THE NATIONAL CENTER ON SCALING UP EFFECTIVE SCHOOLS

Selecting High and Low-Performing High Schools in Broward County, Florida for Analysis and Treatment

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Technical Report
June 2012

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The National Center on Scaling Up Effective Schools (NCSU) is a national research and development center that focuses on identifying the combination of essential components and the programs, practices, processes and policies that make some high schools in large urban districts particularly effective with low income students, minority students, and English language learners. The Center's goal is to develop, implement, and test new processes that other districts will be able to use to scale up effective practices within the context of their own goals and unique circumstances. Led by Vanderbilt University's Peabody College, our partners include The University of North Carolina at Chapel Hill, Florida State University, the University of Wisconsin-Madison, Georgia State University, and the Education Development Center.

We want to express our sincere gratitude to Broward County Public Schools, and the principals, teachers, and other school personnel, and students for their willingness to participate in this study.

This paper is part of our technical report series and was written by:

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This research was conducted with funding from the Institute of Education Sciences (R305C10023). The opinions expressed in this report are those of the authors and do not necessarily represent the views of the sponsor.

Introduction.

The core work of the National Center on Scaling Up Effective Schools consists of four stages: identifying practices of highly effective high schools, designing interventions and transfer of practices, evaluating the intervention's implementation and effects, and evaluating implementation at scale. The purpose of this report is to describe the methodology used for selecting two high value-added and two low-value added schools in one of the partner districts for intensive field work in year one of the Center. Florida and Texas were selected for study of scaling up effective practices in high school because they have two of the most comprehensive student-level administrative and achievement data systems among the 50 states. While NCLB only requires states to test once in the high school grades, both Texas and Florida test English/language arts and mathematics in more than one high school grade, improving our ability to identify effective and ineffective schools. Both states have had data systems in place since at least 2003, allowing us to calculate high school value added models using several years of data.

As part of the proposal for the Center, initial analyses using statewide data were conducted in both Florida and Texas. The goal was to identify districts that had both highly effective and low-performing high schools for students in traditionally low performing subpopulations to serve as both sites of research in which to identify effective practices and sites of intervention to which to transfer those practices. This report describes how Broward County Public Schools (BCPS) compare in value added to other schools in Florida, as well as how the four case study schools were identified.

The Broward County Public Schools (BCPS) district in Florida was chosen both because of the availability of rich individual-level data that link students and teachers over time and because of the diversity of high schools within the district. As illustrated in Table 1, the 34 regular-education high schools in Broward serve varying student populations.1 Some serve fewer than 5 percent Black students while others have student populations that are over 90 percent Black. Likewise, the proportion of Hispanics in the student populations of schools varies from four to 60 percent. Correspondingly, white non-Hispanic students make up less than 10 percent of the population in three schools and more than 60 percent of the population in three schools.

Perhaps the most important selection criterion, however, was that the district possess both highly effective and low-performing schools. One metric of performance is the school grading system used in Florida. Florida assigns grades to schools based on a combination of the proportion of students who reach a proficiency target and the proportion of students who exhibit year-to-year achievement gains. Extra credit is given for students in the lowest performing category who exhibit learning gains.[2] As illustrated in Table 2, BCPS contains high schools that are consistently in the "A" category, as well as schools earning primarily "D"s and "F"s over a five-year span.

[1] Department of Juvenile Justice schools as well as schools serving exclusively special-education students have been excluded from the analysis.

[2] Details on the computation of school and district grades can be found at http://schoolgrades.fldoe.org/.

Value-Added Methodology and Data.

In order to get a better estimate of the relative effectiveness of BCPS high schools in promoting student learning, we estimated a simple value added achievement model of the following form:

$$\Delta A_{it} = \beta \mathbf{X}_{it} + \phi_m + \Gamma_{it} + v_{it} \quad (1)$$

where ΔA_{it} represents the achievement gain for student i in year t relative to their prior-year score in year t-1, $\mathbf{X}$ is a vector of individual student characteristics including gender, race/ethnicity, limited English proficiency (LEP) program participation, free-lunch status, reduced-price lunch status, gifted program participation, a set of broad disability categories for students in special education, student mobility (within-year and between-year school change) and pre-high-school (grade 8) attendance, free/reduced-price lunch status and normed math and reading test scores. The variable ϕ_m is a school-specific fixed effect. Grade-by-year indicators, Γ_{it} are also included to account for any unmeasured grade and year influences, such as variation in the difficulty of the test. The estimated value of ϕ_m is the average test score gain of students at school m, conditional on observed student characteristics. It thus represents the combined effect of all school related inputs, including teacher quality, average peer influences, instructional materials, physical facilities and school leadership on student learning. It is analogous to the value-added often computed for individual teachers and can thus be considered a school value-added measure.

Data on student gains in both math and reading over the years 2004-05 to 2008-09 were used to estimate the value-added model, so the estimated school effects represent the average contribution of a high school to student learning gains in either math or reading over the 2005-06 to 2008-09 time period, conditional on observed student characteristics.

Two measures of student achievement gains were used in the analysis. Both measures are based on developmental scale scores from Florida's "Sunshine State Standards" test, a criterion reference exam used for computing school grades and for other accountability purposes in Florida. The first metric uses the developmental scale scores, normed by grade and year. Thus the unit of measure is a standard deviation and the reference point is the mean for all students at a given grade, in a given year. The second measure accounts for the possibility that achievement gains are uneven across the ability distribution. A mean gain and standard deviation of gains is computed for each grade/year for each decile of the prior-year developmental scale score. The achievement gains are then normalized by the within-decile mean and standard deviation. In this case the reference point is other students in the same grade and year whose prior-year scores fell in the same decile of the prior-year achievement distribution.

Statewide Value-Added Analysis.

In order to verify that in fact schools in BCPS varied in performance relative to other high schools in the state, we first estimated value-added models for all high schools in Florida. This was done for all students, as well as sub-groups of students based on family income (proxied by free-or-reduced-price lunch status, FRPL) and race/ethnicity.[3] Results for both measures of student learning gains in math are presented in Table 3. Consistent with the school grades assigned by the State of Florida, we see considerable variation in school value added. When all students are included, a number of BCPS rank among the top 50 in the state, but also some also rank below 300th out of 431 senior high schools in the state.[4] A comparison of the rankings in columns two and three of Table 3 reveals that norming by the initial achievement level decile has some effect on school rankings, but the differences are usually not substantial.

Another important finding is that schools are often not uniformly effective with all student groups. While some schools do quite well with all types of student (e.g. schools 1, 3 and 4) or are low-performing with each sub-group of students (e.g. schools 28-34), others have much more heterogeneous effects (e.g. schools 12, 13, 25). However, one must be cautious when interpreting these findings for two reasons. First, the standard errors on school effects tend to be large, particularly in the middle of the distribution, so differences in the ranking of middling schools may not be statistically significant (see Figures 1 and 2). Further, the number of students in certain sub-groups at a school may be small, making the school effects for that subgroup quite noisy. For example, school #13 appears to be relatively more effective with free/reduced-price lunch students, but these students only make up 18 percent of their student body.

The effectiveness of schools also appears to vary by subject matter. Table 4 reports rankings based on statewide school value added for student groups in both math and in reading. For both the whole student population, as well as for sub-groups of students, performance in math and reading can vary substantially. For example, school #2 appears to much better in math than in reading for students as a whole, whereas for school #6 it is the reverse. The disparities in effectiveness across subjects also show up when analyzing sub-groups of students. For example, school #13 appears to do much better in promoting reading achievement among free-and-reduced-price lunch students than in promoting math achievement with the same students. The cross-subject differences in value-added rankings could be due to differences in the relative effectiveness of math and English/Language Arts (ELA) faculty, variation in the alignment of course and exam content or variation in other inputs (e.g. reading coaches, specialized software, etc.).

[3] FRPL status is at best a rough proxy for family income. FRPL data tend to be more problematic at the high school level, where reported eligibility rates generally decline relative to elementary and middle school.

[4] There were 666 high schools in our initial sample. However, 235 were schools serving specialized populations, such as students with disabilities or student involved in the juvenile justice system. This left a total of 431 "regular education" senior high schools within Florida's 67 countywide school districts.

Within-District Value-Added Analysis.

In order to select schools for observation a within-district analysis was conducted to determine the relative performance of high schools within BCPS.[5] Separate analyses were conducted for math and reading, as well as for varying student groups (all students, free/reduced-price lunch students, limited English-proficiency students and Black and Hispanic students. The results in Table 5 demonstrate the disparities in school effectiveness across subjects. Some schools, like school #1, rank among the best schools in the district in both subjects. However, other schools exhibit large differences in within-district rankings by subject. For example, school #9 appears to do much better in math than in reading while school #5 is the best school in the district based on value-added in reading, but near the middle of the pack in math. Similar disparities are found for subgroups of students, including free/reduced-price lunch students (Table 6), limited English proficiency students (Table 7) and Black and Hispanic students (Table 8).

Selecting High and Low Value-Added Schools.

The next step was to select two high value-added and two low-value added schools for in-depth case study investigations. As the goal of this phase of the Center's work was to identify the characteristics of the programs, processes, and practices that distinguish high and low value-added schools, it was important to select schools that primarily serve students in traditionally low performing subgroups (e.g., excluding schools with low %FRPL). Given that school effectiveness varies by the performance criteria (school grades vs. value added), by subject (math vs. reading) and by student group, selecting relatively high performing and relatively low performing schools is not an easy task. Rather than try to distinguish between school effectiveness across subjects, we focused on the average ranking of schools across math and reading.[6] These averages are presented for all students and for each sub-group in Table 9. We wanted to select schools that were relatively high performing for all student groups as well as schools that were relatively ineffective for each student group. We then cross checked that the higher performing schools, as measured by value added, also had graduations rates for students in traditionally low performing subgroups that were above the district average. The goal here was to avoid schools that might be investing more in improving achievement gains than keeping students until graduation. Charter schools and magnet schools were excluded from selection, as the choice component in the admissions process may have influenced these schools' value added results. Two high value-added schools and two low-

[5] The relative rankings in the BCPS-only analysis differ from those in the statewide analysis because the weights placed on student characteristics and other predictors of student performance are derived from the full sample of all relevant schools in the state. Consequently, predicted average gains for a school may differ in the two analyses.

[6] The effect is that schools that are consistently close to the top or bottom are more likely to be selected, compared to schools that do very well in one subject or with one group.

value added schools that serve large proportions of students in traditionally low performing subgroups were recommended to our district partners for selection as case-study schools. Once the list was approved by district leadership, each school's principal was invited to participate in the study. As one of the principals declined to participate, they were replaced with a school with similar rank order for value-added performance and similar subgroup representation. Specific details about the schools selected have been omitted here to protect the confidentiality of the case study schools.

Table 1. Broward County High Schools – School and Student Body Characteristics

School ID	MAGNET SCHOOL (Yes/No)	% ENROLLED IN MAGNET	CHARTER STATUS (Yes/No)	% Black	% Hispanic	% White	% LEP	% FRL
1	No	0	No	35	20	40	15	50
2	No	0	No	5	35	50	15	15
3	Yes	50	No	90	5	5	5	85
4	No	0	Yes	90	5	0	0	50
5	NA	0	Yes	20	60	10	10	20
6	Yes	100	No	20	20	55	0	30
7	NA	15	No	70	10	15	10	65
8	Yes	100	No	55	20	25	10	80
9	No	0	No	50	15	30	5	55
10	NA	0	No	10	25	50	15	45
11	No	0	No	15	25	50	10	40
12	No	0	No	10	30	50	N/A	20
13	No	0	No	5	20	70	0	20
14	Yes	25	No	40	15	35	15	65
15	No	0	No	55	15	30	10	65
16	Yes	10	No	20	25	50	15	65
17	No	0	No	15	30	45	10	65
18	No	0	Yes	20	55	15	10	35
19	No	0	No	25	20	45	10	50
20	No	0	No	55	15	25	15	70
21	Yes	35	No	80	10	10	10	80
22	No	0	Yes	20	40	30	5	20
23	Yes	100	No	55	10	30	0	65
24	Yes	40	No	55	15	20	10	75
25	No	0	No	5	25	65	5	30
26	Yes	15	No	85	5	5	15	80
27	Yes	20	No	35	20	40	10	55
28	No	0	No	20	20	50	10	45
29	Yes	100	No	25	25	45	15	65
30	No	0	Yes	40	10	35	15	20
31	No	0	No	25	30	35	10	40
32	No	0	No	15	25	50	10	65
33	No	0	No	20	30	40	10	40
34	No	0	No	10	15	65	5	15

Note: Charter and magnet status from National Center for Educational Statistics, CCD, "Public Elementary/Secondary School Universe Survey (08/09). Student characteristics from Florida Department of Education, School Accountability Reports (09/10). Percentages are rounded to the nearest five percent in order to maintain confidentiality of school identities. N/A=not available

Table 2. Broward County High Schools - School Grades by Year

School ID	School Grade				
	2008/09	2007/08	2006/07	2005/06	2004/05
1	A	A	A	A	A
2	B	A	A	A	A
3	D	D	D	C	D
4	D	C	F		
5					
6	A	A	A	A	A
7	C	C	C	C	C
8	C	C	F	C	D
9	C	D	C	C	C
10	B	A	C	C	C
11	B	A	C	B	B
12	B				
13	B	A	B	A	C
14	C	C	C	C	C
15	C	C	C	D	D
16	B	D	C	C	C
17	C	D	D	C	C
18	A	B	C		
19	D	B	C	B	D
20	D	F	D	D	D
21	D	C	D	D	C
22	A	A	B	A	D
23	C	B	C	B	D
24	C	D	C	C	D
25	C	A	B	A	C
26	D	D	F	C	D
27	D	C	C	B	C
28	A	A	C	B	B
29	C	C	C	B	D
30	A				
31	C	B	C	B	C
32	D	C	D	C	C
33	B	B	C	B	C
34	B	A	B	A	A

Note: Schools grades from Florida Department of Education, School Accountability Reports (09/10). Blanks indicate that no grade was reported for the school in the given year.

Table 3. Broward County High Schools – Statewide Ranking Based on Value-Added in Math

	All Students		FRPL Students		Black and Hispanic Students	
School ID	**Gains**	**Gains standardized by initial decile level**	**Gains**	**Gains standardized by initial decile level**	**Gains**	**Gains standardized by initial decile level**
1	35	25	56	50	54	43
2	55	34	136	70	79	41
3	26	27	47	36	57	48
4	27	18	49	35	56	36
5	118	105	N/A	N/A	130	108
6	51	49	149	178	89	106
7	102	83	151	110	110	95
8	219	127	283	190	223	149
9	106	63	96	64	113	92
10	93	102	228	191	62	87
11	166	165	239	174	174	163
12	96	149	7	6	265	218
13	164	95	108	88	224	120
14	97	114	157	171	159	164
15	82	60	182	105	175	136
16	207	174	241	195	258	228
17	57	43	106	98	83	97
18	217	200	225	260	202	182
19	167	166	177	144	148	148
20	148	113	158	126	181	157
21	79	69	40	37	87	78
22	197	242	192	179	129	185
23	182	136	195	149	206	145
24	65	98	71	99	78	100
25	114	207	88	232	33	82
26	216	194	219	192	228	212
27	115	187	118	237	75	105
28	308	320	249	313	278	308
29	302	266	275	227	315	310
30	367	278	352	269	329	248
31	235	275	372	373	200	234
32	354	263	360	302	331	247
33	334	345	204	240	290	288
34	336	272	359	360	316	290

N/A = not available.

Figure 1. Estimated School Effects and Confidence Intervals (Math) – Gains Model (All Students)

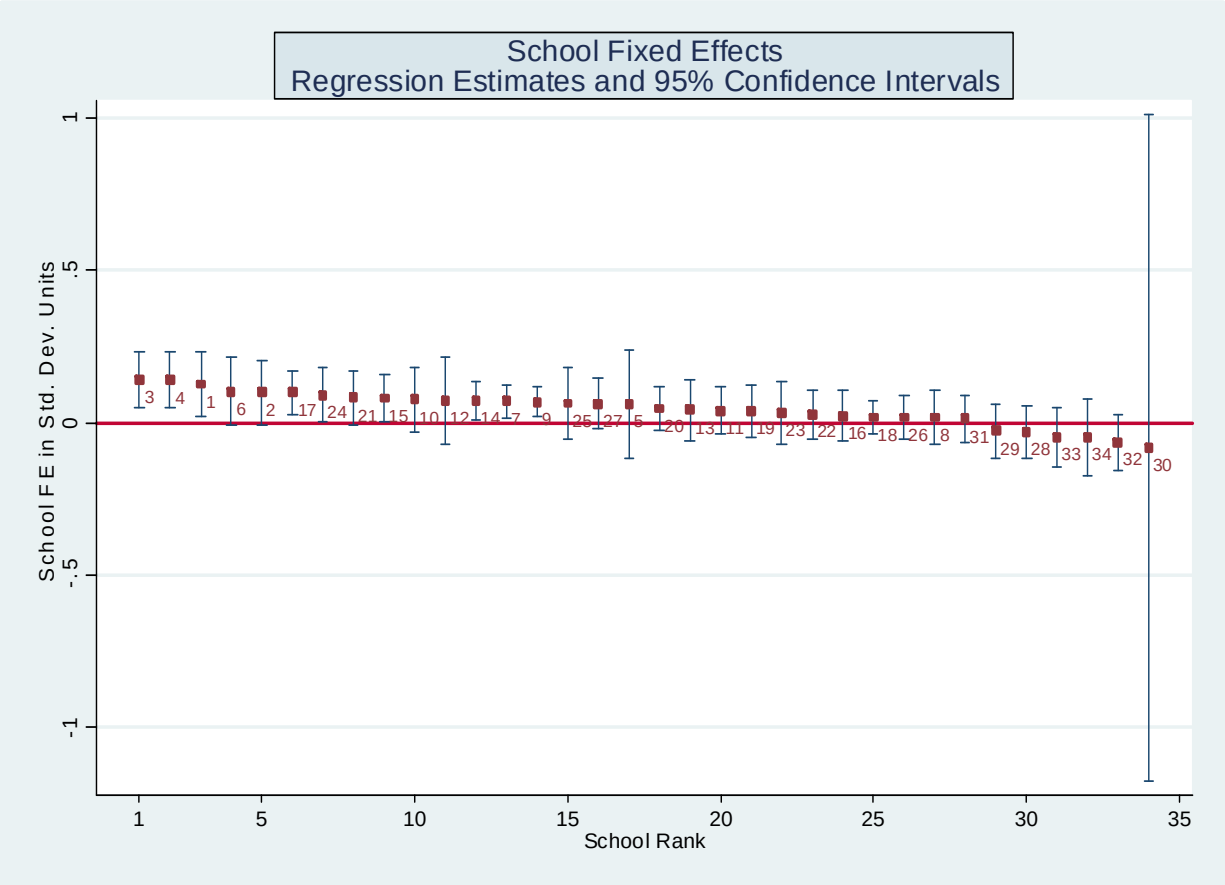

Figure 2. Estimated School Effects and Confidence Intervals (Math) – Gains Standardized by Initial Decile Level (All Students)

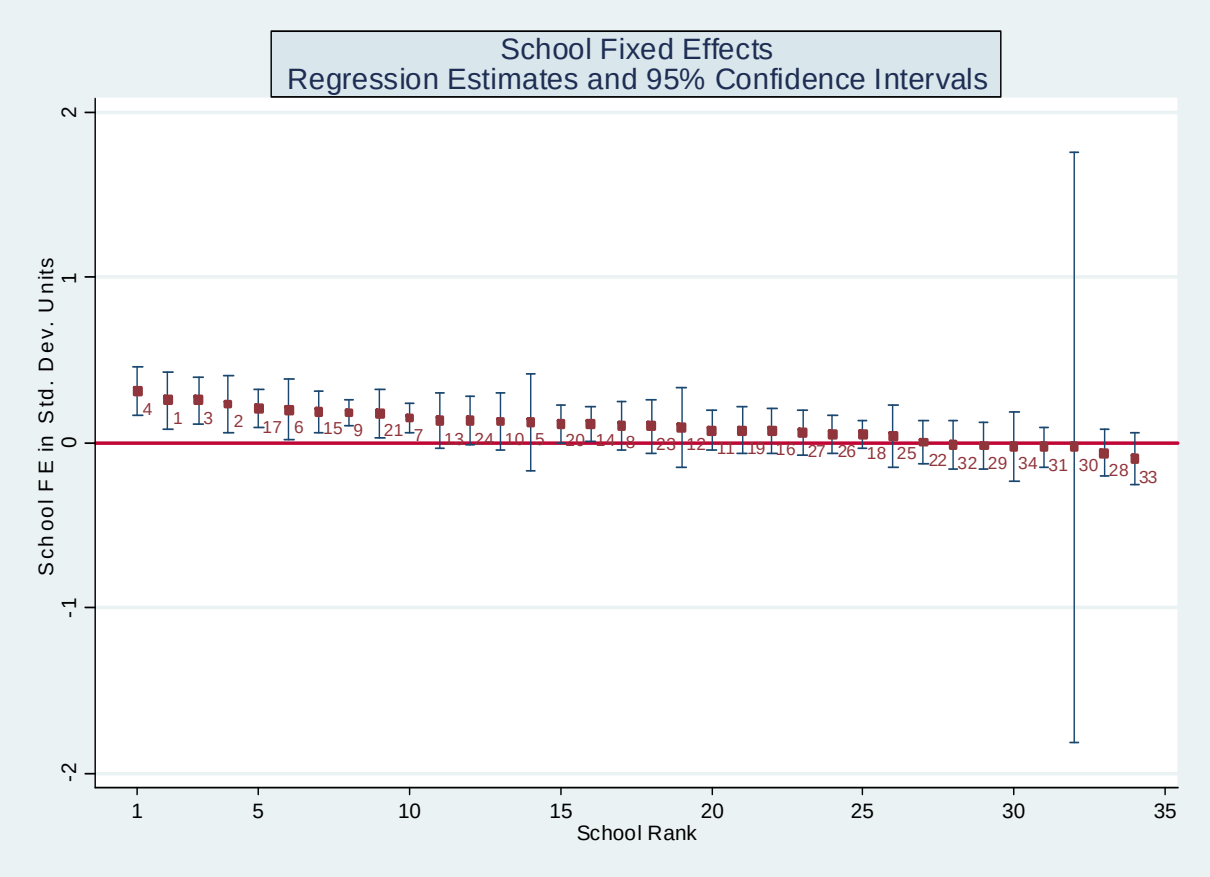

Table 4. Broward County High Schools - Statewide Ranking Based on Value-Added in Math and Reading (Gains, Not Adjusted for Initial Achievement Decile)

	Math			Reading		
School ID	**All Students**	**FRPL Students**	**Black & Hispanic Students**	**All Students**	**FRPL Students**	**Black & Hispanic Students**
1	35	56	54	69	203	97
2	55	136	79	114	31	142
3	26	47	57	79	89	102
4	27	49	56	107	156	125
5	118		130	36		32
6	51	149	89	139	220	67
7	102	151	110	148	168	147
8	219	283	223	153	179	193
9	106	96	113	210	155	148
10	93	228	62	175	104	197
11	166	239	174	136	106	80
12	96	7	265	120	33	180
13	164	108	224	239	15	65
14	97	157	159	126	117	117
15	82	182	175	194	248	209
16	207	241	258	211	288	310
17	57	106	83	319	330	333
18	217	225	202	155	135	124
19	167	177	148	223	138	114
20	148	158	181	265	254	211
21	79	40	87	316	260	261
22	197	192	129	197	363	202
23	182	195	206	160	146	164
24	65	71	78	275	266	254
25	114	88	33	218	118	225
26	216	219	228	185	308	228
27	115	118	75	219	299	306
28	308	249	278	226	94	166
29	302	275	315	253	262	182
30	367	352	329	430	421	413
31	235	372	200	271	223	151
32	354	360	331	366	355	342
33	334	204	290	279	338	243
34	336	359	316	372	352	348

Note: blanks indicate not available.

Table 5. Broward County High Schools – Within-District Ranking Based on Value-Added in Math and Reading (All Students) – Gains Standardized by Initial Achievement Decile

School ID	Average District Ranking in Math and Reading	Math	Reading
1	2	2	2
2	4	3	5
3	5	4	6
4	5.5	1	10
5	7.5	14	1
6	9.5	12	7
7	11.5	9	14
8	12	16	8
9	12.5	6	19
10	13.5	10	17
11	14.5	20	9
12	15	17	13
13	16	11	21
14	17	22	12
15	17	7	27
16	17	18	16
17	18	5	31
18	18	25	11
19	18.5	19	18
20	20.5	13	28
21	21	8	34
22	21.5	28	15
23	22	24	20
24	22.5	15	30
25	22.5	23	22
26	25	27	23
27	25.5	26	25
28	28.5	33	24
29	28.5	31	26
30	29	21	37
31	29.5	30	29
32	31	29	33
33	33	34	32
34	34	32	36

Table 6. Broward County High Schools – Within-District Ranking Based on Value-Added in Math and Reading (Free/Reduced-Price Lunch Students) – Gains Standardized by Initial Achievement Decile

School ID	Average District Ranking in Math and Reading	Math	Reading
1	6.5	6	7
2	5	7	3
3	5.5	3	8
4	11.5	5	18
5			
6	27	31	23
7	13.5	11	16
8	17	21	13
9	11.5	8	15
10	15	16	14
11	12	20	4
12	1	1	1
13	6	10	2
14	15	24	6
15	21.5	15	28
16	20.5	19	22
17	22.5	12	33
18	19.5	30	9
19	14	17	11
20	19	14	24
21	14.5	2	27
22	29	26	32
23	22	25	19
24	19.5	13	26
25	16	22	10
26	26.5	23	30
27	29.5	28	31
28	22.5	33	12
29	27	29	25
30	22.5	9	36
31	28	35	21
32	33	32	34
33	31	27	35
34	31.5	34	29

Note: blanks indicate not available.

Table 7. Broward County High Schools – Within-District Ranking Based on Value-Added in Math and Reading (Limited English Proficiency Students) – Gains Standardized by Initial Achievement Decile

School ID	Average District Ranking in Math and Reading	Math	Reading
1	10.5	15	6
2	17	14	20
3	2.5	2	3
4			
5	14	27	1
6			
7	27.5	26	29
8	17.5	17	18
9	16	19	13
10	11.5	6	17
11	18.5	23	14
12			
13	29	29	
14	19	31	7
15	3	1	5
16	7	10	4
17	25	20	30
18	20	25	15
19	18.5	9	28
20	9.5	11	8
21	14.5	7	22
22	26	28	24
23	6.5	3	10
24	28.5	30	27
25	21	21	21
26	8	4	12
27	7	5	9
28	23.5	22	25
29	14	12	16
30			
31	16	13	19
32	25	24	26
33	9	16	2
34	20.5	18	23

Note: blanks indicate not available.

Table 8. Broward County High Schools – Within-District Ranking Based on Value-Added in Math and Reading (Black and Hispanic Students) – Gains Standardized by Initial Achievement Decile

School ID	Average District Ranking in Math and Reading -- Black Students	Average District Ranking in Math and Reading -- Hispanic Students	Math – Black Students	Math – Hispanic Students	Reading – Black Students	Reading – Hispanic Students
1	5	4.5	4	3	6	6
2	30.5	11.5	28	5	33	18
3	8	17	5	30	11	4
4	9.5	2	3	1	16	3
5	1.5	16	1	27	2	5
6	17	12.5	33	4	1	21
7	11.5	18	10	20	13	16
8	19.5	11.5	25	12	14	11
9	13	15	11	17	15	13
10	20.5	13.5	18	7	23	20
11	8.5	15	14	21	3	9
12	12.5	30	6	32	19	28
13	8.5	13.5	12	15	5	12
14	19	12	26	16	12	8
15	28	11	27	8	29	14
16	33.5	19.5	31	24	36	15
17	18.5	22	7	11	30	33
18	14.5	20.5	20	22	9	19
19	19.5	14	21	18	18	10
20	22	17.5	24	9	20	26
21	20.5	17	15	2	26	32
22	9	25.5	8	29	10	22
23	24	14	23	26	25	2
24	21.5	18.5	19	13	24	24
25	11.5	18.5	2	10	21	27
26	26	24	30	23	22	25
27	22	21.5	13	14	31	29
28	21	30.5	34	31	8	30
29	19.5	28	22	33	17	23
30	34.5		32		37	
31	34.5	13	35	19	34	7
32	28.5	28	29	25	28	31
33	35.5	22.5	36	28	35	17
34	22	34	17	34	27	34

Note: blanks indicate not available.

Table 9. Broward County High Schools – Within-District Ranking Based on Value-Added Average Over Math and Reading (All Students and Student Sub-groups) – Gains Standardized by Initial Achievement Decile

School ID	Average District Ranking in Math and Reading -- All Students	Average District Ranking in Math and Reading -- FRPL Students	Average District Ranking in Math and Reading -- LEP Students	Average District Ranking in Math and Reading -- Black Students	Average District Ranking in Math and Reading -- Hispanic Students
1	2	6.5	10.5	5	4.5
2	4	5	17	30.5	11.5
3	5	5.5	2.5	8	17
4	5.5	11.5		9.5	2
5	7.5		14	1.5	16
6	9.5	27		17	12.5
7	11.5	13.5	27.5	11.5	18
8	12	17	17.5	19.5	11.5
9	12.5	11.5	16	13	15
10	13.5	15	11.5	20.5	13.5
11	14.5	12	18.5	8.5	15
12	15	1		12.5	30
13	16	6	29	8.5	13.5
14	17	15	19	19	12
15	17	21.5	3	28	11
16	17	20.5	7	33.5	19.5
17	18	22.5	25	18.5	22
18	18	19.5	20	14.5	20.5
19	18.5	14	18.5	19.5	14
20	20.5	19	9.5	22	17.5
21	21	14.5	14.5	20.5	17
22	21.5	29	26	9	25.5
23	22	22	6.5	24	14
24	22.5	19.5	28.5	21.5	18.5
25	22.5	16	21	11.5	18.5
26	25	26.5	8	26	24
27	25.5	29.5	7	22	21.5
28	28.5	22.5	23.5	21	30.5
29	28.5	27	14	19.5	28
30	29	22.5		34.5	
31	29.5	28	16	34.5	13
32	31	33	25	28.5	28
33	33	31	9	35.5	22.5
34	34	31.5	20.5	22	34

Note: blanks indicate not available.