Evaluation of LINC's Caring Communities Sites

21st Century Community Learning Center Programs

Cohort 7, Year 3

October 22 , 2015

Prepared by:
Christopher Henrich, Ph.D.

Georgia State University

LINC's Caring Communities Sites: 21st Century Community Learning Center Programs
Cohort 7, Year 3

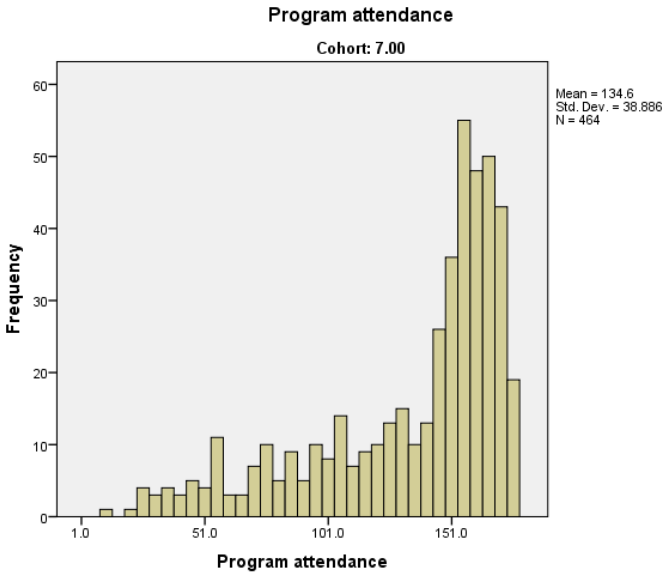
Introduction

This report summarizes the findings from Georgia State University's evaluation of LINC Caring Community sites funded as 21st Century Community Learning Centers (21C). This report includes findings from three LINC sites in Grandview, which comprise Cohort 7 and were in their third year of 21C funding during the 2014-2015 school year.

The data sources for the evaluation differ somewhat from previous years, and for this year consist of de-identified data provided by the program. LINC staff rated **student engagement in after-school program activities**. School teachers also rated, **improvements in students' school behavior.** Last, **academic grades in math, reading and science** were examined for students. Outcome analyses tested the **effects of students' participation in the LINC 21C program** on change in school behavior and academic achievement over the school year, using program attendance data and engagement ratings. We use the Harvard Family Research Project's three-part model of program participation, in which **participation consists of program enrollment, program attendance, and engagement in program activities**. In order for after-school programs to have beneficial effects on student achievement, students should not just be enrolled but attend regularly and also be engaged in program activities.

LINC Program Attendance

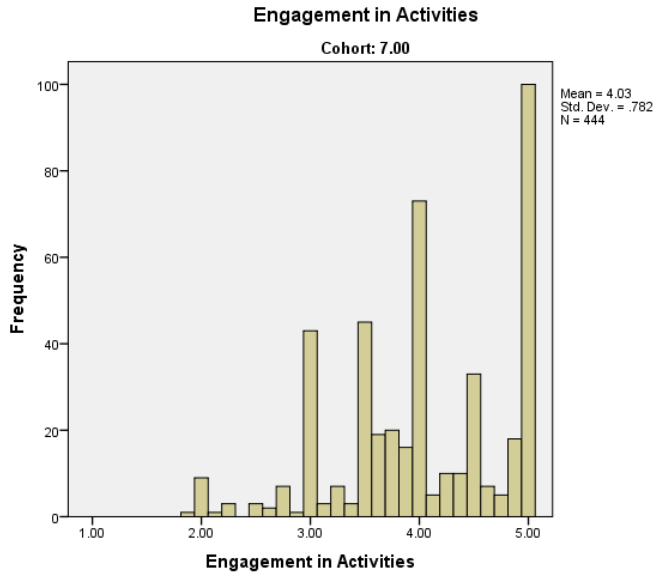
Daily program attendance data were available for 464 students enrolled in the Cohort 7 sites. The average days attended for the 2014-2015 school year was 135 (SD = 39), although there was a wide range from 11 days to 175 days. As indicated in the Figure below, overall program attendance was high.



Student Engagement in Program Activities

During the spring semester LINC staff rated students' engagement during a range of after-school activities. Engagement entails enjoyment of, interest in, and sustained attention and effort focused on an activity. Staff members indicated how often (*never = 1, on occasion = 2, some of the time = 3, most of the time = 4, all of the time = 5*) each student pays attention, seems interested in the subject, on task, and seems to have fun. Student engagement represents each student's average rating during academic and youth development activities. Higher scores indicate a student was more engaged in academic and youth development activities during the LINC after-school program. Engagement data were available for 440 students.

As shown in the figure below, the overall level of student engagement in academic and youth development activities, as rated by program staff, was high. The average engagement score was 4.03 (*SD* = 0.78) out of 5.



Factors Predicting Participation

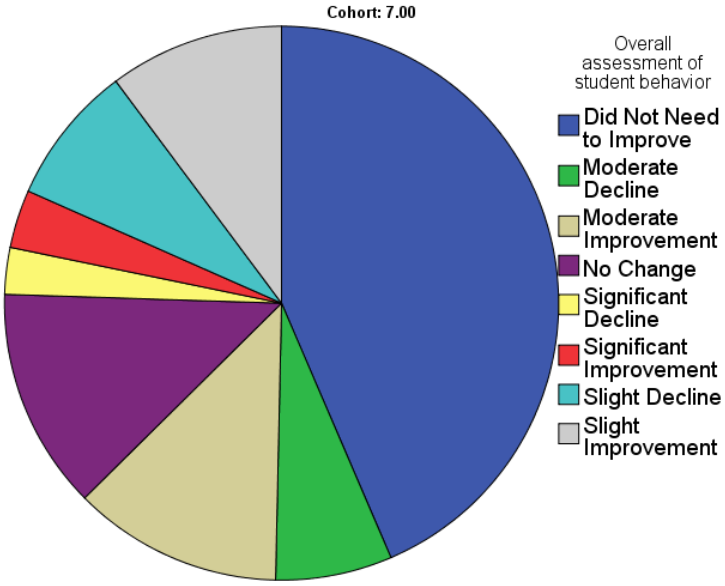
The two facets of participation – program attendance and engagement in program activities – were not correlated with one another, $r = .02$, $p < .67$. Subsequent analyses tested for factors that may predict students' levels of participation. Separate linear models were run in which program attendance and student engagement were regressed on the following predictor variables: Gender, grade level, first quarter academic grades, and whether or not teachers rated students as needing improvement at the start of the school year as part of their overall behavioral assessment.

Analyses also statistically controlled for program site. Detailed results tables from the two sites with sufficient data are included in Appendix A.

None of the predictor variables tested was uniquely associated with students' program attendance. First quarter science grades were associated with engagement in program activities. Students with a first quarter grades of B in science were rated as more highly engaged.

Teacher Ratings of Improvement in School Behavior

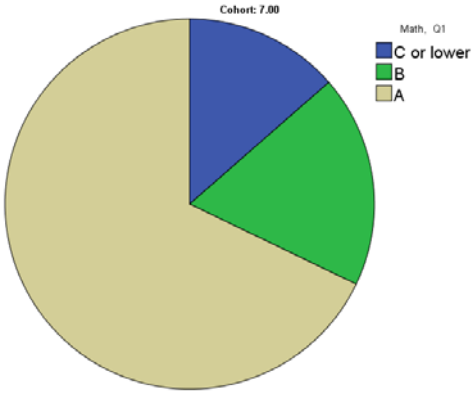
Teacher ratings of changes in student behavior on the DESE Teacher Survey were provided for approximately 147 students who attended the 21CCLC program at least 30 days. For the DESE survey, teachers report on changes over the school year in 10 dimensions of student behavior – academic performance, class attendance, class attentiveness, behaving well in class, gets along with other students, arrives motivated to learn, turns in homework on time, completes homework satisfactorily, participation in class, and volunteering for additional activity – as well as an overall assessment of student behavior. Teachers indicate whether functioning was acceptable at the start of the school year so that the student *did not need to* improve; if level of functioning at the start of the school year was not at an acceptable level, teachers rate change over the school across the following response categories: *significant decline, moderate decline, slight decline, no change, slight improvement, moderate improvement, significant improvement.* The figure below shows the teacher ratings for their overall assessment of student behavior. In terms of overall behavior, 43.5% of students were rated as *did not need to improve*, and 25.8% were rated has having either slight, moderate or significant improvement.



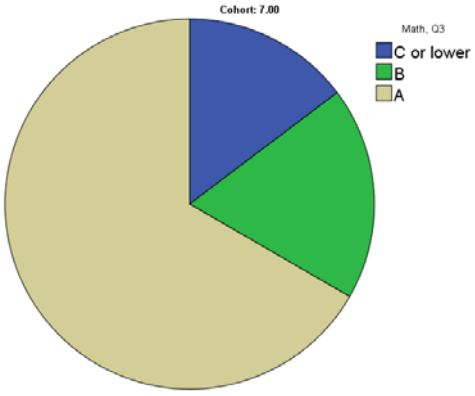
Students' Academic Performance in Math, Reading and Science

Academic grades in math, reading, and science were taken from the first and third quarter marking periods. Because different sites used different grading metrics, they were converted into a standardized three-point ordinal scale in which 3 = A, or E; 2 = B, S or M; 1 = C or lower, W, or U. Math grades from both marking periods were available for 154 students; reading grades from both marking periods were available for 190 students, and science grades from both marking periods were available for 175 students. Results of the Wilcoxon signed ranks test indicated that math grades, reading grades and science grades all did not change from fall to spring, $z = 1.82$, $p = .07$, $z = 1.30$, $p = .19$, and $z = 0.26$, $p = .80$, respectively. Pie charts in the Figure below show the distribution of Math, Reading grades and from the two marking periods (fall and spring).

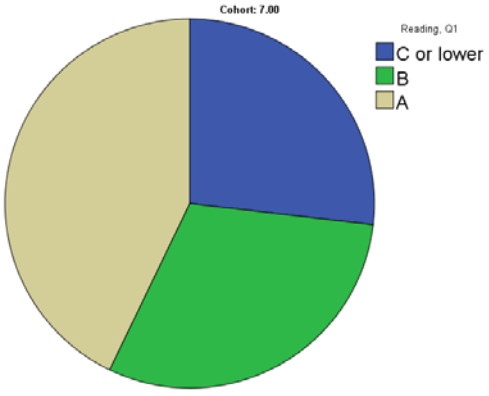
Math Grades Fall



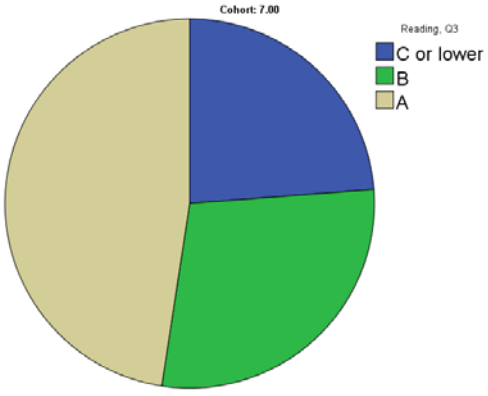
Math Grades Spring



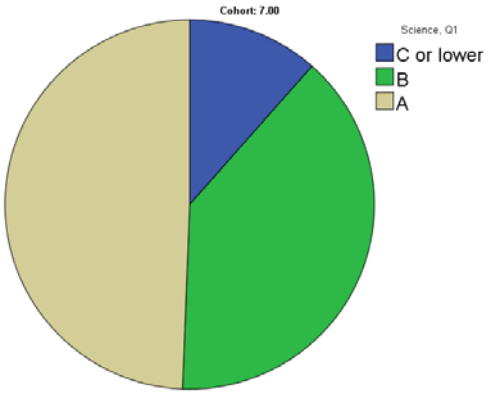
Reading Grades Fall



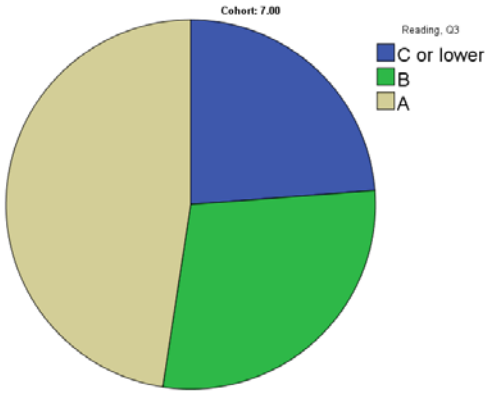
Reading Grades Spring



Science Grades Fall



Science Grades Spring



Effects of Program Participation on School Behavior and Academic Achievement

A primary goal of the evaluation is to assess the impact of participation in LINC's 21C before-and-after school program on students' academic achievement and social competence in school. We used the Harvard Family Project's three-part model of program participation to inform this part of the evaluation. In this model, participation consists of program enrollment, program attendance, and engagement in program activities. In order for after-school programs to benefit student achievement, students should not just be enrolled but attend regularly and also be engaged in program activities. In addition to being linked directly to student outcomes, engagement in after-school programs may also enhance the effects of program attendance on outcomes. Thus, engagement in after-school activities may operate interactively with attendance to promote students' school success.

Academic Grades. To examine the effects of daily program attendance and staff-ratings of students' engagement in program activities on academic achievement, a series of ordinal regression models were conducted in which math, reading and science grades from the 3rd marking period were regressed on the additive and interactive effects of engagement and attendance, controlling for site, gender, grade-level, and grades from the first marking period. Analyses also statistically controlled for program site. Analyses were conducted on a sample of between 202 and 257 students who had available data from staff engagement ratings, school records, and program records.

Detailed results tables are presented in Appendix B. There were no main effects of program attendance on change in math, reading or science grades over the school year. There was an interaction effect detected between program attendance and engagement in program activities predicting science grades. The interaction was in the opposite direction as anticipated though: Program attendance was positively associated with increased science grades over the year, *B* = .017, *SE* = .007, *p* - .02, only for students rated as <u>not very engaged</u> in program activities. There was no effect of program attendance on science grades for students rated as having average or high levels of engagement. Additionally, at average levels of attendance, there was an effect of

engagement in program activities on decreased science grades over the year.

Teachers' Overall Assessment of Student Behavior. To examine the effects of daily program attendance and staff-ratings of students' engagement in program activities on teachers' ratings of improvement over the school year, an improvement rating variable was constructed based on the 11 teacher ratings (10 domains plus overall behavioral assessment). For each item, students who were not rated as *did not need to improve* were assigned a score of 1 (*significant decline*) to 7 (*significant improvement*), and their scores were averaged across the 11 items. Thus, scores on the composite improvement rating reflect the average improvement across all domains that a given student was deemed as not functioning at an acceptable level at the start of the school year. Students who received ratings of *did not need to improve* across all 11 domains were excluded from the analyses. Analyses are based on a small subsample of 43 students that were assessed by their teachers as needing to improve in at least one domain at the start of the school year in the two sites that provided teacher survey data.

Detailed results tables are presented in Appendix C. The composite improvement rating was regressed on the additive and interactive effects of engagement and attendance, controlling for site, gender, grade-level, and grades from the first marking period. Analyses also statistically controlled for program site. No main or interactive effects of program attendance or engagement in program activities on teacher ratings of improvement were detected, although this may be due to small sample size.

Summary and Conclusions

Overall, students attended the LINC program regularly and were rated as being highly engaged in program activities.

Academic grades in math, reading and science did not change overall during the school year.

Tests of whether greater participation in the LINC program – in terms of frequency of attendance and engagement in activities – was associated with school performance did not detect any main effects of program participation on academic grades or teachers' ratings of improvement over the school year. An interaction effect was detected that indicated program attendance may be associated with improved science grades only for students rated as having relatively low levels of engagement in program activities, and there was also an effect of engagement in program activities on poorer performance in science over the school year. These finding should be interpreted with caution; they was not detected in any of the other LINC cohorts.

Several notable weaknesses limit the conclusions from the evaluation. First, a relatively small proportion of students enrolled in the LINC program had complete data from all sources – program records, school records, staff ratings, and teacher ratings. Thus, it is not clear how generalizable findings are to the larger population of students enrolled in LINC 21C programs. Second, due to the scope of the evaluation and the age range of the students in the program, assessment of students' engagement in after-school activities relied exclusively on staff report. More comprehensive evaluations of engagement would rely on student report and possibly

observational ratings. Additionally, given the lack of an experimental design, the direction of effects linking student participation with school outcomes cannot be isolated, limiting causal inferences based on the results.

Appendices

A1. Linear Model Predicting Program Attendance

Sample Descriptives

		Value Label	N
Math, Q1	1	C or lower	7
	2	B	12
	3	A	40
Reading, Q1	1	C or lower	5
	2	B	17
	3	A	37
Science, Q1	1	C or lower	5
	2	B	18
	3	A	36
needs_improvement	.00		30
	1.00		29
Site	Butcher-Greene Elementary		12
	Martin City Elementary		47

Tests of Between-Subjects Effects

Dependent Variable: Program attendance

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	61743.858	1	61743.858	60.061	.000	.560
	Error	48588.446	47.264	1028.027			
Site	Hypothesis	639.460	1	639.460	.603	.441	.012
	Error	50887.556	48	1060.157			
Math, Q1	Hypothesis	4175.051	2	2087.525	1.969	.151	.076
	Error	50887.556	48	1060.157			
Reading, Q1	Hypothesis	233.041	2	116.521	.110	.896	.005
	Error	50887.556	48	1060.157			
Science, Q1	Hypothesis	1134.251	2	567.126	.535	.589	.022
	Error	50887.556	48	1060.157			
Female	Hypothesis	36.699	1	36.699	.035	.853	.001
	Error	50887.556	48	1060.157			
Grade level	Hypothesis	691.167	1	691.167	.652	.423	.013
	Error	50887.556	48	1060.157			
Needs improvement	Hypothesis	568.742	1	568.742	.536	.467	.011
	Error	50887.556	48	1060.157			

A1, continued

Parameter Estimates

Dependent Variable: Program attendance

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
[Site=Butcher-Greene Elementary]	9.619	12.385	.777	.441	-15.283	34.521	.012
[Site=Martin City Elementary]	0[a]	.	.	.	.	.	.
[Math, Q1=1]	-1.503	19.466	-.077	.939	-40.642	37.635	.000
[Math, Q1=2]	22.137	12.634	1.752	.086	-3.266	47.539	.060
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	1.879	19.432	.097	.923	-37.191	40.949	.000
[Reading, Q1=2]	-4.709	11.662	-.404	.688	-28.158	18.740	.003
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	13.222	22.193	.596	.554	-31.400	57.843	.007
[Science, Q1=2]	-6.511	11.038	-.590	.558	-28.704	15.683	.007
[Science, Q1=3]	0[a]	.	.	.	.	.	.
Female	1.846	9.922	.186	.853	-18.104	21.796	.001
Grade Level	-3.880	4.805	-.807	.423	-13.542	5.782	.013
Needs improvement	-7.421	10.131	-.732	.467	-27.791	12.950	.011

a. This parameter is set to zero because it is redundant.

A2. Linear Model Predicting Engagement in Program Activities

Sample Descriptives

		Value Label	N
Math, Q1	1	C or lower	7
	2	B	12
	3	A	40
Reading, Q1	1	C or lower	5
	2	B	17
	3	A	37
Science, Q1	1	C or lower	5
	2	B	18
	3	A	36
Needs improvement	.00		30
	1.00		29
Site	Butcher-Greene Elementary		12
	Martin City Elementary		47

Tests of Between-Subjects Effects

Dependent Variable: Engagement in Activities

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	31.664	1	31.664	77.982	.000	.636
	Error	18.140	44.676	.406			
Site	Hypothesis	.342	1	.342	.832	.366	.017
	Error	19.743	48	.411			
Math, Q1	Hypothesis	.909	2	.455	1.105	.339	.044
	Error	19.743	48	.411			
Reading, Q1	Hypothesis	.028	2	.014	.034	.967	.001
	Error	19.743	48	.411			
Science, Q1	Hypothesis	2.741	2	1.371	3.332	.044	.122
	Error	19.743	48	.411			
Female	Hypothesis	.352	1	.352	.855	.360	.017
	Error	19.743	48	.411			
Grade level	Hypothesis	.051	1	.051	.125	.725	.003
	Error	19.743	48	.411			
Needs improvement	Hypothesis	.276	1	.276	.670	.417	.014
	Error	19.743	48	.411			

A2, continued

Parameter Estimates

Dependent Variable: Engagement in Activities

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
[Site=Butcher-Greene Elementary]	.223	.244	.912	.366	-.268	.713	.017
[Site=Martin City Elementary]	0[a]	.	.	.	.	.	.
[Math, Q1=1]	-.453	.383	-1.182	.243	-1.224	.318	.028
[Math, Q1=2]	-.330	.249	-1.326	.191	-.830	.170	.035
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	.096	.383	.250	.803	-.674	.865	.001
[Reading, Q1=2]	.034	.230	.149	.883	-.428	.496	.000
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	-.065	.437	-.148	.883	-.944	.814	.000
[Science, Q1=2]	.515	.217	2.370	.022	.078	.952	.105
[Science, Q1=3]	0[a]	.	.	.	.	.	.
Female	.181	.195	.925	.360	-.212	.574	.017
Grade Level	.033	.095	.353	.725	-.157	.224	.003
Needs improvement	.163	.200	.819	.417	-.238	.565	.014

a. This parameter is set to zero because it is redundant.

B1. Ordinal Regression Predicting Math Grades

Sample Descriptives

		N	Marginal Percentage
Math, Q3	C or lower	19	9.4%
	B	36	17.8%
	A	147	72.8%
Site	Butcher-Greene Elementary	53	26.2%
	Martin City Elementary	66	32.7%
	Meadowmere Elementary	83	41.1%
Math, Q1	C or lower	26	12.9%
	B	36	17.8%
	A	140	69.3%
Valid		202	100.0%

Parameter Estimates

						95% Confidence Interval	
	Estimate	**Std. Error**	**Wald**	**df**	**Sig.**	Lower Bound	Upper Bound
[Site=Butcher-Greene Elementary]	.570	.487	1.367	1	.242	-.385	1.525
[Site=Martin City Elementary]	1.114	.464	5.770	1	.016	.205	2.023
[Site=Meadowmere Elementary]	0a	.	.	0	.	.	.
Grade level	-.167	.130	1.637	1	.201	-.422	.089
Female	.485	.379	1.640	1	.200	-.257	1.227
[Math, Q1=1]	-3.643	.525	48.244	1	.000	-4.671	-2.615
[Math, Q1=2]	-2.314	.445	27.056	1	.000	-3.186	-1.442
[Math, Q3=3]	0a	.	.	0	.	.	.
Engagement	-.491	.288	2.915	1	.088	-1.055	.073
Attendance	-.007	.008	.747	1	.388	-.021	.008
Engagement * Attendance	.005	.008	.397	1	.529	-.011	.022

Link function: Logit.

a. This parameter is set to zero because it is redundant.

B2. Ordinal Regression Predicting Reading Grades

Sample Descriptives

		N	Marginal Percentage
Reading, Q3	C or lower	57	22.2%
	B	76	29.6%
	A	124	48.2%
Site	Butcher-Greene Elementary	61	23.7%
	Martin City Elementary	79	30.7%
	Meadowmere Elementary	117	45.5%
Reading, Q1	C or lower	61	23.7%
	B	82	31.9%
	A	114	44.4%
Valid		257	100.0%

Parameter Estimates

						95% Confidence Interval	
	Estimate	**Std. Error**	**Wald**	**df**	**Sig.**	Lower Bound	Upper Bound
[Site=Butcher-Greene Elementary]	-.445	.365	1.489	1	.222	-1.159	.270
[Site=Martin City Elementary]	-.109	.347	.100	1	.752	-.789	.570
[Site=Meadowmere Elementary]	0a	.	.	0	.	.	.
Grade level	-.306	.105	8.465	1	.004	-.512	-.100
Female	.206	.294	.493	1	.483	-.370	.782
[Reading, Q1=1]	-4.420	.445	98.798	1	.000	-5.292	-3.549
[Reading, Q1=2]	-2.332	.345	45.685	1	.000	-3.008	-1.656
[Reading, Q1=3]	0a	.	.	0	.	.	.
Engagement	.143	.186	.595	1	.440	-.221	.508
Attendance	.001	.004	.019	1	.889	-.007	.008
Engagement * Attendance	.001	.005	.018	1	.893	-.009	.010

Link function: Logit.

a. This parameter is set to zero because it is redundant.

B3. Ordinal Regression Predicting Science Grades

Sample Descriptives

		N	Marginal Percentage
Science, Q3	C or lower	24	11.0%
	B	85	38.8%
	A	110	50.2%
Site	Butcher-Greene Elementary	25	11.4%
	Martin City Elementary	79	36.1%
	Meadowmere Elementary	115	52.5%
Science, Q1	C or lower	21	9.6%
	B	87	39.7%
	A	111	50.7%
Valid		219	100.0%

Parameter Estimates

						95% Confidence Interval	
	Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
[Site=Butcher-Greene Elementary]	-.322	.516	.389	1	.533	-1.333	.690
[Site=Martin City Elementary]	-.717	.377	3.607	1	.058	-1.456	.023
[Site=Meadowmere Elementary]	0a	.	.	0	.	.	.
Grade level	-.244	.126	3.753	1	.053	-.490	.003
Female	.707	.347	4.146	1	.042	.026	1.388
[Science, Q1=1]	-5.478	.686	63.807	1	.000	-6.822	-4.134
[Science, Q1=2]	-3.444	.426	65.418	1	.000	-4.278	-2.609
[Science, Q1=3]	0a	.	.	0	.	.	.
Engagement	-.530	.237	4.991	1	.025	-.994	-.065
Attendance	.008	.005	2.780	1	.095	-.001	.017
Engagement * Attendance	-.012	.006	4.622	1	.032	-.024	-.001

Link function: Logit.

a. This parameter is set to zero because it is redundant.

C. Linear Model Predicting Composite Teachers' Improvement Ratings

Sample Descriptives

		Value Label	N
Math, Q1	1	C or lower	8
	2	B	7
	3	A	28
Reading, Q1	1	C or lower	5
	2	B	13
	3	A	25
Science, Q1	1	C or lower	5
	2	B	17
	3	A	21
Site	Butcher-Greene Elementary		9
	Martin City Elementary		34

Tests of Between-Subjects Effects

Dependent Variable: Average improvement rating

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Site	Hypothesis	4.171	1	4.171	2.388	.133	.074
	Error	52.387	30	1.746			
Female	Hypothesis	.002	1	.002	.001	.974	.000
	Error	52.387	30	1.746			
Grade level	Hypothesis	.336	1	.336	.193	.664	.006
	Error	52.387	30	1.746			
Math, Q1	Hypothesis	1.091	2	.545	.312	.734	.020
	Error	52.387	30	1.746			
Reading, Q1	Hypothesis	.274	2	.137	.079	.925	.005
	Error	52.387	30	1.746			
Science, Q1	Hypothesis	.173	2	.087	.050	.952	.003
	Error	52.387	30	1.746			
Engagement	Hypothesis	1.255	1	1.255	.718	.403	.023
	Error	52.387	30	1.746			
Program attendance	Hypothesis	.269	1	.269	.154	.698	.005
	Error	52.387	30	1.746			
Engagement * Attendance	Hypothesis	1.978	1	1.978	1.133	.296	.036
	Error	52.387	30	1.746			

C, continued

Parameter Estimates

Dependent Variable: Average improvement rating

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
[Site=Butcher-Greene Elementary]	-.969	.627	-1.545	.133	-2.249	.311	.074
[Site=Martin City Elementary]	0[a]	.	.	.	.	.	.
Female	-.019	.572	-.033	.974	-1.187	1.150	.000
Grade	-.093	.212	-.439	.664	-.527	.340	.006
[Math, Q1=1]	.570	.746	.764	.451	-.954	2.095	.019
[Math, Q1=2]	.046	.715	.064	.949	-1.414	1.506	.000
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	-.115	.845	-.136	.893	-1.840	1.611	.001
[Reading, Q1=2]	-.199	.507	-.394	.697	-1.234	.835	.005
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	.202	.987	.205	.839	-1.813	2.218	.001
[Science, Q1=2]	-.074	.570	-.130	.897	-1.238	1.090	.001
[Science, Q1=3]	0[a]	.	.	.	.	.	.
Engagement	.152	.437	.347	.731	-.741	1.045	.004
Program attendance	.004	.010	.392	.698	-.016	.024	.005
Engagement * Attendance	-.014	.013	-1.064	.296	-.042	.013	.036

a. This parameter is set to zero because it is redundant.