a wide range of options outside the public school system, such as private credit recovery programs, employment, or just non-attendance, but choices other than ESY were outside the scope of this study.

The purpose of this study is to identify the characteristics of ESY students, summarize their attendance patterns, understand their academic performance before and after the program, and test for an association between ESY participation and academic outcomes. We set out to answer the following research questions: (1) What were the characteristics of high school students who participated in the extended school year (ESY) in 2021? (2) How did ESY attendance vary by student characteristics? (3) What were the academic outcomes of ESY students in spring 2021 and spring 2022? (4) How did ESY attendance impact academic outcomes and graduation in 2022, controlling academic performance in spring 2021?59-

Methods

Selection of ESY participants was based on GPA and standardized test scores. We explored the use of a regression discontinuity design to compare the students who attended ESY with those who did not, but no clear cut-off could be identified because there were multiple overlapping selection criteria. Instead, we treat this study as non-experimental, with pre- and posttests and a dose-response design, but with no comparison group (Shadish et al., 2002). We compare academic assessments from before and after the summer program and use the number of days present to construct a dose response function as a continuous treatment variable.

Data Sources

The school district provided ESY program documentation, student-level demographics, school of record, grade level, academic grades, standardized test scores, days present in school, and days present in ESY. The sample for this study included $N = 2,107$ students from all 14 full-service high schools in the District who attended the 24-day ESY program in the summer of 2021, and demographics of the 23,145 high school students who did not attend.

Measures

To compare standardized test achievement scores before ESY in spring 2021 and after ESY in spring 2022, we used standardized assessments in language arts and mathematics. Statewide high-stakes tests were the Florida Standards Assessments in English Language Arts (FSA ELA) for Grades 9 and 10, Algebra I End-of-Course (EOC) assessment, and the Geometry EOC assessment (Florida Department of Education, 2021). The District also administered the Northwest Educational Assessments in Reading, Math, Algebra, and Geometry, for which NWEA has published studies of reliability and accuracy (NWEA, 2021) and the SAT to students in Grade 11, with separate scores for Math and Evidence-Based Reading and Writing (EBRW). Additional academic outcomes include unweighted grade point averages and graduation codes. We list outcome measures for each grade level, pre- and post-ESY in Table 2.

Table 2. *Available Outcome Measures by Grade Level*

Pre-ESY (2021)			Post-ESY (2022)	
Grade Level	Measure		Measure	Grade Level
Grade 9	FSA ELA 9 Algebra I EOC Geometry EOC NWEA Math GPA	→	FSA ELA 10 Algebra I EOC Geometry EOC NWEA Math GPA	Grade 10
Grade 10	FSA ELA 10 Algebra I EOC Geometry EOC GPA	→	Algebra I EOC Geometry EOC SAT Math/EBRW GPA	Grade 11
Grade 11	Geometry SAT EBRW SAT Math	→	SAT EBRA SAT Math GPA Graduation	Grade 12
Grade 12		→	Graduation	Post-Grade 12

Analytic Strategy

In this study, we describe the characteristics of high school students who participated in ESY as compared to the District as a whole (RQ1). We analyze ESY attendance patterns and show distributions of attendance days by student demographics (RQ2). Then, we develop regression models to test for an association between the number of days of ESY attendance and 2022 academic outcomes, controlling for 2021 measures and student characteristics (Q3). Finally, we trace the pathways of seniors at risk of not graduating on time who participated in ESY and describe their high school completion outcomes by the end of the subsequent year (Q4).

To test for an association between ESY and academic outcomes, we estimate eight multiple linear regression models. Each model tests for an association between summer attendance (*ESY*), and one of the academic posttests (*Post*), while controlling for each student's performance on the previous year's test (*Pre*) and for free or reduced lunch eligibility as a proxy for socioeconomic status (*SES*). Each model takes the form shown in Equation 1

$$Post_i = \beta_0 + \beta_1\, ESY_i + \beta_2\, Pre_i + \beta_3\, SES_i + \epsilon_i \tag{1}$$

where i represents each student, β_0 is the intercept, β_1, β_2 and β_3 are coefficients that describe the relationship between each predictor and the outcome, and ϵ is an error term.

Results

Demographics of students who participated in ESY and for the District are displayed in Table 3. Participants in ESY were more likely to be male. The ESY group included a greater proportion of minority students than the District, with a higher percentage of Hispanic, Black, and American Indian students, and a lower percentage of White and Asian students, than the district as a whole. A greater proportion of students in ESY were eligible for free or reduced lunch (54.2%), just under a quarter had registered at least one exceptionality (23.3%), and there were more emerging bilingual students (5.4%). We display summary statistics for ESY and the District in Table 3.

Table 3. *Demographics of High School Students in 24-day ESY Program and District-Wide, 2021*

Characteristic	ESY Attendees		All HS Students	
	N	%	*N*	%
Gender				
Male	1,298	61.6%	12,871	51.0%
Female	809	38.4%	12,380	49.0%
Race or Ethnicity[a]				
White	1692	80.3%	21,413	84.8%
Hispanic (of any race)	667	31.7%	6,128	24.3%
Black	392	18.6%	3,216	12.7%
Asian	55	2.6%	1,259	5.0%
American Indian/Alaska Native	68	3.2%	618	2.4%
Native Hawaiian/Pacific Islander	17	0.8%	158	0.6%
Two or more races	113	5.4%	1,317	5.2%
Support Services[a]				
Eligible for Free/Reduced Lunch	1,141	54.2%	7,575	30.0%
Exceptionality	491	23.3%	5,637	22.3%
Eng. Lang. Learner	114	5.4%	806	3.2%
Total	2,017	100.0%	25,252	100.0%

[a] Subcategories are not mutually exclusive; total > 100%.

High school students who attended the ESY program were selected from all 14 of the full-service schools in the District. High schools identified an average of 151 students per school, ranging from 77 to 248 students. The greater numbers of students in Grades 9 and 11 as compared to Grades 10 and 12 may be due to differences in selection criteria for those grades (see Table 1). We show ESY student frequencies by school and by grade in Table 4.

Table 4. *Attendees of 24-day Extended School Year Program by High School and Grade Level, 2021*

High School	Grade 9	Grade 10	Grade 11	Grade 12	Total
1	66	61	61	11	199
2	56	64	55	10	185
3	72	50	52	–	174
4	45	11	34	6	96
5	55	32	86	7	180
6	52	16	64	4	136
7	110	72	46	20	248
8	45	16	16	–	77
9	48	19	32	7	106
10	36	9	63	10	118
11	41	6	24	9	80
12	55	24	57	6	142
13	57	29	62	14	162
14	53	68	79	4	204
Total	791	477	731	108	2,107

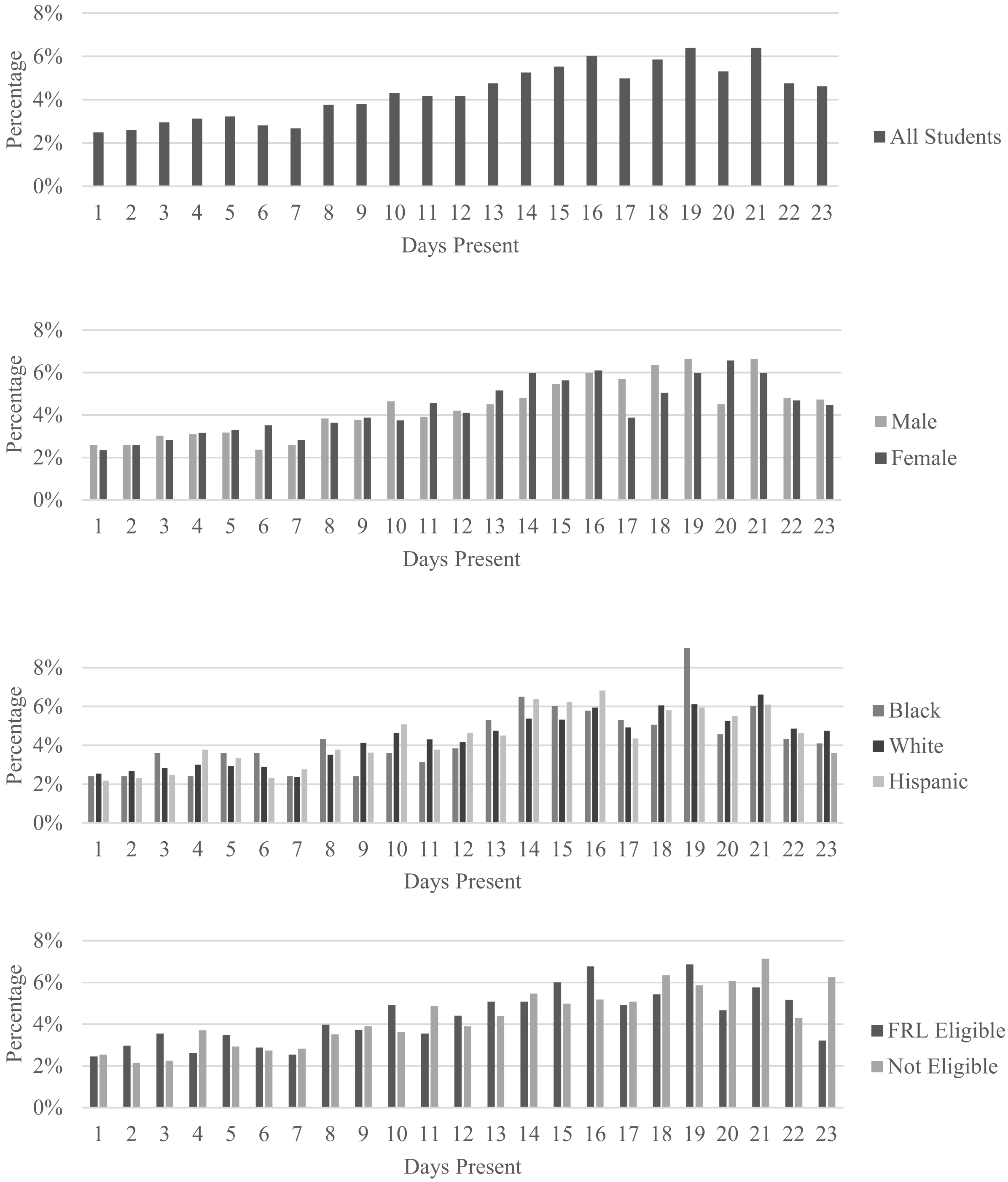
While this study focuses on the ESY program for mainstream high schools, it is important to acknowledge that the District also provided other ESY formats for high school students at specialized schools, including alternative schools, exceptional student education, juvenile detention, and schools for girls at risk of delinquency (see Table 5 for details).

Table 5. *Attendees of Specialized/Alternative ESY Programs by School and Grade Level, 2021*

ESY Calendar and School	Grade 9	Grade 10	Grade 11	Grade 12	Total
SUMALT10 (10 days)	4	7	9	23	43
Alternative school 1	–	–	2	–	2
Alternative school 2	1	5	4	23	33
Alternative school 3	3	2	3	–	8
SUMESE10 (10 days)	1	2	3	7	13
High school ESE program A	–	–	–	2	2
High school ESE program B	1	2	3	5	11
SUM240 (46 days)	14	14	8	1	37
Juvenile justice school	9	11	8	1	29
Specialized school for girls 1	5	3	–	–	8
SUM230 (48 days)	16	8	6	–	30
Specialized school for girls 2	16	8	6	–	30
Total	35	31	26	31	123

ESY administrators encouraged students to attend all days, but half attended fewer than 15 days (M = 13.8, SD = 6.2). Attendance was not significantly different by gender (male: M = 13.9, SD = 6.2; female: M = 13.7, SD = 6.2; $t(2105) = -.72$, *ns*), race (Black: M = 13.8, SD = 6.2; White: M = 13.9, SD = 6.2; $t(2082) = .28$, *ns*); or ethnicity (Hispanic: M = 13.7, SD = 6.0; White: M = 13.9, SD = 6.2; $t(2357) = .48$, *ns*). However, students eligible for free- or reduced-price lunch attended one less day than their peers, on average (FRL: M = 13.5, SD = 6.2; non-FRL: M = 14.2, SD = 6.2; $t(2015) = 2.51$, $p = .01$). See Figure 1 for attendance distributions by student characteristics.

Figure 1. *ESY Attendance Distribution for all Students and by Student Demographics, 2021*



We compared academic outcomes before and after ESY using scores standardized to the District. We made eight comparisons, including four homogeneous comparisons (the same test for both years) and four heterogeneous comparisons (different tests for related subjects). For EOCs, posttests represent retakes. We only included students who took both tests in each comparison. We tested for differences using intraindividual paired-sample *t*-tests.

Statistically significant pre/post differences in means were present for all comparisons. Because large samples can magnify small differences, we can use effect sizes to gauge practical significance. Using

Cohen's criteria (Cohen, 1988), all effect sizes were small (< .50). The largest positive effect sizes were for Geometry EOC retakes ($t_{87} = 4.16$, $p < .001$, $d = .48$), 2021 NWEA Geometry vs. 2022 NWEA Algebra ($t_{132} = 6.39$, $p < .001$, $d = .46$), 2021 FSA ELA vs. 2022 NWEA Reading ($t_{203} = 6.06$, $p < .001$, $d = .40$), and 2021 FSA ELA vs. 2022 SAT EBRW ($t_{159} = 4.25$, $p < .001$, $d = .34$). On the other hand, there was a statistically significant but small year-on-year decline from Grade 9 to Grade 10 for FSA ELA ($t_{859} = -4.54$, $p < .001$, $d = -.23$). We list and compare standardized outcomes across these assessments in Table 6 and provide score distributions for each pre/post outcome pair, depicted as comparative density plots, in Figure 2.

Table 6. *Comparison of Standardized Academic Outcomes, 2021 vs. 2022*

2021 Measure	2022 Measure	*N*	2021		2022		*t*-test (paired obs.)			*d*
			M	*SD*	*M*	*SD*	*t*	*df*	*p*	
Homogeneous comparisons										
FSA ELA	FSA ELA	860	–0.01	0.97	–0.20	0.61	–4.54	859	<.001	–.23
Alg. I EOC	Alg. I EOC[a]	516	–0.14	0.91	0.05	0.97	7.73	515	<.001	.20
Geom. EOC	Geom. EOC[a]	88	–0.31	0.53	0.04	0.88	4.16	87	<.001	.48
GPA	GPA	2170	–0.78	0.76	–0.72	0.61	0.02	498	ns	–
Heterogeneous comparisons										
FSA ELA	NWEA Rdg.	204	–0.32	0.83	0.03	0.92	6.06	203	<.001	.40
FSA ELA	SAT EBRW	160	–0.31	0.79	–0.01	0.98	4.25	159	<.001	.34
NWEA Geom.	NWEA Alg.	133	0.53	0.75	0.69	0.62	6.39	132	<.001	.46
Alg. I EOC	SAT Math	133	–0.14	0.87	–0.53	0.79	–0.64	34	ns	–

[a] Retakes

We examined mean raw scores for each outcome, cross-tabulated with the number of days students attended ESY, as shown in Table 7 and depicted as a composite line graph in Figure 3. Visual inspection of the graph shows that there is no obvious trend between the number of days attended and the academic outcomes. There was a significant but small correlation between 2022 Geometry EOC and ESY attendance ($r = .13$, $p = .02$). We list means, standard deviations, and correlations for variables of interest in Table 8, with test scores standardized to District outcomes.

Table 7. *Cross-Tabulation of ESY Attendance Days and 2022 Outcomes (Raw Scores)*

Outcome	1 to 5 days	6 to 10 days	11 to 15 days	16 to 20 days	≤ 24 days
FSA ELA	328.4	330.3	328.0	326.5	329.3
Algebra EOC	471.3	467.7	469.5	469.5	466.6
Geometry EOC	474.4	476.0	472.2	478.5	481.9
NWER Reading	218.2	215.7	214.4	214.8	216.3
NWER Geometry	227.0	227.0	228.8	228.2	229.4
SAT Math	436.1	460.9	439.3	439.0	443.2
SAT EBRW	404.8	427.3	406.0	406.4	408.4
GPA (percent)	72.5	72.6	74.1	74.4	74.1

Figure 2. *Comparative Density Plots for Pre/Post Outcome Measures*

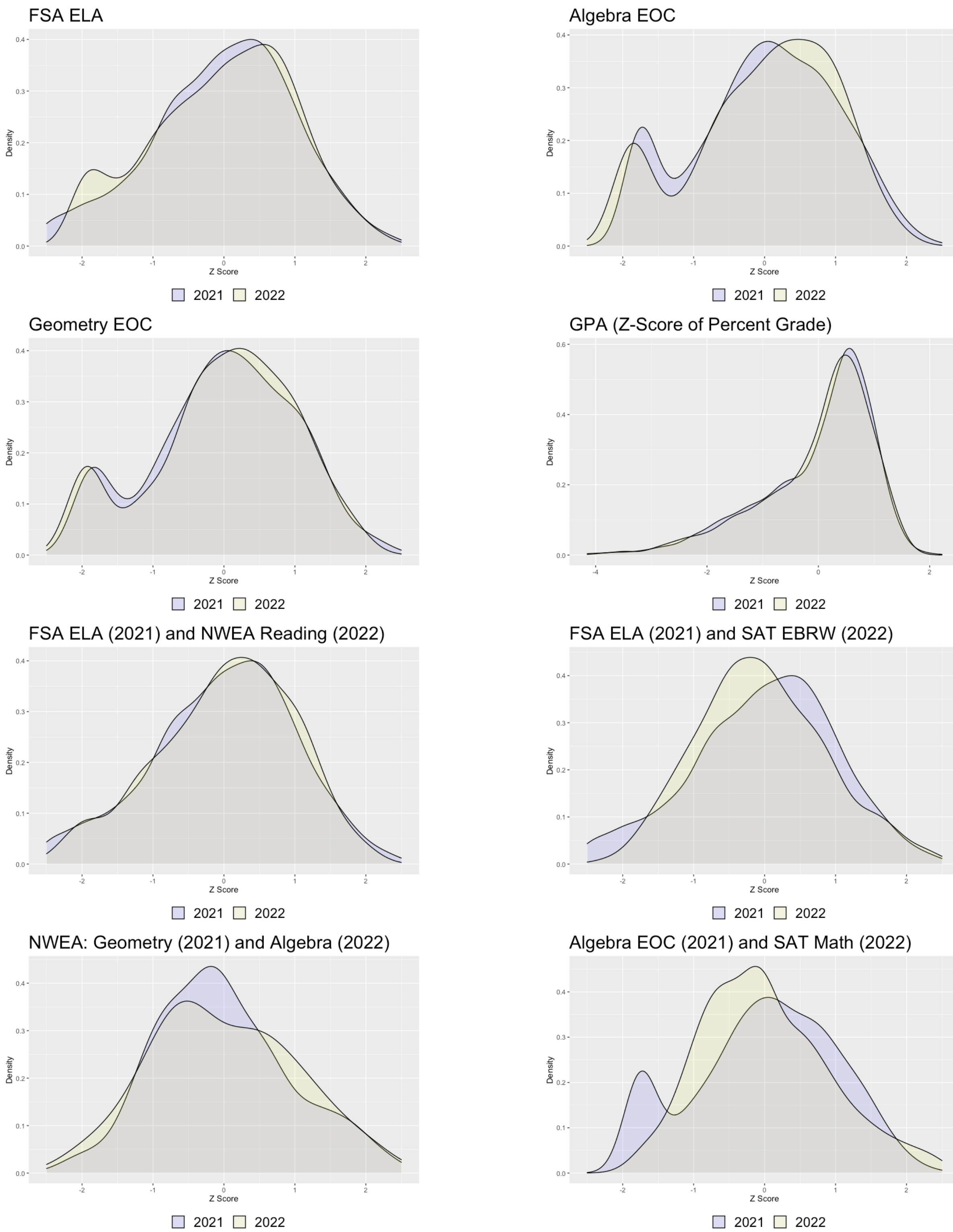


Table 8. *Means, Standard Deviations, and Correlations of Student Characteristics, ESY Attendance, and Academic Outcomes*

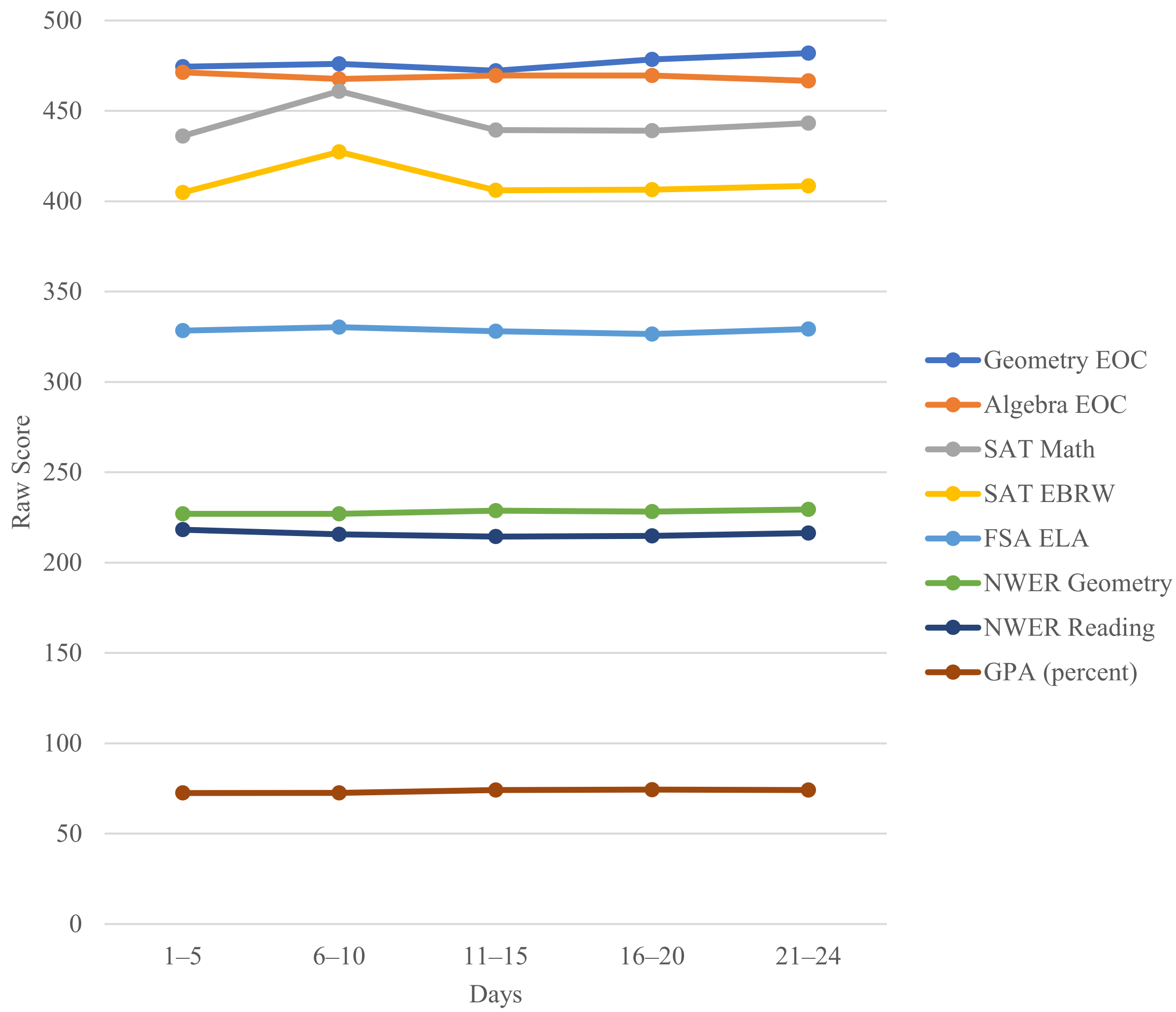
	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Gender (male)	0.62	0.49	1.00																
2 Race (non-White)	0.20	0.40	0.01	1.00															
3 Exceptionality	0.23	0.43	0.09**	0.00	1.00														
4 ELL	0.06	0.24	0.02	0.00	-0.07**	1.00													
5 FRL	0.49	0.21	-0.04*	0.01	0.00	0.06*	1.00												
6 ESY Days	13.82	6.22	-0.04	-0.01	0.01	0.02	-0.20	1.00											
7 Algebra I EOC '21	-0.46	0.98	-0.11**	-0.14**	-0.22	-0.11**	-0.14**	0.07*	1.00										
8 FSA ELA '21	-0.66	0.97	-0.09**	-0.05	-0.26	-0.24	-0.15	-0.02	0.50	1.00									
9 Geom. EOC '21	-0.74	0.98	0.04	-0.15**	-0.14**	-0.11*	-0.22**	0.04	0.50	0.59	1.00								
10 NWEA Math '21	-0.64	0.82	-0.02	-0.17**	-0.10	-0.12*	-0.19**	0.04	0.53	0.61	0.75	1.00							
11 Algebra I EOC '22	-0.20	0.98	-0.15**	-0.07	-0.22**	-0.21**	-0.08	-0.05	0.33**	0.39	0.31	0.11	1.00						
12 FSA ELA '22	-0.61	0.99	-0.12**	0.00	-0.24	-0.25	-0.17**	-0.04	0.49	0.77	0.63	0.59	0.43	1.00					
13 Geom. EOC '22	-0.43	1.29	0.02	-0.15**	-0.04	-0.11	-0.05	0.13*	0.60	0.39	—	0.37	0.27*	0.46	1.00				
14 NWEA Math '22	-0.68	1.25	-0.01	-0.09	-0.17**	-0.12	-0.13*	0.04	0.59	0.46	0.92	-0.18	0.44**	0.47	0.63	1.00			
15 NWEA Reading '22	-0.49	1.05	-0.16**	0.02	-0.26	-0.23**	-0.21**	0.01	0.47	0.69	0.36	0.57**	0.36**	0.74	0.56	0.61	1.00		
16 SAT Math '22	-1.10	0.77	-0.02	-0.02	-0.15**	-0.06	-0.09*	-0.07	0.26**	0.43	0.24	0.41**	0.13	0.07	-0.01	0.43	—	1.00	
17 SAT EBWR '22	-0.98	0.81	-0.13**	-0.06	-0.18**	-0.12**	-0.08	-0.06	0.34**	0.55	0.42	0.50	0.21	0.17	0.03	-0.08	—	0.58	1.00

* Correlation significant at the .05 level

** Correlation significant at the .01 level

ELL = English Language Learner; FRL = Free/Reduced Lunch Eligibility; ESY = Extended School Year; Geom. = Geometry; EBWR = Evidence-Based Reading and Writing

Figure 3. *Trend of ESY Attendance Days and 2022 Outcomes (Raw Scores)*



The associations between posttest outcomes and pretest scores were all statistically significant at the .01 level and positive. The relationship between posttest outcomes and socioeconomic status was significant at the .05 level for two of the outcomes: FSA ELA ($\beta = -.34$, $p = .036$) and SAT EBRW ($\beta = 37.38$, $p = .025$). The associations between ESY Attendance and the posttest outcomes were not significant. We show summaries of regression models in Table 9, and scatterplots of the linear relationship between ESY attendance on each outcome, disaggregated by grade level, in Figure 4.

In addition to nearly 2,000 students recruited in Grades 9 to 11, the District encouraged 109 students in Grade 12 to participate in ESY. These seniors were all at risk of not graduating with their class based on missing credits. For seniors, ESY focused on credit recovery toward graduation with a 24-credit standard diploma or an 18-credit ACCEL diploma. By June 2022, 57 had graduated with an ACCEL diploma, 16 graduated with a Standard Diploma, and 36 did not graduate from a District school, an overall graduation recovery success rate of 66.0% for the at-risk group. For promotion statuses (2021), withdrawal codes (2022), and graduation outcomes (June 2022) for the 109 seniors in ESY, see Table 10.

Table 9. *Results of Regression Models Using 2022 Academic Outcomes as the Criteria*

Predictor	Estimate	*SE*	*t*	*p*
FSA English Language Arts				
(Intercept)	0.34	0.12	2.76	.006
ESY Attendance	–0.00	0.01	–0.66	–.510
ELA 2021	0.77**	0.03	26.25	<.001
SES	–0.34*	0.16	–2.10	.036
Algebra EOC				
(Intercept)	0.38	0.46	0.81	.420
ESY Attendance	–0.02	0.02	–0.98	.329
Geometry 2021	0.41**	0.15	2.76	.008
SES	0.60	0.65	0.93	.356
Geometry EOC				
(Intercept)	–0.40	0.25	–1.63	.105
ESY Attendance	0.01	0.01	1.05	.294
Algebra 2021	0.60**	0.06	9.89	<.001
SES	0.16	0.35	0.46	.644
NWEA Reading				
(Intercept)	221.97	2.76	80.56	<.001
ESY Attendance	–0.09	0.11	–0.76	.447
Algebra 2021	10.73**	0.61	17.51	<.001
SES	–5.84	3.47	–1.68	.094
NWEA Geometry				
(Intercept)	–0.11	0.30	–0.35	.724
ESY Attendance	–0.00	0.01	–0.31	.761
Algebra 2021	0.59**	0.08	7.40	<.001
SES	–0.16	0.41	–0.387	.700
SAT Evidence-Based Reading and Writing				
(Intercept)	414.30	11.66	35.53	<.001
ESY Attendance	–0.36	0.49	–0.733	.464
FSA ELA 2021	42.04**	3.53	11.89	<.001
SES	37.78*	16.74	2.26	.025
SAT Mathematics				
(Intercept)	374.67	30.51	12.28	<.001
ESY Attendance	–0.21	.07	–0.19	.848
Geometry 2021	24.23**	8.37	2.90	.005
SES	43.44	42.74	1.02	.313
Grade Point Average				
(Intercept)	–1.20	1.48	–0.81	.428
ESY Attendance	0.02	0.02	.40	.175
GPA 2021	0.46**	0.14	3.34	.003
SES	–1.09	0.50	–2.18	.757

Figure 4. *Scatterplots of ESY Attendance and Outcome, by Grade Level*

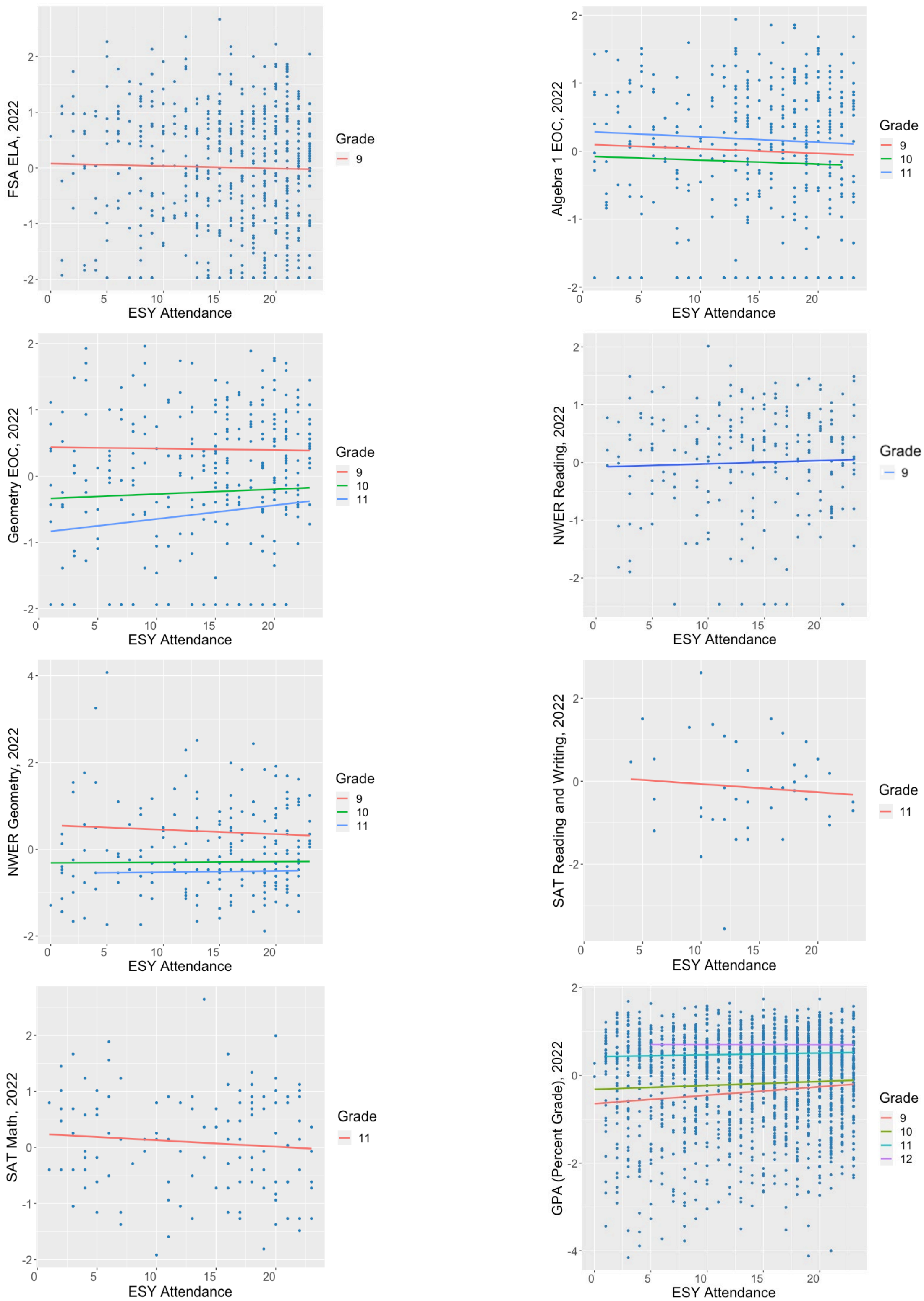
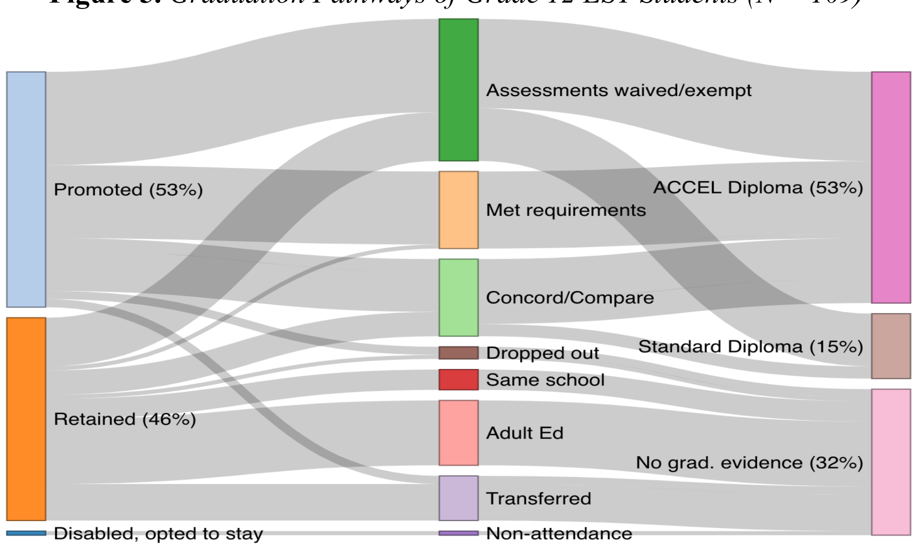


Table 10. *Graduation Outcomes for ESY Participating 12th-Graders*

Outcome	*N*	%
Promotion Status, June 2021		
Promoted	58	53.2%
Retained	50	45.9%
Disabled and opted to stay	1	0.9%
Last recorded withdrawal code		
Exempt from assessments (or waived)	35	32.1%
Met graduation requirements	19	17.4%
Achieved Concord/Compare score	19	17.4%
Transferred to Adult Education	16	14.7%
Transferred out of district or to private school	11	10.1%
Stayed in same school	5	4.6%
Dropped out	3	2.8%
Withdrawn for non-attendance	1	0.9%
Outcome by June 2022		
Graduated with ACCEL Diploma (18 credits)	57	52.3%
Graduated with Standard Diploma (24 credits)	16	14.7%
No evidence of graduation	36	33.0%
Total	109	100.0%

Further exploration of graduation data reveals the diversity of pathways students experienced toward different outcomes by the end of the following academic year. Among students who had been promoted in spring 2021, almost all had received an ACCEL diploma by spring 2022. For students who had been retained, about one-third graduated with a standard diploma, but there was no evidence of graduation for the two-thirds of students who had not yet received a high school diploma due to transfer, dropping out, or retention in school. A Sankey diagram was used to visualize these pathways. In the illustration, the passage of time is from left to right; the height of the bars shows the proportion of students with each status; and the width of each grey connector shows the number of students who followed each pathway (see Figure 5).

Figure 5. *Graduation Pathways of Grade 12 ESY Students (N = 109)*



Discussion

This purpose of this study was to describe the participants, impacts, and outcomes of the 2021 extended school year (ESY) program for high school students in the District. The group of 2,107 attendees from 14 high schools had a greater proportion of males, more minority students, and more students who were eligible for free or reduced lunch (FRL) than the District. Specialized high school ESY programs were also provided for 123 students, and other programs were available for elementary and middle school students.

A comparison of standardized test scores before and after ESY showed that there were statistically significant and positive differences in mean standardized test scores before and after ESY. Effect sizes for four of these differences in test scores were of limited practical significance: the Geometry EOC, NWEA Algebra, NWEA Reading, and the SAT EBRW. However, these differences were small, and may have been due to other factors such as EOC retakes, improvement due to maturation, or the historic impact of the COVID-19 pandemic in 2020 and 2021.

Though the ESY program in this study was offered for approximately five weeks (24 weekdays) and students were strongly encouraged to attend until the end, students were only present for an average of 14 days, with a standard deviation of 6.2 days. Attendance did not vary by gender, race/ethnicity, or FRL status. The variation in overall attenance allowed us to test the relationship between ESY dosage and subsequent academic outcomes, controlling for prior year outcomes and socioeconomic status (SES). No significant association was detected between ESY attendance and academic outcomes, regardless of the number of days a student attended ESY. Although previous studies identified program duration as a key component of effective summer learning programs (Winship et al., 2005) and recommended that summer learning be offered for five weeks (Augustine et al., 2016), this study found no evidence of the relationship between more attendance and greater impact.

Despite low attendance rates, ESY supported the needs of seniors at risk of not graduating on time, through academic support, credit recovery, assessment completion or exemption. Of 109 seniors, 73 (67%) graduated with either the Standard Diploma or the ACCEL Diploma. This finding, combined with the lack of evdience for a relationship between attendance and academic achievement, suggests that a shorter program with more targeted objectives could have the potential to have a greater impact on student outcomes, while simultantesouly reducing the resources required for program implementation.

Limitations and Future Research

The authors acknowledge the following five limitations of the current study.

First, due to non-equivalent groups of ESY and non-ESY students, this was a non-experimental study with one group. It relied on pre- and posttests around one treatment occasion and used days of attendance in a dose-response design. This did not allow us to rule out other variables that may have affected the outcomes or to infer the causal impacts of ESY.

Second, the study only included data from one school district. Future expansions of this study would improve generalizability by using data from additional districts or from multiple states.

Third, the factors that motivated students to engage in ESY are unknown. Why did students register, attend, or stop attending? What alternative activities did they engage in? Non-ESY students may have registered for other summer options, such as private credit recovery programs. Competing activities may have been a source of compensatory rivalry, threatening the validity of the study. Future studies could employ student and family interviews to address these questions.

Fourth, to allow pre/posttest comparison, we paired different assessments of the same subject area, and in some cases compared tests measuring related but different constructs. For example, we paired the criterion-referenced FSA ELA, which was designed to measure reading, with the norm-referenced SAT EBRW, which was designed to measure both reading and writing. The convergent validity for test pairs, or the extent to which two tests both measured the same construct, was unknown. An increase or decrease may have been the result of the properties of the tests rather than changes in student abilities. Even when we compared standardized scores from the same tests, score increases could be the result of the retest effect. Also, we only included students with both pre- and post-test scores in the analysis, raising the risk that there could have been systematic reasons for missing data.

Fifth, there was only one cycle of measurement. A longitudinal study with multiple cycles could test whether impacts are consistent over time, while isolating the historic effect of the COVID-19 pandemic. Although we did not detect effects for the 24-day program with an average attendance of 14 days, it is possible that this period was not enough time to have a long-term academic impact.

Conclusion

Although this study is correlational, we can infer descriptive information from our findings that we hope is useful for practitioners (q.v., Huggins-Manley et al., 2021). Through document review and analysis of district data, we learned of multiple ways in which ESY programs support high school students, e.g., academic remediation, test preparation, credit recovery, and services for students in specialized programs.

In contrast to other ESY studies, where duration has been a factor in participant success (McLaughlin & Pitcock, 2009; U.S. Department of Education, 2022; Winship et al., 2005), we did not detect a positive or negative association between the number of days a student attended ESY and their standardized test scores in the following academic year. However, we did find that ESY facilitated graduation pathways for students who were at risk of not graduating with their peers.

In follow-up discussions with district leaders, we learned that ESY programs serve many goals and not all summer learning is time-dependent. Even a few days of ESY may have benefited students by providing access to learning resources, assistance with registration for appropriate courses, make-up testing, or identification of alternative pathways to graduation. When designing summer learning, we recommend that district leaders consider the wide range of functions that ESY programs serve and incorporate the flexibility needed to support students when and where they need it the most.

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Appendix

R Syntax and Output for Regression Models

```
# 2022 FSA ELA
Call:
glm(formula = ela22 ~ esyprs + ela21 + frlsch21, data = esyela22)
Deviance Residuals:
     Min       1Q   Median       3Q      Max
-2.14198 -0.35034  0.06678  0.43546  1.89766
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.335504   0.121396   2.764  0.00592 **
esyprs      -0.003249   0.004928  -0.659  0.50998
ela21        0.773255   0.029474  26.235  < 2e-16 ***
frlsch21    -0.340119   0.161748  -2.103  0.03598 *
---
Signif. codes:
0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.6288 on 503 degrees of freedom
  (1016 observations deleted due to missingness)
Multiple R-squared:  0.5913,  Adjusted R-squared:  0.5888
F-statistic: 242.5 on 3 and 503 DF,  p-value: < 2.2e-16

# 2022 Algebra I EOC
Call:
glm(formula = alg22 ~ esyprs + geo21 + frlsch21, data = esyalg22)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.2140  -0.6549   0.2178   0.6032   1.9359

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.37614    0.46358   0.811   0.4200
esyprs      -0.01793    0.01823  -0.984   0.3288
geo21        0.41205    0.14942   2.758   0.0075 **
frlsch21     0.59978    0.64554   0.929   0.3562
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 0.7543661)

    Null deviance: 58.317  on 70  degrees of freedom
Residual deviance: 50.543  on 67  degrees of freedom
  (321 observations deleted due to missingness)
AIC: 187.36

Number of Fisher Scoring iterations: 2
```

 # 2022 Geometry EOC for all grades (excludes fall retakes)

```
Call:
glm(formula = geo22 ~ esyprs + alg21 + frlsch21, data = esygeo22)

Deviance Residuals: 
    Min       1Q   Median       3Q      Max  
-2.3984  -0.3792   0.1670   0.4860   2.2021  

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) -0.40043    0.24552  -1.631    0.105    
esyprs       0.01081    0.01028   1.052    0.294    
alg21        0.59932    0.06060   9.890   <2e-16 ***
frlsch21     0.16166    0.34881   0.463    0.644    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 0.6450619)

    Null deviance: 175.44  on 176  degrees of freedom
Residual deviance: 111.60  on 173  degrees of freedom
  (118 observations deleted due to missingness)
AIC: 430.66

Number of Fisher Scoring iterations: 2
```

 # 2022 NWEA Reading for all grades

```
Call:
glm(formula = nwerdg22 ~ esyprs + ela21 + frlsch21, data = esynwerdg22)

Deviance Residuals: 
    Min       1Q   Median       3Q      Max  
-41.926   -5.959    1.602    7.815   31.153  

Coefficients:
             Estimate Std. Error t value Pr(>|t|)    
(Intercept) 221.96494    2.75541  80.556   <2e-16 ***
esyprs       -0.08698    0.11419  -0.762   0.4467    
ela21        10.72478    0.61248  17.510   <2e-16 ***
frlsch21     -5.84209    3.47444  -1.681   0.0935 .  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 147.1916)

    Null deviance: 104742  on 377  degrees of freedom
Residual deviance:  55050  on 374  degrees of freedom
  (114 observations deleted due to missingness)
AIC: 2965.6

Number of Fisher Scoring iterations: 2
```

 # 2022 NWEA Geometry for all grades; covariates limited due to missing data)

```
Call:
glm(formula = nwegeo22 ~ esyprs + alg21 + frlsch21, data = esynwegeo22)

Deviance Residuals:
     Min        1Q    Median        3Q       Max
-1.76684  -0.54093   0.02551   0.49081   2.21611

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.105132   0.297463  -0.353    0.724
esyprs      -0.003727   0.012220  -0.305    0.761
alg21        0.589610   0.079699   7.398 2.36e-11 ***
frlsch21    -0.159329   0.411870  -0.387    0.700
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 0.6120236)

    Null deviance: 104.796  on 119  degrees of freedom
Residual deviance:  70.995  on 116  degrees of freedom
  (83 observations deleted due to missingness)
AIC: 287.56

Number of Fisher Scoring iterations: 2
```

 # 2022 SAT Evidence-Based Reading and Writing for Grade 10 cohort

```
Call:
glm(formula = satrw22 ~ esyprs + ela21 + frlsch21, data = esysatrw22)

Deviance Residuals:
     Min        1Q    Median        3Q       Max
-244.133   -29.464     0.393    29.697   151.517

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 414.2994    11.6597  35.533   <2e-16 ***
esyprs       -0.3625     0.4946  -0.733   0.4642
ela21        42.0399     3.5349  11.893   <2e-16 ***
frlsch21     37.7835    16.7373   2.257   0.0247 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for gaussian family taken to be 2664.484)

    Null deviance: 1180903  on 302  degrees of freedom
Residual deviance:  796681  on 299  degrees of freedom
  (286 observations deleted due to missingness)
AIC: 3255.8

Number of Fisher Scoring iterations: 2
```

 # 2022 SAT Math

```
Call:
glm(formula = satma22 ~ esyprs + alg21 + geo21 + frlsch21, data = esysatma22)

Deviance Residuals:
     Min        1Q    Median        3Q       Max
-171.320   -31.225     0.769    30.020   108.829

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 374.6684    30.5130  12.279  < 2e-16 ***
esyprs       -0.2065     1.0740  -0.192  0.84814
alg21         4.2251     7.5106   0.563  0.57571
geo21        24.2340     8.3696   2.895  0.00517 **
frlsch21     43.4357    42.7440   1.016  0.31337
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 2888.681)

    Null deviance: 220548  on 68  degrees of freedom
Residual deviance: 184876  on 64  degrees of freedom
  (520 observations deleted due to missingness)
AIC: 752.45

Number of Fisher Scoring iterations: 2
```

 # 2022 GPA (Average of percentage grades in 2021-2022 for Grade 9, 10, 11 cohorts)

```
Call:
glm(formula = gpa22 ~ esyprs + gpa21 + frlsch21 + grd21, data = esygpa22)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-3.5713  -0.4223   0.0792   0.5523   2.4326

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -3.833988   0.255534 -15.004   <2e-16 ***
esyprs       0.010499   0.003409   3.080   0.0021 **
gpa21        0.378760   0.021099  17.951   <2e-16 ***
frlsch21    -0.084480   0.113873  -0.742   0.4583
grd21        0.370451   0.023512  15.756   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for gaussian family taken to be 0.7373886)

    Null deviance: 1811.9  on 1762  degrees of freedom
Residual deviance: 1296.3  on 1758  degrees of freedom
  (74 observations deleted due to missingness)
AIC: 4473.1

Number of Fisher Scoring iterations: 2
```