Funding Success:

An Analysis of Public School Funding and Demographics

in Colorado and their

Effect on School Performance

A Thesis

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Introduction

This study examines the spatial and statistical effects of school and neighborhood demographics as well as public school funding on Transitional Colorado Assessment Program (TCAP) test scores in Colorado public schools. Using demographic variables that include race, poverty, employment, and education this study hopes to understand what factors can predict gaps in academic performance that exist across the United States and limit inner city students to larger schools with significantly less hope of graduating or attending college.

Beginning with a brief overview of neighborhood segregation by race and socioeconomic status and this paper will provide an explanation of how segregation in public schools is a larger function of these community divisions. Next, covering how race and poverty are interrelated for American youth, it will delve into the family and community effects that place poor minorities at a disadvantage for educational achievement, and how these community effects shape the institutional quality of local public schools. Finally, using spatial analyses and various statistical tests this study tries to answer for what effect public school funding had on TCAP standardized test scores in the 2010-11 school year.

The primary objective of this study is determining how public school funding in Colorado affects the dependent variable, TCAP scores and how these two vary across districts. This study also seeks to answer the question of how school funding and demographics, both at the school and neighborhood level, relate to TCAP scores.

Literature Review

The departure of affluent residents from urban areas teamed with low demand for unskilled labor in poor areas, exclusionary housing policies, and the construction of group housing projects have contributed to the concentration of poverty in many urban neighborhoods (Fauth, Leventhal, and Brooks-Gunn 2007; Gottdiener and Hutchison 2011). Urban divisions of wealth and race create public schools that mirror their location. Therefore a typical public school in a low-income area segregated by race and socioeconomic status serves the residents of that community. Neighborhood conditions not only affect demographics in the classroom but funding as well, according to the traditional funding model, which is traditionally based primarily off local property taxes.

Frequently, studies find a sizable gap in educational achievement between low-income, minority students and their wealthy white counterparts. The general consensus is that socioeconomic status is the bridge between race and school performance (Connell and Halpern-Felsher 1997; Saporito and Sohoni 2007; Ransdell 2012). Race (and to a lesser extent, poverty) is typically seen as a veneer for underlying differences that may account for variance in school performance. From a socioeconomic standpoint, researchers tend to explore one of three directions in explaining variance in school performance by poverty: (1) personal attributes regarding the subject's home life, family structure, and background, (2) structural differences rising from neighborhood surroundings, or (3) institutional differences in quality among schools.

Personal Attributes

Several findings have implicated student background and home-life as significant indicators of academic performance. Specifically, an indirect link has been noted between student poverty and school performance through family structure and peer influence (Connell and Halpern-Felsher 1997; Halpern-Felsher et al. 1997; Roscigno 1998; Chapman 2003; Fauth et al. 2007; Ransdell 2012). Fauth and her colleagues (2007) found that of the families who relocated away from inner city housing projects in Yonkers, NY, parents reported less monitoring and discipline for their children in their new suburban homes, leading to increased behavioral issues, substance abuse, and lower academic performance. The propensity for adolescents' to engage in deviant behavior following a shift in parental discipline and monitoring supports the claim that stability at home is crucial for academic performance.

More than just stability, there is mounting evidence that both parental involvement and attitudes regarding education are vital for academic success, especially for families in low-income areas. Chapman found a significant correlation between parental involvement and students' self-reported measure of school meaningfulness, the latter is highly correlated to academic success. Other studies have implicated parental attitudes as a contributing factor to school performance (Bradley and Corwin 2002; Ransdell 2012). Some speculate that parents who yield to learned helplessness on account of their poverty status has negative implications for student outcome (Bradley and Corwin 2002).

The strongest and most visible effect of student home-life on academic performance is based on parental education levels (Halpern-Felsher 1997; Roscigno 1998; Ozmert et al. 2004). Students whose parents have earned a high school degree or equivalent show a 2.1 point advantage in mathematics compared to families where neither parent has completed high school. Students whose parents have completed college are at an even greater advantage (Roscigno 1998). Age is a contributing factor when dealing with parenting and home-life variables. Halpern-Felsher et al. (1997) found parental education significant for certain groups at varying ages. Maternal education was highly significant for black and white males and females' test scores in the "middle adolescence" sample, ages 15 to 20. The 9th and 10th graders who took the TCAP tests used in this study are typically between age 14 and 16.

Speculated theories about the lack of parental education include decreased emphasis on the importance of literacy and education in the home. Economically disadvantaged youth also are prone to hear a smaller range of words used at home, impacting diction. Traits such as increased structure, emphasis on education, and wider spectrum of word use at home are more commonly associated with wealthy and educated households and can be influential in children's success academically.

Neighborhood Effects

Despite continual findings that student poverty levels as well as neighborhood indicators of poverty have substantial correlations with low school performance and high school dropout rates (Garo 2012; Ransdell 2012), school social workers acknowledge that professionals often overlook the context of community (Gutterman and Cameron 1999). Neighborhood components such as community socioeconomic status and safety have been linked to lower self-reported grades as well as school attendance (Dornbusch 1991; Chapman 2003). Some posit that the connection between neighborhood safety and public school attendance is a matter of students' fear of being assaulted either at school or on the commute (Chapman 2003). Others warn of the importance of integration and a sense of belonging in the community (Wilson 1987; Halpern-Felsher 1997; Armor 2002; Fauth et al. 2007).

Neighborhood danger theories may apply for schools located in more threatening urban communities. More than just immediate danger shaping a child's formative years, other community factors such as limited positive social contact with neighbors and lack of after-school commitments may contribute to increase in aggression or deviant behavior and a decrease in school performance.

As for the effect of neighborhood socioeconomic status, findings indicate that for white males, neighborhood SES was associated with lower educational risk, until controlling for family economic risk. For African American males, however, concentration of jobless males in their neighborhoods predicted higher educational risk even while controlling for family variables (Halpern-Felsher et al. 1997). If we acknowledge the momentous level of racial segregation in America's public schools, this finding is consistent with Wilson's (1987) theory that inner city neighborhoods in Chicago with high numbers of jobless males are socially isolated, and the underachieving schools located in these neighborhoods prepare students for a life of unemployment (if they graduate at all), therefore contributing to the level of social isolation.

Another branch of work has investigated the class and racial segregation component of varying public school achievement. The 24 largest cities in the U.S. have more than 70% black and Latino enrollments in their districts (Orfield and Lee 2005). According to Swanson (2008), graduation rates are 15 percent lower in urban high schools than those located in the suburbs. Therefore, urban school location could account for some of the variance in achievement with regard to race.

Researchers often advocate the integration of schools along race and class based lines. According to Wilson (1987), of the 25,500 black and Hispanic freshmen enrolled in Chicago's segregated, inner-city high schools in 1980, 16,000 did not graduate by 1984. Many younger children who were relocated to suburbs from inner city projects exhibited behavioral issues and struggled to adapt socially to their new environments (Fauth et al. 2007). This supports another of Wilson's (1987) claims that the social isolation of blacks in the inner city that amplifies the social components of poverty. Some reason that if a socially isolated minority group were moved to a radically different area that behavioral issues might ensue. Still, other research indicates that children who relocate to suburbs are more likely to graduate high school and more likely to enroll in college preparatory courses (Rosenbaum 1995).

Though neighborhood cohesiveness is imperative, the culture of support in the community is also pivotal for adolescents' success in school. Some suggest that the performance gap between white and minority students is due to variation in peer group support for educational achievement (Mickelson 1990). However, support in the form of positive role models, perceived opportunities for employment, and institutions like Boys and Girls' Clubs and after-school programs plays an important role in the shaping of urban disadvantaged youth (Connell and Halpern-Felsher 1997). Youth from poor neighborhoods are motivated to perform better in school when they see people slightly older than themselves from the same backgrounds engaging in meaningful work after high school (Connell and Halpern-Felsher 1997; MacLeod 2008).

Revisiting Halpern-Felsher and her colleagues' (1997) findings that boys are more susceptible to neighborhood factors in their academic performance, it suffices that the positive role-model ideal applies more to adolescent boys than girls. Without proper role models or hope for employment in the legal economy, young men are more likely to perceive helplessness in their future and succumb to the anticipated strains illustrated in the strain theory of deviance (Agnew 2009). The driving force behind the perceived usefulness of neighborhood institutions like after-school programs is the long standing concept that by keeping youth from impoverished neighborhoods busy, they will be less likely to engage in deviant behavior. This is all assuming that deviance is the antithesis of school performance.

Along with home-life variables and school qualities, community factors have a substantial effect on a childs' well-being and, accordingly, their academic performance as well. Adolescents' sense of both safety and belonging in their community are critical. On one hand, exposure to violence and bleak expectations for the future can be detrimental. On the contrary, community cohesiveness and sense of belonging are vital, as seen by the complications that arise from top-down class based integration (Wilson 1987; Fauth et al. 2007).

School Demographics & Funding

Geographic divisions by class and race by nature affect the demographics, quality, and funding of local public schools everywhere, regardless of urban or rural location. Throughout the 20th century, per-student spending in public schools was strongly associated with property taxes and commercial tax base gathered within the corresponding district (Connell and Halpern-Felsher 1997; Olson 2005). This policy of public school funding has resulted in large disparities among districts with varying property wealth. Even in states with equality standards like Colorado, property tax funding requires lower income districts to contribute more tax effort to public schools than their wealthy counterparts. 1988 saw three major legal decisions mandating finance reform in Montana, Texas, and New Jersey with the argument that the denial of equal educational opportunity violated the corresponding states' constitution (Wise and Gendler 1989). Despite efforts to equalize the funding gap, funding still varies quite heavily across some districts. The fact remains that public schools are segregated by race, socioeconomic status, and performance as a function of the community segregation and isolation covered in the previous section. Findings consistently suggest that children from poor backgrounds tend to perform worse in school. Ransdell (2012) found that on average for all grades, 59% of the variance in Florida Comprehensive Assessment Test (FCAT) reading comprehension tests could be accounted for by poverty. Granted that black and Latino children are more twice as likely to live in poverty than white children, there is evidence that race plays a large role in the disparity (DeNavas-Walt, Proctor, and Lee 2005).

As a result of this overlap in the U.S., the typical black or Latino student attends a school where the majority of students are below the poverty line (Saporito and Sohoni 2007). High school dropout rates for black and Latino students continue to be double that of whites or Asians (Roscigno 1998; Logan et al. 2012). Several studies have also found black and Latino children score significantly lower on standardized tests (Roscigno 1998; Stiefel, Schwartz, and Chellman 2008).

Most public school districts and state policies acknowledge that low income or “at-risk” students require more funding (Chapman 2003; Ransdell 2012; Colorado Department of Education 2013). Since the Elementary and Secondary Education Act of 1965, federal funding has been allocated to districts with at-risk pupils (Moser and Rubenstein 2002). Notable scholars acknowledge that the policy of free and reduced lunch prices for low income students is not enough to combat the disadvantage of family, peer, and community influence on school performance for these students (Chapman 2003; Ransdell 2012). Among the top recommendations for policy improvement are increased social workers to work personally with at risk children, after school activities, and increased parent involvement.

The funding disparities across public schools of different locational contexts condemn underfunded schools with older textbooks, larger class-sizes, fewer resources, and less experienced teachers. Federal and state funding continues to grow and play a larger role in public school funding, in contrast to 1973 when local funding provided about half of all total district revenues (Doyle and Finn 1984; Moser and Rubenstein 2002). Though federal and state funding have contributed a good deal to district funding equality, some complain that the fragmentation of sources for district funding adds to administrative complexity, jeopardizing efficacy (Meyer, Scott, and Strang 1987; Moser and Rubenstein 2002).

A number of institutional factors associated with decreased academic outcomes could potentially be solved with funding equality. Underfunded schools are typically characterized by high student-teacher ratios. Higher student-teacher ratios have been repeatedly associated with poor academic performance (Roscigno 1998; Decker, Mayer, and Glazerman 2004; McMillen 2004). Likewise, fewer educational resources are often attributed to learning difficulties in the classroom. Roscigno (1998) acknowledges that school spending indirectly influences academic outcomes through factors like resources, teacher competency, and school facilities.

Teacher competency is known to be much lower at poor neighborhood schools (Connell and Halpern-Felsher 1997;Murnane 2007). Poor public schools are characterized by weak leadership, inconsistent instruction, and teachers who lack critical skills--all of which allow struggling students with already troubled home lives to slip through the cracks of the institution (Murnane 2007). Poor urban schools in particular suffer from inadequate instructors due to seniority within the district. Typically, the more experienced teachers abandon the underfunded, understaffed urban public schools for those with better management and perhaps in safer neighborhoods.

To examine the shortcomings of teachers in underfunded public schools, we can look at a study conducted by Teach for America over the 2000-2001 school year in elementary schools located across several metropolitan areas throughout the U.S. TFA hires recent college graduates and dispatches them to underfunded urban public schools. Of the control teachers, only 55 percent had a bachelor's or master's degree in education, 30 percent had no teaching experience before formally teaching, and 11 percent planned to leave teaching if "something better comes along" (Decker et al. 2004, 14). The control teachers in their sample of underfunded urban schools were less likely to have had an education-specific education and less likely to have attended a competitive college altogether than the national average public elementary school teacher. Though teaching techniques varied only slightly, TFA teachers' students saw a statistically significant increase in math scores by the end of the year.

The clearest evidence for the importance of public school funding and achievement comes from a 2002 professional judgment panel determined adequacy gap. This panel calculated dollar-amount needs of public elementary, middle, and high schools in New York State during the 2001-02 school year, totaling in $7.16 billion statewide. By aligning all schools along adequacy gap quintiles, schools with the largest disparities between needs and actual resources suffered drastically lower attendance rates and pass rates. 12th grade pass rates ranged from 96 percent in the least needy schools to 82 percent in those with the largest adequacy gaps; the figure ranged from 85 percent to 54 percent for middle school pass rates. Pass rates across the adequacy gaps were more disparate for minority students, with high school pass rates plummeting from 81 percent in the least needy schools to 50 percent in the neediest (Chambers, Levin, and Parrish 2006).

The current system of funding for public schools in many parts of the U.S. delegates students in such a way that confines disadvantaged minorities into overcrowded, underfunded classrooms. Many of whom come from backgrounds that already indicate educational risk. Though the federal government does provide additional funding to districts for at-risk students, and states such as Colorado have made efforts to minimize the funding gap, more changes need to be addressed to reduce class sizes, increase instructional competency, and bring urban public schools up to the same standards as those located outside of the cities.

Adolescents' school performance is dependent on a myriad of factors stemming from home-life variables, school effectiveness, and community context; all three are made more complex by the presence of poverty. If we view family economic risk as a function of neighborhood poverty, then a lack of school funding and effectiveness is surely a function of neighborhood conditions, under the current system.

The findings of the various studies just covered ground the following research into two distinct groups of independent variables: Funding and Demographics. Based on the literature, the research conducted will split by these terms to determine the effect each has on TCAP scores then search for connections between the two. The importance of urban location in the literature presents another dynamic to funding disparities which will be examined in greater detail.

Colorado Public School Funding Technicalities

The Colorado Department of Education has a set formula which determines a base amount of funding for each district prior to the start of the school year (CDE 2013). The final amount is referred to as "total program" or "total program funding." The total program is based off of pupil counts taken annually October 1st. Based on the prior year's pupil count, the state provides a certain dollar amount of funds for each student. Total program consists of: (1) Preliminary per pupil funding, (2) at-risk pupil funding, and (3) on-line funding.

Preliminary funding begins with a base amount of funding for each student. In the 2010-11 school year, the year the data in this study is from, the base amount was $5,529.71. Preliminary per-pupil funding adds a cost of living factor, a personnel factor for districts that employ more staff, and a size factor granting added funds to districts with fewer than 4,023 students (CDE 2013). Additional funding for at-risk students (those who qualify for free or reduced lunch programs) is added onto the preliminary per-pupil funding, along with on-line funding and negative factor. For each FRL eligible student in a district, the district receives an additional 12-30% of the total per-pupil funding.

Local revenue is taken from property taxes and specific ownership (vehicle ownership) taxes. Local revenue varies on the basis of local mill-levies, decided by area voters. The state then provides "state share" funding to cover the remainder of total program not covered by local revenue in that district. Districts whose local revenue is enough to fulfill total program funding receive no state share. Once the total program is met, additional revenues can be raised through local bond and mill levy elections.

Data and Methods

Data

This thesis examines Transitional Colorado Assessment Program (TCAP) scores for 9th and 10th grade students in all public high schools in Colorado for which data are available. The primary unit of analysis in this study are Colorado public schools. Dependent variables include neighborhood demographic variables for each school's district area, school demographics, and district funding. Neighborhood demographic variables include variables pertaining to race, income, education, and employment. School demographic variables include percentage values for student race, student free and reduced lunch eligibility and student teacher ratio. Funding variables include funding sources and dollar amounts per student and expenditures per student.

This research uses data from three sources. Neighborhood demographic data was obtained from the Census Bureau 2008-2012 American Community Survey 5-Year Estimates. Variables taken from the 2008-2012 ACS, including employment, demographics, income, and education were obtained at the school district-level for all districts in Colorado. The ACS data was joined to a district-level shapefile also obtained from the Census Bureau website using Topically Integrated Geographic Encoding and Referencing (TIGER)/Line.

School data including school name and address, number of students, student race, free and reduced lunch eligibility and student teacher ratio were obtained from the National Center for Education Statistics Elementary/Secondary Information System. The data from NCES ELSi included all public schools in Colorado for the 2010-11 school year. Elementary and middle schools were filtered out of the spreadsheet, leaving only high schools and "other schools" with high school students. Using GIS the schools were geocoded onto the district shapefile.

Finally, district funding data for the 2010-11 school year was obtained from the Colorado Department of Education website. The funding data used in this study represents total revenue which is different from the total program funding mentioned earlier. Revenue includes total program, but accounts for additional funding that is added onto total program. This additional funding includes programs for students with disabilities, employee salaries, maintenance, transportation, and other vital programs that are not covered by total program.

The funding data was presented in a number of spreadsheets which were then consolidated into one excel file and joined by district name to the existing district shapefile in GIS. TCAP data for the 2010-11 school year was also taken from the CDE website. Each subject was organized in its own excel spreadsheet, where numbers of students were divided by "Total," "Unsatisfactory," "Part-proficient," "Proficient," "Advanced," and "No Score" for grades 3-10. Filtering out only TCAP data for grades 9 and 10 and consolidating them into one spreadsheet, these were also joined to the school shapefile by school name.

To get the sum of school demographic and TCAP variables into the district shapefile's attributes, a spatial join was used. It was also necessary to join district variables such as funding and neighborhood demographics to schools within those districts. Here, a reverse spatial join was conducted.

Methods

Several alterations were made to the data in GIS. First, 71 schools either did not take TCAP tests that year, or they had insufficient data. A number of those with insufficient TCAP data had a "count" for each subject that was above zero, but no students were recorded in any grading column. After filtering out those schools, four new variables were created. At this point there was sufficient data in both the district and school shapefiles to create the maps used in this study. Attributes from the school-level shapefile were then exported and converted to Stata format. Using Stata, a number of variables were generated. Both the proficient and average variables for each subject were combined and a percentage of the total count was calculated to create a percent proficient or advanced variable in each subject. A fifth TCAP variable was then created, an average of the percent proficient or advanced of all four subjects. Each funding variable was divided by the total number of students in each district to create funding per student variables. Percentages of total revenue for each revenue source were then calculated. Percentage variables were also created for education variables, number of people below poverty, free and reduced lunch, and race variables. Descriptive statistics for variables used in this study can be found in tables A1-A3 in Appendix A.

After removing schools with inadequate TCAP reporting, for tests involving TCAP scores, there were several additional outlying schools that were left out of tests. Using standardized residuals, 21 outlier cases were removed from the OLS regression in table 5. The R^2 value once removing outliers increased by 0.1509. 11 of the outlying schools were labeled as "other" by the NCES ELSi. A number of those were charter schools. The mean percentage free and reduced lunch eligible was 9 percent higher for outliers than for those used in the regression, and average student teacher ratio was higher by 3. The outliers were erratic for both of these variables, with percent FRL eligible ranging from 0 to 83.75 and student teacher ratio ranging from 3.88 to 354.02. Figure A1 in the appendix is a spatial analysis of these outliers by percent FRL eligible.

The second OLS regression included in the results, table 7, had 11 outliers removed from its models. This set of outliers tended to be in rural locations, had on average greater Latino population in their districts, less total students enrolled in the districts, and a greater percent free and reduced lunch eligible students (a mean of 52.37, compared to the overall mean of 39.28). The outliers had much greater total revenue per student, with a mean of $48,333.19 compared to the maximum total revenue per student used in the regression, $31,417.42. Removing these outliers from the regression accounted for an additional 0.08 in R^2.

Results

First the hypothesis that public school demographics in Colorado are a function of neighborhood demographics in the district area gains support in Table 1. Table 1 is a list-wise deletion correlation matrix with indicators of significance. The district population percentage for white, black, and Latino residents have high correlation coefficients for corresponding student race variables ranging from .71 to .79, all significant at the P<.001 level. District percent Asian and percent Asian students have a slightly weaker correlation at .56, P<.001.

Table 1. List-wise correlation matrix for neighborhood and school demographics

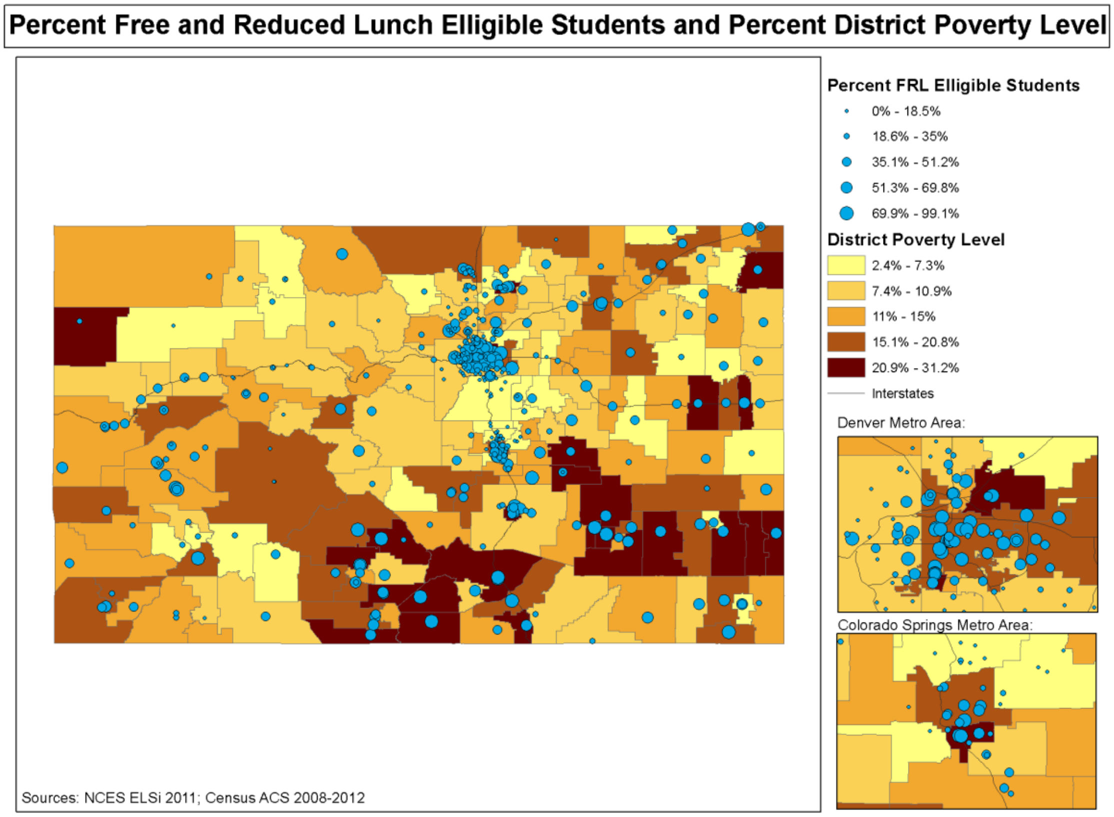
Variable	1	2	3	4	5	6	7	8	9	10	11
1. % White Students	1.00										
2. % Black Students	-.46***	1.00									
3. % Latino Students	-.94***	.15**	1.00								
4. % Asian Students	-.06	.23***	-.1*	1.00							
5. % FRL Eligible	-.66***	.26***	.66***	-.21***	1.00						
6. % White	.71***	-.62***	-.53***	.28***	-.4***	1.00					
7. % Black	-.5***	.71***	.27***	.32***	.3***	-.86***	1.00				
8. % Latino	-.75***	.17***	.79***	-.05	.5***	-.59***	.24***	1.00			
9. % Asian	-.27***	.45***	.08	.56***	-.13**	.53***	.54***	.02	1.00		
10. District % Below Pov.	-.49***	.21***	.47***	-.11*	.56***	-.44***	.31***	.58***	-.16**	1.00	
11. Local Rev. per Student	.13**	-.02	-.12*	-.041	-.094	.17***	-.14**	-.24***	-.08	-.16**	1.00

P<.05* P<.01** P<.001***

Two income variables included in this matrix, district percent below poverty and percent free and reduced lunch eligible correlate moderately strong with one another, .56, P<.001. I first hypothesized that the prevalence of FRL eligible students and people below poverty in the district would indicate lower local revenue per student. FRL eligible students had no significant correlation to local revenue, while the latter had a weak negative correlation, -.16, P<.01, which was expected to be stronger.

Figure 1 shows a spatial analysis of the relationship between FRL eligible students and district poverty. Statewide, there appears to be a connection between district poverty and schools with higher percentages of FRL eligible students.

Figure 1. Percent Free and Reduced Eligible Students and District Poverty Level



Several districts such as Denver 1 and Colorado Springs 11 cover a wider geographic span of dense areas, leading to less precise shading for district poverty. However, both the Colorado Springs and Denver metro areas have smaller districts with darker shading indicating poverty concentration; these are Harrison 2 and Adams County 14, respectively. Both the Harrison 2 district in Southern Colorado Springs and the Adams County 14 district North-East of Denver have schools with larger numbers of FRL students, supporting the hypothesis that district poverty leads to student poverty in public schools.

Table 2 is a summary of list-wise correlation coefficients between TCAP proficient or advanced percentage and various neighborhood, school, and funding variables. Supporting the hypothesis that student poverty negatively effects school performance, percent FRL eligible students has a relatively strong negative correlation for each; the average coefficient being -.65, P<.001. As predicted, higher levels of education in the district corresponds to higher TCAP scores in all four subjects. The strongest correlations of the education variables is for percentage non-high school graduates, correlating with average TCAP proficiency at -.47, P<.001. Of the four individual subjects, percent non high school graduates has the strongest negative relationship with math proficiency at -.47, P<.001, and the weakest with reading proficiency at -.43, P<.001 though the variance is very small. Also as predicted, the percentage of college graduates positively correlates with TCAP proficiency, and percentage of those who only finished high school is a weak negative one.

Table 2. District funding, neighborhood and school demographics' listwise correlation coefficients for percent TCAP proficient and advanced

Variable	Percent Math Proficient	Percent Reading Proficient	Percent Writing Proficient	Percent Science Proficient	Average TCAP Proficiency
% White Students	.6***	.64***	.67***	.65***	.67***
% Black Students	-.28***	-.33***	-.33***	-.29***	-.32***
% Latino Students	-.59***	-.61***	-.65***	-.64***	-.64***
% Asian Students	.32***	.23***	.26***	.25***	.27***
% FRL	-.62***	-.61***	-.64***	-.64***	-.65***
Unemployment Rate	-.24***	-.26***	-.3***	-.3***	-.29***
% Non-H.S. Grads	-.47***	-.43***	-.46***	-.46***	-.47***
% H.S. Grads	-.29***	-.13*	-.16**	-.19***	-.2***
% College Grads (Bach. Degree)	.37***	.21***	.25***	.28***	.28***
Total Local	.16***	.07	.07	.08	.09
Federal Funding	-.39***	-.39***	-.44***	-.42***	-.43***
State Revenue	-.09	-.05	-.05	-.08	-.07
Total Revenue	-.04	-.05	-.05	-.08	-.06

P<.05* P<.01** P<.001***

Table 2 also indicates strong correlations with student race and TCAP proficiency, the strongest being white and Latino students (the two most prevalent racial/ethnic groups in Colorado). Percent white student body has a strong positive correlation with TCAP scores, the average being .67, P<.001, whereas Latino student body is roughly the opposite, -.64, P<.001. Federal funding per student has an unexpected negative coefficient, -.43, P<.001 for average TCAP proficiency. The spatial analysis in figure 2 shows which districts receive the most federal funding. Figure 2 indicates that more federal funding tends to go to urban districts with higher enrollments of FRL students.

To understand the funding, demographic, and institutional differences that urban schools present, a series of two-sample t-tests by group were run to examine the differences between urban and rural school locations.

Figure 2. Percent FRL Eligible and Federal Funding per Student (Dollars)

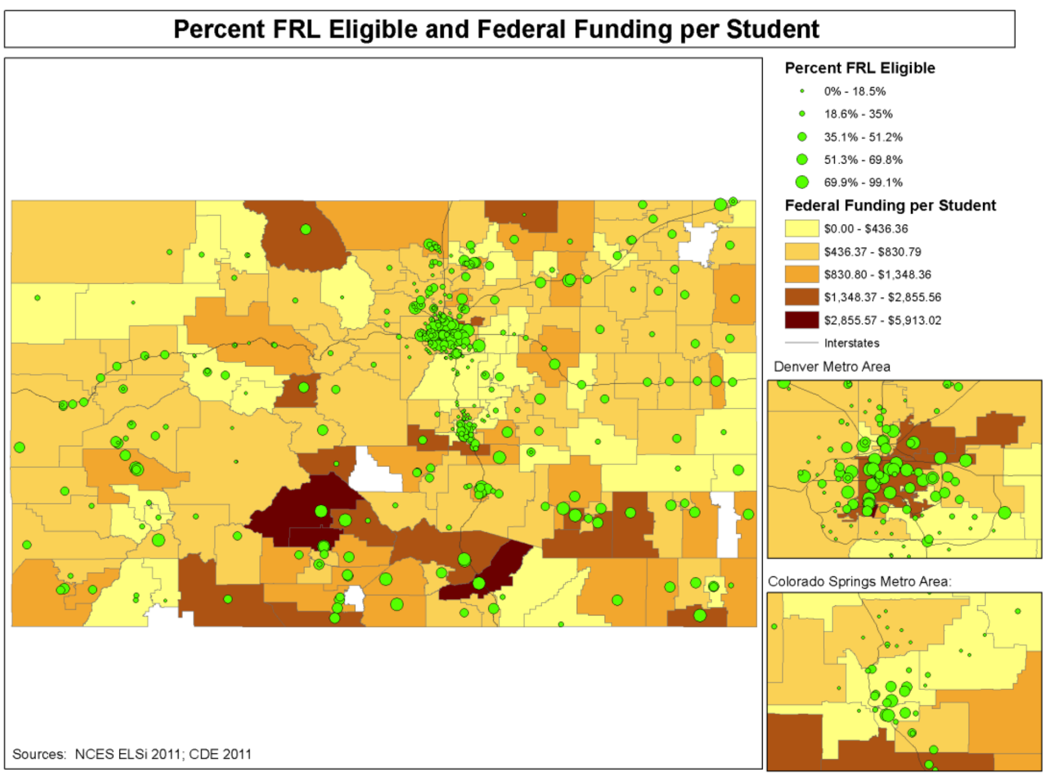


Table 3 summarizes the results of 9 two sample t-tests comparing school demographics among urban and rural schools. The results in table 3 confirm the hypothesis that urban and rural schools are highly segregated by race. Rural schools have significantly larger portions of white students, t(399)=8.06, P<.001, while urban schools have proportionally larger enrollments of black, Latino, and Asian students. All racial demographic tests in this table are significant enough to reject the null hypothesis. Table 5 also confirms that percent FRL eligible students are not significantly divided by urban or rural locations, t(399)=1.32, P>.05. This does not disprove that there are more FRL eligible students in inner cities than elsewhere, as urban, in this case, accounts for schools within 5 miles of any urban area in Colorado. As seen in figure 1, inner city districts of Denver and Colorado Springs have clusters of high FRL schools.

Table 3. Summary of two sample t-tests for school demographics by urban and rural location

Variable	Mean of Rural Schools	Mean of Urban Schools	Difference in Means	T Statistic and Significance	Wilcoxon Rank Sum	Cohen's D
% White Student Body	77.76	55.55	22.21	8.06***	9***	.91
% Asian Student Body	.647	1.96	-1.31	-5.93***	-6.79***	-.67
% Black Student Body	.875	5.01	-4.14	-5.2***	-8.36***	-.58
% Latino Student Body	18.4	33.88	-15.48	-5.88***	-7.09***	-.66
% FRL Eligible	30.8	31.94	2.37	-.479	.568	-.05
Student Teacher Ratio	14.2	19.9	-5.7	-2.44*	-9.96***	-.27
Number of Students	150.83	811.92	-661.09	-9.23***	-10.12***	-1.04

P<.05* P<.01** P<.001***

Table 4 indicates significant differences in funding and expenditures per student across rural and urban located schools. Property tax per student is significantly higher for rural schools, t(399)=3, P<.001, as was expected in the hypothesis. However, local revenue makes up a higher percentage of total revenue for urban schools, t(399)=-3.03, P<.05. Rejecting another hypothesis, State share is significantly higher for rural school districts than urban, t(399)=2.2, P<.05, generating a Wilcoxon rank sum of 6.68, P<.001. State revenue (which includes state share) was also significantly higher for rural schools. Federal funding per student is higher for urban schools than rural, totaling in significantly more total revenue per student for rural schools than urban, t(399)=6.57, P<.001. All expenditures per student tested by urban or rural location were significantly higher in rural schools as expected.

Table 4. Summary of two sampled t-tests for funding variables by urban or rural location

Variable	Mean of Rural Districts	Mean of Urban Districts	Difference in Means	T Statistic and Significance	Wilcoxon Rank sum	Cohen's D
Instructional Expend. per Student	6372.82	5037.43	1335.39	8.82***	6.59***	.99
Maintenance Expend. per Student	1288.15	869.2	418.95	9.34***	7.54***	1.05
Supply Expend. per Student	466.48	297.48	169	6.52***	4.35***	.73
Total Expend. per Student	16719.6	12331.4	4388.2	5.03***	3.84***	.56
Property Tax Rev. per Student	4476.31	3863.19	613.11	2.22*	.049	.25
Special Ownership Tax Rev. per Student	370.36	269.08	101.28	5.7***	2.42*	.64
Total Local Rev. per Student	5998.21	5018.83	979.37	3***	-13.09***	.34
State Share per Student	8949.35	3861.2	5088.15	2.2*	6.68***	.25
State Rev. per Student	8947.55	4437.74	4509.8	5.8***	7.09***	.65
% State Share of Total Rev.	77.8	38.04	39.76	1.81	2.4*	.2
Federal Funding per Student	845.75	865	-19.25	.605	-2.32*	-.03
% Federal Funding of Total Rev.	5.89	8.4	-2.51	-4.9***	-5.81***	-.55
Total Rev. per Student	15791.51	10321.58	5469.93	6.57***	5.22***	.74
Number of Students in District	1170.26	30549.58	-29379.32	-10.24***	-13.75***	-1.15

P<.05* P<.01** P<.001***

The regression in table 5 gives a better understanding of the variance of TCAP scores across public schools in Colorado. Table 5 is a multiple OLS regression with average TCAP percent proficient or advanced as the dependent variable. The regression consists of 8 independent variables divided into 4 models accounting for neighborhood and school demographics as well as district funding and expenditures.

Table 5. Multiple OLS regression for Average TCAP proficient or advanced

	Variable	Model 1	Model 2	Model 3	Model 4
Neighborhood Demographics	% Non H.S. Graduates	-1.36*** (.14)	-.001 (.136)	-.003 (.136)	.006 (.138)
	Unemployment Rate	-2.16*** (.59)	-.837 (.438)	-.825 (.448)	-.864 (.451)
School Demographics	% Latino Students		-.169*** (.051)	-.169*** (.051)	-.171*** (.051)
	% FRL Eligible		-.456*** (.047)	-.456*** (.047)	-.454*** (.048)
	Student Teacher Ratio		-.169*** (.028)	-.169*** (.028)	-.17*** (.029)
	Urban Location		-4.34** (1.67)	-4.29* (1.72)	-4.4* (1.72)
Funding	Total Revenue per Student			.000 (.000)	-.000 (.000)
Expenditures	Total Expenditures per Student				.000 (.000)
	R^2	.334	.659	.659	.66
	Constant	69.86*** (3.11)	78.01*** (2.57)	77.74*** (3.28)	77.77*** (3.28)
	Observations (n)	309	309	309	309

Note: Unstandardized regression coefficients; standard error in parenthesis

P<.05* P<.01** P<.001***

Model 1 supports the hypothesis that district employment and level of education positively affect TCAP scores. Percent non-high school graduates in the district negatively effects average TCAP proficient and advanced scores with a coefficient of -1.36, P<.001 when controlling for district unemployment. Percent non-high school graduates is not significant when controlling for school demographics. District unemployment also has a significant negative effect on TCAP proficiency, -2.16, P<.001 until controlling for school demographics. Figure B1 in the appendix shows the spatial relationship between unemployment rate and TCAP math proficiency.

School demographics accounted for the largest variation in TCAP scores. The addition of school demographic variables in model 2 accounts for an R^2 of .659, up from .334 in the previous model. Percent Latino student body has a significant negative coefficient of -.169, P<.001, which is consistent with both my hypothesis and prior research. While the intention was to measure for percent black and Latino students, the addition of percent black student body in the regression, or as a composite variable posed a high risk for multicolinearity. Percent Latino students remained in the model because Latinos are a more prevalent ethnic group in Colorado than are African Americans. Percent FRL eligible has a larger negative coefficient of -.456, P<.001. Supporting the hypothesis that higher class sizes have a negative effect on academic performance, student teacher ratio also returned a significant negative coefficient despite a positive effect for the number of students enrolled in a school overall. Contrary to my hypothesis, neither total revenue per student nor total expenditures per student was significant at the P<.05 level; both returned coefficients close to zero.

Table 6. Summary of two sampled t-tests for TCAP proficiency by urban or rural location

Variable	Mean of Rural Schools	Mean of Urban Schools	Difference in Means	T Statistic and Significance	Wilcoxon Rank Sum	Cohens D
% Math Prof./Adv.	31.21	27.68	3.53	1.48	1.77	.2
% Reading Prof./Adv.	65.94	57.34	8.61	3.09**	2.6**	.42
% Writing Prof./Adv.	50.45	42.21	8.24	2.97**	2.74**	.4
% Science Prof./Adv.	46.15	40.23	5.92	2.01*	2.17*	.27
Average TCAP Prof./Adv.	48.44	41.93	6.51	2.48*	2.37*	.34

P<.05* P<.01** P<.001***

Table 6 is a collection of two sample t-tests of TCAP proficient and advanced scores in each subject as well as the average of the four subjects. All but math proficiency were significantly higher in rural schools. As predicted, reading and writing proficiency had the greatest significance, t(399)=3.09, P<.001 for reading and t(399)=2.97, P<.001 for writing. Figure B2 in the appendix shows a spatial analysis of reading proficiency and district poverty levels.

Though neither local, state, nor federal revenue had any significant effect on average TCAP proficiency in table 5, the regression in table 8 seeks to uncover what determines higher total revenue per student in Colorado. Table 7 is another multiple OLS regression with total revenue per student as the dependent variable.

Table 7. Multiple OLS regression for total revenue per student

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
% Below Poverty	19.04 (26.85)	87.7** (27.67)	96.81** (32.24)	34.57 (33.63)	29.68 (34.18)	14.77 (33.36)
Unemployment Rate		-639.21*** (99.04)	-626.58*** (101.73)	-593.93*** (98.88)	-576.95*** (101.13)	-488.7*** (99.96)
District % Latino			-7.78 (14.09)	-27.79 (14.23)	-26.96 (14.28)	-6.63 (14.49)
% FRL Eligible				40.17*** (7.98)	40.7*** (8.01)	32.54*** (7.97)
Number of Students in District					-.004 (.005)	.007 (.006)
Urban Location						-1951.31*** (402.4)
R^2	.001	.098	.099	.15	.156	.205
Constant	10528.22*** (387.72)	12943.53*** (525.47)	12910.42*** (529.35)	12386.5*** (523.88)	12425.7*** (526.36)	13257.2*** (539.55)
Observations (n)	390	390	390	390	390	390

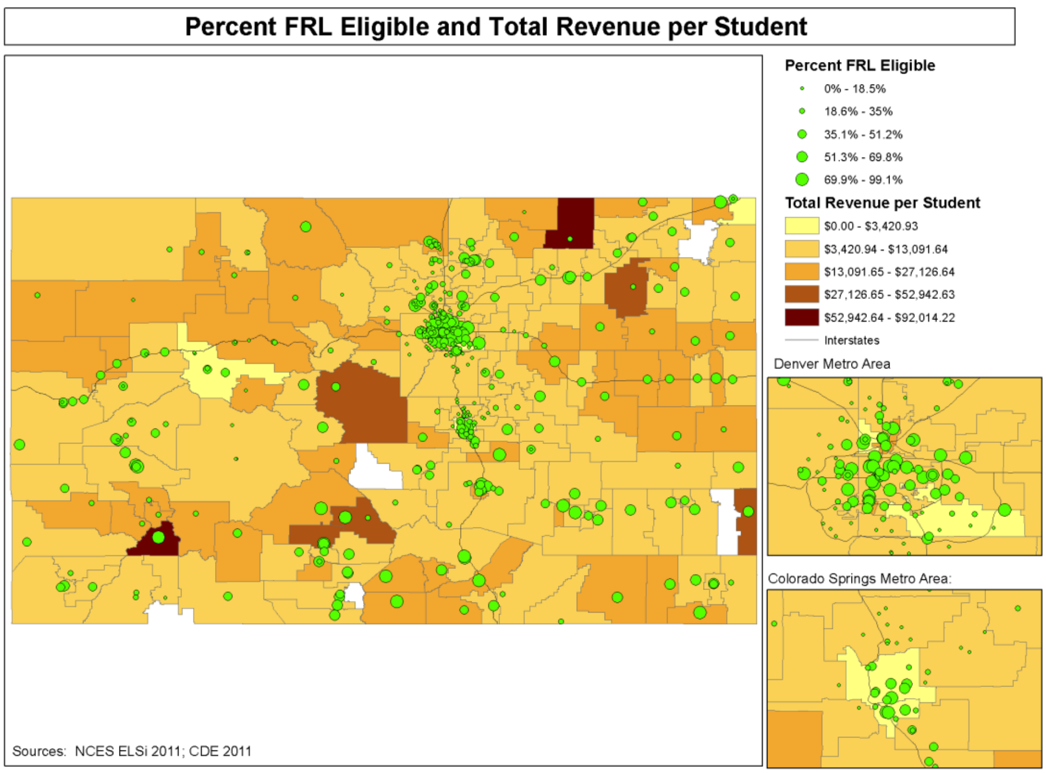
Note: Unstandardized regression coefficients; Standard error in parenthesis

P<.05* P<.01** P<.001***

Violating a central hypothesis of this study, district percent below poverty has no significant effect on total revenue in model 1, but has a significant positive one when controlling for the unemployment rate and FRL eligible students in models 2 and 3. Consistent with my predictions, unemployment rate has a significant negative effect on total revenue of -488.7, P<.001 when controlling for all other variables. Percentage of FRL eligible students has a significant positive effect on total revenue of 32.54, P<.001, also making up the largest increase in R^2 of any other variable.

Figure 3 is a spatial analysis of district total revenue per student and percent FRL eligible. Total revenue per student varies slightly across most districts. Except for several outliers, Silverton 1 in the Southeastern portion of Colorado and Prairie RE-11 to the North-East, there is not much variance in total revenue per student. Many urban districts in the Denver area have moderate revenue per student with the exception of Cherry Creek to the Southeast in the Denver inset which has particularly low revenue per student. In Colorado Springs, both district 11 and Harrison 2 have especially low revenue per student and rather high percentages of FRL eligible students.

Figure 3. Percent FRL Eligible and Total Revenue per Student



Discussion

The efficacy of public education in Colorado, as measured by TCAP is differentiated based on the wealth, race, and social capital of the community where the school is located. According to much of the literature covered previously, Colorado is not unique in this way. Some policymakers logically conclude that the disparity in school performance can be reduced by additional funding in underperforming schools. However, the research presented in this study did not confirm any direct connection between the amount of per-student funding and Transitional Colorado Assessment Program (TCAP) scores. The research tends to confirm that inner city schools are overpopulated and segregated by wealth and race.

District Funding

The funding variables included in this study proved far less indicative for increased academic performance than expected. District revenue and expenditures also had minimal relationships with most school and neighborhood demographic variables. Despite the lack of significance between funding and TCAP scores, several conclusions can be drawn from these funding variables and their distribution. First, both district revenue and expenditures varied heavily between urban and rural districts. Examining the differences presented in the results between rural and urban schools and the distribution of revenue using spatial analyses as well as exploring different revenue sources and their meanings for demographics and academic performance, one can understand the role funding plays in our research questions.

Previous studies mentioned in the literature review consistently found funding to be far lower for inner city urban schools. More importantly, several studies indicated funding as a crucial component of a districts' success in teaching students. Chamers, Levin, and Parrish

(2006) found that public schools in New York State with larger adequacy gaps had significantly lower pass rates for students, especially students of color and those who posed an economic risk. This was not the case for this study.

Funding distributions were more significant. This study predicted a significant difference in both funding and expenditures per student based on location in inner cities. However, total revenue per student remained fairly consistent throughout much of the state, and more surprising, in urban areas. In the Denver metro area, Cherry Creek School District's relatively low revenue per student came unexpectedly. Cherry Creek is located away from the central, inner portion of the Denver metro area and it has far less poverty than neighboring districts like Adams County 14. An examination of funding sources showed that Cherry Creek received far less federal funding than Adams County.

The perceived measure of equality in total revenue across the state is due in part to federal funding. According to the CDE, federal funding includes but is not limited to "funds received for vocational education, education of children with disabilities, adult education, migrant children education, and nutrition and meal programs" (CDE 2013). Therefore, though total revenue was surprisingly even across many districts, those receiving more federal funding likely use those funds primarily for free and reduced lunch programs rather than instructional or material costs. Not taking into account federal funding, Cherry Creek receives considerably less revenue than Adams County 14.

From the original hypothesis that all funding variables are positively associated with TCAP performance, the negative relationship between federal funding and TCAP was unexpected. However, the negative effect of percent FRL eligible students on TCAP scores explain this relationship.. Federal funding is highly associated with percent FRL eligible, the latter has a strong negative effect on TCAP scores.

This thesis hypothesized that funding would be more influential for test scores, but it also expected the different sources of revenue to provide a greater narrative about the schools' performances. The local wealth component of property tax contributions leads one to believe higher property tax revenue in a district indicates wealth and therefore, as we have seen, academic success. The four districts with no state share, on average had 19 percent fewer FRL eligible students than the other 391 schools, a substantial difference. Regardless, state share per student had no significant effect on TCAP proficiency nor did it correlate with percent free and reduced lunch eligible.

Many revenue and expenditure variables were significantly greater in rural schools than those in urban areas. Revenue per student is significantly greater in rural schools. This can be explained by the "size factor" of total program funding, which grants additional funds to districts with fewer than 4,023 students (CDE 2013). The size factor is granted to small districts to keep up funds for maintenance, supply, and other expenses that would be unattainable without state compensation for the lack of per-pupil funding. However, none of the expenses that are significantly greater per student in rural areas are flat rates; they increase with student enrollment. To uphold truly equal funding standards these expenses should be similar across districts per pupil.

Regardless of the small effect revenue and expenditures had on TCAP scores when controlling for school demographics, the funding disparity is not an isolated statistic. Given the effect of school demographics like percent FRL eligible and student-teacher ratio have on TCAP scores, it seems the state has settled for an education standard that places urban schools on the bottom rung. The low predictive power of district funding on TCAP scores and the appearance of revenue equality cannot tell the whole story behind varying test scores if the state and federal funds granted go towards lunch prices. Researchers in the field of education acknowledge that children from low income families in low income neighborhoods need more than just a free lunch (Chapman 2003; Ransdell 2012). To overcome the many societal obstacles in the way of educational achievement for these children, a bigger effort must be made to reduce class sizes and hire meaningful and effective teachers.

School Demographics

The results of this study indicate that as far as funding, the urban public school model is the cheaper alternative for Colorado taxpayers. Larger public schools are able to push a greater number of students through the grades to their eventual graduation or departure from school. Graduation rates would have been another valuable asset to this study. By revisiting Wilson (1987) who, using graduation statistics claims that these overcrowded, underfunded inner city schools are merely a vehicle for the reproduction of inequality, one can see the findings of urban schools in Colorado reflect this rhetoric.

The issue of urban versus rural education standards also takes a racial position. Graduation rates in urban high schools are 15 percent lower than rural or suburban (Swanson 2008). Taking into account that school districts in the 24 largest cities in the U.S. are made up 70% black and Latino, and that black and Latino youth are also more than twice as likely to live in poverty, it is evident that race, poverty, and urban schools are intertwined (Denavas-Walt et al. 2005; Orfield and Lee 2005). The interactions of race and poverty in the city can also be seen in this study, and offer some explanations as to why the presence of black or Latino students in a school is negatively associated with TCAP proficiency. This negative relationship is also supported by Chambers and colleagues' 2006 study of adequacy gaps in New York State, which found high school pass rates for minorities ranged from 81 percent in less needy districts, to 50 percent in the neediest.

Of school demographic variables, student-teacher ratio is the most related to district spending. In theory and in the data, though its connection to funding was limited, student-teacher ratio should increase with district expenditures. Roscigno, in his 1998 study drew attention to the importance of low student-teacher ratios for an adequate learning environment. Student teacher ratio in Colorado was significantly greater in urban public schools than rural. Rural schools on average spent an additional $1,335.39 per student on instructional expenditures to fund significantly smaller classrooms. Urban districts, given the size of their enrollments and revenue cannot afford small class sizes and settle for larger ones which have been proven by data in this study and others to be less conducive for learning.

This is evidence of a stark division between rural and urban located public schools. Consistent with Roscigno (1998), the results of this study indicated a significant negative effect of student teacher ratio on TCAP proficiency when controlling for all other demographic and funding variables. The frugality of urban districts' spending in this case places the students at a disadvantage. The number of students in urban classrooms, along with the significant level of racial segregation confirm Wilson's theory of social isolation in the inner city and numerous other findings concerning the lesser academic performance of low-income or minority students in urban schools.

District Demographics

District demographics were not great indicators of funding. District demographics did confirm the hypotheses that levels of poverty, education, and unemployment effect TCAP scores and support the idea that schools in poor areas require more funding. District demographic variables only had significant effects on TCAP scores until controlling for school demographics. As predicted, district poverty was negatively associated with TCAP proficiency, especially in reading and writing. This is consistent with the theory that low income youth hear less articulate words in the home and spend less time reading.

The relationship between non-high school graduates and TCAP proficiency relates back to Halpern-Felsher (1997), who found parental education levels, especially maternal, to be very influential on children's academic outcomes. Halpern-Felsher found that for the age group of the students taking the TCAP tests, age 15-20, maternal education was highly significant for white and black males and females. Despite the issue of accuracy with larger district sizes, education variables remained significantly correlated to TCAP proficiency until controlling for school demographics.

Like education and poverty, unemployment had significant negative effect on TCAP proficiency until controlling for school demographics. Unemployment rate returned moderately strong negative correlations with proficiency in all four TCAP subjects. More relevant to this study's research questions unemployment has a strong negative effect on total revenue per student. Unemployment rate has a similar effect as what had been expected of FRL eligibility but without a federal aid program. Unemployment's negative effect on total revenue also supports the original hypothesis that districts with higher poverty would have less funding due to a lack of property tax basis. Unemployment rate also had a confirmed negative effect on TCAP proficiency, consistent with the theory that without positive role-models, children in low-income areas perform worse in school (Connell and Halpern-Felsher 1997; MacLeod 2008).

Limitations

Using school districts as the unit of analysis for neighborhood demographics was limiting. School districts in Colorado vary in their geography and size, but all are relatively large. If this study had used smaller units of analysis for neighborhood demographics then the results could have been more precise. Urban districts like Denver 1 or Colorado Springs 11 were especially troublesome for demographics due to their high population density. The ideal unit of analysis for neighborhood variables would have been individual school catchment areas within districts.   Unfortunately those boundaries are not readily available.

Funding variables presented another issue, as funding data were only available at the district level. Funding data specific to each school would have been beneficial for understanding more direct trends in both revenue and spending and their effects on school performance. The funding variables were somewhat vague and did not translate well with the funding literature. Where the CDE explains public school funding in terms of a formula for "Total Program," the data used in this study was framed by revenue which includes total program plus additional income for certain programs that were not mentioned specifically in some cases. Due to the inclusion of unspecified funding in revenue variables, total program for each district could not be calculated.

Though TCAP are standardized tests used by the CDE to gage instructional capabilities of schools, other academic performance variables could have revealed more distinct findings.

Standardized tests are impersonal and could lack meaning for the students required to take them. Grade point average or graduation rates would have built a more comprehensive look at the institutions' ability to teach and pass students through high school. 71 schools in this study either did not take TCAP tests in 2011 or had insufficient data for TCAP results.

Implications for Future Research

This study had shown that the current system of funding, as it is allocated now, does little to placate the disparity of TCAP proficiency across districts of varying poverty and culture. Future research for policy-makers should investigate more closely individual schools and their funding actions to gain a clearer understanding of how funding allocation can be amended to better suit urban, economically disadvantaged students.

A smaller geographic focus could also open the possibilities for more precise and in depth neighborhood analysis, including crime data as a measure of area safety. Incorporating variables that include student self-reported measures, teacher backgrounds and teaching experience, and in-depth funding for each individual school could reveal more about the inner workings of urban public schools in a smaller geographic span to find more significant data. Detailed studies of administrators, instructors, and school guidance counselors could provide answers to critical questions of how to better serve disadvantaged students in school.

Conclusion

The findings of this study first and foremost found very little evidence that funding has an effect on standardized test scores in Colorado public schools. Using both demographic variables and funding data to explain the reasons for the disparity in academic performance, the results of this study found demographics to be a much more influential predictor. With this data, wealth, race, employment, and education were all significantly greater indicators of variance in TCAP proficiency than any funding variable included in the study.

The significance and high predictive power of demographics, especially at the school level, indicates a deeper lurking issue that is beyond funding. The fact that race and poverty presented the largest effect on TCAP scores proves that there are latent cultural causes that could explain the disparity. On the other hand, the significance of classroom sizes proposes a more solvable method to improving education standards. Lowering student-teacher ratios may be the best use of funding for future policy changes.

Based off the research conducted in this study and others referenced in the literature, the current system of funding as it stands now cannot compensate for underlying cultural differences between students from underprivileged backgrounds, regardless of free lunch programs. As Chapman (2003) acknowledges in her assessment of underprivileged students, free lunches are not enough to combat the cultural obstacles to school success that are highly associated with poverty. In order to close the gap in academic performance, serious changes must be made not only to the funding system used in Colorado, but to the general model of urban public schools.

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Appendix A: Descriptive Statistics

Figure A1. Outliers from table 5 regression and percent FRL Eligible

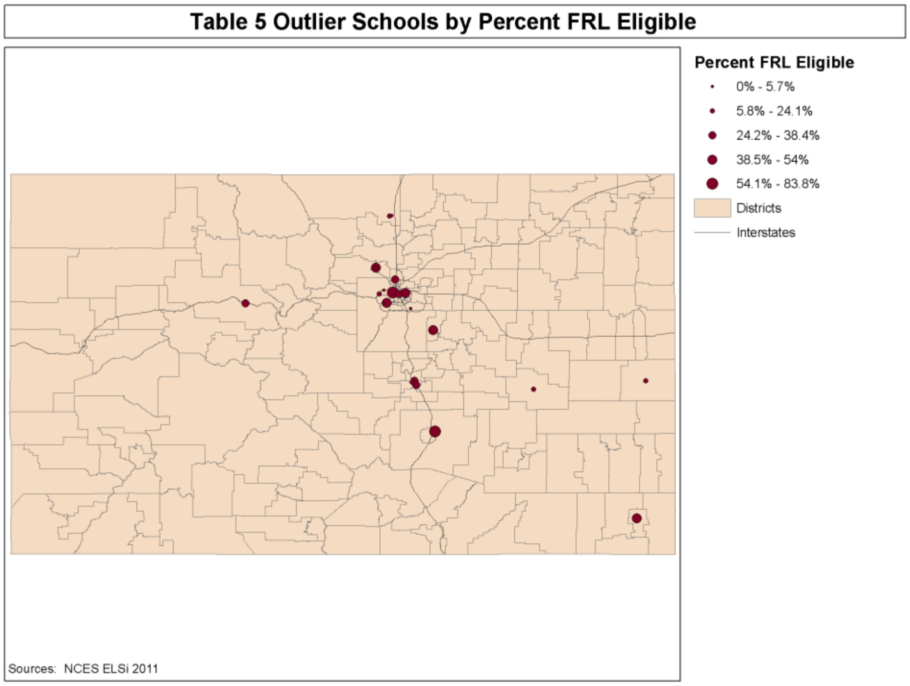

Table A1. Descriptive Statistics: Funding Variables

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
Total exp. per student	396	13694.97	7912.48	3255.31	112638.9
Property tax per student	396	4080.73	2446.03	391.58	18431.01
State share per student	396	5231.08	20796.38	0	416536.2
Instructional exp. per student	396	5468.6	1349.96	2280.53	15679.52
Maintenance exp. per student	396	995.49	429.07	152.87	4320.35
Federal funding per student	396	870.63	641.59	67.98	5913.02
Total rev. per student	396	11957.51	7736.30	3420.93	92014.22
Total local rev. per student	396	5351.78	2894.6	654.4	24891.35
State rev. per student	396	5735.11	7221.85	105.39	82964.6

Table A2. Descriptive Statistics: School Variables

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
Urban	401	.7282	.4455	0	1
% Math Prof./Adv.	331	28.42	17.74	0	88
% Reading Prof./Adv.	331	59.16	20.97	0	100
% Writing Prof./Adv.	331	43.95	20.9	0	98.85
% Science Prof./Adv.	330	41.48	21.93	0	96
Student-teacher ratio	401	18.35	20.95	0	354.02
% Black students	401	3.89	7.32	0	45.94
% White students	401	61.59	26.43	0	98.08
% Latino students	401	29.67	24.43	0	100
% Asian students	401	1.6	2.05	0	16.11
% FRL Eligible	401	39.28	23.35	0	99.1
Number of students in school	401	632.22	702.09	11	5034
Number of students in district	401	22563.7	28684	33	85971

Table A3. Descriptive Statistics: Neighborhood Variables

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
% Below poverty	401	13.29	6.1	2.43	31.23
Unemployment rate	401	5.19	1.7	0	12.57
% Non-H.S. graduates	401	10.43	6.41	.84	38.98
% Bachelor's degree	401	31.9	14.52	5.93	64.78

Appendix B: Neighborhood Demographics

Table B1. Two sampled t-tests of various neighborhood demographics by urban or rural location.

Variable	Mean of Rural Districts	Mean of Urban Districts	Difference in Means	T Statistic and Significance	Wilcoxon Rank Sum	Cohen's D
% Non-H.S. Graduates	10.55	10.38	.166	.231	-.149	.03
% H. S. Graduates	30.95	22.94	8.002	10.08***	8.92***	1.13
% Some College Education	35.15	31.55	3.6	5.75***	5.61***	.65
% College Graduates (Bach. Degree)	23.35	35.11	-11.76	-7.73***	-7.33***	-.867
Unemployment Rate	4.43	5.48	-1.04	-5.68***	-5.06***	-.64
% White N.H.	95.89	87.72	8.17	10.5***	11.71***	1.17
% Black N.H.	.962	4.39	-3.42	-7***	-10.75***	-.79
% Asian N.H.	.805	3.25	-2.45	-11.89***	-11.23***	-1.33
% Latino	14.09	21.96	-7.87	-5.02***	-7.29***	-.563

P<.05* P<.01** P<.001***

Figure B1. District Unemployment Rate and Percent Math Proficient or Advanced

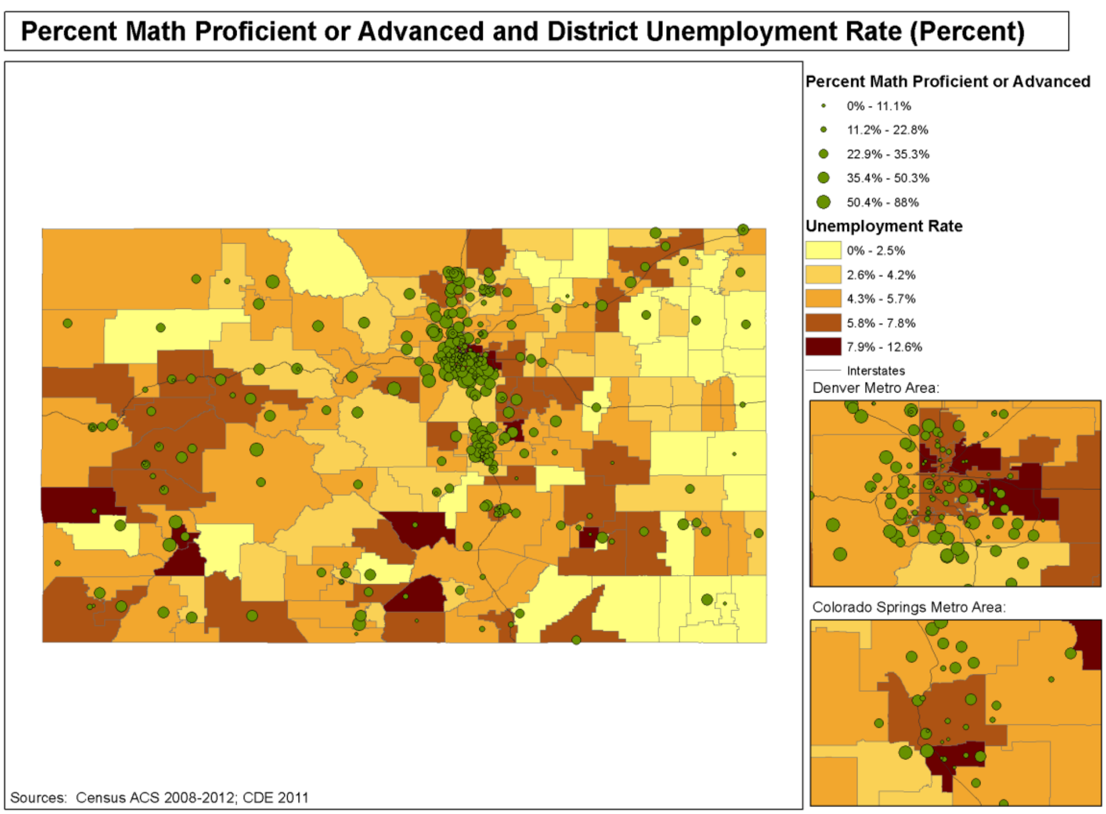

Figure B2. Percent Reading Proficient or Advanced and District Percent Below Poverty Level.