What Works Clearinghouse

ies INSTITUTE OF EDUCATION SCIENCES

WWC Review of the Report "Charter-School Management Organizations: Diverse Strategies and Diverse Student Impacts"[1,2]

The findings from this review do not reflect the full body of research evidence on charter-school management organizations.

What is this study about?

The study examined the effect of non-profit charter-school management organizations (CMOs) operating in eight states on middle school student achievement, high school graduation rates, and post-secondary enrollment rates.

The intervention sample included over 13,600 students who attended 68 middle schools operated by 22 CMOs and nearly 2,700 students who attended 13 high schools operated by six CMOs. The authors matched each CMO school student with similar students attending non-CMO public schools.

The study examined the effectiveness of each CMO separately by comparing the outcomes of CMO school students with those of matched non-CMO school students. To determine the effectiveness of the average CMO, the researchers averaged the CMO-specific impacts.

Features of the Charter School Management Organizations (CMOs) in This Study

CMOs operate multiple charter schools under a common structure and philosophy. To be eligible for the study, the CMO had to meet the following criteria:

- Had direct control of at least four charter schools;
- Had operated as a not-for-profit organization since inception;
- Did not primarily serve dropouts or special populations of students;
- Directly managed the charter schools by having the authority to hire and fire school principals.

What did the study find?

On average, the study found that the CMOs had no statistically significant impact on state assessments in math, reading, science, or social studies among middle school students.

Among the high school sample, the average impacts on graduation rates and rates of post-secondary enrollment were not statistically significant. However, the average impact on the rate of post-secondary enrollment was substantively important, with an effect size of 0.35.

The study also reported impacts separately for each CMO and found substantial variation in the direction, magnitude, and statistical significance of the impacts. These impacts are presented for each CMO in Appendix C.

WWC Rating

The research described in this report meets WWC evidence standards with reservations

Strengths: The authors matched CMO school students to similar students in non-CMO public schools using demographic and academic characteristics.

Cautions: Although the study matched CMO school students to traditional public school students on observable characteristics, it is possible that there were other differences between the two groups that were not accounted for in the analysis but could have influenced student achievement.

Appendix A: Study details

Furgeson, J., Gill, B., Haimson, J., Killewald, A., McCullough, M., Nichols-Barrer, I., . . . Lake, R. (2012). *Charter-school management organizations: Diverse strategies and diverse student impacts.* Report prepared by Mathematica Policy Research and the University of Washington's Center on Reinventing Public Education. Princeton, NJ: Mathematica Policy Research.

Setting
The study was conducted in eight states in the West, Southwest, Midwest, and Mid-Atlantic regions, including CMO schools located in 16 metropolitan areas and two rural school districts. The high school analysis included schools from three states located in the West, Southwest, and Midwest regions.

Study sample
Using a propensity score matching approach, the authors constructed a matched comparison group of students who did not enter CMO schools. The propensity score procedure matched students on all or a subset of the following pre-intervention characteristics:

- math test scores,
- reading test scores,
- sex,
- race/ethnicity,
- free/reduced-price lunch (FRPL) status,
- individualized education plan (IEP) status,
- English language learner (ELL) status,
- baseline grade,
- baseline cohort,
- baseline district,
- whether a student attended a charter school in the baseline year, and
- two-way interactions of these covariates.

Each CMO school student was matched with between two and 30 comparison non-CMO students. The study analyzed data from over 13,600 students attending 68 middle schools operated by 22 CMOs and over 240,000 students attending non-CMO public middle schools (which could have included magnet schools and independent charter schools). The analysis of high school graduation rates focused on six CMOs serving nearly 2,700 students and over 33,000 students attending non-CMO public high schools; post-secondary outcomes were available for students from four of these six CMOs.

Intervention group
Intervention group students attended charter schools that were operated by eligible CMOs. Eligible CMOs were not-for-profit organizations that had direct control over at least four schools, directly managed the schools (by having the authority to hire and fire school principals), and did not serve special student populations (for example, not focusing primarily on dropouts).

Comparison group
Comparison students attended nearby non-CMO public schools.

Outcomes and measurement

Measures of middle school achievement were scores on grade-specific standardized state assessments in math, reading, science, and social studies. Study authors used z-score transformations to standardize scores across different states' assessments. Educational attainment outcomes at the high school level were high school graduation rates within four years after entering ninth grade and rates of post-secondary enrollment within four years following the first semester of ninth grade. For a more detailed description of these outcome measures, see Appendix B.

Reason for review

This study was eligible for a single study review by receiving substantial media attention.

Appendix B: Outcome measures for each domain

Math achievement	
Statewide mathematics assessments (z-score)	Study authors used z-score transformations to standardize scores across different state mathematics assessments for middle school students. Data were available for 22 CMOs after one and two years of treatment and for 14 CMOs after three years of intervention.
Reading achievement	
Statewide reading assessments (z-score)	Study authors used z-score transformations to standardize scores across different state reading assessments for middle school students. Data were available for 22 CMOs after one and two years of treatment and for 20 CMOs after three years of intervention.
Science achievement	
Statewide science assessments (z-score)	Study authors used z-score transformations to standardize scores across different state science assessments for middle school students. Data were not available after one and two years of treatment, but were available for 11 CMOs after three years of intervention.
Social studies achievement	
Statewide social studies assessments (z-score)	Study authors used z-score transformations to standardize scores across different state social studies assessments for middle school students. Data were not available after one and two years of treatment, but were available for nine CMOs after three years of intervention.
Completing school	
High school graduation	Researchers created an indicator variable from school records to show whether students graduated within four years after beginning ninth grade.
Post-secondary enrollment	
Post-secondary enrollment	Researchers used administrative data to determine whether students enrolled in a two- or four-year college within four years of their first ninth-grade semester.

Appendix C: Study findings for each domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	*p*-value
Math achievement								
Statewide mathematics assessments (z-score)	Middle school students, after 1 year of intervention	22 CMOs/ 18,606 CMO students, 321,296 non-CMO students	nr	nr	nr	0.06	+2	> 0.10
Statewide mathematics assessments (z-score)	Middle school students, after 2 years of intervention	22 CMOs/ 13,434 CMO students, 237,490 non-CMO students	0.17 (1.00)	0.06 (1.00)	0.11	0.11	+4	0.08
Statewide mathematics assessments (z-score)	Middle school students, after 3 years of intervention	14 CMOs/ 5,747 CMO students, 121,050 non-CMO students	nr	nr	nr	0.15	+6	> 0.10
Reading achievement								
Statewide reading assessments (z-score)	Middle school students, after 1 year of intervention	22 CMOs/ 18,769 CMO students, 325,063 non-CMO students	nr	nr	nr	−0.01	0	> 0.10
Statewide reading assessments (z-score)	Middle school students, after 2 years of intervention	22 CMOs/ 13,674 CMO students, 242,946 non-CMO students	0.11 (1.00)	0.08 (1.00)	0.03	0.03	+1	> 0.10
Statewide reading assessments (z-score)	Middle school students, after 3 years of intervention	20 CMOs/ 8,131 CMO students, 159,945 non-CMO students	nr	nr	nr	0.05	+2	> 0.10

Appendix C: Study findings for each domain *(continued)*

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	*p*-value
Science achievement								
Statewide science assessments (z-score)	Middle school students, after 3 years of intervention	11 CMOs/ 3,803 CMO students, 72,121 non-CMO students	nr	nr	nr	0.06	+2	> 0.10
Social studies achievement								
Statewide social studies assessments (z-score)	Middle school students, after 3 years of intervention	9 CMOs/ 3,529 CMO students, 69,751 non-CMO students	nr	nr	nr	0.09	+4	> 0.10
Completing school								
High school graduation (%)	High school students, 4 years after beginning ninth grade	6 CMOs/ 2,659 CMO students, 33,302 non-CMO students	69	62	7	0.19	+7	> 0.10
Post-secondary enrollment								
Post-secondary enrollment (%)	High school students, 4 years following first semester of ninth grade	4 CMOs/ 2,150 CMO students, 25,860 non-CMO students	42	29	13	0.35	+14	0.10

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the change (measured in standard deviations) in an average student's outcome that can be expected if the student is given the intervention. The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention. The WWC did not compute average effect sizes for the three math achievement outcomes or the three reading achievement outcomes because they were measured with similar samples at different time periods and thus are considered to be in separate domains. The study is characterized as having indeterminate effects on math, reading, social studies, and science achievement and high school graduation because the impacts for each outcome in each time period are neither statistically significant nor substantively important. The study is characterized as having a substantively important effect on post-secondary enrollment since the effect size for this outcome is greater than 0.25, but is not statistically significant. CMO = charter-school management organization. nr = not reported.

Study Notes: No corrections for clustering or multiple comparisons were needed. The *p*-values presented here were reported in the original study. The one- and two-year reading and math outcomes include 68 charter middle schools within the 22 CMOs; the number of comparison schools is unavailable. The number of schools for the three-year analyses are not available. Means and percentages were not reported in the original study, but were provided to the WWC by the authors. The WWC included author-provided comparison group means and calculated the adjusted intervention group mean by adding the comparison mean and the study-reported standardized effect size. The study authors calculated the effect sizes for the average CMO by averaging impact estimates from each individual CMO analysis (see Appendix D for CMO-specific impact estimates). Mean differences for middle school math, reading, social studies, and science achievement are the same as the effect size because the authors transformed test score data into z-scores (that have a mean of zero and a standard deviation of 1). For the high school graduation and post-secondary enrollment outcomes, the WWC calculated effect size estimates using the author-provided percentages. Since comparison group sample sizes were not available but are necessary to calculate effect sizes for the high school graduation and post-secondary enrollment outcomes, the WWC assumed a two comparison to one intervention student ratio. Changing the sample size assumptions to 30 comparison students per intervention student yielded less than 0.001 differences in magnitude for all effect size calculations.

Appendix D: Supplemental findings by domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	*p*-value
Math achievement								
Statewide mathematics assessments (z-score)	CMO—A, Year 2	179 CMO students	0.73 (1.00)	0.86 (1.00)	−0.13	−0.13	−5	< 0.01
Statewide mathematics assessments (z-score)	CMO—B, Year 2	1,042 CMO students	0.44 (1.00)	0.08 (1.00)	0.36	0.36	+14	< 0.01
Statewide mathematics assessments (z-score)	CMO—C, Year 2	500 CMO students	0.53 (1.00)	−0.10 (1.00)	0.63	0.63	+24	< 0.01
Statewide mathematics assessments (z-score)	CMO—D, Year 2	837 CMO students	−0.42 (1.00)	−0.30 (1.00)	−0.12	−0.12	−5	< 0.05
Statewide mathematics assessments (z-score)	CMO—E, Year 2	269 CMO students	0.46 (1.00)	0.41 (1.00)	0.05	0.05	+2	> 0.05
Statewide mathematics assessments (z-score)	CMO—F, Year 2	826 CMO students	0.18 (1.00)	−0.10 (1.00)	0.28	0.28	+11	< 0.01
Statewide mathematics assessments (z-score)	CMO—G, Year 2	534 CMO students	0.26 (1.00)	−0.05 (1.00)	0.31	0.31	+12	< 0.05
Statewide mathematics assessments (z-score)	CMO—H, Year 2	499 CMO students	0.14 (1.00)	0.44 (1.00)	−0.30	−0.30	−12	< 0.01
Statewide mathematics assessments (z-score)	CMO—I, Year 2	961 CMO students	0.04 (1.00)	−0.08 (1.00)	0.12	0.12	+5	< 0.01
Statewide mathematics assessments (z-score)	CMO—J, Year 2	628 CMO students	0.20 (1.00)	0.11 (1.00)	0.09	0.09	+4	< 0.01
Statewide mathematics assessments (z-score)	CMO—K, Year 2	403 CMO students	−0.05 (1.00)	0.16 (1.00)	−0.21	−0.21	−8	< 0.01
Statewide mathematics assessments (z-score)	CMO—L, Year 2	409 CMO students	0.20 (1.00)	0.22 (1.00)	−0.02	−0.02	−1	> 0.05
Statewide mathematics assessments (z-score)	CMO—M, Year 2	1,125 CMO students	0.52 (1.00)	0.02 (1.00)	0.50	0.50	+19	< 0.01
Statewide mathematics assessments (z-score)	CMO—N, Year 2	207 CMO students	−0.53 (1.00)	−0.26 (1.00)	−0.27	−0.27	−11	< 0.01
Statewide mathematics assessments (z-score)	CMO—O, Year 2	422 CMO students	−0.19 (1.00)	−0.10 (1.00)	−0.09	−0.09	−4	< 0.01
Statewide mathematics assessments (z-score)	CMO—P, Year 2	746 CMO students	0.15 (1.00)	−0.02 (1.00)	0.17	0.17	+7	< 0.01
Statewide mathematics assessments (z-score)	CMO—Q, Year 2	342 CMO students	−0.41 (1.00)	−0.15 (1.00)	−0.26	−0.26	−10	< 0.01
Statewide mathematics assessments (z-score)	CMO—R, Year 2	428 CMO students	0.12 (1.00)	0.17 (1.00)	−0.05	−0.05	−2	> 0.05
Statewide mathematics assessments (z-score)	CMO—S, Year 2	1,766 CMO students	0.43 (1.00)	0.03 (1.00)	0.40	0.40	+16	< 0.01
Statewide mathematics assessments (z-score)	CMO—T, Year 2	519 CMO students	0.47 (1.00)	0.05 (1.00)	0.42	0.42	+16	< 0.01
Statewide mathematics assessments (z-score)	CMO—U, Year 2	449 CMO students	0.07 (1.00)	0.05 (1.00)	0.02	0.02	+1	> 0.05
Statewide mathematics assessments (z-score)	CMO—V, Year 2	343 CMO students	0.54 (1.00)	−0.01 (1.00)	0.55	0.55	+21	< 0.01

Appendix D: Supplemental findings by domain *(continued)*

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	**Comparison group**	**Mean difference**	**Effect size**	**Improvement index**	
Reading achievement								
Statewide reading assessments (z-score)	CMO—A, Year 2	179 CMO students	0.72 (1.00)	0.81 (1.00)	−0.09	−0.09	−4	> 0.05
Statewide reading assessments (z-score)	CMO—B, Year 2	1,052 CMO students	0.24 (1.00)	0.06 (1.00)	0.18	0.18	+7	< 0.01
Statewide reading assessments (z-score)	CMO—C, Year 2	500 CMO students	0.15 (1.00)	−0.07 (1.00)	0.22	0.22	+9	< 0.01
Statewide reading assessments (z-score)	CMO—D, Year 2	853 CMO students	−0.32 (1.00)	−0.22 (1.00)	−0.10	−0.10	−4	< 0.05
Statewide reading assessments (z-score)	CMO—E, Year 2	269 CMO students	0.22 (1.00)	0.35 (1.00)	−0.13	−0.13	−5	< 0.01
Statewide reading assessments (z-score)	CMO—F, Year 2	824 CMO students	−0.08 (1.00)	−0.03 (1.00)	−0.05	−0.05	−2	> 0.05
Statewide reading assessments (z-score)	CMO—G, Year 2	548 CMO students	0.31 (1.00)	0.11 (1.00)	0.20	0.20	+8	< 0.01
Statewide reading assessments (z-score)	CMO—H, Year 2	509 CMO students	0.29 (1.00)	0.44 (1.00)	−0.15	−0.15	−6	< 0.01
Statewide reading assessments (z-score)	CMO—I, Year 2	970 CMO students	0.09 (1.00)	−0.04 (1.00)	0.13	0.13	+5	< 0.01
Statewide reading assessments (z-score)	CMO—J, Year 2	627 CMO students	0.26 (1.00)	0.08 (1.00)	0.18	0.18	+7	< 0.01
Statewide reading assessments (z-score)	CMO—K, Year 2	404 CMO students	−0.13 (1.00)	0.04 (1.00)	−0.17	−0.17	−7	< 0.01
Statewide reading assessments (z-score)	CMO—L, Year 2	409 CMO students	0.24 (1.00)	0.34 (1.00)	−0.10	−0.10	−4	< 0.01
Statewide reading assessments (z-score)	CMO—M, Year 2	1,126 CMO students	0.25 (1.00)	0.03 (1.00)	0.22	0.22	+9	< 0.01
Statewide reading assessments (z-score)	CMO—N, Year 2	208 CMO students	−0.60 (1.00)	−0.38 (1.00)	−0.22	−0.22	−9	< 0.01
Statewide reading assessments (z-score)	CMO—O, Year 2	423 CMO students	−0.08 (1.00)	−0.01 (1.00)	−0.07	−0.07	−3	> 0.05
Statewide reading assessments (z-score)	CMO—P, Year 2	748 CMO students	0.19 (1.00)	0.03 (1.00)	0.16	0.16	+6	< 0.01
Statewide reading assessments (z-score)	CMO—Q, Year 2	343 CMO students	−0.17 (1.00)	−0.04 (1.00)	−0.13	−0.13	−5	> 0.05
Statewide reading assessments (z-score)	CMO—R, Year 2	426 CMO students	0.20 (1.00)	0.19 (1.00)	0.01	0.01	0	> 0.05
Statewide reading assessments (z-score)	CMO—S, Year 2	1,770 CMO students	0.13 (1.00)	0.05 (1.00)	0.08	0.08	+3	< 0.01
Statewide reading assessments (z-score)	CMO—T, Year 2	522 CMO students	0.25 (1.00)	0.01 (1.00)	0.24	0.24	+9	< 0.01
Statewide reading assessments (z-score)	CMO—U, Year 2	621 CMO students	0.09 (1.00)	0.03 (1.00)	0.06	0.06	+2	> 0.05
Statewide reading assessments (z-score)	CMO—V, Year 2	343 CMO students	0.25 (1.00)	0.02 (1.00)	0.23	0.23	+9	< 0.01

Appendix D: Supplemental findings by domain *(continued)*

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Science achievement								
Statewide science assessments (z-score)	CMO—B, Year 3	744 CMO students	nr (1.00)	nr (1.00)	0.21	0.21	+8	> 0.05
Statewide science assessments (z-score)	CMO—E, Year 3	67 CMO students	nr (1.00)	nr (1.00)	−0.17	−0.17	−7	< 0.01
Statewide science assessments (z-score)	CMO—G, Year 3	301 CMO students	nr (1.00)	nr (1.00)	0.61	0.61	+23	< 0.01
Statewide science assessments (z-score)	CMO—H, Year 3	367 CMO students	nr (1.00)	nr (1.00)	−0.49	−0.49	−19	< 0.01
Statewide science assessments (z-score)	CMO—I, Year 3	104 CMO students	nr (1.00)	nr (1.00)	0.03	0.03	+1	> 0.05
Statewide science assessments (z-score)	CMO—J, Year 3	352 CMO students	nr (1.00)	nr (1.00)	0.31	0.31	+12	< 0.01
Statewide science assessments (z-score)	CMO—L, Year 3	188 CMO students	nr (1.00)	nr (1.00)	−0.11	−0.11	−4	< 0.01
Statewide science assessments (z-score)	CMO—N, Year 3	125 CMO students	nr (1.00)	nr (1.00)	−0.11	−0.11	−4	> 0.05
Statewide science assessments (z-score)	CMO—R, Year 3	350 CMO students	nr (1.00)	nr (1.00)	0.06	0.06	+2	> 0.05
Statewide science assessments (z-score)	CMO—S, Year 3	1,004 CMO students	nr (1.00)	nr (1.00)	0.32	0.32	+13	< 0.01
Statewide science assessments (z-score)	CMO—U, Year 3	201 CMO students	nr (1.00)	nr (1.00)	0.01	0.01	0	> 0.05
Social studies achievement								
Statewide social studies assessments (z-score)	CMO—B, Year 3	747 CMO students	nr (1.00)	nr (1.00)	0.12	0.12	+5	> 0.05
Statewide social studies assessments (z-score)	CMO—E, Year 3	68 CMO students	nr (1.00)	nr (1.00)	−0.02	−0.02	−1	> 0.05
Statewide social studies assessments (z-score)	CMO—G, Year 3	307 CMO students	nr (1.00)	nr (1.00)	0.22	0.22	+9	< 0.01
Statewide social studies assessments (z-score)	CMO—H, Year 3	371 CMO students	nr (1.00)	nr (1.00)	−0.48	−0.48	−18	< 0.01
Statewide social studies assessments (z-score)	CMO—J, Year 3	351 CMO students	nr (1.00)	nr (1.00)	0.40	0.40	+16	< 0.01
Statewide social studies assessments (z-score)	CMO—N, Year 3	128 CMO students	nr (1.00)	nr (1.00)	−0.03	−0.03	−1	> 0.05
Statewide social studies assessments (z-score)	CMO—R, Year 3	350 CMO students	nr (1.00)	nr (1.00)	0.15	0.15	+6	< 0.05
Statewide social studies assessments (z-score)	CMO—S, Year 3	1,004 CMO students	nr (1.00)	nr (1.00)	0.19	0.19	+8	< 0.01
Statewide social studies assessments (z-score)	CMO—U, Year 3	203 CMO students	nr (1.00)	nr (1.00)	0.31	0.31	+12	< 0.01

Appendix D: Supplemental findings by domain *(continued)*

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	*p*-value
Completing school								
High school graduation (%)	CMO—1	977 CMO students	77	54	23	0.63	+24	< 0.01
High school graduation (%)	CMO—2	532 CMO students	84	67	17	0.58	+22	< 0.01
High school graduation (%)	CMO—3	189 CMO students	57	45	12	0.29	+11	< 0.05
High school graduation (%)	CMO—4	452 CMO students	58	50	8	0.20	+8	> 0.05
High school graduation (%)	CMO—5	182 CMO students	90	87	3	0.18	+7	> 0.05
High school graduation (%)	CMO—6	327 CMO students	44	66	−22	−0.55	−21	< 0.01
Post-secondary enrollment								
Post-secondary enrollment (%)	CMO—1	977 CMO students	49	26	23	0.61	+23	< 0.01
Post-secondary enrollment (%)	CMO—2	532 CMO students	64	43	21	0.52	+20	< 0.01
Post-secondary enrollment (%)	CMO—3	189 CMO students	27	24	3	0.10	+4	> 0.05
Post-secondary enrollment (%)	CMO—4	452 CMO students	25	21	4	0.14	+5	> 0.05

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the change (measured in standard deviations) in an average student's outcome that can be expected if the student is given the intervention. The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention. The table presents CMO-specific outcomes; numbers and letters in the Study sample column represent different CMOs. These outcomes are also available for math and reading for Year 1 and for Year 3, and show similar heterogeneity in impacts (at least one significant positive, one significant negative, and one nonsignificant impact across achievement domains). Because those results are similar to the Year 2 results presented in this table, and because the study authors focus their report on the Year 2 achievement impacts, these additional impact results have been excluded from this table. Since science and social studies achievement were only measured in Year 3, CMO-specific impacts for Year 3 are presented in this table. CMO = charter-school management organization. nr = not reported.

Study Notes: No corrections for clustering or multiple comparisons were needed. The *p*-values presented here were reported in the original study. The number of students included in the comparison groups for each CMO are not available. Each treatment group was matched using propensity score methods with up to 30 comparison students. Means and percentages were not reported in the original study, but were provided to the WWC by the author for math, reading, high school graduation and post-secondary enrollment. The WWC included author-provided comparison group means and calculated the adjusted intervention group mean by adding the comparison mean and the study-reported standardized effect size. Mean differences for middle school math, reading, social studies, and science achievement are the same as the effect size because the authors transformed test score data into z-scores (that have a mean of zero and a standard deviation of 1). For completing school and post-secondary enrollment outcomes, the WWC calculated effect size estimates using the author-provided percentages. Since comparison group sample sizes were not available but are necessary to calculate effect sizes for the high school graduation and post-secondary enrollment outcomes, the WWC assumed a two comparison to one intervention student ratio. Changing the sample size assumptions to 30 comparison students per intervention student yielded less than 0.001 differences in magnitude for all effect size calculations.

Endnotes

[1] Single study reviews examine evidence published in a study (supplemented, if necessary, by information from requests to the author[s]) to assess whether the study design meets WWC evidence standards. The review reports the WWC's assessment of whether the study meets WWC evidence standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the Single Study Review protocol, version 2.0. A quick review of this study was released on March 7, 2012, and this report is the follow-up review that replaces that initial assessment.

[2] Absence of conflict of interest: This study was conducted by staff from Mathematica Policy Research. Because Mathematica operates the WWC, this study was reviewed by staff from subcontractor organizations.

Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2012, August). *WWC review of the report: Charter-school management organizations: Diverse strategies and diverse student impacts*. Retrieved from http://whatworks.ed.gov.

Glossary of Terms

Attrition Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.

Clustering adjustment If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.

Confounding factor A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.

Design The design of a study is the method by which intervention and comparison groups were assigned.

Domain A domain is a group of closely related outcomes.

Effect size The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.

Eligibility A study is eligible for review if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.

Equivalence A demonstration that the analysis sample groups are similar on observed characteristics defined in the review area protocol.

Improvement index Along a percentile distribution of students, the improvement index represents the gain or loss of the average student due to the intervention. As the average student starts at the 50th percentile, the measure ranges from –50 to +50.

Multiple comparison adjustment When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.

Quasi-experimental design (QED) A quasi-experimental design (QED) is a research design in which subjects are assigned to intervention and comparison groups through a process that is not random.

Randomized controlled trial (RCT) A randomized controlled trial (RCT) is an experiment in which investigators randomly assign eligible participants into intervention and comparison groups.

Single-case design (SCD) A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.

Standard deviation The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample tend to be spread out over a large range of values.

Statistical significance Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ($p < 0.05$).

Substantively important A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the WWC Procedures and Standards Handbook (version 2.1) for additional details.