NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 2007: NATIONAL AND IOWA SOCIO-ECONOMIC GAPS BY LOCATION

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Abstract—NAEP results for 2007 reading and mathematics were examined using the NAEP Data Explorer. School location and student lunch status were the primary independent variables of interest. The dependent variable was performance on the NAEP assessment. For all of the NAEP state tests in reading and mathematics, except reading grade four, the gap between students not eligible for free or reduced-price lunch and those eligible vary across the levels of school location.

Background—"Is there a difference in the gaps in the achievement for student with different socio-economic levels between school classified as central city, urban fringe, and rural?" is the question driving this study. Questions concerning rural and nonrural student achievement have a long history in Iowa (Hieronymus, 1949; Pogue and Maxey, 1996).

Part of the problem when examining student achievement and school location is that the definitions of central city and other locations found in the Common Core Data (CCD) and used in the National Assessment of Educational Progress (NAEP) have changed frequently (Appendix A).

For testing completed in 2007, NAEP results are reported for four mutually exclusive categories of school location: city, suburb, town, and rural. The categories are based on standard definitions established by the Federal Office of Management and Budget using population and geographic information from the U.S. Census Bureau. Schools are assigned to these categories in the NCES Common Core of Data based on their physical address. The classification system was revised for 2007; therefore, trend comparisons to previous years are not available. The new locale codes are based on the proximity of an address to an urbanized area (a densely settled core with densely settled surrounding areas). This is a change from the original system based on metropolitan statistical areas. To distinguish the two systems, the new system is referred to as "urban-centric locale codes." The urban-centric locale code system classifies territory into four major types: city, suburban, town, and rural. Each type has three subcategories. For city and suburb, these are gradations of size—large, midsize, and small. Towns and rural areas are further distinguished by their distance from an urbanized area. They are characterized as fringe, distant, or remote.

Lee and McIntire (2000) noted that "Rural schools tend to have a better social/organizational context (i.e., teacher training, safe/orderly climate, and collective support) conducive to higher performance, but...poorer curricular/instructional conditions (i.e., classroom resources, advanced course offerings, and progressive instruction) which balance out achievement gains." According to Williams (2005), the United States showed a marginal raw rural achievement gap, which disappeared when socio-economic status (SES) was controlled. Further analysis suggested positive interaction effects in the United States between school SES and both urban and rural location. Hopkins (2005) found that in schools with the highest percentage of disadvantaged students, rural locales outscored both central city and other nonrural locales, across all grade levels tested. The explanation offered for this discrepancy included additional social capital in rural locations ("social networks, the interactions between children and adults within the family and within the community"). Hopkins also noted that cultural capital is more easily accessed in urban locations ("theater, concert, or cinema attendance; reading and purchasing books; museum attendance," for example).

Method—NAEP results for 2007 reading and mathematics were examined using the NAEP Data Explorer. School location and student lunch status were the primary independent variables of interest. The dependent variable was performance on the NAEP assessment.

Results and Discussion—In Iowa, the majority of students live in the Town or Rural Categories (64 percent). However, in the nation as a whole, 66 percent of the students included in the NAEP assessment live in areas classified as City or Suburban. The results of NAEP Mathematics grade four are shown in the table below.

Table 1—NAEP 2007 Mathematics Grade 4

	NATIONAL PUBLIC			IOWA		
School Location	Average Scale Score	Standard Error	Percent of Students in Category	Average Scale Score	Standard Error	Percent of Students in Category
City	**233**	**(0.4)**	**29%**	**240**	**(2.2)**	**26%**
Suburb	243	(0.3)	37%	248	(2.2)	10%
Town	**238**	**(0.5)**	**12%**	**242**	**(I.6)**	**27%**
Rural	240	(0.4)	22%	244	(1.4)	37%

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2007 Mathematics Assessment.

In Iowa, the gap between students eligible for free or reduced-priced lunch and those who are not eligible continues to differ by location. Overall, the gap is the smallest in schools classified as rural.

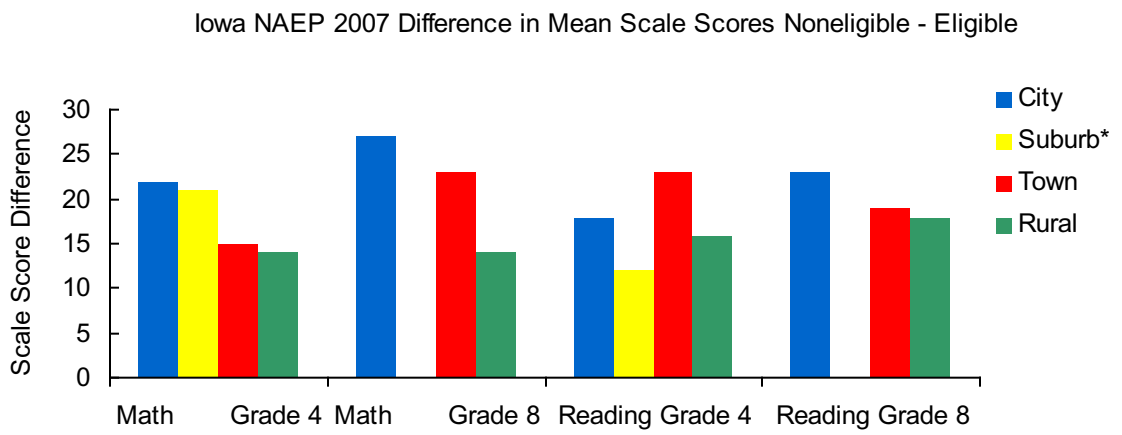
Table 2—NAEP 2007 Iowa Average Scale Score by Location and Eligibility for Free or Reduced-Lunch

		CITY	SUBURB	TOWN	RURAL
Math 4	Not eligible	250	253	248	248
	Eligible	228	232	233	234
	Difference	22**	21*	15**	14**
Math 8	**Not eligible**	**290**	**293**	**291**	**294**
	Eligible	**263**	**‡**	**268**	**280**
	Difference	**27****	**‡**	**23****	**14****
Read 4	Not eligible	230	229	233	231
	Eligible	212	217	210	215
	Difference	18**	12**	23**	16**
Read 8	**Not eligible**	**272**	**277**	**272**	**275**
	Eligible	**249**	**‡**	**253**	**257**
	Difference	**23****	**‡**	**19****	**18****

*significant at .05.
**significant at .01.
‡ The reporting requirements were not met for grade 8 students classified as ineligible and attending suburb schools.

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2007 Mathematics and Reading Assessments.

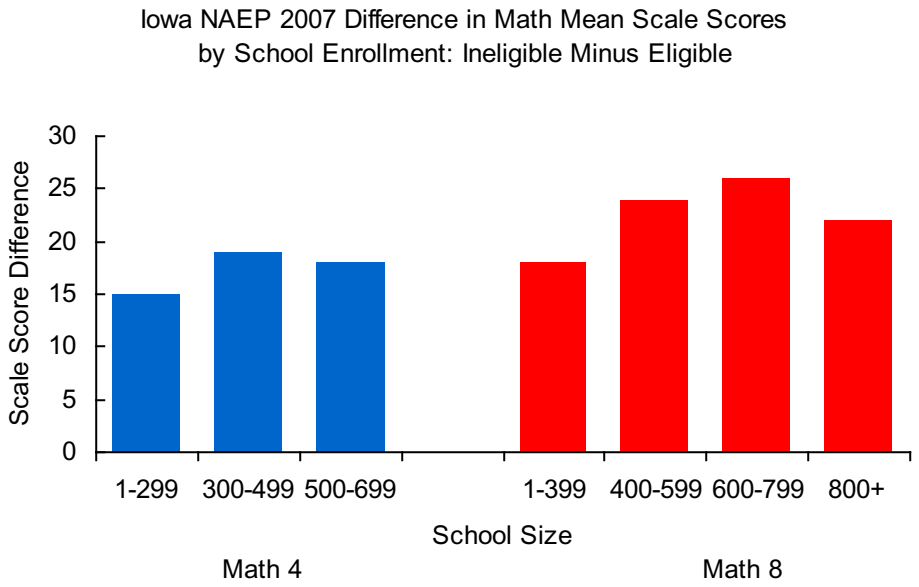
Figure 1—NAEP 2007 Iowa Social-Economic Gaps by Location



Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2007 Mathematics and Reading Assessments.
Note: *The reporting requirements were not met for grade 8 students classified as ineligible and attending suburb schools.

School size appears to be a related or confounding variable.

Figure 2—NAEP 2007 Iowa Social-Economic Gaps by School Size



Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2007 Mathematics and Reading Assessments.
Note: All comparison of differences between ineligible students and eligible students by school size shown in the above chart were significant at .01.

Part of the confounding problem is that the categories overlap. For example, while schools classified with the location "city" tend to have greater mean enrollments, all four locations reported 14 percent or more in each school size category as recorded in the Iowa NAEP Mathematics Grade 4. No information is available on the NAEP assessments as to class size or student/faculty ratio.

Table 3—Iowa NAEP Math 4 Percent of Schools by Location and Enrollment

SCHOOL ENROLLMENT	CITY	SUBURB	TOWN	RURAL
1-299	14	27	36	52
300-499	**51**	**50**	**47**	**32**
500+	36	23	17	16

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2007 Mathematics Assessments.

Conclusion—For all of the NAEP state tests in reading and mathematics, except reading grade 4, the difference between students not eligible for free or reduced-price lunch and those eligible changes across the levels of school location. However, more study is required to explore the differences between the school categories. One method of study would be to repeat the above study using the Iowa Tests, which are given on a census basis to Iowa students in grades four, eight, and 11. The larger question is "What is the reason for the differences in student achievement by school location?"

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APPENDIX A

NAEP DEFINITIONS OF CENTRAL CITY OVER THE YEARS	
YEAR	**DEFINITION OF CENTRAL CITY**
1992-1998	*Large central city*: A central city of a Metropolitan Statistical Area (MSA) with a population greater than or equal to 400,000, or a population density greater than or equal to 6,000 persons per square mile. Mid-size central city: A central city of an MSA but not designated as a large central city.
2000-2004	**A central city is a city of 50,000 or more that is the largest in its metropolitan area, or can otherwise be regarded as "central." The term means "a city that is central," not "the central part of a city" or the "inner city." Note that central cities encompass wider areas than what is commonly referred to as "the inner city."**
2005	*Large city*: A central city of Consolidated Metropolitan Statistical Area (CMSA), with the city having a population greater than or equal to 250,000. *Mid-size city*: A central city of a CMSA or Metropolitan Statistical Area (MSA), with the city having a population less than 250,000.
2007	**City, Large: Territory inside an urbanized area and inside a principal city with population of 250,000 or more.** **City, Midsize: Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.**