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Principles of Statistics

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Socio-economic Impact on Classroom Performance

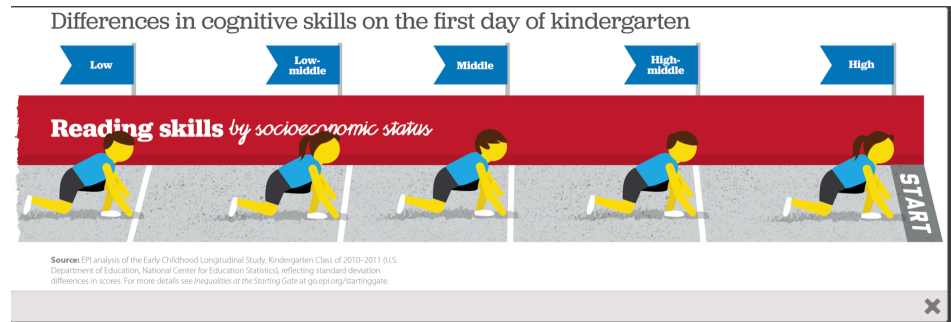
Introduction:

Whether or not the public education system needs reform can spark controversy at the local, regional, and national bureaucratic levels in the United States. Currently, public education is disorganized and heavily favors students from higher-income families by preparing them for college and ensuring they do not fall behind in class. However, for students from lower-income families, this is not the case. These students often fall behind due to problems at home and lack good role models who value education, causing the system to fail to cater to their needs. The study comparing family income to high school grade point average is a good indicator of the strong correlation between socioeconomic status and success in the high school classroom. The results of the correlational study are vital for our government, school boards, and teachers to recognize the discrepancies among different fiscal classes, enabling political changes that benefit everyone in the classroom. The study is crucial because it can be used as evidence for lawmakers to reform the current public education system for equality among all students, regardless of socioeconomic background.

Literature Review:

Social stratification has caused the education system in the United States to be heavily influenced by a socioeconomic hierarchy favoring high-income families(Paulson). Students from higher socioeconomic backgrounds perform better in the high school classroom because the education system is tailored to them and they are expected to succeed (Yan, Yan and Xiaosong Gai). Many factors contribute to low-income students having lower grade point averages, such as a lack of access to food, limited resources at home, and negative influences in the household. Poverty impacts a child’s brain development and social abilities, ultimately limiting students’ potential within the classroom (Garcia and Weiss) (Figure on right). Jason Sockin, a well-

respected economics expert, conducted a similar correlational study and found that lower-income students



have lower performance in the classroom in terms of grade point average, high school rank, and ACT score (see figure below) (Sockin).

Table 2: Correlation between Household Income, High School Performance, and the ACT

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	Household income	High school GPA	High school rank	ACT composite score	AFQT exam score
Household income	1.00	-	-	-	-
High school GPA	0.09	1.00	-	-	-
High school rank	0.10	0.76	1.00	-	-
ACT composite score	0.23	0.59	0.55	1.00	-
AFQT score	0.21	0.55	0.52	0.82	1.00

Notes: Data are from the publicly available National Longitudinal Survey of Youth 1997. Analysis restricted to sample of high school graduates. Each of the five measures is standardized to have mean zero and standard deviation one. High school rank reflects an imputed percentile based on the numerical rank available for each student and five bins of graduate class sizes for which we assume a fixed class size (50 for bin 1--100, 160 for bin 101--220, 275 for bin 221--330, 400 for bin 331--470, and 1000 for bin 470+). Correlations are weighted according to representative panel sampling weights.

Based on the research I have conducted and Sockin's findings, I expect to find a strong correlation coefficient between a family's income and a student's grade point average, estimated to be very high, around 0.8 to 0.85.

Research Question and Hypothesis Statement::

From the articles and findings above, there is a gap in the academic performance of high school students in the classroom, but there's very little information about at the early levels of education. The study will be researching the discrepancies of education at the primary level with the question: Does the socioeconomic status of students have an influence on the academic performance within primary education classrooms in regards scores achieved in statewide reading assessments? I will be using be comparing the reading test scores of the students who need subsidized lunch to the reading test scores of the total population to see if socioeconomic status has an impact on classroom performance, with 69.169 being the found reading score throughout the state of North Carolina. Hypothesis: $H_0: \mu_{\text{subsidized lunch students}} \geq 69.169$; $H_a: \mu_{\text{subsidized lunch students}} < 69.169$.

Data and Summary Statistics:

The data source used in this study is from the North Carolina Department of Public Instruction's data collects. This governmental department collects statistics and data of the performance, demographics, and backgrounds of the kids in North Carolina to track growth and ensure the state's education system does its best to have equal education for all students. The data that I collected is a sample of a thousand entries with the following variables: sex, race, parent's

level of education, whether the student gets free or standard lunch, standardized assessment math score, standardized assessment reading score, and standardized assessment writing score. I will be using whether students get free lunches or standard lunches for an indicator of socioeconomic status as my independent variable and the standardized assessment reading scores for level of performance in the classroom as my dependent variable. Below are the summary statistics for the reading scores of grades 3-8 on the statewide standardized test.

Ave:	69.17	Ave:	64.54
STD:	14.6	STD:	14.9
# of observations:	1000	# of observations:	355
Min Value:	17	Min Value:	17
Max Value:	100	Max Value:	100

Summary Statistics for Entire Sample of Students

Summary Statistics for Students Who need Free Lunch

Hypothesis Test and Discussion:

For testing the hypothesis, we use $Z = (\bar{x} - \mu_0) / (\text{std} / \sqrt{n})$ because the sample size is one thousand, which is too big of a sample size to use a T test. We will use a lower tail test with 95% Confidence Interval for the test to find our critical value because we are examining if the test scores of subsidized lunch students are lower than the average of all of the students in North Carolina. We then plug in the values from the summary statistics above into the equation :

$$(64.65 - 69.17) / (14.60 / \sqrt{355})$$

$$-4.52 / -17.02 = -.27$$

The resulting test statistic came out to be -.27. The critical value is 1.645 which is found from the z table. We fail to reject the null hypothesis that $\mu_{\text{subsidized lunch students}} < 69.169$ because the test

statistic is less than the critical value or $-.27 < 1.645$. Since the test statistic is less than the critical value, the null hypothesis is failed to be rejected, therefore we can assume that the reading test averages of the “free lunch students” will be lower than the average of the total students.

Conclusion:

In conclusion, I found that my hypothesis had been correct that the reading standardized test scores were going to be lower than average for primary education students who need subsidized school lunch. This can be assumed that socioeconomic status impacts the performance of elementary students, consequently hindering their success in the future. The average test scores of the students who need free lunch being lower than the average of total students and the H_0 proves that the United States government might need to reform the education system to make learning equitable for all students, regardless of economic status. There are discrepancies in education between lower income students and higher income students that start at a very young age. Lawmakers need to take this data and make sure that all test scores are equivalent at the elementary level to ensure none of the students fall behind when they get to the higher level. The government should prioritize the education of all citizens and reform the system to shift away from plutocratic influences and social stratification ideologies that currently favor higher income students. .

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