Socioeconomic Status and School Achievement

Do children of low socioeconomic status more often score below basic on standardized Mathematic achievement tests than students of high socioeconomic status?

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November 2008

Introduction to Statistics

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ABSTRACT

A relationship was found between the percentages of students on free or reduced lunch programs and the percentages of students performing Below Basic in mathematics on the current mandated achievement tests in grades three through eight. Analysis was conducted on information obtained from a total of 74 school districts representing region one, the Northwestern region of the state of Arkansas.

A correlation coefficient, Pearson's r calculation was used to determine the strength of the correlation between the two percentages in grades three through eight. The correlational study was designed with the Free and Reduced Lunch Program percentages as the criteria variable and the mathematic score percentages as the predictor variable. The Pearson's r correlation revealed a positive association of 0.44 between the percentage of 8^{th} grade students participating in the free or reduced lunch program and the percentage of students scoring below basic on the mathematics benchmark tests in region one of Arkansas. This is indicative of a moderate correlation between a student's socioeconomic status and math test scores. The remaining grades, three through seven, however, were found to have weak to very weak associations ranging from -0.1 to 0.23. This conversely reveals a weak correlation between socioeconomic status and math scores.

Introduction

In studying educational achievement from the perspective of parents and teachers it has been found that most parents have positive attitudes about school testing because it provides evidence of their child's accomplishments. Some parents worry that the scores may be affected if the children experience any type of anxiety at all. Several factors can be taken into consideration when we think about what can affect the child's performance. It is important to conduct a study that provides information about student demographics and student achievement. Previous studies found that socioeconomic status, the level of family income, what level of income a family is in; low-SES or high-SES, is an important predictor of student achievement across the nation (Klingele & Warrick, 1990). There are several factors thought to affect low-SES families; hence, contributing to lower tests scores. For example, nutrition, parent involvement, and the environments children are exposed to all have a significant impact on a child's ability to learn and achieve (Milne and Plourde, 2006; Sambonmatsu et al 2008. The studies conclude that student/family poverty status measured by student participation in federal free or reduced lunch programs does have a negative impact on student achievement. Another study predicted that the percentage of students on free or reduced lunch programs would be negatively related to achievement. (Caldas and Bankston, 1997). Does the socioeconomic status of a school district correlate with achievement on standardized testing? Multiple researchers have shown this to be true time and time again. In this research paper the correlation between the percentages of children participating in Free or Reduced Lunch Programs

and the percentages of children scoring below basic on the state mandated achievement tests in mathematics, relative to the current institution of math coaches into the schools, will be investigated. The research will focus on region one of the Arkansas state schools. This region will include the Northwestern region of Arkansas. It is hypothesized that children of low socioeconomic status will more often score below basic on standardized mathematic achievement tests than students of high socioeconomic status.

Review of Literature

Although the curriculum in many schools throughout the United States is designed to promote success on standardized tests, there are still many students who score at a basic or below basic level on these tests. The level of family income, what level of income a family is in, has the potential to influence a child's ability to perform from one extreme to the other. If a parent is financially able to clothe, feed and entertain their children it appears they should have all the support they would need to score well on benchmark exams. However on the flip side, if parents are not financially able to support their children with just the basic needs, it is possible that will have an effect on the child's benchmark scores as well. A number of studies have found that food insecurity has a negative impact on various child outcomes, including children's physical and mental health, social behavior, and school performance. The results of the study, Hunger in America 2006: A Report on Emergency Food Distribution in the United States in 2005

are disconcerting. This report states that more than 25 million Americans, including 9 million children and nearly 3 million seniors receive emergency food assistance each year. Even though Food Stamp Programs have contributed to substantial reductions in children's poverty gap, we may still find that food stamp recipients and non-recipients have the same likelihood of being food-insecure. Thus, we find that participation in the School Free or Reduced Lunch Program may not always be associated with improved child's well-being or school performance

The significance of parent involvement, another factor affecting the level of a child's school success was investigated by authors, Milne and Plourde (2006). The qualitative study investigated the various home factors of low-SES primary students possessing high academic achievement. The authors sought to find what factors low-SES homes had in common that enabled their children to attain academic success. They wanted to know if it is just the natural resiliency of some children from low-SES homes to succeed and whether or not they would do so regardless of the living environment.

In order to find these answers the authors first identified 6 academically successful second grade students residing in low-SES homes and their parents. This information was ascertained from the free and reduced lunch status of the entire second grade class. The primary caregivers were then contacted to determine their willingness to participate in the interview process. Upon the conclusion of the interviews and compilation of data, four common themes within each home and attitudes of the children's caregivers was identified.

The first commonality, educational resources and influences, was found to be abundantly available to children in each of the homes. While some homes had more or less than others they all had, at the very minimum, materials for writing and books to read. Time was allocated each day for the children to complete homework and television time was limited. The caregivers made sure their children did educational activities outside of school and made sure they were available to assist, encourage, and participate with their children. Secondly, all the caregivers expressed how important they felt it was to have an education and conveyed this to their children. Despite the limited education mentioned by a couple of the caregivers they strongly encouraged and often reminded their children of the need to acquire an education. The third commonality, relationships, revealed very distinctive patterns in how the parents and children related to one another. Each parent spoke highly of spending quality time together on a regular basis. While all the parents wanted to be respected they as well desired relationships with their children and wanted to be able to have fun and enjoy each other. The last of the four relates to the causes of each child's success. The author's wanted to know what the care givers felt was their key role in assisting their child to succeed in school. And once again, the care givers replies were very similar. They each emphasized the need for infinite support and guidance at home as well as reinforcing that completing schoolwork and other educational was not optional but rather, a priority. Continual efforts were made by all parents to set an example of how crucial it was to do well in school.

In conclusion the study proves that educators should not assume that just because a

child comes from a low-SES they are going to struggle. Although some families may not have many material items, they can still provide the things their child needs to be successful in school. Educators can benefit from the knowledge gained in this research to determine how to best support students by knowing what type of home environment they live in. Parents as well can benefit in knowing that despite their income level if they can plan to spend quality time with their children and foster good values regarding education that and encourage continual activities in and outside of school their children can reap the benefits in academic success.

In an article by Klingele and Warrick (1990), a study was performed determine the extent to which parent involvement affects a child's school performance. Parents of low-SES aren't involved with school activities as much as those of high-SES children. While reasons for this vary, the impact on student achievement is the same, lower than that of students with continual parent support and involvement. In studying educational achievement from the perspective of parents and teachers it has been found that most parents have positive attitudes about school testing because it provides evidence of their child's accomplishments. Some parents worry that the scores may be affected if the children experience any type of anxiety. Student/family poverty status measured by student participation in federal free or reduced lunch does have negative impact on student achievement. Another study predicted that the percentage of students on free or reduced lunch would be negatively related to achievement. (Caldas and Bankston 1997).

Students at Risk in Poor, Rural Areas, is an article resulting from research pursued in

relation to environmental factors associated with low-SES. The questions asked by authors, Khattri, Riley, and Kane (1997), Do the combination of "poverty" and "community type" in a rural area or in a poor urban area have an affect on public school education? Are they performing as well as their suburban counterparts? What are some unique characteristics of poor, rural communities and the students? Do they benefit at all? How do they place their students at risk? The United States Department of Education's National Institute on the Education of At-Risk Students got together to examine these questions. The Institute has designed activities to improve the education of students at risk of failure for several reasons: limited English proficiency, poverty, race, location or economic disadvantage. Poor neighborhoods can negatively affect a student's education. Research shows that students enrolled in high-poverty schools tend to perform at lower levels than students enrolled in low-poverty schools. Research shows poverty plays a vital role in both urban and rural areas, but it is still unclear as to whether or not poverty alone is the main factor. Recent studies employ various definitions of "at-risk." Some have considered students at risk due to failing a course, dropping out of school or not taking any kind of challenging courses. However, others have focused on students at risk of unemployment or lack of success in later life. Rural education often does not include adequate control variables, making it difficult to determine whether a particular phenomenon is truly "rural" or observed in a rural setting and could be associated with other conditions. Data reveals that 25% of Title 1 finds are spent in non-metro areas with the greatest concentration in the South. Some research shows that the academic

performance was better of students in poor, rural areas than those in the poor, urban areas. High poverty schools tend to enroll larger proportions of minority children than do rural schools with lower poverty, such as Hispanics. These families usually move around a lot to work the season. They, too, usually have to work for lower wages and long hours as well. Single parent tend to have lower achievement rates and higher drop out rates than do students from more traditional, two parent households. Rural students are less likely to be living with single parents than are urban students. Economic opportunities are not distributed evenly across the country, and consequently, therefore, a finer-grained picture of poor, rural communities is needed to assess the educational opportunities and out-comes for students in rural communities.

Pertinent as well to the environmental factors impacting school performance, is the article "New Kids on the Block: Results from the Moving to Opportunity Experiment, by researchers Lisa Sanbonmatsu, Jeffrey Kling, Greg Duncan, and Jeanne Brooks-Gunn. The researchers compared the educational outcomes of children whose families were offered housing vouchers through a lottery with those of children in families who entered the lottery but were not offered vouchers.

A randomized evaluation of the Moving to Opportunity program which was a federal housing program piloted in five major U.S. cities that sought to relocate poor families by providing housing vouchers. The study showed that contrary to expectations,

moving families out of high-poverty neighborhoods had no overall positive impact on children's learning. During the first four years of the program, more than 4,000 families applied for the housing vouchers in the five pilot cities which included Baltimore, Boston, Chicago, Los Angeles, and New York. A lottery was used to randomly assign each family to one of three groups: those receiving unrestricted housing vouchers that could be used to rent in the private market in any neighborhood; those receiving restricted vouchers that could be used only in neighborhoods with a poverty rate of less than 10 percent; and those who did not receive either voucher.

The improvements in the schools attended by the children of families using vouchers were more modest. Children in restricted voucher families attended schools with only slightly higher scores on state exams. The schools also had about 10 percent fewer minority students and almost 13 percent fewer students eligible for the federal lunch program. Unrestricted vouchers produced changes about 30 to 50 percent as large. The MTO program, however, had no overall impact on student test scores. For children whose families had a restricted voucher, no statistically significant increase was seen in combined reading and math test scores. In addition, no statistically significant difference were found in behavior or attitudes toward school between children from families with and without vouchers.

The authors suggest various reasons for the program's limited benefit. Families who used vouchers took steps later that undid some of the potential advantages of their initial moves to middle-class neighborhoods in subsequent moves. Moreover, many

families who remained in their new neighborhoods found that the poverty rate increased around them. Notably, the neighborhood improvements did not involve moving to truly affluent neighborhoods. It may be the case that children from low-income families who moved into high-income suburbs would experience notable improvements in academic achievement. Moving poor families to neighborhoods that, while less poor, have schools that are only marginally better than those in the original neighborhoods is unlikely to solve the children's academic problems, note the authors.

Methods

To test the hypotheses that students of low-socioeconomic status will more often score below basic on standardized achievement tests, analysis on information obtained from the state's current mandated achievement tests and the Free and Reduced Lunch Programs was performed. Information from the 2007 Benchmark scores for region one of the Arkansas state schools and current data on the Free and Reduced Lunch Programs was obtained from the Arkansas Department of Education website to complete this study. Region one is situated in the northwestern region of the state.

Students attending the third through eighth grade in all public schools in the state of Arkansas are given the Benchmark exam annually. Each student is given a test performance ranking in mathematics and literacy. The test scores are listed as Below Basic performance, Basic performance, Proficient performance and Advanced performance. Students with test scores of below basic or basic are considered to be

functioning below expectations of grade level. The Arkansas State Department of Education publishes the test results on each district, each year the test is given. The free and reduced lunch percentages of each district were correlated with the below basic test percentages for each district. The socioeconomic status of the community and the students of the district reflect the data percentage. To determine the correlation between the percentages of students scoring Basic or Below Basic in Mathematics in grades three through eight, six statistical calculations were needed.

To determine the relationship between the percentage of students on free or reduced lunches and the percentage of students performing Below Basic on Mathematics in grades three through eight a correlation coefficient was calculated. The strength of the correlation between the two percentages can be determined through this correlation. The closer the correlation coefficient is relative to 1.0 or -1.0 the stronger the correlation between variables. A strong correlation exists when a correlation coefficient is in the .80 to 1.0 or -.80 to -1.0 range. Weak correlations exist when correlation coefficients are below .40 or -.40. Correlations considered to be moderate in strength are those with coefficients between .40 and .80 or -.40 and -.80

Results

A Pearson's r correlation was completed on the information obtained from the Arkansas Department of Education which used the free and reduced lunch program percentages as the criterion variable and the math score percentages as the predictor variable. The mean

percentage of students participating in the free or reduced lunch program for all 74 districts analyzed was determined to be 53%. The data percentages of participants in the free or reduced lunch program from each district varied widely with a range of 18.9% to 75.8%. Individual free or reduced lunch program percentages from each school district were correlated with the number of students scoring Below Basic on the annual Mathematics Benchmark exam in grades 3 through 8. A correlation coefficient range of -.01 to .44 was determined for grades three through eight in the area of mathematics. The third, sixth, and fourth grades had the lowest correlation coefficient of -.01 demonstrating a very weak, if any, correlation. Next was the fifth grade with a 0.23, weak association. And lastly, the seventh and eighth grade calculated r values of 0.4 and 0.44, respectively, show moderate negative associations in those grade levels. Thus, showing when the food program participant percentages are high, the math scores are low.

Overall, weak correlations were identified in grades three through seven between the percentage of students scoring below basic in mathematics on the annual benchmark exam and the percentage of students participating in the free or reduced lunch program. And, while the weak correlation coefficient range; -0.1, 0.07, 0.23, 0.02, 0.4 is evident in grades three through seven, the eighth grade correlation coefficient of 0.44 is as well, barely indicative of a moderate association. There were no correlation coefficients higher than .50.

Below Basic Math Benchmark Correlation Coefficient Data for all grades

3rd	4th	5th	6th	7th	8th
-0.1	0.07	0.23	0.02	0.4	0.44

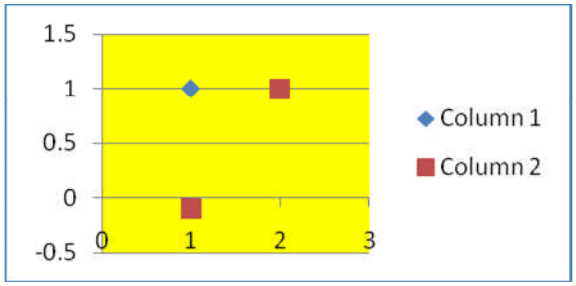

Figure 1. 3rd grade

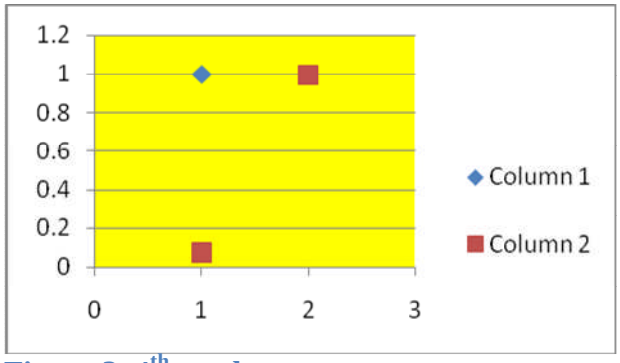

Figure 2. 4th grade

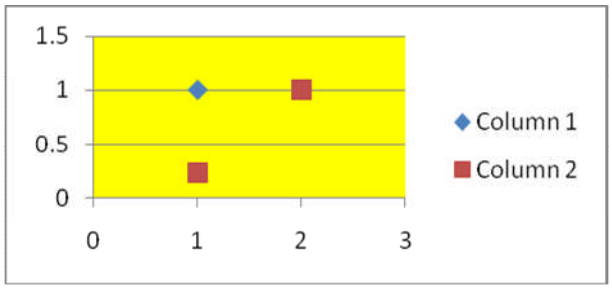

Figure 1. 5th grade

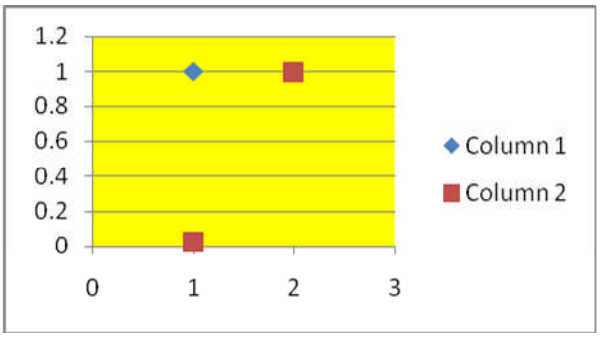

Figure 2. 6th grade

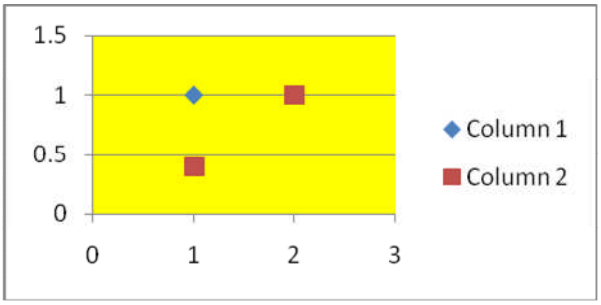

Figure 3. 7th grade

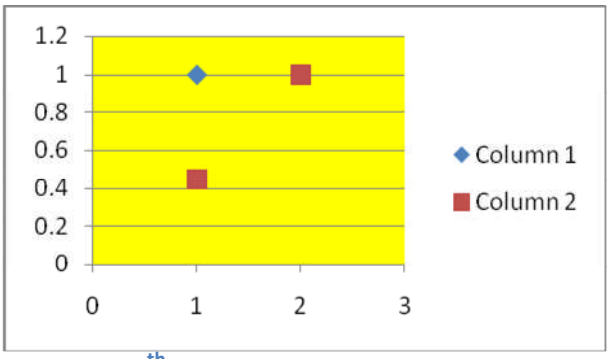

Figure 6. 8th grade

Discussion

This study does not indicate any significant positive or negative association for any one grade level over another, between the students participating in the Free or Reduced Lunch Programs and the Below Basic Scores obtained in mathematics. The Pearson's r tells us that the closer a value gets to 1.0, either positive or negative, the stronger the association between the two variables being studied. We obtained the percentages for both Free and Reduced Lunch Programs and the Below Basic Mathematic test scores then figured the correlation between the two variables. The study revealed, at most, a moderate association between the variables for the seventh and eighth grade levels. This tells us that in these two grades there is an association between students of low-SES and the below basic scores received on the mathematics portion of the Benchmark tests.

However, the fact that no significant correlation between the two variables was determined warrants the need for further research. Additional research could prove beneficial to determine if the implementation of math coaches into the public school systems has indeed contributed to improved math scores. And what other changes, if any, have occurred contributing to the improved scores on the majority of the remaining low-SES students in the study. The data analyzed for this study could provide support for further research in the other Arkansas public school regions. The information would enable comparisons between the regions to determine if additional research results could assist in determining which methods of teaching, curriculums, environments, etc., would

prove most beneficial in contributing to the students improved test scores as well as overall school success.

Since there are many factors that affect student performance, researchers, as seen throughout this paper often find that low-SES has a significant impact on student success. Thus, it is felt that students of low-SES face more obstacles in achieving success in school than students of high-SES. Further research to establish what has contributed to the improved math test scores in region one of the Arkansas Schools would enable the implementation of programs to help low-SES students continue to overcome unfortunate obstacles and attain a quality education.

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