Evaluation of LINC's Caring Communities Sites

21st Century Community Learning Center Programs

Cohort 6, Year 4

October 22 , 2015

Prepared by:
Christopher Henrich, Ph.D.

Georgia State University

LINC's Caring Communities Sites: 21st Century Community Learning Center Programs
Cohort 6, Year 4

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 six LINC sites in Hickman Mills and the Kansas City Public Schools which comprise Cohort 6 and were in their fourth 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.

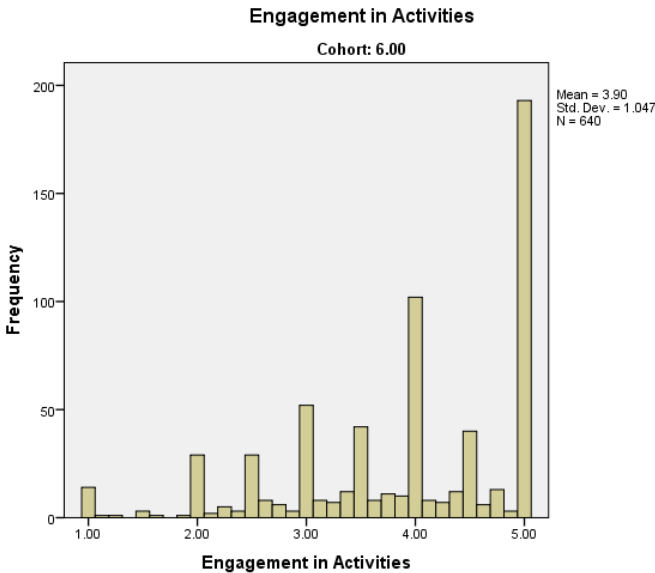## LINC Program Attendance

Daily program attendance data were available for 870 students enrolled in the Cohort 6 sites. The average days attended for the 2014-2015 school year was 128 (SD = 48), although there was a wide range from 1 day to 175 days. As indicated in the Figure below, overall program attendance was high.

Program attendance
Cohort: 6.00

Mean = 128.17
Std. Dev. = 47.867
N = 870
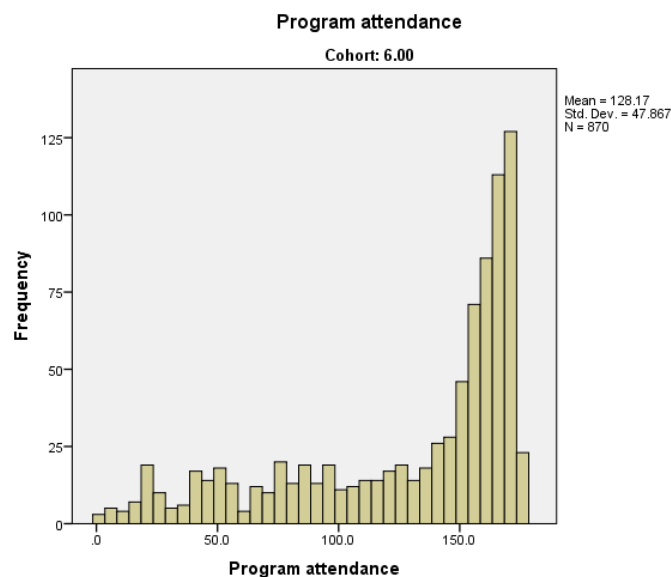
Student Engagement in Program Activities

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 640 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 3.90 (*SD* = 1.05) out of 5.


Factors Predicting Participation

The two facets of participation – program attendance and engagement in program activities – were positively correlated with one another (i.e., students who were more engaged attended more), although the magnitude of the association was small, $r = .16, p < .001$. 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 are included in Appendix A.

Although program attendance varied by site, none of the predictor variables tested was uniquely associated with students' program attendance.

Staff ratings of students' engagement in program activities also varied by site. Also, students with higher first quarter math grades and younger students were rated as more highly engaged in program activities.

**Teacher Ratings of Improvement in School Behavior**

Teacher ratings of changes in student behavior on the DESE Teacher Survey were provided for approximately 479 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, 33% of students were rated as *did not need to improve*, and 40% were rated has having either slight, moderate or significant improvement.
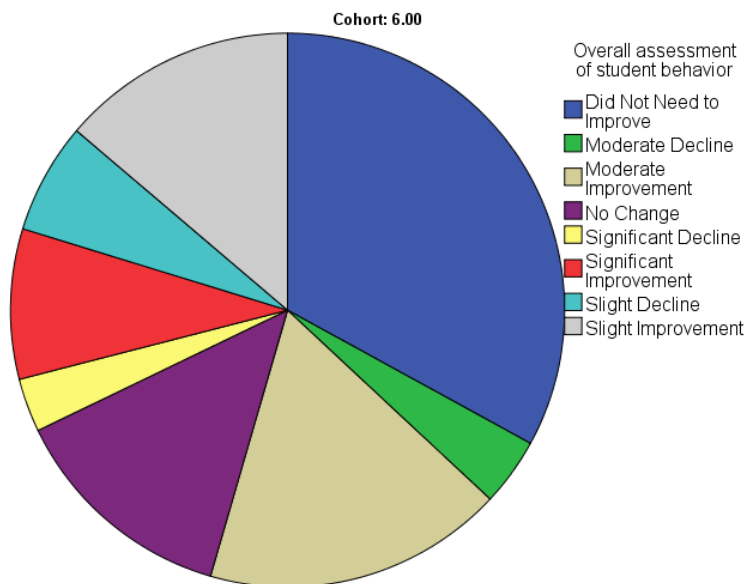
Students' Academic Performance in Math, Reading and Science

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 474 students; reading grades from both marking periods were available for 505 students, and science grades from both marking periods were available for 501 students. Results of the Wilcoxon signed ranks test indicated that math grades, reading grades and science grades all increased from fall to spring, $z = 2.33$, $p < .05$, $z = 2.02$, $p < .05$, and $z = 2.64$, $p < .01$, 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
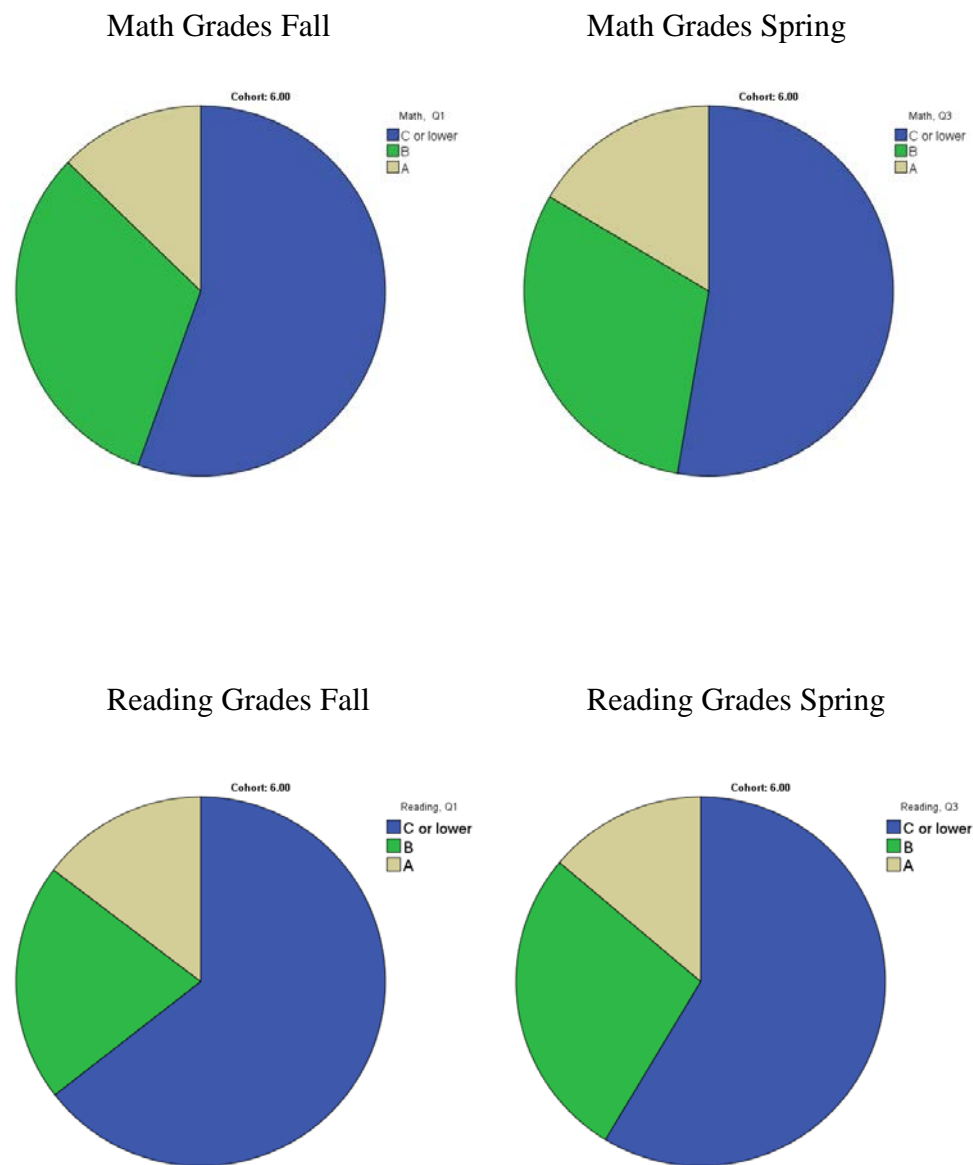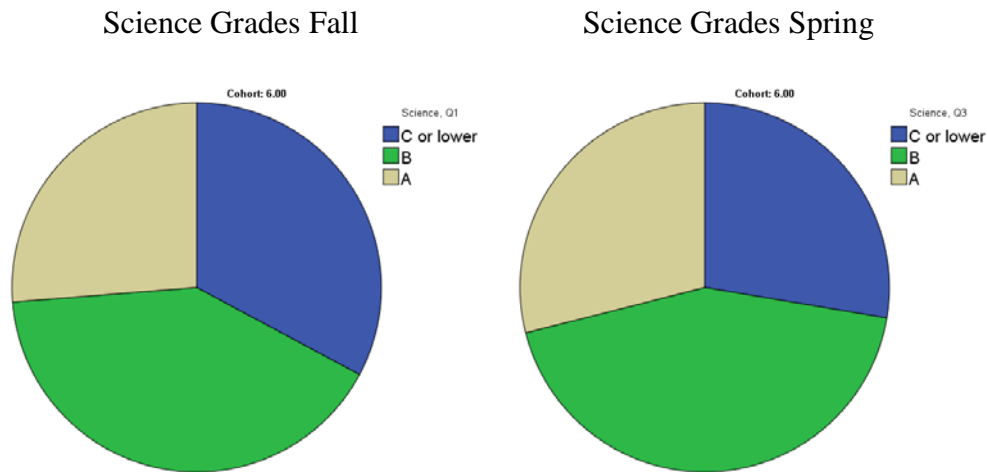
Effects of Program Participation on School Behavior and Academic Achievement

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 382 and 407 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 effects of program attendance on reading or science grades over the school year. There was an effect of engagement in program activities on science grades. Students who were rated as more highly engaged in LINC activities performed better academically in science over the school 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 the subsample of 270 students who were assessed by their teachers as needing to improve in at least one domain at the start of the school year.

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. Students who were rated as more engaged in LINC program activities were rated by their school teachers as showing greater improvement in their class behaviors No effects of program attendance on teacher ratings of improvement were detected.

Summary and Conclusions

Overall, the sample of students enrolled in the LINC program improved their academic performance in math, reading and science over the school year.

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

Analyses that tested 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 many effects of program participation on academic grades or teachers' ratings of improvement over the school year. The only effects that were detected were that greater engagement in LINC activities was improved science grades, and that greater engagement in LINC activities was associated with greater overall improvements in class behavior during the school day.

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**	207
	2	**B**	110
	3	**A**	48
Reading, Q1	1	**C or lower**	236
	2	**B**	81
	3	**A**	48
Science, Q1	1	**C or lower**	125
	2	**B**	149
	3	**A**	91
Needs improvement	.00		118
	1.00		247
Site	Burke Elementary		43
	Foreign Language Academy		71
	Ingels Elementary		146
	James Elementary		61
	Rogers Elementary		44

A1, continued

Tests of Between-Subjects Effects

Dependent Variable: Program attendance

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	1065830.480	1	1065830.480	996.469	.000	.978
	Error	24133.745	22.563	1069.607			
Site	Hypothesis	10975.691	4	2743.923	3.682	.006	.040
	Error	261553.366	351	745.166			
Math, Q1	Hypothesis	2137.707	2	1068.854	1.434	.240	.008
	Error	261553.366	351	745.166			
Reading, Q1	Hypothesis	3476.154	2	1738.077	2.332	.099	.013
	Error	261553.366	351	745.166			
Science, Q1	Hypothesis	2834.585	2	1417.293	1.902	.151	.011
	Error	261553.366	351	745.166			
Female	Hypothesis	20.023	1	20.023	.027	.870	.000
	Error	261553.366	351	745.166			
Grade level	Hypothesis	2148.451	1	2148.451	2.883	.090	.008
	Error	261553.366	351	745.166			
Needs improvement	Hypothesis	380.574	1	380.574	.511	.475	.001
	Error	261553.366	351	745.166			

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=Burke Elementary]	7.741	6.523	1.187	.236	-5.088	20.570	.004
[Site=Foreign Language Academy]	5.525	5.421	1.019	.309	-5.135	16.186	.003
[Site=Ingels Elementary]	10.959	5.397	2.031	.043	.345	21.573	.012
[Site=James Elementary]	-7.017	5.553	-1.264	.207	-17.938	3.905	.005
[Site=Rogers Elementary]	0[a]	.	.	.	.	.	.
[Math, Q1=1]	-8.896	6.008	-1.481	.140	-20.712	2.919	.006
[Math, Q1=2]	-8.826	5.292	-1.668	.096	-19.235	1.583	.008
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	-3.621	6.292	-.575	.565	-15.996	8.754	.001
[Reading, Q1=2]	6.225	5.380	1.157	.248	-4.356	16.807	.004
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	9.497	5.097	1.863	.063	-.526	19.521	.010
[Science, Q1=2]	7.934	4.575	1.734	.084	-1.065	16.933	.008
[Science, Q1=3]	0[a]	.	.	.	.	.	.
Female	.495	3.020	.164	.870	-5.445	6.435	.000
Grade Level	-1.765	1.039	-1.698	.090	-3.808	.279	.008
Needs improvement	-2.347	3.284	-.715	.475	-4.112	8.806	.001

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**	163
	2	**B**	98
	3	**A**	44
Reading, Q1	1	**C or lower**	193
	2	**B**	70
	3	**A**	42
Science, Q1	1	**C or lower**	100
	2	**B**	131
	3	**A**	74
Needs improvement	.00		104
	1.00		201
Site	Burke Elementary		40
	Foreign Language Academy		58
	Ingels Elementary		109
	James Elementary		57
	Rogers Elementary		41

A2, continued

Tests of Between-Subjects Effects

Dependent Variable: Engagement in Activities

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	Hypothesis	739.194	1	739.194	590.015	.000	.955
	Error	34.475	27.518	1.253			
Site	Hypothesis	11.228	4	2.807	2.982	.019	.039
	Error	273.918	291	.941			
Math, Q1	Hypothesis	12.454	2	6.227	6.616	.002	.043
	Error	273.918	291	.941			
Reading, Q1	Hypothesis	2.688	2	1.344	1.428	.241	.010
	Error	273.918	291	.941			
Science, Q1	Hypothesis	.548	2	.274	.291	.748	.002
	Error	273.918	291	.941			
Female	Hypothesis	2.819	1	2.819	2.995	.085	.010
	Error	273.918	291	.941			
Grade level	Hypothesis	13.637	1	13.637	14.487	.000	.047
	Error	273.918	291	.941			
Needs improvement	Hypothesis	3.095	1	3.095	3.288	.071	.011
	Error	273.918	291	.941			

A2, continued

Parameter Estimates

Dependent Variable: Engagement in Activities

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound	Partial Eta Squared
[Site=Burke Elementary]	-.175	.245	-.715	.475	-.656	.307	.002
[Site=Foreign Language Academy]	.529	.206	2.574	.011	.125	.934	.022
[Site=Ingels Elementary]	.077	.207	.370	.711	-.330	.483	.000
[Site=James Elementary]	.023	.205	.113	.910	-.379	.426	.000
[Site=Rogers Elementary]	0[a]	.	.	.	.	.	.
[Math, Q1=1]	-.574	.224	-2.563	.011	-1.015	-.133	.022
[Math, Q1=2]	-.071	.199	-.358	.721	-.464	.321	.000
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	.372	.234	1.586	.114	-.090	.833	.009
[Reading, Q1=2]	.304	.204	1.490	.137	-.098	.706	.008
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	-.148	.194	-.761	.447	-.530	.234	.002
[Science, Q1=2]	-.084	.173	-.489	.625	-.424	.255	.001
[Science, Q1=3]	0[a]	.	.	.	.	.	.
[Math, Q1=1]	.205	.118	1.731	.085	-.028	.438	.010
[Math, Q1=2]	-.149	.039	-3.806	.000	-.227	-.072	.047
Needs improvement	-.227	.125	-1.813	.071	-.474	.019	.011

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	192	50.3%
	B	123	32.2%
	A	67	17.5%
Site	Burke Elementary	73	19.1%
	Foreign Language Academy	90	23.6%
	Hickman Mills Freshman Center	6	1.6%
	Ingels Elementary	103	27.0%
	James Elementary	60	15.7%
	Rogers Elementary	50	13.1%
Math, Q1	C or lower	200	52.4%
	B	130	34.0%
	A	52	13.6%
Valid		382	100.0%

B1, Continued

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[Site=Burke Elementary]	-1.659	.423	15.361	1	.000	-2.489	-.829
[Site=Foreign Language Academy]	-.203	.365	.309	1	.579	-.919	.513
[Site=Hickman Mills Freshman Center]	-.452	.988	.210	1	.647	-2.388	1.483
[Site=Ingels Elementary]	-1.695	.400	17.964	1	.000	-2.478	-.911
[Site=James Elementary]	.389	.386	1.014	1	.314	-.368	1.145
[Site=Rogers Elementary]	0a	.	.	0	.	.	.
Grade level	.003	.078	.001	1	.969	-.150	.157
Female	.692	.237	8.501	1	.004	.227	1.158
[Math, Q1=1]	-3.407	.401	72.038	1	.000	-4.193	-2.620
[Math, Q1=2]	-1.461	.359	16.518	1	.000	-2.165	-.756
[Math, Q3=3]	0a	.	.	0	.	.	.
Engagement	.158	.133	1.404	1	.236	-.103	.418
Attendance	.002	.004	.240	1	.624	-.006	.010
Engagement * Attendance	-.001	.004	.000	1	.995	-.007	.007

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	235	57.7%
	B	113	27.8%
	A	59	14.5%
Site	Burke Elementary	82	20.1%
	Foreign Language Academy	90	22.1%
	Hickman Mills Freshman Center	11	2.7%
	Ingels Elementary	114	28.0%
	James Elementary	64	15.7%
	Rogers Elementary	46	11.3%
Reading, Q1	C or lower	259	63.6%
	B	89	21.9%
	A	59	14.5%
Valid		407	100.0%

B2, continued

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[Site=Burke Elementary]	-.887	.444	3.999	1	.046	-1.757	-.018
[Site=Foreign Language Academy]	-.794	.385	4.250	1	.039	-1.548	-.039
[Site=Hickman Mills Freshman Center]	-.478	.839	.325	1	.569	-2.123	1.167
[Site=Ingels Elementary]	-.848	.401	4.468	1	.035	-1.634	-.062
[Site=James Elementary]	-.363	.396	.840	1	.360	-1.140	.414
[Site=Rogers Elementary]	0a	.	.	0	.	.	.
Grade level	.053	.074	.511	1	.475	-.092	.198
Female	.461	.227	4.136	1	.042	.017	.905
[Reading, Q1=1]	-3.589	.401	80.304	1	.000	-4.374	-2.804
[Reading, Q1=2]	-1.990	.358	30.963	1	.000	-2.692	-1.289
[Reading, Q1=3]	0a	.	.	0	.	.	.
Engagement	.100	.128	.610	1	.435	-.151	.352
Attendance	.002	.004	.187	1	.665	-.006	.010
Engagement * Attendance	-.001	.003	.080	1	.777	-.008	.006

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	100	24.9%
	B	183	45.5%
	A	119	29.6%
Site	Burke Elementary	79	19.7%
	Foreign Language Academy	91	22.6%
	Hickman Mills Freshman Center	17	4.2%
	Ingels Elementary	108	26.9%
	James Elementary	60	14.9%
	Rogers Elementary	47	11.7%
Science, Q1	C or lower	125	31.1%
	B	172	42.8%
	A	105	26.1%
Valid		402	100.0%

B3, continued

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[Site=Burke Elementary]	-.348	.389	.801	1	.371	-1.111	.414
[Site=Foreign Language Academy]	.201	.402	.250	1	.617	-.587	.989
[Site=Hickman Mills Freshman Center]	-.882	.726	1.476	1	.224	-2.306	.541
[Site=Ingels Elementary]	-.999	.379	6.956	1	.008	-1.742	-.257
[Site=James Elementary]	-.206	.405	.258	1	.612	-.999	.588
[Site=Rogers Elementary]	0a	.	.	0	.	.	.
Grade level	-.029	.074	.155	1	.694	-.174	.116
Female	.316	.215	2.149	1	.143	-.106	.737
[Science, Q1=1]	-3.160	.364	75.471	1	.000	-3.874	-2.447
[Science, Q1=2]	-2.136	.322	43.974	1	.000	-2.767	-1.504
[Science, Q1=3]	0a	.	.	0	.	.	.
Engagement	.251	.123	4.170	1	.041	.010	.492
Attendance	.006	.004	2.319	1	.128	-.002	.014
Engagement * Attendance	-.002	.003	.285	1	.593	-.008	.005

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**	156
	2	**B**	81
	3	**A**	33
Reading, Q1	1	**C or lower**	186
	2	**B**	57
	3	**A**	27
Science, Q1	1	**C or lower**	89
	2	**B**	118
	3	**A**	63
Site	Burke Elementary		42
	Foreign Language Academy		52
	Ingels Elementary		95
	James Elementary		48
	Rogers Elementary		33

C, continued

Tests of Between-Subjects Effects

Dependent Variable: Average improvement rating

Source		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Site	Hypothesis	5.644	4	1.411	.801	.526	.012
	Error	447.595	254	1.762			
Female	Hypothesis	.214	1	.214	.122	.728	.000
	Error	447.595	254	1.762			
Grade level	Hypothesis	.766	1	.766	.435	.510	.002
	Error	447.595	254	1.762			
Math, Q1	Hypothesis	6.988	2	3.494	1.983	.140	.015
	Error	447.595	254	1.762			
Reading, Q1	Hypothesis	1.358	2	.679	.385	.681	.003
	Error	447.595	254	1.762			
Science, Q1	Hypothesis	3.349	2	1.674	.950	.388	.007
	Error	447.595	254	1.762			
Engagement	Hypothesis	3.534	1	9.534	5.410	..021	.021
	Error	447.595	254	1.762			
Program attendance	Hypothesis	5.057	1	5.057	2.870	.091	.011
	Error	447.595	254	1.762			
Engagement * Attendance	Hypothesis	.775	1	.775	.440	.508	.002
	Error	447.595	254	1.762			

D, 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=Burke Elementary]	-.275	.350	-.787	.432	-.963	.413	.002
[Site=Foreign Language Academy]	.241	.305	.789	.431	-.361	.842	.002
[Site=Ingels Elementary]	-.255	.310	-.823	.411	-.865	.355	.003
[Site=James Elementary]	-.002	.312	-.007	.995	-.616	.612	.000
[Site=Rogers Elementary]	0[a]	.	.	.	.	.	.
Female	-.062	.177	-.349	.728	-.410	.287	.000
Grade	-.039	.059	-.659	.510	-.154	.077	.002
[Math, Q1=1]	.123	.345	.358	.721	-.555	.802	.001
[Math, Q1=2]	.463	.320	1.451	.148	-.166	1.093	.008
[Math, Q1=3]	0[a]	.	.	.	.	.	.
[Reading, Q1=1]	-.272	.383	-.709	.479	-1.027	.483	.002
[Reading, Q1=2]	-.060	.345	-.173	.863	-.739	.619	.000
[Reading, Q1=3]	0[a]	.	.	.	.	.	.
[Science, Q1=1]	-.240	.284	-.845	.399	-.799	.319	.003
[Science, Q1=2]	.046	.250	.183	.855	-.446	.538	.000
[Science, Q1=3]	0[a]	.	.	.	.	.	.
Engagement	.218	.094	2.326	.021	.033	.403	.021
Program attendance	.006	.003	1.694	.091	-.001	.013	.011
Engagement * Attendance	.002	.003	.663	.508	-.003	.007	.002

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