Differentiated College-Prep Course Access

An Analysis of Colorado Public Schools

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A thesis submitted in fulfillment

of the requirements for the

Degree of Bachelor of Arts with Honors

in Political Science

UNIVERSITY OF COLORADO AT BOULDER

Boulder, Colorado

April 6th, 2015

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Acknowledgements

My utmost appreciation and sincerest gratitude is extended to the following persons who, in some way, have contributed to making this thesis a success.

Dr. Kenneth Bickers, Advisor, for his time, support, and wisdom.

Dr. Janet Donavan, Honors Council Representative, for going above and beyond in terms of unconditional support and encouragement throughout this process.

Mr. Kent Willmann, Committee Member, for his time, constant enthusiasm, and education background.

Dr. Scott Adler, Professor, for pushing this project to its fullest potential and believing in me when I didn't.

Joseph Schaffer & Joseph Zamadics, for statistics assistance, and for answering frantic and untimely code questions.

Dr. Jeffrey Lyons, for telling me I should and could write a thesis.

Anonymous Principal, for taking the time out of her busy schedule to answer my questions and compile data.

Anonymous Admissions Counselor, for her time and thoughtful and thorough answers.

Evian Hardester, for her help editing this manuscript.

Kelly Lindau, for being my emotional support system, cheerleader, and best friend.

Parents, for donating their homes to research and their endless moral support.

Friends, for hearing about my thesis for the past eight months.

Without you, this project would not have been possible.

Thank you!

Introduction

We all have education experiences. One experience some are familiar with is being placed in or selecting classes for school. What many don't realize is that the curriculum choices that were made about which classes students are in have a drastic effect on the futures of K-12 students around the country. Class choice can affect the skills that students leave the secondary education system with, what jobs they are qualified for, and if and what college they can go to. *Did students take a foreign language? Did they learn Calculus to do this work? Can they write an argumentative essay? Did they take advanced classes?* These are possible questions employers and college admissions counselors may ask when considering applicants. The question that isn't asked enough is- *did this applicant have access to the classes that provide the skills I am looking for?* This is just as important a question to ask because how can we penalize people for not having skills they were never offered to obtain in the first place?

This thesis makes the case that the United States has an education system that provides different access to different kinds of students. More specifically, this paper questions whether or not students have differentiated access to classes that would realistically prepare them for and help them get accepted to college. The question this thesis attempts to answer is: Are schools systematically shunting low socio-economic status students into non-college tracks compared to students with higher socio-economic statuses?

This question is important because the first step to obtaining skills is having access to them at all. If this access is provided inequitably, meaning some students have less access than others based on where they went to school, then the United States faces the reality that the education system may be systematically providing opportunities to some students while keeping them from others. This can result in systematic inequality. Census Bureau data reveals that the US is plagued by inequalities that constantly segregate classes by race, supporting that Whites and Asians economically benefit more than African Americans and Hispanics. According to the Census Bureau, in 2009, the average median income was $60,098 per year (Census Bureau, 2009). However when broken down by race, the differences are quite apparent. The average median income for a White household was $62,545, and for an Asian/Pacific Islander household, it was $75,027 per year (ibid.). By contrast, the average median income for Hispanics and Blacks were $39,730 per year and $38,409 per year, respectively. What creates these inequalities? Why are differences between different groups of people so apparent? One argument is that the educational opportunities provided to students can push them forward or keep them back.

This argument seems likely when looking at the demographics of college campuses. This study focuses on education opportunities provided in the state of Colorado. In Colorado in 2013, the percentage of the population that was White alone (not Hispanic or Latino) is 69.4%, Asian alone is 3%, Hispanic or Latino is 21%, and Black or African American alone is 4.4% (Census Bureau, 2013). Yet, the demographics of the state college campuses look different. The University of Colorado at Boulder's student body, a public state school, has 70.6% White, 6.7% Asian, 9.3% Hispanic, and 2.1% African American (University of Colorado at Boulder). The only race adequately represented on this campus is White, Asians are over represented, and Hispanics and

African Americans represent less than half of the state population percentage. This is fairly consistent across other Colorado state schools. Colorado State University's student body is 75% White, 2% Asian, 9% Hispanic, and 2% African American (Colorado State University). Similarly, the University of Northern Colorado's student body has 59% White, 1% Asian, 15% Hispanic, and 4% African American (Colleges.Nich.com). If education throughout the state were equal, shouldn't the demographics on college campuses be similar? This begs the question as to why this disparity exists. This study seeks to find whether different demographic groups have systematically different opportunities to courses that could help them get into and stay in college through an interview with a Colorado principal and a college admissions councilor as well as comparing courses offered at specific schools with the demographics of the school and corresponding test scores. This process will assist in answering whether or not students of lower socio-economic statuses (usually correlated with race) are offered fewer opportunities to college-prep courses, and if this affects students' chances of getting into college. It will also qualitatively address how the decisions behind providing these opportunities are made.

This study is important because its results shed light on the systematic inequalities experienced throughout the country. I argue that Colorado's public education system is perpetuating the cycle of poverty by not enabling students of low-socioeconomic status to prepare for college, therefore keeping them from economic mobility. This is not to say that simply adding more opportunities will solve these problems overnight. However, if these opportunities aren't even being provided in the first place, it is a good place to start.

This study is conducted in the state of Colorado for a few reasons. First, a study of this magnitude has yet to be completed in the state. Secondly, focusing on one state as opposed to multiple allows for the study to inherently control for different policies and laws states have that may skew results as well as control for the fact that different states use different tests and measurements to report student success that aren't always easily compared to each other. Also, there were similar findings in California (that will be discussed in detail later) that suggest that the phenomenon exists across state lines, meaning this needs to be done in multiple to states to assess the full magnitude of the problem.

As a state, and as a nation, we should care whether or not students have the opportunities to succeed because this is something that can be addressed and fixed at the beginning of a person's life and career as opposed to after the damage has already been done. There is an obligation as policy makers and as citizens to provide equal educational opportunities to all, as according to our Constitution and national philosophy, we are all created equal under the law. We can address and fix the problem, but we must first identify root causes such as educational opportunity disparities.

In this study I assert that low socio-economic students in Colorado are disproportionately and systematically disadvantaged in getting skills to help them be successful in college based on their lack of access to college-prep courses. I also argue that schools with more college prep classes to offer and schools with an above average low-socioeconomic student population in college-prep courses will have higher average test scores for low-socioeconomic students. Previous research and litigation shows that academic tracking and unequal access are common findings, but has yet to be truly tested in the state of Colorado. Because of this, I will first give an overview of the history of educational policies and trends that have provided the structures of the current unequal education system. After, I will present studies that argue that processes commonly used today are not only ineffective and damaging to low-socioeconomic students but also disproportionally affects low socio-economic students. Then I describe relevant litigation from California and subsequent studies showing that access to college-prep programs are unequal and the result has been inhibiting students from college. I will then make the case that since the litigation had solid evidence but was not legally successful, that there is a need for a similar, but adjusted, study needed specifically for Colorado, especially following past education court cases in Colorado Supreme Court.

Literature Review

Access to college-prep classes has two parts: access between schools and access within schools. This study attempts to address both. Access varies both by how many college-prep courses are physically offered in an individual school, and which students have access to take the college-prep courses within their school building. Integral to understanding how students take differentiated courses understands the history behind how the current systems came to be. Because of this, this literature review will be presented in two parts: (1) Access within a school: course differentiation, and (2) access between schools: unequal opportunity. In part one, studies and court cases discussing the prevalence of differences in access in between schools and subsequent affects. This section will conclude with critiques of the current studies available and reiterate how my study will address these issues, and why my research is important. From this review of the literature, it is shown that course-differentiation is widely practiced, relatively ineffective, and has disproportionately negative effects on low-income students. It will also provide reasonable evidence that K-12 students have differentiated access to college –prep classes based on where they attend high school, and that this also tends to work to the disadvantage of low-income students.

Access Within A School: Course-Differentiation

What is course-differentiation and what is its origin?

Course-differentiation is commonly referred to the more loaded term *tracking*. Most of the studies reviewed in this section refer to course-differentiation as academic tracking, so it is important to clarify the definition. In an attempt to display what the authors of the studies reviewed mean by academic tracking, a few of their definitions are provided here. According to the study, *Early adolescents' aspirations and academic tracking: an exploratory investigation*, authored by Akos, Lambie, Milsom, and Gilhart (2011), academic tracking is "the educational practice of categorizing and classifying students by curriculum standards, educational career aspirations and/or ability levels" (pg. 58). According to Jeanie Oakes (2005), author of the book, Keeping Track: How Schools Structure Inequality, "tracking is the practice of dividing students into separate classes for high-, average-, and low-achievers; it lays out different curriculum paths for students headed for college and for those who are bound directly for the workplace" (Pg. 421-422). What is interesting about Oakes' definition is that it specifically differentiates between courses preparing students for college and for the workplace. This is important because it points out that some course tracks aren't necessarily made for students to be college-ready at graduation. In a job market that is continually demanding applicants to be college educated, and in which over a lifetime, college-educated persons make $1 million more than people with just high school diplomas, the fact that students leave their state-mandated education without the requirements and skills to attend college puts them at a direct societal and economical disadvantage (United States Census Bureau, 2012). Perhaps this wouldn't be a problem if course-differentiation were the exception and not the rule. However, according to Schweiker-Mara and Pula (2005), authors of *Effects of a homogeneous low-tracked program on academic performance of at-risk students*, "Over 95 percent of middle and senior high schools use some type of tracking program," implying that it is a pervasive and common practice that should be addressed (Pg. 35). The pervasiveness of this practice in the United States should beg the question as to whether or not course-differentiation is effective? It also begs the question of how this practice became so wide spread in the first place?

Academic tracking in the United States became a systemic practice as a result of an education reform movement that sought to change the system to support a large influx of immigrant students from diverse backgrounds. This first education movement, commonly referred to as the Progressive movement, occurred in the early 20th century and was the first time course differentiation was introduced (Noddings, 1992). According to Nel Noddings (1992) in her book When School Reform Goes Wrong, she explains that this reform resulted from "population growth, a huge influx of immigrants, industrialization, and urbanization" (Pg. 10). The author also explains that this reform was especially important to educate immigrants "who were thought to need education in citizenship if they were to become loyal Americans" and the new schools prepared "some young people for college and others for the industrial workforce" (ibid. Pg. 10). Based on Noddings explanation of this reform, it seems that its purpose was less on academic achievement, and more focused on assimilating immigrants to the American way of life. This facet American exceptionalism created a hierarchy stacked against immigrants because the new members of society needed to learn to be "loyal" and "American." As a result, the tracking system ultimately judged students based on their "perceived abilities" and ended up being "unquestionably pernicious in placing poor and minority students in 'lower' tracks and irresponsible in often failing to provide strong courses in these tracks" (ibid., Pg. 11). What Noddings is trying to point out is that lower tracks were in essence created to teach immigrant children how to be a citizen and to be loyal, and were rarely moved up because of stereotypes affecting whether or not teachers and administrators thought these children could and should go to college. The systematic practice of course-differentiation was built on judging students based on abilities that were generally determined by race and class, and this is still perpetuated today.

Is course-differentiation effective?

Proponents of tracking have argued that separating students by ability allows for students to learn more efficiently, however, a multitude of studies have found this to not be true. Oakes (2005) explains that "teachers and administrators generally assume […] that the academic needs of all students will be better met when they learn in groups with similar capabilities of prior levels of achievement" but that "among students identified as average or slow, tracking often appears to retard academic progress" (Pg. 3). This means that separating students that need more help out of a classroom not only doesn't help their academic progress, but actually prevents it. Studies have been conducted since the 1970's on the effectiveness of course differentiation, and have consistently found similar results that course differentiation is ultimately ineffective in providing the results it is intended (Esposito, 1973; Persell, 1977; Calfee & Brown, 1979; Rosenbaum, 1980; Kulik & Kulik, 1982; Slavin, 1990, Kulik, 1992; Slavin, 1995; Hattie, 2009). The next logical question is then why is this still a common practice even when it has been shown to be ineffective?

One possible answer to why course-differentiation is still common practice is that the students, families, and teachers that benefit from these courses are the most vocal and politically savvy to keep it in place. Mathis (2013) explains that the resistance to changing course-differentiation comes not from evidence that it is effective, but rather from "resistance [that] is generally from "high-track" teachers and parents who believe that they have benefited from a tracked system" (Pg. 2). The real inequality of it all, however, is based on the fact that, "the parents who are able to secure high-track placement for their children are disproportionately likely to be white, well-educated and politically vocal" (Mathis, 2013, Pg. 2). Studies have also shown that the alternative to tracking, when all students are provided with the same high-quality curriculum, the net effect is beneficial to both high-achieving and low-achieving students (Burris, Walner, & Bezoza, 2009). The unfortunate reality is that, "the net effect of tracking is to exaggerate the initial differences among students rather than to provide means to better accommodate them" (Oakes, 2005, Pg. 4). This shows that course-differentiation is not only poor at achieving the academic equality and achievement it is aimed at, but also, systematically disadvantages students of low SES status and students of color.

Does course-differentiation disproportionally affect different races and socio-economic status?

As shown in the introduction, race and class are highly correlated, meaning that people of low-income are more likely to be people of color (Hispanic and Black) than people that are White or Asian. Because of this, this section discusses studies that used race and socioeconomic status as independent variables in course-differentiation. This is where the true problem with course-differentiation lies. There is substantial evidence that tracking occurs through class-discrimination. To clarify, this is not arguing that schools purposefully and consciously place students based on their race or economic status. This is rather to point out that regardless of intent, students of low-socioeconomic status and students of color are disproportionately represented in lower track classes. Mathis (2013) explains that tracking "generally plays out in a discriminatory way, segregating students by race and socioeconomic status" (Pg. 1). This segregation puts poor and minority students at an inherent disadvantage regardless of their academic abilities, because of the proven ineffectiveness and stunting discussed in the previous section. Both Persell (1977) and Oakes (1985) found that poor and minority students are a disproportionate majority of low-track courses regardless of how the selection process occurs (test scores, parent/teacher/counselor recommendations, etc). This means that regardless of how students are separated into different class, sometimes by how they score on standardized tests, whether or not a teacher recommended them, or whether they self-selected to be in a specific course, systemically, poor and low-income students are over-represented in lower tracks and under-represented in higher tracks. Interestingly, Gamoran (1992), in his study, *The variable effects of high school tracking*, found that poor students with low grades are more likely to be directed to a low-track than middle case students with similar grades. This speaks to the fact the something is happening that separates students into different tracks even when their grades are the same.

If low-track classes were designed to eventually move students that were behind into higher tracks, this would be a much different conversation. However Burris, Welner, and Bezoza (2009) found that low-track classes have “watered-down curriculum”, more disciplinary problems, lower expectations for students, and less experienced teachers. This is further supported in Oakes’ (2005) study of a “representative group of 300 English and Mathematics classes,” she found due to the inherent inequalities between tracked classrooms, “those students who need more [instruction] time to learn appear to be getting less; those students who have the most difficulty learning are being exposed least to the sort of teaching that best facilitates learning” (Pg. 7). Because students in low tracks are given less instruction time, lower-quality teachers, are not even guaranteed to meet the requirements for college entrance, and are more likely to be low-SES students, academic tracking bars low-SES students from being successful in college. Even with good intentions, lower track classes are less effective, and therefore make it difficult for students to move up once placed in a low track. Students are segregated into tracks, kept there by inadequate instruction, and finally blamed for not wanting to go or not being prepared for college.

<u>What are the affects on post-secondary careers?</u>

Multiple studies support the premise that the courses students take in high school significantly affect a student’s post-secondary career. Valadez (1998) found that students of low-SES have lower aspirations to go to college, and that a student's SES has a larger effect on this than a student's race or gender. What Valadez doesn't address is why low-SES students are affected in this way. It has already been established that low-SES students are disproportionally put into low tracks. Add the fact that according to Akos, et. al. (2011), "curriculum track choices often dictate the types of post-high school options available to students", it should be no surprise that poorer students are less likely to want to go to college, let alone be prepared to go (Pg. 58). Akos, Lambie, Milson, and Gilbert (2011) studied 522 eighth graders' choices of academic tracks in South Carolina and found that only the highest track met the entrance requirements for college and few free and reduced lunch students chose the highest track. This means that students who, for whatever reason, chose lower tracks before even entering high school, were barred from meeting entrance requirements to college. Although these findings were based on a student's personal choice and not an administrative decision, the authors themselves question whether or not this "choice" was reliant on the aspiration of the student him or herself, or whether this decision was influenced by structural factors. They explain that, "if students of lower SES choose or are encouraged to pursue academic paths that limit future educational and career opportunities, their choices potentially help to maintain a cycle of poverty" and "the influence of discrimination of systemic patterns of educational placement and social expectations are also possible explanations of diminished post secondary aspirations and attainment" (Akos, et. al, 2011, Pg. 61). Even when students get to choose their own paths, the decisions they make affect their future. They may not even be eligible for college after high school because of a decision they made in 8th grade. It seems unfair to bar children from a college education because of a decision they made in 8th grade, and these 'choices' as explained by Akos, et. al., may be the results of systematic problems and lack of information.

According to Smith-Maddox and Wheelock (1995), in their study, *Untracking and students' futures: Closing the gap between aspirations and expectations*, tracking discourages positive career aspirations in young people. It should come as no surprise that low-SES students have low expectations for themselves even when they get to make their own choices. Students are often tracked as early as elementary school, and "students placed in low-ability groups in elementary school are likely to continue in these groups in middle or junior high school [and in] senior high school these students are typically placed in non-college preparatory tracks" (Oakes, 2005, Pg. 5). According to Trusty and Niles (2004), in their study, *Realized potential of lost talents: High school variables and bachelor's degree completion*, higher expectations are positively related to achievement in school and career. I argue that there is a reciprocal relationship between a student's aspirations and the classes he or she has been put into that is perpetuated by the expectations of students from teachers and the expectations students have for themselves.

Many of the studies referenced above discuss tracking in terms of schools where a college-prep class is even available. My study will identify whether or not tracking goes beyond the school level. There is no standard number of college-prep courses a school must offer, and therefore, schools differ in the amount that they offer. I want to identify whether low-SES students realistically have access to high-track classes at all. Some may argue that parents can choose where they live, so if they aren't satisfied with courses offered at the local school, they can just go to a school that has better options. However, parents from a low socioeconomic background must often send their children to the schools they can afford to live by and transport them to and from.

Are there studies that say otherwise?

It should be noted that studies have found race and socio-economic status not to be a factor in track placement for students, but rather that grades and test scores from middle school are the best predictors. Archbald and Farly-Ripple (2012) conducted a study on student mathematics placements from 8th to 10th grade by controlling for previous achievement in middle school to see if there were any placements based on demographics such as race and or class. They found that before controlling for achievement, demographic differences across race and class lines are apparent, showing low SES and racial minorities under-represented in high school courses (Archbald and Farly-Ripple, 2012). However, the demographic differences after controlling for achievement essentially disappear (ibid.). The concern with this study, which the researchers themselves admit, is that the results are based on one district. It is also interesting that other studies show similar but conflicting results. Archbald and Farly-Ripple cite three other studies as finding similar results (Dauber et. al. 1996), (Stone, 1998), (Schiller & Hunt, 2011). However, Dauber, et. al. and Stone found conflicting results because Dauber et. al. found evidence that race played a small effect and class played an inconclusive effect (1996) and Stone found the opposite in that race was a factor but class was not (1998). Schiller and Hunt found that neither race nor class played a significant role in mathematics placement (2011). These results seem to conflict with each other. Also, Schiller and Hunt's data, "relied heavily on survey responses from the students" and "self-reporters of grades" (Archbald and Farly-Ripple, 2012, Pg. 38).

Conflicting findings, and small survey-based sample sizes are concerning. I will use a much larger sample size (30 schools) and rely on test scores to avoid these problems.

The takeaway from Archbald and Farly-Ripple's (2012) study is still concerning in that, by 8th grade, low-SES and minority students are performing significantly worse than their white and high-SES counterparts, and that their track is decided before they even enter high school. The researchers explain that, "there is a possibility that processes in elementary or middle school systemically disadvantage black, Hispanic, and low-income students (ibid., Pg. 49). There is something systematic happening before students reach high school that creates these achievement gaps, and keeps students from being able to close them.

Access Between Schools: Unequal Opportunity

In the state of California, there have been two court cases that have questioned the constitutionality of unequal access to college-prep classes. The first case, Daniel v. California argued that, "low-income African American and Latino students in particular were disproportionately disadvantaged by lack of access to Advanced Placement (AP) college preparatory classes" and, "that AP classes had become a de facto admissions requirement at the University of California" (Miksch, 2008, pg. 112). This case was dismissed because legislation was passed that funded more AP classes, which did successfully happen, but this funding was cut a few years later (Miksch, 2008). The other case, Castaneda v. Regents of the University of California, focused on "U.C. Berkeley's admission process and whether it overly favored students who had taken AP courses", which ended in a settlement (Miksch, 2008, pg 112). Although these cases did not result in constitutional changes, the studies and subsequent findings that went into the litigation of both cases show strong evidence that not only is unequal access to college-prep courses a widespread and real phenomenon, but also that it directly affects a student's ability to get accepted and succeed in college. It was found that, in California High Schools, "upper income students and white ethnic students went to high schools with a much higher opportunity to take AP classes than their African-American and Latino peers (Miksch, 2008, p. 128). Also, "the Daniel case documented that in low-income, predominantly African-American and Latino public high schools, AP mathematics and science classes were much less likely to be offered than in upper income high schools" (Miksch, 2008, p. 127). These cases and studies show definitively that schools in California offer fewer AP courses in schools that serve more low-income students. Since this is found so prevalently across California, it seems likely that a similar phenomenon exists in Colorado.

Colorado has never had such an extensive case study done. In fact, the only major education policy to see court in Colorado was Lobato v. State of Colorado. This case, questioning the constitutionality of unequal funding in the Colorado public K-12 education system, "recognized that Colorado schools are under funded", but that the "state [is] not obligated to spend more on K-12 public education" because it was found to stand up against constitutional scrutiny for being "thorough and uniform" (Klein, 2013). Interestingly, this decision was made thereby overturning the decisions of a lower court that was then appealed (Klein, 2013). Although this does not address unequal access to college-prep programs directly, it draws attention to the fact that the State of Colorado isn't moving legislatively in the direction of equalizing funding opportunities for its K-12 students. Although funding does not solve problems directly, it is necessary to provide resources to schools to help students succeed. Unfortunately, the state of Colorado's voters seem unlikely to increase education funding themselves, as Amendment 66, a comprehensive reform to the education finance formula as well as an increase in funding, was voted down by a 64.9% no vote in the 2013 midterm election (Simpson). Unequal funding affects low-income students access to opportunities such as college-prep courses.

How schools decide how many and which college prep courses to offer is an issue that needs to be addressed. According to Kent Willmann, a former Colorado teacher and current instructor at the University of Colorado at Boulder, "Colorado is a local control state" and this means, "each school district and often each school makes its own decision on college prep courses" (Willmann, 11/11/14). He continues that this "is often driven by student/parent demand and available resources such as teacher training and class size" (Willmann, 11/11/14). This suggests that there is no standardized way in which schools must provide advanced classes. This is apparent since, according to the College Board, in 2006, only 63.5% of Colorado Public schools offered AP classes, which was below the national average of 70.8% (CollegeBoard.com). The keys to courses being offered are resources and demand. If parents of low-income students are less likely to demand these classes, and a poor school has limited resources to provide them, it seems intuitive that schools with low-income students are less likely to have these classes offered at all. The problem is that this keeps low-income students from being able to accepted, let alone succeeding, in college. This was shown to be a reality in California, and it should be no surprise that a similar fate is given to the students of Colorado.

Beyond deciding on whether or not schools can have college-prep at all, it also begs the question of how students are selected for higher classes. According to Willmann, it can be as simple as signing up, a minimum GPA requirement, the need for a teacher recommendation, or a requirement to write a certain number of essays (11/12/14). Ultimately, this process is that "these measures aren't necessarily measures of academic capabilities, they tend to be measures of academic performance" and that "the selection process is arbitrary and capricious, and beset with hurdles that make it more difficult for those with less skills to access" (Willmann, 11/12/14). The take away here is that in the state of Colorado, schools with more resources and parents with more wherewithal to navigate the system are more likely to receive college-prep courses for their students, systematically disadvantaging low-income students.

My Research

Karen Miksch, in the state of California, did a similar study to what I am interested in doing comparing the number of AP courses different schools offer to their students and the percent of African American and Latino students in the building. She uses an indicator called "an 'Opportunity Index' [created by UCLA professor Walter Allen], comparing the number of students enrolled in AP courses in a particular school to that school's total enrollment" (Miksch, 2008, Pg. 117). By doing this calculation and multiplying by 100, "the Opportunity Index is thus the number of AP opportunities available per 100 students at a given school" (ibid., Pg. 117). I use a similar index in my study because it allows for comparison between schools with significantly different sized populations. However, I will make some minor adjustments. First, the study will not only use the number of Advanced Placement classes, but also include any Honors and

International Baccalaureate classes offered, as well as any other college-prep course offered. Miksch, herself, admits, “I focus on AP courses […] because they are the most commonly offered college preparatory courses in the United States” (ibid., pg. 113). With the purpose of finding a more accurate ‘Opportunity Index’, this study includes most types of college-prep courses available. Also, she compares the percentage of minority students in a specific school. I will instead use the percentage of free and reduced lunch (FRL) students. I argue that this is a better measure because although race and class tend to be correlated, using FRL as a proxy for low-SES students is a more accurate proxy than race. The argument is that minorities are more likely to be low-income, not that their minority status itself is the reason for poor achievement. I also want to go farther than just comparing schools on the amount of access to college-prep courses they provide, I want to see whether higher access actually provides improved measurable results for low-SES students. Therefore, I also assess test scores in comparison to a school’s “Opportunity Index”. Miksch also examined how colleges assessed students’ applications in terms of availability of classes and how many they took. I also met with an admissions counselor of a public Colorado university to evaluate whether or not access is taken into account.

Research Design

Based on the studies, books, and articles examined in the previous section, I have multiple hypotheses on course-differentiation and access in Colorado. First, I hypothesize that, as a school has a higher percentage of the school’s student body comprised of low-income students, they will offer fewer college-prep programs. Essentially, schools with fewer low-income students = more college prep classes. Free and reduced lunch (FRL) is used as a proxy for low socioeconomic status. Although most likely unintentional, FRL students are less likely to have access to many college-prep classes than their non-FRL counterparts. I expect to see this in Colorado, because it was found to be widespread in California, according to Miksch (2008). I also expect this to be true because schools with more low-income students are more likely to have fewer economic and talent resources to provide these classes, as well as less parental pressure. The net effect of not having pressures and resources to provide it is that schools with more low-income students will provide fewer college-prep classes. To test if this is true, I compare a stratified sample of schools throughout the state based on the percentage of FRL students enrolled in the school and the number of college-prep classes they provide. I supplement my findings with an interview with a principal.

I test whether or not my hypothesis is true, by comparing the Opportunity Index to the percentage of Free or Reduced Lunch students they serve. The opportunity index was calculated on a per school basis as follows:

$$Opportunity\ Index = \frac{\#\ College\ Prep\ Courses}{Total\ Enrollment} \times 100$$

My interview assesses, based on a principal's response, whether providing these classes is a resource issue, cost issue, parent issue, or another issue all together. In my interview, I addressed the following questions:

1) Do you offer college-prep courses (AP, IB, Honors) in your school?

2) If you do, what are the biggest deciding factors in how many and which you offer?
3) How are students selected for these classes?
4) Do parents ask or demand more college-prep classes?
5) What is your biggest impediment to offering new classes?
6) Do the number and subjects of the college-prep courses change from year to year? If so, how do you decide which courses to offer and which not to offer?
7) Is any student allowed to enroll into these courses? If not, what are your pre-requisites and/or requirements.

Through these questions, I hope to ascertain the root cause of course-differentiation that will inform why my hypothesis may be true. My independent variable is the percentage of FRL students in an individual school's population and my dependent variable is the Opportunity Index. If my hypothesis is correct there will be a negative relationship, meaning that, the higher percentage of students that are FRL the lower the Opportunity Index will be.

My second hypothesis is that mid to high-income students will perform better on standardized tests than low-income students. Said another way, there will be higher percentage of mid to high-income students that are proficient and advanced on standardized tests than low-income students. Income is operationalized in terms of the eligibility of free and reduced lunch programs. To test this I create a histogram that compares the test scores of FRL and Non-FRL students. I expect to find that at every school, Non-FRL students have a higher rate of proficiency than FRL students.

My third hypothesis is that schools that have a higher Opportunity Index will have higher test scores than schools that have a lower Opportunity Index. More college prep courses = higher test scores. This seems intuitive in that if schools are offering more challenging classes, the school should have higher than average test scores. This however does not ascertain whether or not FRL students are in fact taking the college prep classes offered within the building. To test my hypothesis, I created a lowess smoothing[1] model in which I use the Opportunity Index as my independent variable and the percentage of students proficient on standardized tests as my dependent variable. Colorado students are tested in reading, writing, and math. Because of this I show four lowess smoothing models for both FRL student test proficiency and non-FRL test proficiency. One model will be the average proficiency of the three subjects and the other three will be each subject individually, and all will be based on the Opportunity Index. I expect to see a positive relationship in that when the Opportunity Index increases, test scores will also increase.

My fourth hypothesis is that students that have access to fewer college prep classes will be disadvantaged when applying to college. I will assess this hypothesis qualitatively by interviewing an admissions office employee at a public Colorado university to understand their admissions practices, and understand how college prep classes are considered on an applicant's application. The admissions office employee was asked the following questions:

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[1] Lowess in a lowess model stands for "locally weighted scatter plot smoothing", which is more accurate to the data than a linear model.

1. How does a students' number of college-prep courses taken affect admission decisions?
2. Are there considerations taken for how many classes a student had access to? If so, how? If not, why not?

My fifth hypothesis is that there will be a higher percentage of low-income students in the student body as a whole than the percentage of low-income students enrolled in college prep courses. Said another way, I predict that low-income students will be underrepresented in college prep courses. This is likely to be true because Oakes (2005) and Persell (1977), as cited previously, both found that poor and minority students are the disproportionate majority of low-track classes regardless of the selection process. I test this hypothesis through a case study because the data to test this must be provided by individual principals. To explore whether or not this is true within a Colorado public high school, I analyze college prep enrollment data provided by an anonymous principal. From this, I compare the percentage of FRL students in the school building compared to the percentage enrolled in college prep classes. FRL student enrollment will also be compared to Non-FRL enrollment. The classes are also divided into subject categories (math, engineering, language, English, science, and misc) to ascertain whether certain subjects have more or less FRL students than the overall average. I also analyze this hypothesis by showing how many college prep classes have no FRL students compared to how many are offered. Lastly, the school's test proficiency is discussed in terms of college prep courses offered to ascertain whether course differentiation affects test scores.

To summarize, my five hypotheses are as follows:

Hypothesis 1: As a school has a higher percentage of their student body comprised of low-income students, they will offer fewer college-prep programs.

Hypothesis 2: Mid to high income students will perform better on standardized tests than low-income students.

Hypothesis 3: Schools that have a higher Opportunity Index will have higher test scores than schools that have a lower Opportunity Index.

Hypothesis 4: Students that have access to fewer college prep classes will be disadvantaged when applying to college.

Hypothesis 5: Low-income students will be underrepresented in college prep courses.

This project has strengths and weaknesses. A strength is that this study is a way to identify behavior consistent with course-differentiation even though course-differentiation is frowned upon. It is also able to show how students of different economic statuses compare on tests. One weakness is that FRL does not capture all students in poverty. However, this is the closest proxy available that can be easily identified and differentiated in this large data set and to be able to compare test scores. Another weakness is that tests scores are not always the most accurate measures of student performance. Similar to the last weakness, however, it is difficult to find a measurement that can be compared between all students in the state. Another weakness of this study is that this doesn't test whether or not FRL students in college-prep courses go to college. Lastly, this study has a small data set making some data analysis difficult.

A case study offers strengths and weaknesses in that, it allows to an in-depth look at root causes but doesn't allow for overarching trends across the state to be realized. A case study of one school allows trends within individual classes to appear. It can show the economic status of students in individual classes. This is important to show because just because a school offers college-prep classes, doesn't mean that students are well distributed within them. A weakness, however, is that, because there is only one case, a statistical analysis is not possible, nor can the trends found be tested across all the other schools. A weakness of this case study in particular is that the enrollment data does not differentiate between students that are enrolled in classes more than once. There is a count for each individual class, but it cannot be differentiated how many FRL and Non-FRL students are in no classes a all, and if and which students are in two or more.

Data Collection

To test my hypotheses, I sampled 42 high schools in Colorado that most represent what a conventional school would be. This means the school is a public school serving a large percentage of its district that is not a charter, innovation, alternative, or credit-recovery school. This is because this study is trying to ascertain the experience of students that have not opted out of the traditional system. Also, of the 486 schools serving high school students, only 299 are strictly high schools (meaning the others also serve any combination of middle school and elementary school students) (Colorado Department of Education). Because enrollment data isn't differentiated by age, this would produce incorrect results in the Opportunity Index. The 42-school sample was therefore randomly selected out of the remaining schools that meet the criteria for a conventional school.

The schools were selected based on a stratified sample in which schools were listed first in order of largest district to smallest district based on number of schools, followed by schools that only had one school. The schools were then ordered within the district strata from highest to lowest percentage of FRL students. This allowed for smaller one-high school districts to not be over represented while simultaneously selecting multiple schools from Colorado's larger districts. I then had a random start selecting every sixth school resulting in a 42-school sample.

To successfully test the hypotheses above, I collected the following data as thoroughly as possible based on availability:

1) Name and district of every public high school in the state of Colorado
2) Enrollment of free and reduced lunch students in each school
3) Total enrollment for every school
4) Test scores for each school as a whole
5) The number of AP, IB, Honors, or Other college-prep courses offered
6) The total enrollment in college-prep courses per school

The data for numbers one through four are readily available on the Colorado Department of Education website through the Data Lab and Data Center tools (Colorado Department of Education). Finding the number of AP, IB, Honors, or Other college-prep courses offered (number five) is a little bit more difficult. On the Colorado Department of Education website, data on specifically Advanced Placement classes are provided, including how many and which ones the state offers, a breakdown by district, as well as a breakdown of enrollment by race and gender by district. However, this is not by school or by FRL status. These data are also not attainable for IB and Honors and any other college-prep classes. The International Baccalaureate website offers a list of all public schools in Colorado offering IB, which subjects are offered at the school, and the individual coordinator's contact information for each school (International Baccalaureate). This website does not offer the exact number of each class provided, however. The number of AP, IB, and Honors classes are generally identifiable in course books provided by individual schools on their websites. Through this process, only 30 of the 42 schools provided course books on their websites, and 29 of those 30 schools had complete test proficiency profiles (one school's sample size of FRL students was too low to report). Overall, this resulted in having a 30-school sample, with a 29-school sample when analyzing test results. Overall, this is a fairly small data set, which limits the amount of analysis that can be done to bivariate analysis.

The data for number six was collected through one school provided by the principal. Since this is not public data, IRB Approval (see Appendix) was required to contact and request data from schools. One school agreed to provide the data to me. The data included every college-prep class that is offered, the total number of students enrolled in each class, the number and percentage of free and reduced lunch students in each class, and a breakdown by grade. It also included total school enrollment, total enrollment per grade, and what number and percentage is FRL.

Data Analysis

When analyzing the data, it is clear that there are stark differences between the programs different schools offer. The range of the number of classes offered was between nine and 95 classes (Figure 1). Regardless of its relation to free and reduced lunch or to population size, the amount of college-prep classes students have access to varies greatly based on what school they go to. Although students in Colorado have access to school choice, barriers to school choice are great. Being able to use school choice is contingent on seats available and ability to get there and household resources. For parents, access to reliable transportation and the information resources to learn about that school in the first place also limits school choice. Another significant barrier to school choice is a language barrier for many immigrant parents. This means that students in Colorado have differentiated-access based on where they go to school. The Opportunity Index allowed for this access to be normalized for population. The Opportunity Index ranges from 1.024-10.74, showing that even when normalizing for population, access varies greatly from school to school (Figure 2). The lowest opportunity based on population is 9 classes for 879 students while the highest is 29 classes for 270 students. This is cause for concern because this shows that how many college prep classes you have access to is indicative of where you go to high school. Considering these classes can improve a student's GPA, give them college credits, and/or provide skills for college level classes; unequal access is a serious issue to consider.

Hypothesis 1

As a school has a higher percentage of their student body comprised of low-income students, they will offer fewer college-prep programs.

Figure 3 compares the relationship between the Opportunity Index (the dependent variable) and the percentage of free and reduced lunch students in a school (the independent variable). This shows that there is a relationship, but not the one I predicted. Based on the lowess smoothing line shown in Figure 3, there is a quadratic relationship. Essentially, middle class students have the most access to classes and it tapers off as school populations are low or high FRL. One explanation for this quadratic phenomenon, although I do not have the data to provide proof, is a sorting phenomenon. This would mean that there are certain schools in a district that have a magnet program or school with many college-prep classes. In response, the most savvy parents take the students there, leaving other schools with low FRL populations with low-college prep classes also. It may also be that very small schools, although low-FRL, how fewer classes in general.

Figure 4 compares the relationship between the Opportunity Index and just the students that receive free lunch, removing students that receive reduced lunch. This represents the most economically disadvantaged of the group of free and reduced. This lowess smoothing line shows that above a certain threshold of FRL students (~>50%), there is an extreme downward trend in the number of classes and opportunities. This supports my hypothesis in that once more than half the school receives free and reduced lunch, the number of college prep opportunities available decreases significantly.

When contemplating whether or not the free and reduced lunch population is correlated with providing classes, it is important to understand how schools decide to provide and add college prep courses into the curriculum. To shed light on this, I interviewed a Colorado high school principal. Since only one interview was conducted, this should not be taken to represent all schools' beliefs and practices, but should shed light on why, from a principal's perspective, schools do and do not offer particular classes. The interview was not recorded, but the overall takeaway is that adding college prep courses has a lot to do with resources and demand (Anonymous Principal, 3/6/15). The school where I conducted the interview offers AP, Pre-IB, and IB classes. To paraphrase, the principal, when possible, always wants to offer as many classes as possible (ibid.). She has to consider how many students register for a class they will potentially offer, and compare that to the FTE (Full Time Equivalent)[2] funding that has been allocated to the school (ibid.). How much funding the school gets decides how many teachers they can have on staff and how many classes those teachers can teach (ibid). Class sizes at this school are between 20-30 students, and when deciding what classes to offer, the enrollment needs to be around 20 students for the class to be economically viable (ibid). However, the principal stated that in most cases, if a college prep class has fewer than 20 students, they tend to keep it on the schedule (ibid).

One of her biggest concerns is to support the college prep programs as a whole. For example, with the IB program, students must complete a certain series and number of classes to achieve an IB diploma which can be worth a substantial amount of college credits on most campuses. Her first priority is making sure that the school offers the courses that allow students, not only to take college prep courses, but also to complete the

[2] "The pupil count is expressed in full-time equivalent (FTE) pupils to reflect the amount of time a student spends in an instructional setting, either a half or a full day" (Colorado Legislative Staff of the General Assembly, 2011).

diploma to give them credit once they get to college (ibid.). Beyond this, offering more college prep classes comes down to student demand, teacher training, and cost (ibid.).

When asked how parent and student demand played a role in adding classes, she gave an example of when students wanted an IB Physics class (ibid.). A group of IB students wanted to take IB Physics, so she made it a point to get it on the schedule and has now been offered at the school for several years (ibid.). For this school in particular, there is no barrier to entry for college prep courses (ibid.). This means that there is no GPA, test score, or teacher recommendation requirement to be allowed to enroll for a college prep class. However, this is not true for all high schools in Colorado. The principal explained that, through their counselors, students are encouraged to take the "appropriate class", which usually means encouraging students to take a higher level course (ibid.).

From this interview, it can be gathered that adding a new college prep class is a process that must take consideration of resources available and demand. If low income students and their parents are unaware that students can get into classes with no barriers or simply express interest in a new class, it seems unlikely that they will be automatically provided to them.

Hypothesis 2

Low-income students will perform better on standardized tests than mid to high-income students.

As is shown in Figure 5, FRL students are less likely to be proficient on standardized tests. Although School A in Figure 5 has a very small difference between the average proficiencies of FRL and non-FRL students, every other school has large gaps between these two groups—the largest disparity being just under a 40% difference. This shows that there is a significant gap between students simply based on their economic status. It should also be pointed out that the highest proficiency percentage is just above 80%, and that is for non-FRL students. Even at our best performing schools, at least two in ten students are not proficient in reading, writing, and/or math. Just by considering economic status, the highest proficiency percentage for low-income students is just about 60%. Four in every ten low income students, and likely more, are not proficient in one or all subjects. To put this in perspective, in a high school of 1000 students, in a best-case scenario, no less than 200 of the students in the building would be below proficient in one or all core subjects, and most likely more. The achievement gap is a real phenomenon that exists between economic classes consistently across classrooms in the state of Colorado, and why this is the case needs to be addressed.

Hypothesis 3

Schools that have a higher Opportunity Index will have higher test scores than schools that have a lower Opportunity Index.

Overall, whether or not schools that have a higher Opportunity Index have higher test scores than schools that have a lower Opportunity Index is inconclusive. Table 1, the regression table expressing the Opportunity Index compared to FRL test scores, has a low t-score indicating that the data are not statistically significant. This is also true for non-FRL test scores represented in Table 2[3].

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[3] The data for Hypothesis 3 were trimmed of its outliers. All Opportunity Indexes, except for three, were between the range of 1-6 (27 cases), and three were between 6-10. The lowess-lines were misleading because there were not enough data points above six on the graph. Table 3 and Table 4 show the regression tables all cases included.

Figure 6 shows the average percentage of students proficient or advanced on standardized tests based on the Opportunity Index, with FRL test proficiency on the left graph and non-FRL test proficiency on the right. Figures 7-9 follow the same format as Figure 6 but show each testing subject broken down by reading, writing, and math. Figures 6-9 show that there isn't a clear linear relationship between the access to college prep classes and the increase in proficiency on test scores.

What can be discerned however, from Figures 6-9, is the apparent gap across all schools; low-income students are less proficient than their mid and high-income counterparts in every subject. Although it cannot be proven from this data, this may be because low-income students are not enrolled in the college prep classes in the first place due to processes such as tracking. Just because the classes are available, doesn't mean that students are necessarily in them. This data confirms the second hypothesis that low-income students are less proficient in all subjects than mid to high-income students, and also begs the question of what is causing such a significant gap. Although this data clearly does not support the statement that this is directly caused by access to classes, it does warrant a look at a larger dataset to see if a pattern with statistical significance emerges. It also warrants a look into whether or not low-income students are actually taking college prep classes, and how test scores compare between low-income students that are and are not taking college prep classes.

Hypothesis 4

Students that have access to fewer college prep classes will be disadvantaged when applying to college.

Through my interview with an admissions counselor at a public Colorado university, it was refreshing to discover that not only does the state university recognize the difference in access, but they also have a process by which students are compared directly with the peers within their own school (Anonymous Admissions Counselor, 3/17/15). The counselor being interviewed explained that the school uses a holistic review model in which, "we actually have real people looking at every application [so] we know the transcripts and what school environment they're coming [from]", and "we know [a specific] school and how many college prep classes or honors level classes or AP level classes are offered and so we can […] evaluate a student within their own educational context" (ibid.). This means that the school acknowledges differences in access to college prep classes.

Beyond this, the school also recognizes that some students may not take the classes even when they are offered in their school due to systematic reasons. "[In] some public K-12 systems, students are tracked", she explains,

> *So they might be in a high school environment where there are college prep classes or honors classes or AP classes, and they might have the ability to perform well in those classes, but since 6th grade or 5th grade they were tracked, and while they're in an environment that offers [college prep courses], they are on a track that didn't allow them to engage in those courses. In that scenario too, we can make some assumptions and know the environment and know that that's a possibility, and use that to frame our decisions. (ibid.)*

This is positive, in that, the school actively tries to recognize when tracking has systematically disadvantaged students and give them an opportunity at college anyway. It should also be noted that, to paraphrase, every counselor is provided a territory in the state in which they become familiar with the individual school or schools in the area, make personal connections with guidance counselors and schools, know the academic environment of the school, and read a majority or all of applications from that location to create a holistic approach to admissions (ibid.).

Interestingly, however, this holistic approach is not something that Colorado universities are required to adhere to. The counselor explained that, “if there’s any kind of legislative or state policies around [class access] in terms of how we need to interpret that information that is provided to us, that I’m not aware of, to be candid” (ibid.). The state of Colorado does require that students meet Minimum Academic Preparation Standards (MAPS) in which they must either meet before entering or pay the university to take those classes once on campus. So basically, students can still get into college if they didn’t have access to a MAPS requirement, but they now have to pay for what the public school didn’t provide them with in the first place.

Overall, it seems that students, in terms of the admissions process, at least at this public state university, are not at a direct disadvantage into getting in. But, “there’s other elements to an application [other than what classes students took], but data and research have shown time and time again that performance in a high school classroom is the best indicator of performance in a college classroom” (ibid.). Therefore students that have access to more rigorous classes are more likely to succeed on campus, so although maybe not disadvantaged on the application, students that didn’t have access puts them at a disadvantage the second they step foot into a college level class. This information may or may not apply to other campuses in Colorado, and is less likely to be true at more competitive colleges around the country. This question should be asked of all campuses in Colorado, and around the country.

Case Study: Hypothesis 5

Low-income students will be underrepresented in college prep courses.

The high school being studied is a medium sized school population-wise and 53 college prep courses in over seven subjects, giving it an Opportunity Index of 5.274. In comparison to the sample in this study, this is a very high Opportunity Index. The college-prep curriculum is comprised of AP classes, IB classes, Pre-IB classes, as well as other weighted classes. There are nine foreign language classes offered, eleven math classes, seven history classes, seven English classes, nine science classes, six engineering classes, and four miscellaneous. The miscellaneous section includes art, music, and design tech classes (Figure 10). Of the student population, 36% receive free or reduced lunch. Broken down by grade, 39% of freshman are FRL, 35% of sophomores are FRL, 40% of juniors are FRL, and 33% of seniors are FRL. This school is interesting for a case study because it has a high Opportunity Index as well as a high FRL percentage.

On average, each student is in 2.2 college prep classes. Of the total number of students enrolled in college prep classes, 18% of all students in college prep classes are low income. 73% of all students are in at least one college prep class, and 52% of FRL students are in at least on college prep class. Broken down by grade, 50% of FRL 9^{th} graders, 56% of FRL 10^{th} graders, 53% of FRL 11^{th} graders, and 47% of FRL 12^{th} graders are in at least one college prep class. This is compared to 70% of all 9^{th} graders, 80% of all 10^{th} graders, 75% of all 11^{th} graders, and 65% of all 12^{th} graders. Students are less likely to be in a college prep class if they are low-income. Also, 20% of all 9^{th} graders, 15% of all 10^{th} graders, and 18% of all 11^{th} and 12^{th} graders in college prep courses are FRL students. Since the percentage of FRL students in the school is 36%, FRL students are underrepresented in college prep courses. This becomes apparent in Figure 11, which shows the distribution of the number of students (All, Non-FRL, and FRL) enrolled in each class.

The ranges for class size varies widely depending on the class, but even in the largest classes, the largest number of FRL students in one college prep classroom is 32. The class sizes vary from 6 students to 169 students. In the smallest class (6 students) there are no FRL students, and in the largest (169 students), there are 31 (18%) FRL students. Figure 12, which displays the percentage ranges for FRL and Non-FRL student enrollment, shows that FRL students are consistently the minority of college prep classes. While the maximum percentage of a college prep classroom FRL students comprise of is 52%, the minimum for Non-FRL students is 48%. There is only one class of the 53 classes where FRL students comprise the majority. On average, FRL students comprise of 14% (the median) of a class, while Non-FRL students comprise of 86% (the median). However, it should be noted, that only three of the 53 classes have no FRL students at all, and there is a class where Non-FRL students are in the minority. So although FRL students are underrepresented, it is clear that low-income students are encouraged to participate in the college-prep program at this school.

FRL student participation varies between subjects of college prep courses. Figure 13 shows the average percentage of FRL students in each subject, and shows that FRL students are more likely to be in a college prep English class, followed by a foreign language. Although FRL students are less likely to be in math and science classes (with participation falling below the average), they are represented above average in engineering courses. Although no subject reached a fully representative participation of 36%, it is quite encouraging to see FRL students in almost every class, one-fifth of all engineering courses are FRL students, and that the 9th grade class has the highest rate of participation yet.

Whether or not FRL student participation in college prep classes increases test scores is yet to be seen because individual student test data are unavailable. However, it can be said that, 28.4% of FRL students are proficient or advanced in one or more subjects and 67.73% of Non-FRL students are proficient or advanced in one or more subjects at the school studied. This shows that there is an achievement gap at a school with a high Opportunity Index. The principal said that they have seen success in closing this gap when they remove "basic" classes and rather offer support to students within higher-level classes (ex. Giving a student two years to complete the course instead of one) (Anonymous Principal, 4/1/2015). More data are ultimately required at the school and state levels to understand this relationship, but it seems clear that keeping students out of college prep courses isn't providing desired results either. From previous studies, and this case study, it is likely that the trends found at this school are common across many high schools in Colorado, and perhaps pushing students, with strong supports, into college prep classes, may ultimately improve student performance and work to shrink, or even close, the achievement gap.

Discussion

This study has shown that there is a significant achievement gap between low-income students and their peers. This is significant in that it should be urgent to figure out why there is such a pervasive and consistent gap solely based on economic status, and how we can fix it. Although this study was ultimately inconclusive in attributing this gap to the access of college prep classes, the small data set and positive relationship merits a more in depth look into this correlation. This study also began the complicated process of understanding how and why different courses are offered to different students as well as how those choices can effect them when and if they apply to college.

The largest flaw with this study is that the dataset is ultimately too small to be conclusive. Since the state of Colorado does not collect how many college prep classes a student has access to in a meaningful way, data collection was not only time consuming but imprecise. This question has never been asked before in Colorado, which is concerning. The fact that the data to answer these questions are not readily available should make perfectly clear to need to test these questions more accurately and extensively. I had to cut 12 schools from my data set because the course books were inaccessible. This further shows the difficultly in ascertaining the data to accurately answer the question in the first place.

This study is the baseline for trying to figure out how course differentiation affects students, particularly of low socioeconomic status. The data are clear in that students are performing differently across the state and within the same buildings, and we owe it to our students to figure out why. When a problem is this consistent and pervasive, it becomes clear that the root of the problem is systematic. When our system educates students differently based on aspects of their life they don't have control over, such as socioeconomic status, the system has failed. We must do everything our power to diagnose and remedy the problem plaguing Colorado public schools, and schools around the nation.

It is refreshing that a Colorado state university takes into consideration course differentiation and its effects on tracking, that a high school principal is committed to offering as many opportunities to her students as possible, and that almost one-fifth of every college prep class at at least one high school consists of FRL students. But this doesn't change the reality that colleges have to make exceptions for students our public system failed, and that the cost is coming out of students' pockets. Students of low socioeconomic status are more likely to not be proficient in one more subjects if they go to college at all, and are the least likely to be able to afford the remediation costs required to catch them up.

Conclusion

Clearly, this body of research is far from complete. It appears that there is a quadratic relationship between the number of opportunities offered to a student and the percentage of FRL students that may be a result of a sorting phenomenon. To understand this relationship further, a similar study should be done in districts across the state. Since this study is a stratified sample of schools from all over the state, the relationship between schools within a district and differentiation within them could not be examined. It is important, however, to find out whether or not there are schools in a district that attract savvy parents and their students and high performing teachers therefore draining from other schools in a district. A future study should examine the correlation between the

Opportunity Index and low-income population in districts that have three or more schools, and compare to other districts across the state.

Whether or not access to college prep classes increases proficiency on test scores is inconclusive. To remedy this situation, the Colorado Department of Education should collect this data. Then all traditional high schools should be given an Opportunity Index to see if there is a statistically significant correlation with a more comparable dataset size. Also, more principals and college counselors should be interviewed to create a more extensive profile on how and why schools offer the classes they do, and how this affects a student when applying for and on taking classes a college campus.

This study only caught a glimpse on whether or not low-income students are represented in the college prep classes that are offered in their buildings and didn't touch on whether or not certain college prep classes are more effective than others, or effective at all. Future research should attempt to ascertain the above data through interviews with principals, as most is protected data. The case study showed evidence that low-income students are underrepresented, and future studies should replicate and expand upon the data collected. In depth case studies at many more sites combined with more extensive test scores broken down by grade, subject, socioeconomic status, and class schedule should be examined to answer if and how socioeconomic status, the achievement gap, and course differentiation correlate. Overall, this study raised many questions, but if nothing else, it makes it clear that more data and more research is needed to conclude why the achievement gap exists, how course differentiation plays a role, and how we can fix the disparities between students of different socioeconomic statuses.

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Graphs & Tables

Figure 1

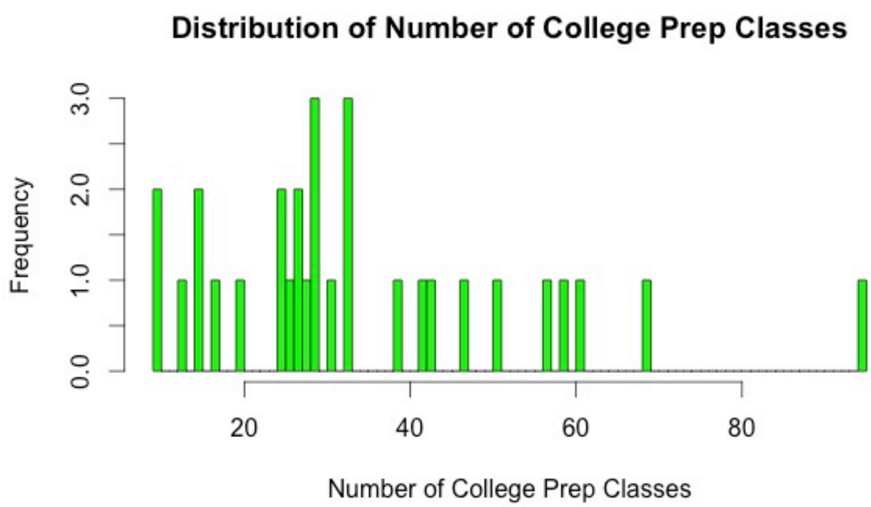

Figure 2

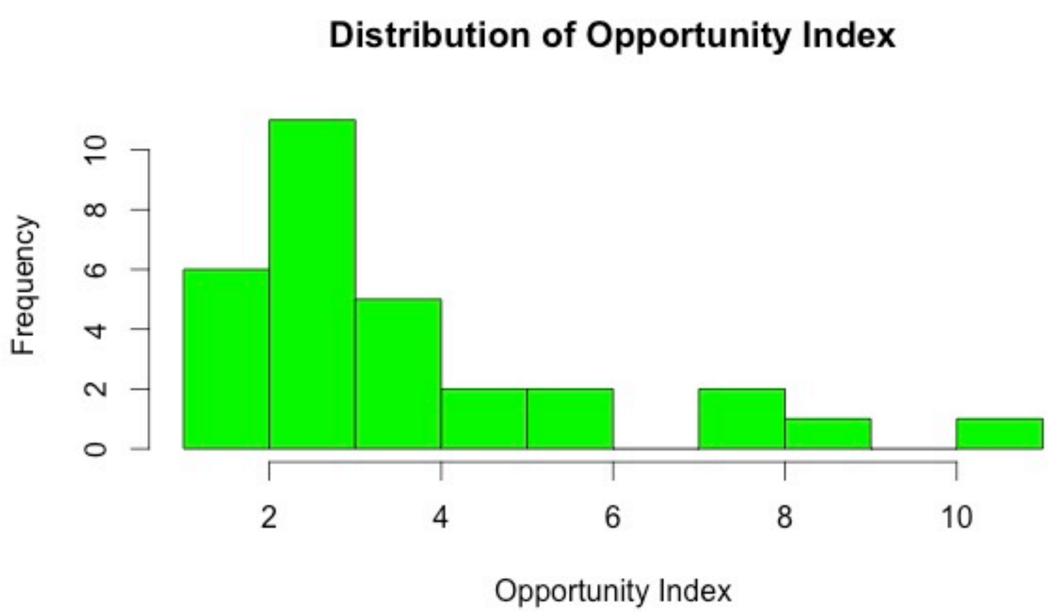

Figure 3

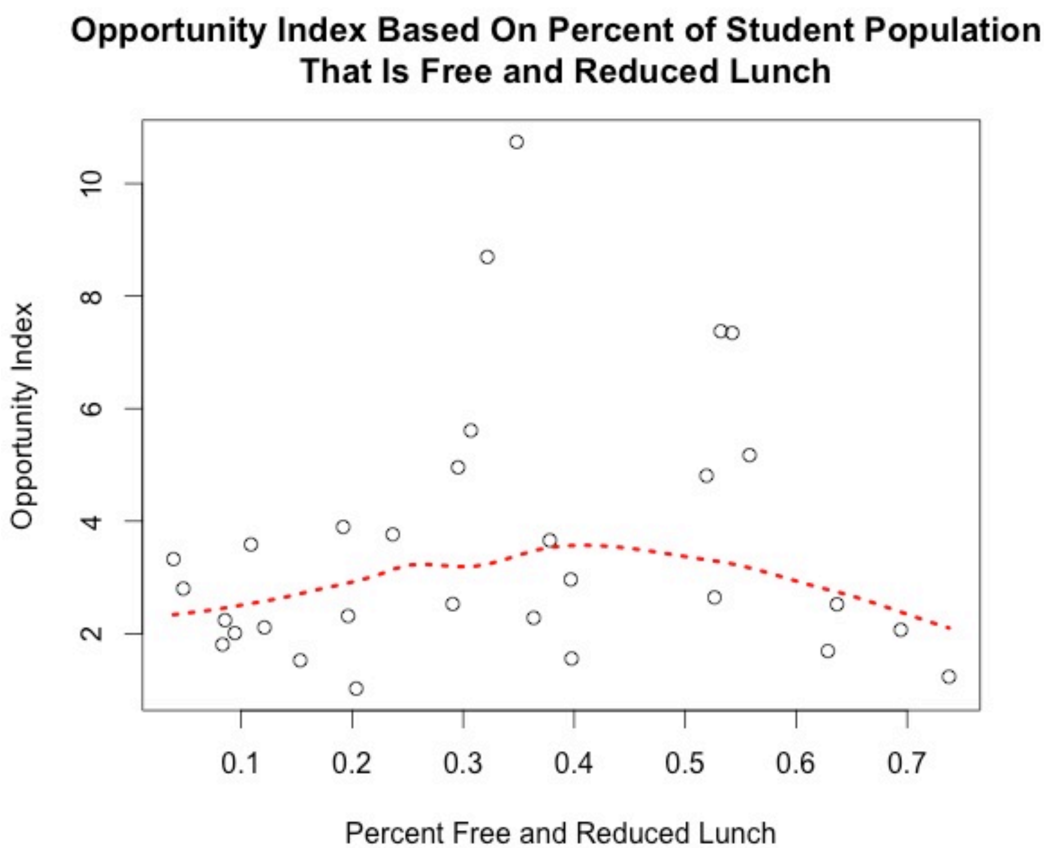
Opportunity Index Based On Percent of Student Population
That Is Free and Reduced Lunch
Opportunity Index
2
4
6
8
10
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Percent Free and Reduced Lunch

Figure 4

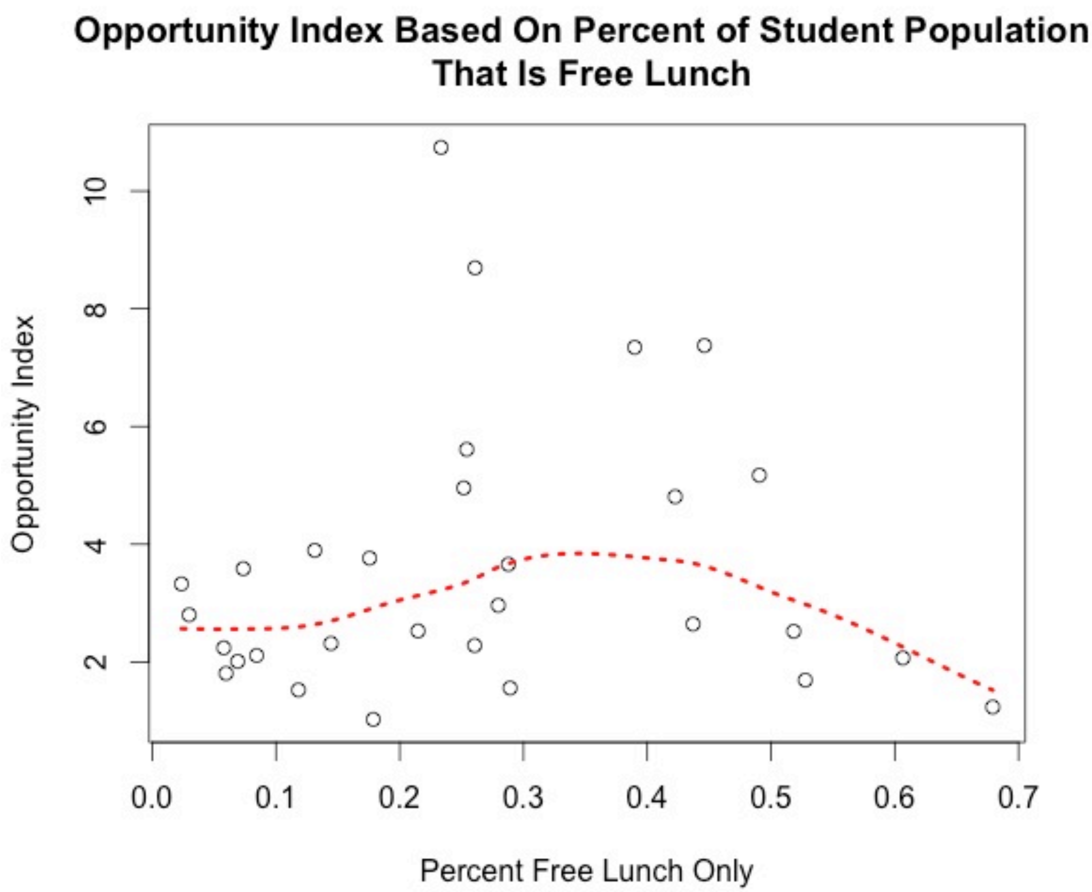
Opportunity Index Based On Percent of Student Population That Is Free Lunch
Opportunity Index
10
8
6
4
2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Percent Free Lunch Only

Figure 5

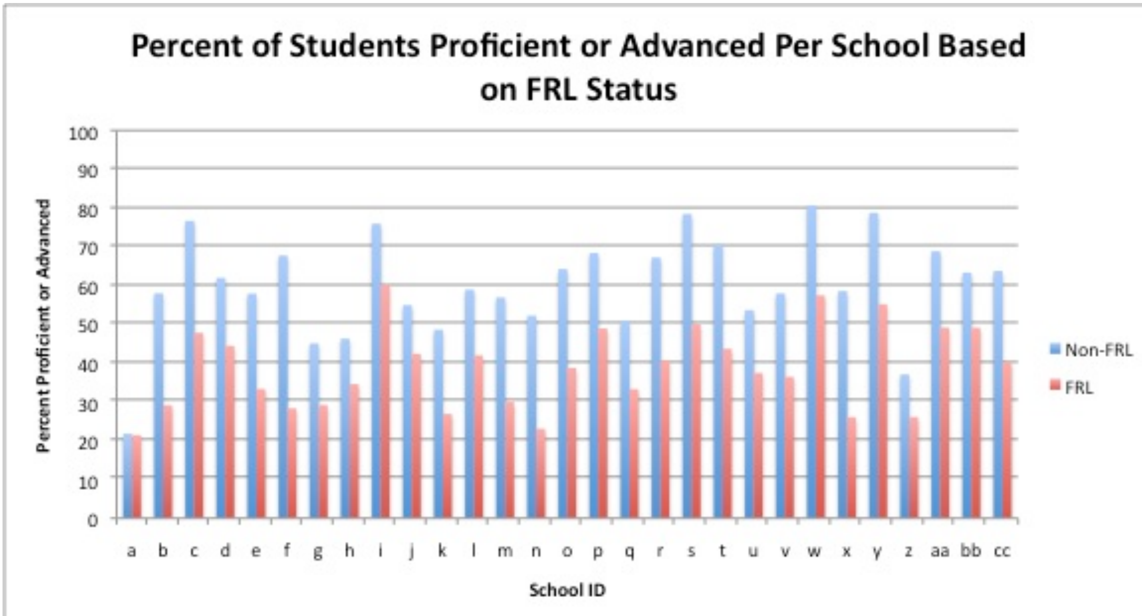
Percent of Students Proficient or Advanced Per School Based on FRL Status
Percent Proficient or Advanced
100
90
80
70
60
50
40
30
20
10
0
a b c d e f g h i j k l m n o p q r s t u v w x y z aa bb cc
School ID
Non-FRL
FRL

Figure 6

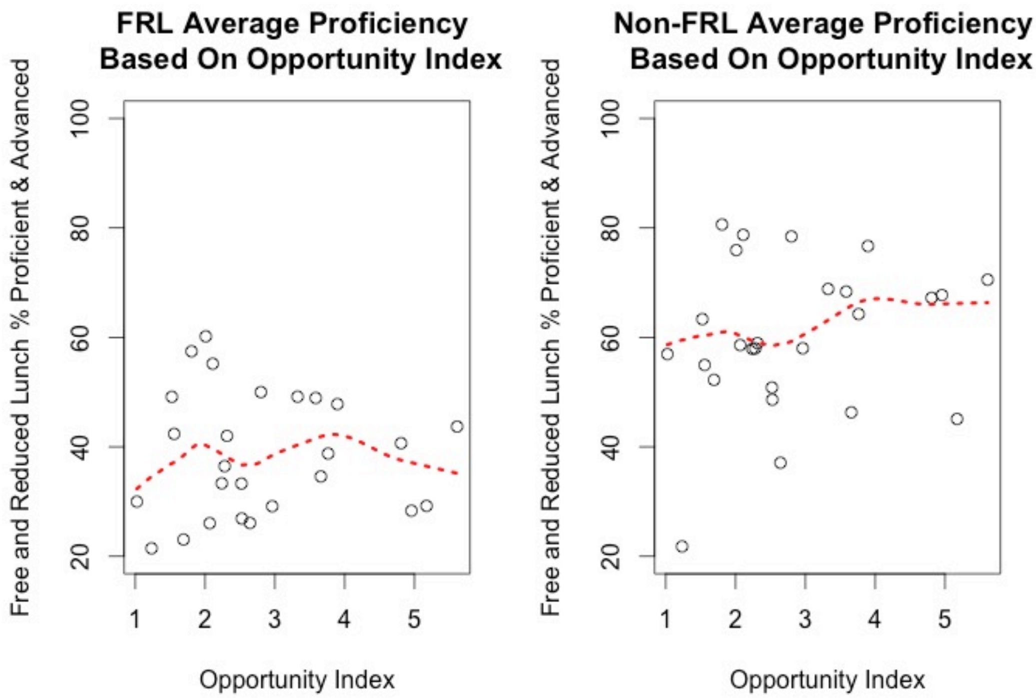

Figure 7

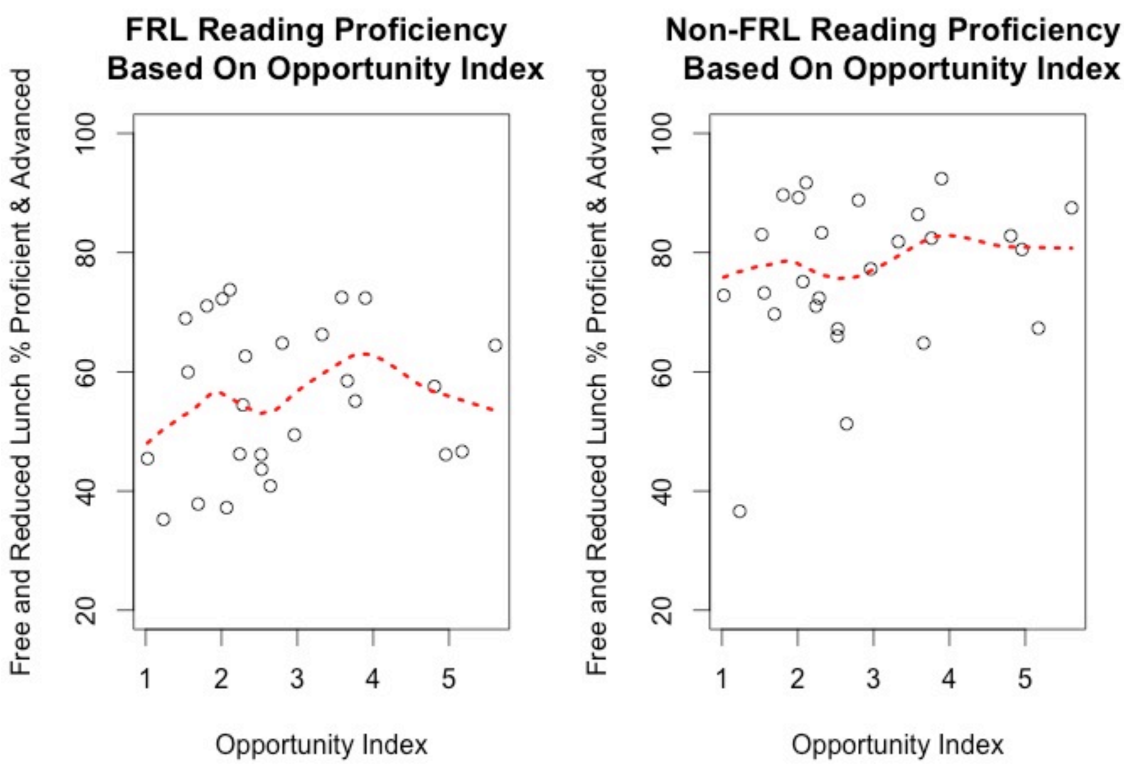

Figure 8

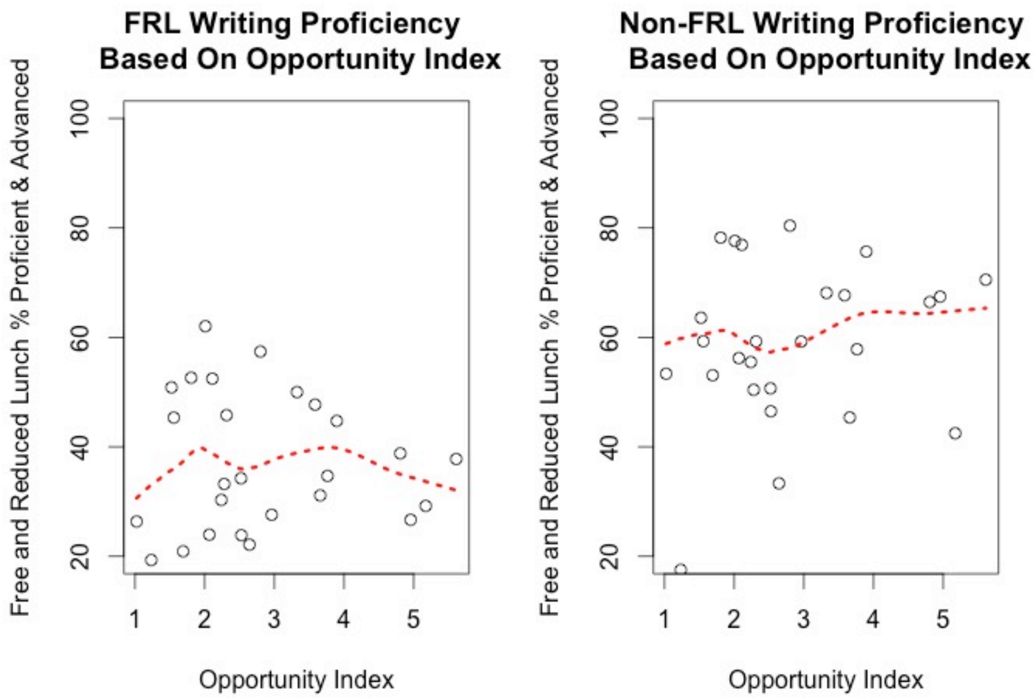

Figure 9

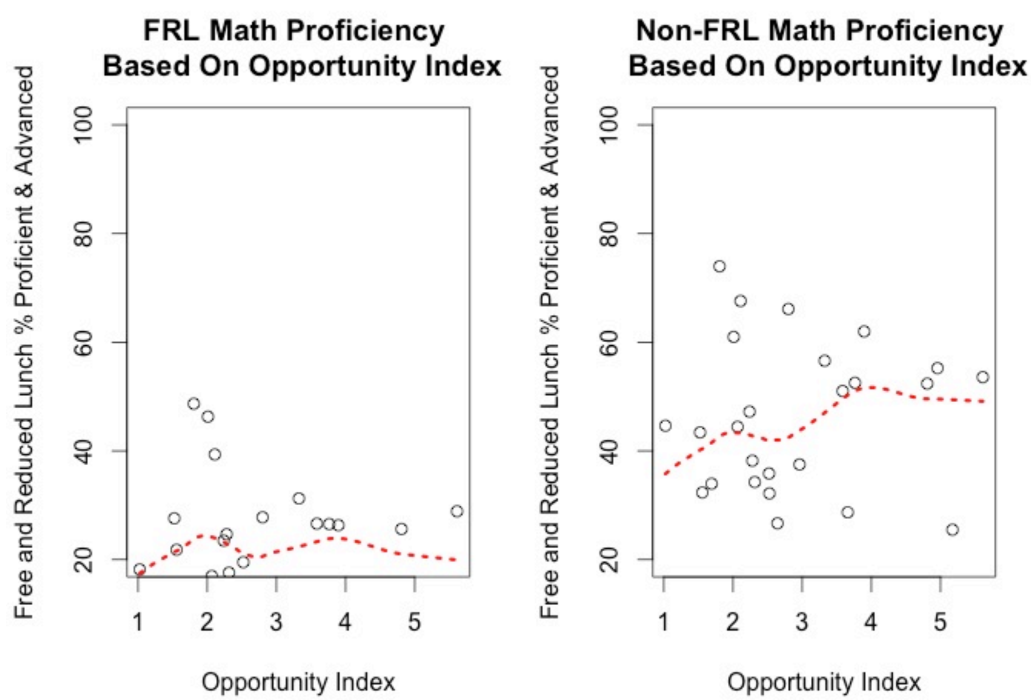

Figure 10

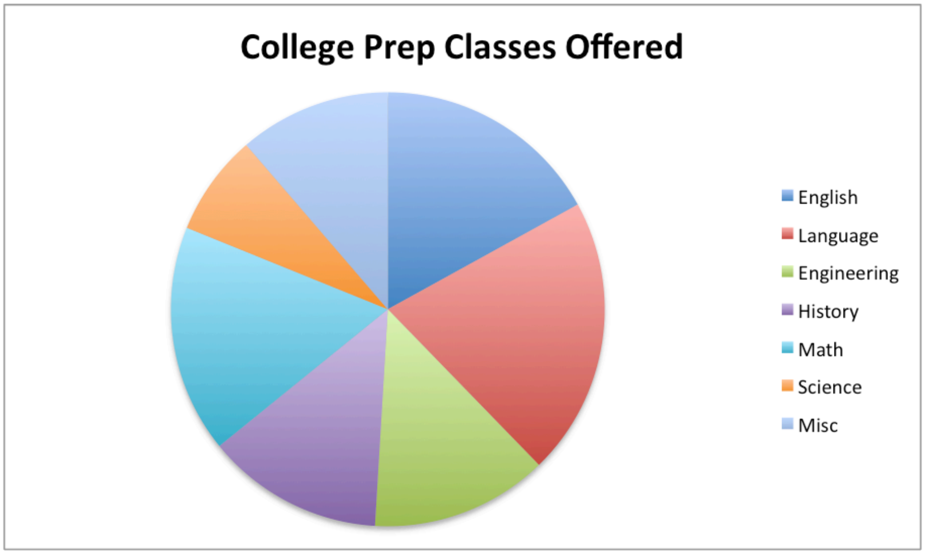

Figure 11

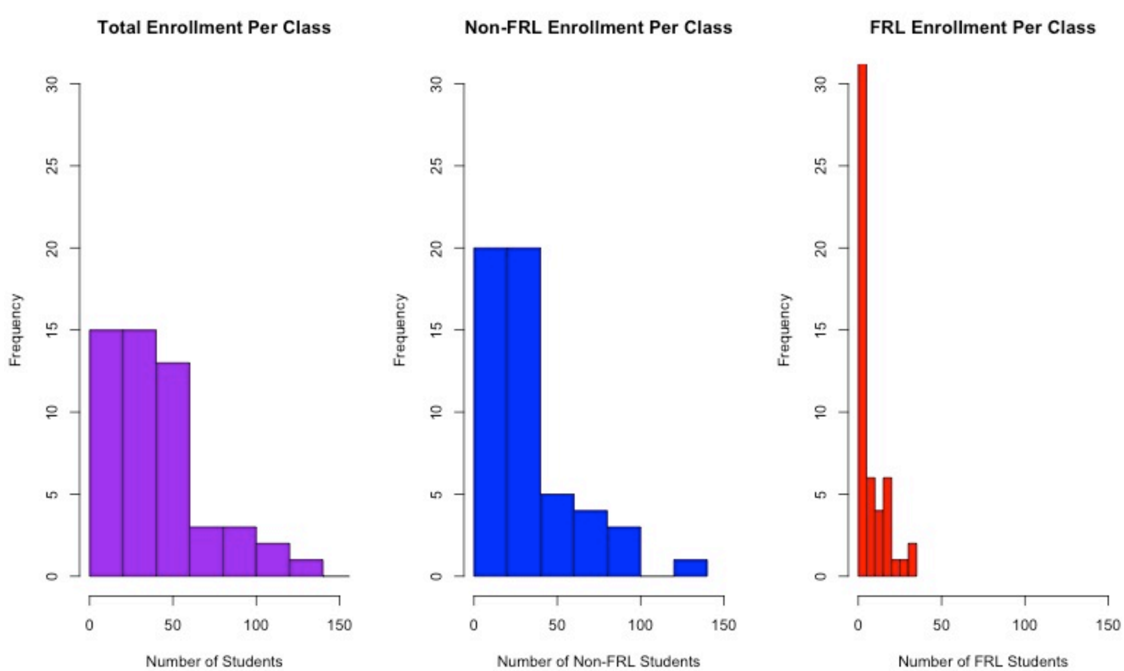

Figure 12

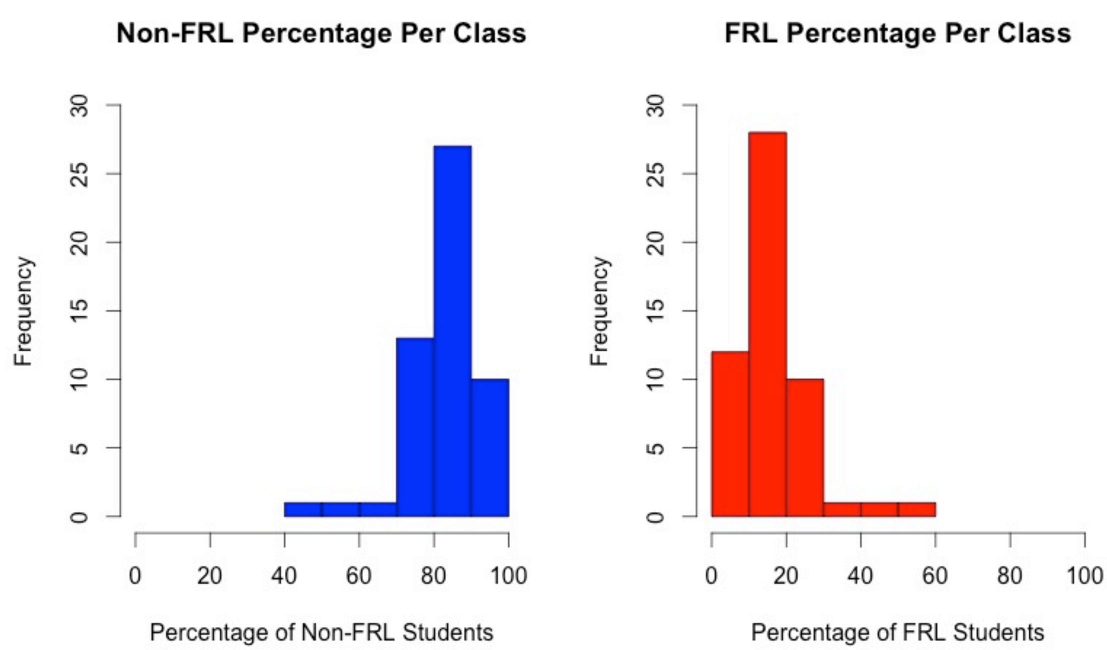

Figure 13

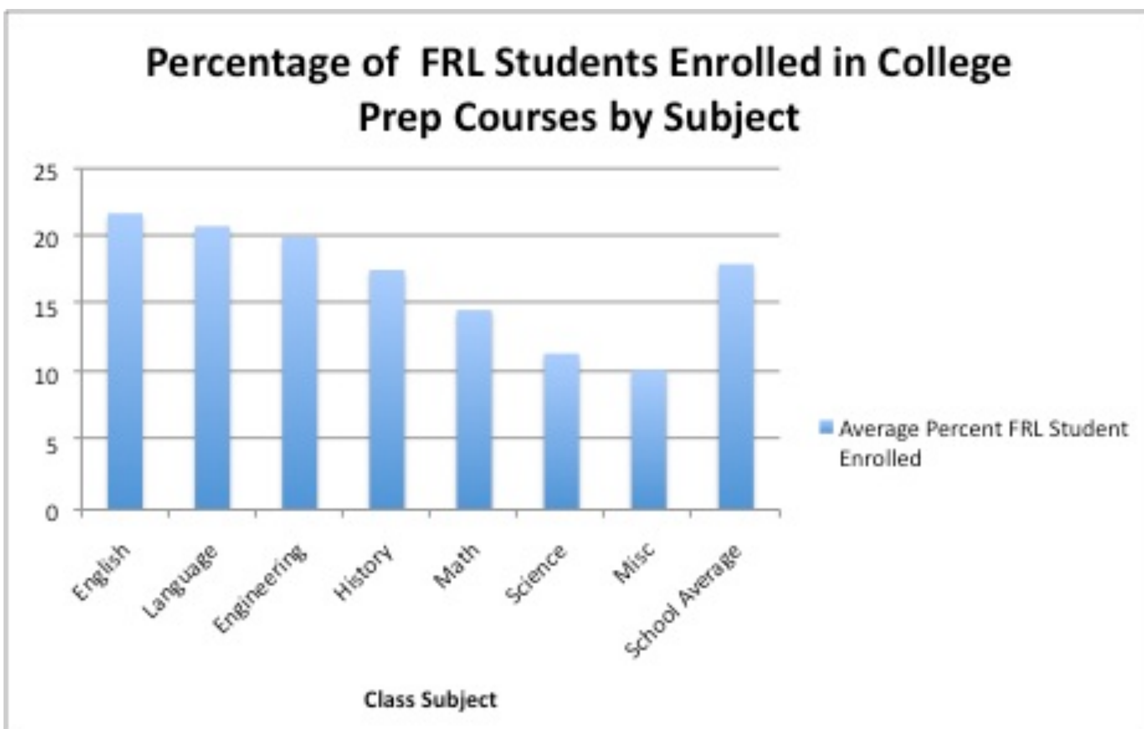

Table 1

SUMMARY OUTPUT: Free and Reduced, Trimmed to exclude three high OI cases								
Regression Statistics								
Multiple R	0.0134542							
R Square	0.000181							
Adjusted R	-0.041478							
Standard E	11.389119							
Observatior	26							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.563621093	0.563621	0.004345	0.947989			
Residual	24	3113.088779	129.712					
Total	25	3113.6524						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	38.28589	5.622671451	6.809199	4.83E-07	26.68127	49.89051	26.68127	49.8905133
OI	0.1193651	1.810814304	0.065918	0.947989	-3.61797	3.856702	-3.617972	3.85670215

Table 2

SUMMARY OUTPUT: Non Free and Reduced, Trimmed to exclude three high OI cases								
Regression Statistics								
Multiple R	0.211024							
R Square	0.044531							
Adjusted R Square	0.00472							
Standard Error	13.82775							
Observations	26							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	213.8746687	213.8747	1.118552	0.30076007			
Residual	24	4588.960559	191.2067					
Total	25	4802.835228						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	53.4392	6.826594659	7.82809	4.63E-08	39.3497982	67.528596	39.349798	67.52859604
OI	2.325217	2.198544832	1.057616	0.30076	-2.2123567	6.8627904	-2.212357	6.862790353

Table 3

SUMMARY OUTPUT: Free and Reduced, All Cases								
Regression Statistics								
Multiple R	0.0699							
R Square	0.004886							
Adjusted R	-0.03197							
Standard Er	10.78154							
Observatior	29							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	15.41026138	15.41026	0.132571	0.7186169			
Residual	27	3138.520858	116.2415					
Total	28	3153.93112						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	37.63934	3.785975794	9.94178	1.61E-10	29.871158	45.40752	29.87115788	45.4075192
OI	0.340827	0.936073257	0.364103	0.718617	-1.579837	2.261491	-1.5798365	2.26149085

Table 4

SUMMARY OUTPUT: Non- Free and Reduced, All Cases								
Regression Statistics								
Multiple R	0.14008085							
R Square	0.01962264							
Adjusted R	-0.0166876							
Standard Er	13.2349409							
Observatior	29							
ANOVA								
	df	*SS*	*MS*	*F*	*iignificance F*			
Regression	1	94.66120577	94.66120577	0.540416	0.468598			
Residual	27	4729.418831	175.1636604					
Total	28	4824.080037						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	57.2861398	4.647497999	12.32623227	1.34E-12	47.75026	66.82202	47.750262	66.822018
OI	0.84472476	1.149082516	0.735129769	0.468598	-1.513	3.202447	-1.512998	3.2024473

Appendix

Legend for Raw Data

Variable Code	Variable Name/Description
SID	School ID
Sname	School Name
Spop	School Population
FL	# Free Lunch
RL	# Reduced Lunch
NE	# Not Eligible
FAR	# Free and Reduced
PerFree	% Free Lunch
PerRed	% Reduced Lunch
PerFAR	% Free and Reduced Lunch
APclass	# of AP classes offered
IBclass	# of IB classes offered
PIBclass	# of Pre-IB classes offered
Hclass	# of honors classes offered
OTHclass	# of miscellaneous college prep classes offered
TOTclass	# of total classes offered
OI	Opportunity Index
ReadNFN	# of non-FRL students that took the standardized reading test
ReadNFT	% of non-FRL students proficient or advanced on the standardized reading test
ReadFN	# of FRL students that took the standardized reading test
ReadFT	% of FRL students proficient or advanced on the standardized reading test
WriteNFN	# of non-FRL students that took the standardized writing test
WriteNFT	% of non-FRL students proficient or advanced on the standardized writing test
WriteFN	# of FRL students that took the standardized writing test
WriteFT	% of FRL students proficient or advanced on the standardized writing test
MathNFN	# of non-FRL students that took the standardized math test
MathNFT	% of non-FRL students proficient or advanced on the standardized math test
MathFN	# of FRL students that took the standardized math test
MathFT	% of FRL students proficient or advanced on the standardized math test
ReadDIFF	The difference in proficiency rate between FRL and non-FRL students on the standardized reading test. (ReadNFT-ReadFT)
WriteDIFF	The difference in proficiency rate between FRL and non-FRL

WriteDIFF	The difference in proficiency rate between FRL and non-FRL students on the standardized writing test. (WriteNFT-WriteFT)
MathDIFF	The difference in proficiency rate between FRL and non-FRL students on the standardized math test. (MathNFT-MathFT)
TestAvgNF	The average proficiency on all three subjects tests for non-FRL students. (((ReadNFT+WriteNFT+MathNFT)/3)).
TestAvgF	The average proficiency on all three subjects tests for FRL students. (((ReadFT+WriteFT+MathFT)/3)).
CNum	Course Number
NineN	9^{th} Grade total enrollment per class
NineFR	9th Grade free and reduced lunch enrollment per class
NinePer	9th Grade free and reduced lunch percentage of enrollment per class
TenN	10th Grade enrollment per class
TenFR	10th Grade free and reduced lunch enrollment per class
TenPer	10th Grade free and reduced lunch percentage of enrollment per class
ElevenN	11th Grade enrollment per class
ElevenFR	11th Grade free and reduced lunch enrollment per class
ElevenPer	11th Grade percent free and reduced lunch enrollment per class
TwelveN	12th Grade enrollment per class
TwelveFR	12th Grade free and reduced lunch enrollment per class
TwelvePer	12th Grade percent free and reduced lunch enrollment per class
TotN	Total enrollment per class
TotFR	Total free and reduced lunch enrollment per class
TotPerFR	Total percent free and reduced lunch enrollment per class
TotNFR	Total non-free and reduced lunch enrollment per class

Raw Data

SID	Sname	Spop	FL
1	AURORA CENTRAL HIGH SCHOOL	2188	1486
2	BATTLE MOUNTAIN HIGH SCHOOL	844	236
3	BERTHOUD HIGH SCHOOL	693	91
4	BUENA VISTA HIGH SCHOOL	270	63
5	CASTLE VIEW HIGH SCHOOL	1920	111
6	CENTAURUS HIGH SCHOOL	1029	259
7	ENGLEWOOD HIGH SCHOOL	638	313
8	FLORENCE HIGH SCHOOL	410	118
9	FOSSIL RIDGE HIGH SCHOOL	1940	134
10	FOUNTAIN-FORT CARSON HIGH SCHOOL	1798	520
11	FREDERICK SENIOR HIGH SCHOOL	1029	221
12	FRUITA MONUMENT HIGH SCHOOL	1253	181
13	GLENWOOD SPRINGS HIGH SCHOOL	879	157
14	GREELEY CENTRAL HIGH SCHOOL	1478	780
15	GREEN MOUNTAIN HIGH SCHOOL	1116	196
16	LIBERTY HIGH SCHOOL	1590	117
17	OVERLAND HIGH SCHOOL	2340	1213
18	PALMER HIGH SCHOOL	1976	835
19	PALMER RIDGE HIGH SCHOOL	1107	33
20	PLATTE CANYON HIGH SCHOOL	303	77
21	POMONA HIGH SCHOOL	1447	377
22	PUEBLO COUNTY HIGH SCHOOL	827	369
23	RALSTON VALLEY SENIOR HIGH SCHOOL	1827	109
24	SOROCO HIGH SCHOOL	115	30
25	SOUTH HIGH SCHOOL	1403	851
26	STEAMBOAT SPRINGS HIGH SCHOOL	711	60
27	THORNTON HIGH SCHOOL	1778	777
28	THUNDERRIDGE HIGH SCHOOL	2075	49
29	WINDSOR HIGH SCHOOL	1312	155
30	WRAY HIGH SCHOOL	177	69

RL	NE	FAR	PerFree	PerRed	PerFAR
128	503	1614	0.67915905	0.05850091	0.73765996
99	508	335	0.27962085	0.11729858	0.39691943
42	557	133	0.13131313	0.06060606	0.19191919
31	174	94	0.23333333	0.11481482	0.34814815
53	1751	164	0.0578125	0.02760417	0.08541667
45	716	304	0.25170068	0.04373178	0.29543246
43	274	356	0.49059561	0.06739812	0.55799373
37	255	155	0.28780488	0.0902439	0.37804878
49	1751	183	0.06907217	0.02525773	0.0943299
195	1078	715	0.28921023	0.10845384	0.39766407
78	727	299	0.21477162	0.07580175	0.29057337
65	1007	246	0.14445331	0.0518755	0.19632881
22	693	179	0.17861206	0.02502844	0.2036405
149	539	929	0.52774019	0.10081191	0.6285521
68	846	264	0.17562724	0.0609319	0.23655914
56	1413	173	0.07358491	0.03522013	0.10880503
277	850	1490	0.51837607	0.11837607	0.63675214
191	926	1026	0.42257085	0.09665992	0.51923077
20	1052	53	0.0298103	0.01806685	0.04787715
16	207	93	0.25412541	0.05280528	0.30693069
149	914	526	0.26053905	0.10297167	0.36351071
71	386	440	0.44619105	0.08585248	0.53204353
43	1674	152	0.05966065	0.02353585	0.0831965
7	78	37	0.26086957	0.06086957	0.32173913
123	423	974	0.60655738	0.08766928	0.69422666
26	622	86	0.08438819	0.03656821	0.1209564
159	842	936	0.43700787	0.08942632	0.5264342
32	1985	81	0.02361446	0.01542169	0.03903615
46	1109	201	0.11814024	0.03506098	0.15320122
27	81	96	0.38983051	0.15254237	0.54237288

Apclass	IBclass	PIBclass	Hclass	OTHclass	TOTclass
14	0	0	2	11	27
16	0	0	0	9	25
12	0	0	7	8	27
18	0	0	2	9	29
22	0	0	11	10	43
15	26	10	0	0	51
10	0	0	16	7	33
0	0	0	10	5	15
25	0	0	4	10	39
8	0	0	7	13	28
15	0	0	8	3	26
19	0	0	2	8	29
5	0	0	0	4	9
22	0	0	2	1	25
19	0	0	12	11	42
20	0	0	17	20	57
26	0	0	10	23	59
16	30	34	13	2	95
16	0	0	7	9	31
6	0	0	8	3	17
14	0	0	11	8	33
7	0	0	11	43	61
19	0	0	12	2	33
0	0	0	0	10	10
17	0	0	11	1	29
12	0	0	0	3	15
6	24	14	0	3	47
22	32	0	7	8	69
10	0	0	2	8	20
0	0	0	0	13	13

OI	ReadNFN	ReadNFT	ReadFN	ReadFT	WriteNFN
1.23400366	194	36.6	766	35.25	194
2.96208531	255	77.25	174	49.43	255
3.8961039	263	92.4	76	72.37	263
10.7407407	85	82.35	42	69.05	85
2.23958333	811	71.02	132	46.21	811
4.95626822	344	80.52	180	46.11	344
5.17241379	153	67.32	178	46.63	153
3.65853659	108	64.81	106	58.49	108
2.01030928	956	89.23	108	72.22	956
1.55728587	538	73.23	407	59.95	538
2.52672498	314	67.2	197	43.65	314
2.31444533	324	83.33	107	62.62	324
1.02389079	298	72.82	110	45.45	298
1.69147497	211	69.67	526	37.83	211
3.76344086	415	82.41	147	55.1	415
3.58490566	684	86.4	109	72.48	684
2.52136752	438	65.98	692	46.1	438
4.80769231	483	82.82	523	57.55	483
2.80036134	490	88.78	54	64.81	490
5.61056106	112	87.5	45	64.44	112
2.28058051	474	72.36	292	54.45	474
7.37605804	230	75.22	202	52.97	230
1.80623974	822	89.66	76	71.05	822
8.69565217	36	63.89	.	.	36
2.06699929	217	75.12	551	37.21	217
2.10970464	290	91.72	61	73.77	290
2.64341957	390	51.28	497	40.85	390
3.32530121	963	81.83	80	66.25	963
1.52439024	530	83.02	116	68.97	530
7.34463277	46	82.61	48	54.17	46

WriteNFT	WriteFN	WriteFT	MathNFN	MathNFT	MathFN
17.53	766	19.32	195	11.28	766
59.24	174	27.59	256	37.5	173
75.67	76	44.74	263	61.98	76
61.18	42	45.24	85	42.35	42
55.49	132	30.3	811	47.23	132
67.44	180	26.67	344	55.23	180
42.48	178	29.21	153	25.49	178
45.37	106	31.13	108	28.7	106
77.62	108	62.04	956	60.98	108
59.29	408	45.34	538	32.34	408
46.5	197	23.86	314	32.17	197
59.26	107	45.79	324	34.26	108
53.36	110	26.36	298	44.63	110
53.08	526	20.91	212	33.96	526
57.83	147	34.69	415	52.53	147
67.69	109	47.71	684	51.02	109
50.68	692	34.25	438	35.84	692
66.46	523	38.81	483	52.38	523
80.41	54	57.41	490	66.12	54
70.54	45	37.78	112	53.57	45
50.42	292	33.22	474	38.19	292
59.13	202	36.14	230	39.57	202
78.22	76	52.63	822	73.97	76
55.56	.	.	36	36.11	.
56.22	551	23.96	216	44.44	548
76.9	61	52.46	290	67.59	61
33.33	497	22.13	390	26.67	497
68.12	80	50	963	56.59	80
63.58	116	50.86	530	43.4	116
63.04	48	39.58	46	45.65	48

WriteDIFF	MathDIFF	TestAvgNF	TestAvgF
-1.79	1.49	21.8033333	21.4533333
31.65	27.1	57.9966667	29.14
30.93	35.66	76.6833333	47.81
15.94	23.3	61.96	44.4466667
25.19	23.75	57.9133333	33.33
40.77	43.01	67.73	28.3333333
13.27	13.69	45.0966667	29.2133333
14.24	14.55	46.2933333	34.59
15.58	14.68	75.9433333	60.1866667
13.95	10.53	54.9533333	42.3666667
22.64	18.97	48.6233333	26.9033333
13.47	16.67	58.95	42
27	26.45	56.9366667	29.9966667
32.17	23.5	52.2366667	23.0666667
23.14	26	64.2566667	38.7733333
19.98	24.41	68.37	48.9333333
16.43	16.33	50.8333333	33.2866667
27.65	26.76	67.22	40.66
23	38.34	78.4366667	50
32.76	24.68	70.5366667	43.7033333
17.2	13.53	53.6566667	37.4433333
22.99	19.27	57.9733333	36.47
25.59	25.29	80.6166667	57.4533333
32.26	27.47	58.5933333	26.0466667
24.44	28.25	78.7366667	55.19
11.2	11.38	37.0933333	26.09
18.12	25.34	68.8466667	49.1666667
12.72	15.81	63.3333333	49.14
23.46	18.57	63.7666667	40.2766667

Cnum	NineN	NineFR	NinePer	TenN	TenFR
1	0	0	0	3	1
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	114	15
7	86	16	19	0	0
8	0	0	0	0	0
9	53	12	23	31	8
10	23	3	13	57	9
11	0	0	0	0	0
12	2	2	100	105	17
13	69	16	23	0	0
14	0	0	0	0	0
15	18	4	22	23	6
16	10	0	0	22	4
17	13	5	38	22	7
18	13	3	23	7	0
19	2	0	0	16	0
20	0	0	0	1	0
21	0	0	0	0	0
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	0	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	3	0
32	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36	1	0	0	24	1
37	0	0	0	2	1
38	0	0	0	1	0
39	0	0	0	0	0
40	119	29	24	2	1
41	0	0	0	56	12
42	0	0	0	34	5
43	0	0	0	0	0
44	1	0	0	16	2
45	0	0	0	19	0
46	0	0	0	0	0
47	0	0	0	3	0
48	0	0	0	0	0
49	33	2	6	0	0
50	0	0	0	118	13
51	0	0	0	0	0
52	0	0	0	0	0
53	28	2	7	1	1
Total	471	94	20	680	103

TenPer	ElevenN	ElevenFR	ElevenPer	TwelveN	TwelveFR
33	8	4	50	5	2
0	6	0	0	0	0
0	40	3	8	1	0
0	2	0	0	11	2
0	5	0	0	3	1
13	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	24	3
26	1	1	100	0	0
16	9	6	67	1	0
0	17	2	12	5	0
16	3	0	0	0	0
0	0	0	0	0	0
0	16	1	6	0	0
26	1	1	100	0	0
18	26	3	12	0	0
32	16	2	13	15	4
0	0	0	0	1	1
0	15	5	33	0	0
0	11	3	27	1	0
0	0	0	0	15	0
0	13	1	8	8	3
0	4	0	0	2	0
0	11	1	9	10	2
0	22	3	14	19	1
0	43	4	9	0	0
0	0	0	0	29	4
0	1	0	0	14	1
0	0	0	0	7	2
0	15	2	13	3	0
0	24	3	13	0	0
0	44	4	9	0	0
0	50	14	28	0	0
0	48	24	50	4	3
0	1	0	0	28	5
4	22	2	9	10	3
50	13	1	8	30	7
0	3	0	0	13	2
0	26	3	12	25	2
50	1	1	100	1	1
21	18	2	11	2	1
15	7	1	14	6	1
0	1	0	0	33	4
13	23	2	9	2	2
0	17	2	12	2	0
0	14	0	0	14	2
0	7	1	14	5	1
0	9	1	11	7	1
0	0	0	0	1	0
11	51	18	35	0	0
0	14	3	21	0	0
0	0	0	0	26	7
100	1	0	0	4	1
15	679	124	18	387	69

TwelvePer	TotN	TotFR	TotPerFR	TotNFR	TotPerNFR	Class Type
40	16	7	44	9	56	Lang
0	6	0	0	6	100	Math
0	41	3	14	38	86	Hist
18	13	2	15	11	85	Math
33	8	1	13	7	87	Misc
0	114	15	13	99	87	Eng
0	86	16	19	70	81	Eng
13	24	3	13	21	87	Hist
0	85	21	25	64	75	Math
0	90	18	20	72	80	Math
0	22	2	9	20	91	Sci
0	110	19	17	91	83	Sci
0	63	16	23	47	77	Sci
0	16	1	6	15	94	Sci
0	42	11	26	31	74	Lang
0	58	7	12	51	88	Lang
27	66	18	27	48	73	Lang
100	21	4	19	17	81	Lang
0	32	5	16	27	84	Lang
0	14	4	29	10	71	Lang
0	15	0	0	15	100	Misc
38	21	4	19	17	81	Misc
0	6	0	0	6	100	Lang
20	21	3	14	18	86	Lang
5	41	4	10	37	90	Sci
0	43	4	9	39	91	Eng
14	29	4	14	25	86	Eng
7	15	1	7	14	93	Math
29	7	2	29	5	71	Math
0	18	2	11	16	89	Math
0	27	3	11	24	89	Math
0	44	4	9	40	91	Misc
0	50	14	28	36	72	Eng
75	52	27	52	25	48	Eng
18	29	5	17	24	83	Eng
30	57	6	11	51	89	Math
23	45	9	20	36	80	Math
15	17	2	12	15	88	Math
8	51	5	10	46	90	Engin
100	123	32	26	91	74	Engin
50	76	15	20	61	80	Engin
17	47	18	38	29	62	Engin
12	34	4	12	30	88	Engin
100	42	6	14	36	86	Engin
0	38	2	5	36	95	Sci
14	28	2	7	26	93	Sci
20	15	2	13	13	87	Sci
14	16	2	13	14	87	Sci
0	34	2	18	32	82	Hist
0	169	31	18	138	82	Hist
0	14	3	21	11	79	Hist
27	26	7	27	19	73	Hist
25	34	4	12	30	88	Hist
18	2211	402	18	1809	82	

IRB Approval Letter

University of Colorado Boulder

Institutional Review Board
563 UCB
Boulder, CO 80309
Phone: 303.735.3702
Fax: 303.735.5185
FWA: 00003492

APPROVAL

27-Feb-2015

Dear Alexandra Wolk,

On **27-Feb-2015** the IRB reviewed the following protocol:

Type of Submission:	Initial Application
Review Category:	Exempt - Category 2
Title:	Differentiated College-Prep Course Access: An Analysis of Colorado Public Schools
Investigator:	Wolk, Alexandra
Protocol #:	15-0090
Funding:	None
Documents Approved:	Protocol; 15-0090 Consent Form (27Feb15); Recruitment Scripts;
Documents Reviewed:	HRP-211: FORM - Initial Application;

The IRB approved the protocol on **27-Feb-2015**.

Click the link to find the approved documents for this protocol: Approved Documents. Use copies of these documents to conduct your research.

In conducting this protocol you must follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,
Douglas Grafel
IRB Admin Review Coordinator
Institutional Review Board

Consent Form

University of Colorado
Boulder

Permission to Take Part in a Human Research Study **Page** 1 of 3

Title of research study: Differentiated College-Prep Course Access: An Analysis of Colorado Public Schools

Investigator: Alexandra Wolk

Why am I being invited to take part in a research study?

We invite you to take part in a research study because you are either an admissions counselor at a public Colorado university or an administrator at a public Colorado high school.

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at Alexandra.wolk@colorado.edu.

This research has been reviewed and approved by an Institutional Review Board ("IRB"). You may talk to them at (303) 735-3702 or irbadmin@colorado.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Why is this research being done?

This study is being conducted to find out whether low-socioeconomic students are disadvantaged in terms of access to college prep courses (AP, IB, Honors), if access affects test scores, and if and how this affects their applications to public state universities. This study also attempts to discuss how the number of college prep courses is decided on a per school basis.

Permission to Take Part in a Human Research Study

How long will the research last?

We expect that you will be in this research study for no more than 1 hour.

How many people will be studied?

We expect about 10-15 people will be in this research study. This study will include up to 10 administrators from 10 different Colorado high schools, and 3-5 college admission councilors.

What happens if I say yes, I want to be in this research?

You will be asked a series of questions:

If you are an administrator at a Colorado public high school, you will be asked about how decisions about offering college-prep courses are made and whether or not you record how many FRL students and non-FRL students are in the college-prep courses provided. If you do collect and/or are able to disclose how many students in college-prep courses are FRL and non-FRL, you will be asked to provide non-identifiable data to the researcher.

If you are a college admissions counselor, you will be asked about how college-prep courses affect admissions decisions.

I will use a voice recorder to transcribe and quote interview questions, but names and schools will not be identified for privacy purposes. Interviews should take no longer than one hour in length. Interviewees will interact directly with Alexandra Wolk, the author and researcher of the study. The interview will be conducted at the interviewees' convenience either at the place of work, over the phone/e-mail, or at another specified location.

What happens if I do not want to be in this research?

You can leave the research at any time and it will not be held against you.

What happens if I say yes, but I change my mind later?

You can leave the research at any time it will not be held against you.

If you choose to withdrawal from the study, the data collected will not be used in the final project and will be deleted. You will not be asked to explain the reasoning of your withdrawal.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study records, to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of this organization.

If under rare circumstance, the research discloses abuse, neglect, or reportable disease; I am required to report these to the appropriate authorities.

What else do I need to know?

If you are interested in the results of the research study, you may find it at http://digitool.library.colostate.edu/, or e-mail the researcher directly at Alexandra.wolk@colorado.edu for a copy. This should be available anytime after April 7th, 2015.

Permission to Take Part in a Human Research Study Page 3 of 3

Signature Block for Capable Adult

Your signature documents your permission to take part in this research.

Signature of subject	Date
Printed name of subject	
Signature of person obtaining consent	Date
Printed name of person obtaining consent	IRB Approval Date