An (updated) version of the results in this working paper will be presented at the conference:


To be held at Johns Hopkins University, October 5-6, 2016

*I thank Minhyoung Kang and Joel Pally for their programming assistance.
Prefatory Note

James S. Coleman (1926-1995) was a giant of twentieth century sociology, offering seminal contributions to both basic and applied research between 1955 and 1995. He has a posthumous Google Scholar page here.

Beyond sociology, Coleman is best known as the lead author of the 1966 report, *Equality of Educational Opportunity*, which was mandated by Section 402 of the Civil Rights Act of 1964 and subsequently commissioned by the U.S. Department of Health, Education, and Welfare.

*Equality of Educational Opportunity* is often regarded as the most important piece of education research ever conducted, and it established the fundamental importance of family background in the determination of educational outcomes, above and beyond the much more modest effects attributable to school resources and student composition. Because of his leadership of the project, the report is most commonly referred to as “The Coleman Report.” The full 737 page report is available at: http://files.eric.ed.gov/fulltext/ED012275.pdf. For further detail on the report, see Gamoran and Long (2007) and Mosteller and Moynihan (1972).

Coleman was a Professor in the Department of Social Relations at Johns Hopkins University from 1959 to 1973, a period during which he offered many of his most important contributions to research, including the Coleman Report.
What pattern of educational opportunity would James S. Coleman see if he returned and walked among us today? Let us suppose that he would look first to the Baltimore metropolitan area, recalling both his time at Johns Hopkins and also how the debate over school effects moved away from broad regional differences toward the dynamics of particular metropolitan areas following desegregation efforts of the 1960s and early 1970s.

For the first two figures of the Coleman Report (see Coleman et al 1966, pages 4 and 5), Coleman and his colleagues looked at the student racial composition of elementary schools in the nation, after which they considered regional variation throughout their report. Looking now at the Baltimore metropolitan area, we think Coleman would first want to consider the same patterns. Accordingly, just as in the Coleman Report, Figure 1 presents histograms for the proportion of students identified by their schools as black or African American across the 327 regular elementary schools in the four school districts that encompass the Baltimore metropolitan area. The pattern of segregation, fifty years after the Coleman report, is dramatic. The median Baltimore City school is 97 percent black. In contrast, the median schools in Anne Arundel, Baltimore County, and Howard are 14, 25, and 16 percent black, although Baltimore County has a larger diversity of racial composition across its schools than both Anne Arundel and Howard.

Table 1 presents basic characteristics of elementary school students in these four school districts. As shown in the first row, the elementary school student populations of each district

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1 Schools designated by Maryland as special education schools, vocational education schools, and “alternative/other” schools for federal reporting are excluded from this figure, as for all subsequent results reported below.
are large, and each district should be able to capture the cost-efficiencies afforded by size. (This may be one general advantage of education in Maryland, where counties and school districts share the same boundaries.) Holding size aside, student mobility into and out of Baltimore City schools is substantially higher, as shown in the second and third rows of the table. And of particular importance to Coleman for a consideration of educational opportunity (see Coleman 1990[1968]), the last two rows of the table reveal a large difference in proficiency levels for the performance of third graders on Maryland’s official standardized test.² Among Baltimore City third graders, 53 and 44 percent are not proficient in reading and mathematics. The gaps with the next closest school district – Baltimore County – are 34 and 24 percent, respectively.

[ Table 1 About Here ]

To begin to understand these differences, Coleman would inspect the geography of Baltimore to determine the extent to which residential patterns structure these differences, taking advantage of the geographic information systems now enabled by administrative data collection and the Census Bureau’s American Community Survey. With a wider regional perspective, Figure 2 presents a map of central Maryland with two sets of information displayed simultaneously. First, census tracts are shaded on a gray scale by the proportion of the tract that is non-white and non-Asian, as estimated by pooled 2009 through 2013 samples of the American Community Survey. Second, all regular elementary schools are plotted at their physical locations but then colored with a “heat” scale, where color gradations from blue through violet to red represent the proportion of the school population that is non-white and non-Asian. The map shows Baltimore City, with its harbor in the northwest of Chesapeake Bay,

² District-level differences for tests in other grades are similar.
surrounded by Baltimore County in the shape of a wrench. Anne Arundel is due south of the city, and Howard is to the southwest squeezing in to the point where Baltimore County and Anne Arundel form their own border. Washington, DC is the square void further southwest, but the Maryland portion of its metropolitan area surrounds it on three sides. Across the whole region, the correspondence between residential and school racial segregation is clear, with red dots representing schools with high percentages of black, African American, and Hispanic students sitting generally on top of darkly shaded census tracts with high proportions of black, African American, and Hispanic residents.³

[ Figure 2 About Here ]

Figure 3 zooms in on the Baltimore metropolitan area, and it overlays the proportion of each elementary school that is black or African American on top of the proportion of residents of census block groups that are black or African American. The comparatively small Hispanic population in Baltimore assures a close correspondence between the patterns in Figures 2 and 3 in the Baltimore metro area, and the Census block groups of this map bring local residential variation into greater relief. In either representation, the overall pattern is clear. Baltimore’s black population is concentrated in a distinct v-shaped pattern, mostly within Baltimore City but also extending into Baltimore County, especially to the northwest. Elementary school segregation mirrors the residence pattern very closely, as Coleman would expect.

[ Figure 3 About Here ]

³ In maps available in the Supplementary Appendix, we show that the Hispanic population is substantial in the metro DC area, but not in the metro Baltimore area.
Next, Coleman would want to consider the stability of the racial segregation of schools, looking for clues as to whether an underlying trend toward integration might be present. Figure 4 offers a scatterplot of the proportion of students designated as black or African American in 311 of the 327 elementary schools for which data are available in both 2002 and 2012. The stability of the pattern over a decade is dramatic, and the correlation coefficient for the ten-year scatter is a staggering .97. Thus, although the Baltimore metro area has certainly changed over the past 50 years in many ways, since 2000 at least the racial segregation of elementary schools has looked fixed in place.

[ Figure 4 About Here ]

Beginning to realize the familiarity of the demographic pattern in Baltimore, Coleman would next begin to examine differences in school performance, expecting to end up with a conclusion, as in EEO, that family background differences are paramount. Recalling the district differences in proficiency documented already in the last two rows of Table 1, he would want to first establish the extent to which a school’s proportion black is related to its proportion not proficient. Figure 5 presents scatterplots, with one panel for reading and one for math, based on the results of third graders on the Maryland State Assessment in 2013, again for regular elementary schools in the four school districts under examination. For both panels of Figure 5, the correlation coefficient exceeds .7 for the relationship between the proportion not proficient and the proportion black or African American. The nonparametric regression line, presented in red, suggests a strengthening of the relationship above 60 percent black.

[ Figure 5 About Here ]
Coleman, of course, would not be satisfied with an examination only of the relationship between test scores and racial composition, since he would surely regard such a pattern as a surface representation of deeper structural determinants. Indeed, one might regard the Coleman report, more than any other piece of research, as the document that established clearly why such comparisons have limited value. Instead, Coleman would first look for notable differences in school inputs.

Table 2 presents selected “input” characteristics that are available from administrative reporting, and these do reveal a substantial difference for Baltimore City. The level of instructional staff is lower, and the rate of advanced certification for this staff is lower as well. Yet, without a comprehensive analysis of educational programming, and how it varies across districts, differences such as these are hard to interpret. Looking at the distribution of revenue reveals, in contrast, a large and clear difference that sets Baltimore City apart. Only 18.7 percent of Baltimore City’s funding is from local sources, in comparison to 51.7 percent for Baltimore County, and even higher shares for Anne Arundel and Howard. Unlike the other three districts, far and away the largest portion of Baltimore City’s funding is from Maryland. And its funding from federal sources is much larger as well.

[ Table 2 About Here ]

The explanation for these differences is partly revealed in Table 3, which gives annual wealth and expenditures per pupil for each of the four districts in two periods, 2003 and 2004 and then in 2013 and 2014. For the first time period, Maryland had only just begun to implement an elaborate foundation program, authorized by the Bridge Act, to compensate for variation in low levels of local funding and demonstrated need for better educational
performance across the state. For the latter time period, 2013 and 2014, Bridge Act funding, as originally designed, was fully distributed, following a formula that many argue is not transparent (including payments, justified by “hedonic” models estimated by economist consultants, that teachers need to be paid more in schools with students who have less support for schooling in their homes and neighborhoods).

[ Table 3 About Here ]

With the goal of better understanding variation in the local capacity to fund schooling, for the first panel per pupil wealth is tabulated in each year relative to the state average. In both time periods, Baltimore City has dramatically less wealth per pupil, thereby generating much lower local funding from analogous taxation mechanisms. Between the two periods, Baltimore City’s wealth per pupil grew slightly more, benchmarked against the state average, than the other three school districts, closing a substantial amount on the wealth of Baltimore County. (It is unclear from the available administrative data if the shift in the per pupil number is attributable to the numerator, denominator, or both.)

The story for expenditures is similar, and some subtle patterns drive the results. State and federal funding for Baltimore City kept the district on par with the other three school districts before full implementation of the Bridge Act’s foundation program. By 2013 and 2014, Baltimore City (and Howard) pulled ahead in nominal dollars from both Anne Arundel and Baltimore County. But, in part because per pupil funding increases from the foundation program were large in some other districts in the state, the relative positions of all four school districts were little changed, as shown in the third panel. Overall, implementation of the Bridge
Act funding may have helped Baltimore City modestly, relative to its nearest two school districts, Baltimore County and Anne Arundel.

Tables 2 and 3 represent two bedeviling realities of school effects research since the Coleman report was published. First, direct measures of inputs, such as staffing characteristics, are hard to interpret, given the wide variation in programming across districts, especially in special education. Second, gross district-level funding differences do not line up with common expectations for seemingly resource-poor urban schooling, tending to show instead that urban districts with low tested performance do not lack for funding, at least on paper.

Coleman would, of course, want data on students’ parents in order to begin to model family background inputs and then to assess their relationship to test performance, both on average across schools and then on average within schools. Alas, he would be disappointed that the abundant resources poured into schools in the past two decades in order to test kids has not been matched, in Maryland or any other state, by investment in the capacity to systematically collect data on students’ families.

Nonetheless, Figures 6 and 7 consider the role of family background inputs, as best one can do without data on students’ parents to match directly to their test scores. Each figure plots the same regular elementary schools displayed for Figure 3 in the Baltimore metropolitan area, but now with the heat scale set by the percent of third graders not proficient on the state tests for math (with the results for reading provided in a Supplementary Appendix, and showing an even more dramatic pattern, presumably because third-grade reading scores are more strongly influenced by the home than math scores). For Figure 6, census tracts are shaded dark on a gray scale proportional to the average years of education for residents in the tract who are 25 years or
older. For Figure 7, the shading is for median income among civilians aged 18 or older who report any income.

[ Figures 6 and 7 About Here ]

In line with what Coleman would expect, a close correspondence exists between aggregate family background characteristics in census tracts and the levels of proficiency for regular elementary schools located within and near to them. With reference to Figure 3, one can see how within-race variation in family background has a clear relationship with proficiency levels. For example, census tracts that are predominantly black outside of Baltimore City have higher levels of education and income. In a pattern that would be unsurprising to Coleman, the schools in these areas have higher levels of tested proficiency as well.⁴

We imagine Coleman would conclude that, while undoubtedly there are local communities and particular schools with unique stories of success and failure, the broad pattern across Baltimore is simple. Racial segregation remains dramatic, and historic patterns of family disadvantage, which have changed too little across the decades, convert this segregation into a clear geography of varied school performance. Elementary schools situated in affluent areas test well, but performance falls off steadily and regularly as the local prevalence of family disadvantage increases. Large portions of Baltimore City are deserts of educational performance, dotted with too few oases of distinction.

⁴ In additional figures available in the Supplementary Appendix, we show that the pattern appears even more starkly when the map is zoomed out to show the entirety of all four counties. Virtually all of the schools in the exurban zones on the fringe of the Baltimore metro area are solidly blue, and none are in or near census tracts with the low levels of education and income characteristic of many areas of Baltimore City.
References Cited


Table 1. Elementary School Students in the Baltimore Metropolitan Area

<table>
<thead>
<tr>
<th></th>
<th>Baltimore City</th>
<th>Anne Arundel</th>
<th>Baltimore County</th>
<th>Howard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Elementary School Students, 2014</td>
<td>39,767</td>
<td>36,749</td>
<td>50,999</td>
<td>23,458</td>
</tr>
<tr>
<td>Percent New Entrants, 2014</td>
<td>16.9</td>
<td>12.6</td>
<td>10.8</td>
<td>7.3</td>
</tr>
<tr>
<td>Percent Withdrawal, 2014</td>
<td>15.3</td>
<td>7.2</td>
<td>7.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Percent Not Proficient in 3rd Grade Reading</td>
<td>53.0</td>
<td>13.9</td>
<td>18.9</td>
<td>15.6</td>
</tr>
<tr>
<td>Math</td>
<td>44.1</td>
<td>14.2</td>
<td>19.9</td>
<td>13.5</td>
</tr>
</tbody>
</table>

Source: Author calculations based on data available from the Maryland State Department of Education for the 2013-14 academic year.

Notes: Percent Not Proficient is the category of “basic” on the Maryland State Assessment in 2014.
Table 2. Selected Inputs to School Districts in the Baltimore Metropolitan Area

<table>
<thead>
<tr>
<th>District Staff</th>
<th>Baltimore City</th>
<th>Anne Arundel</th>
<th>Baltimore County</th>
<th>Howard</th>
</tr>
</thead>
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<tr>
<td>Instructional Staff per 1000 Students</td>
<td>62.2</td>
<td>68.6</td>
<td>68.7</td>
<td>73.3</td>
</tr>
<tr>
<td>Instructional Assistants per 1000 Students</td>
<td>16.1</td>
<td>11.6</td>
<td>9.7</td>
<td>24.9</td>
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<tr>
<td>Percent Advanced Certification</td>
<td>47.6</td>
<td>66.1</td>
<td>66.4</td>
<td>65.3</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Distribution of Revenue</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Percent Local</td>
<td>18.7</td>
<td>57.9</td>
<td>51.7</td>
<td>65.6</td>
</tr>
<tr>
<td>Percent State</td>
<td>67.4</td>
<td>37.0</td>
<td>42.6</td>
<td>31.7</td>
</tr>
<tr>
<td>Percent Federal</td>
<td>14.0</td>
<td>5.1</td>
<td>5.8</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Source: Maryland State Department of Education for district staff, and the National Center for Education Statistics’ Common Core of Data for the distribution of revenue.

Notes: The district staff information is for the 2013-14 academic year, and the distribution of revenue is for the 2011-12 academic year.
Table 3. Wealth and Expenditures Per Pupil, Before and After Full Implementation of the Bridge Act’s Foundation Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Baltimore City</th>
<th>Anne Arundel</th>
<th>Baltimore County</th>
<th>Howard</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0.54</td>
<td>1.20</td>
<td>1.12</td>
<td>1.21</td>
</tr>
<tr>
<td>2004</td>
<td>0.53</td>
<td>1.22</td>
<td>1.10</td>
<td>1.18</td>
</tr>
<tr>
<td>2013</td>
<td>0.58</td>
<td>1.24</td>
<td>1.01</td>
<td>1.08</td>
</tr>
<tr>
<td>2014</td>
<td>0.59</td>
<td>1.24</td>
<td>1.02</td>
<td>1.09</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Expenditures Per Pupil (nominal dollars)</th>
<th>Expenditures Per Pupil (relative within year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
<td>2003</td>
</tr>
<tr>
<td></td>
<td>8,926</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>2004</td>
<td>2004</td>
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<tr>
<td></td>
<td>9,585</td>
<td>1.09</td>
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<tr>
<td></td>
<td>2013</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>14,973</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>14,631</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Source: Author calculations based on data from the Maryland State Department of Education.

Notes: Relative wealth and expenditures per pupil in each year were calculated by dividing the district-specific nominal dollar amount in each year by the Maryland state average across all districts in each year.
Figure 1. Histograms for the Proportion of Students Identified as Black or African American in Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area

Source: Author calculations based on NCES’ Common Core of Data, 2012 School Universe File.

Notes: The number of regular elementary schools is 327 (77 for Anne Arundel, 105 for Baltimore City, 105 for Baltimore County, and 40 for Howard County). To make the four subgraphs comparable, the vertical axis is the percent of schools in each school district with the corresponding proportion of Black or African American students.
Figure 2. Locations of Regular Elementary Schools in Central Maryland, Colored with a Heat Scale for the Percent of Students Identified as Neither White Nor Asian, and Plotted on Top of Census Tracts Shaded by the Percent of Residents Estimated to be Neither White Nor Asian.

Source: Author calculations and plotting of data from NCES’ Common Core of Data, 2012 School Universe File, and the 2009-2013 Five-Year File from the American Community Survey.
Figure 3. Locations of Regular Elementary Schools in the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Students Identified as Black or African American, and Plotted on Top of Census Block Groups Shaded by the Percent of Residents Estimated to be Black or African American.

Source: See Figure 2.
Figure 4. The Persistence of De Facto Segregation of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area

Source: Author calculations based on data from NCES’ Common Core of Data, 2002 and 2012 School Universe Files.

Notes: The estimated correlation for the underlying scatterplot is .97. The number of elementary schools with valid and available data in both years is 311 (75 for Anne Arundel, 101 for Baltimore City, 99 for Baltimore County, and 36 for Howard County).
Figure 5. The Proportion of Students Who Fell Below the Proficiency Cutoff in Third Grade in 2013 in Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Plotted Against the Percentage of Each School Identified as Black or African-American in 2012

Source: Author calculations based on the Common Core of Data, 2012 School Universe File, Merged with publicly available data from the Maryland State Department of Education for 2013.

Notes: The red line is a kernel-smoothed local regression prediction, which is interpretable as the smoothed average proficiency for each value of racial composition. The estimated correlation for the underlying scatterplot is .73 in reading and .71 in math. The number of elementary schools with valid and available data for the proportion black in 2012 and percentage not proficient in 2013 is 323 (77 for Anne Arundel, 101 for Baltimore City, 105 for Baltimore County, and 40 for Howard County).
Figure 6. Locations of Regular Elementary Schools in the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Math in 2013, and Plotted on Top of Census Tracts Shaded by Levels of Education for Residents

Source: See Figure 2.
Figure 7. Locations of Regular Elementary Schools in the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Math in 2013, and Plotted on Top of Census Tracts Shaded by Levels of Income for Residents.

Source: See Figure 2.
SUPPLEMENTARY APPENDIX

for

Coleman in Baltimore, Circa 2015*  

Stephen L. Morgan  
Johns Hopkins University  

Working Paper  
August 26, 2015
Figure 2A. Locations of Regular Elementary Schools in Maryland, Colored with a Heat Scale for the Percent of Students Identified as Black or African American, Plotted on Top of Census Tracts Shaded by the Percent of Residents Estimated to be Black or African American.

Source: See Figure 2.
Figure 2B. Locations of Regular Elementary Schools in Maryland, Colored with a Heat Scale for the Percent of Students Identified as Hispanic, Plotted on Top of Census Tracts Shaded by the Percent of Residents Estimated to be Non-Black Hispanic or Non-African-American Hispanic

Source: See Figure 2.
Figure 3A. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Students Identified as Black or African American, Plotted on Top of Census Block Groups Shaded by the Percent of Residents Estimated to be Black or African American

Source: See Figure 2.
Figure 3B. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Students Identified as Hispanic, Plotted on Top of Census Block Groups Shaded by the Percent of Residents Estimated to be Non-Black Hispanic or Non-African-American Hispanic

Source: See Figure 2.
Figure 6A. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Math in 2013, Plotted on Top of Census Tracts Shaded by Levels of Education for Residents

Source: See Figure 2.
Figure 6B. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Reading in 2013, Plotted on Top of Census Tracts Shaded by Levels of Income for Residents.

Source: See Figure 2.
Figure 7A. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Math in 2013, Plotted on Top of Census Tracts Shaded by Levels of Income for Residents

Source: See Figure 2.
Figure 7B. Locations of Regular Elementary Schools in the Four School Districts that Encompass the Baltimore Metropolitan Area, Colored with a Heat Scale for the Percent of Third Graders Not Proficient in Reading in 2013, Plotted on Top of Census Tracts Shaded by Levels of Education for Residents

Source: See Figure 2.