The Socioeconomic Gap: Are They Being Left Behind By Computerized Testing?

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Abstract

School districts continue to try to close the achievement gap. However, studies continue to show that there is a socioeconomic gap and students frequently struggle with their grades, graduating, and achieving higher test scores. Students are now tested using the Partnership for Assessment of Readiness for College and Careers (PARCC), the new computer-based standardized test in the State of New Jersey. A problem with computer-based testing are students' familiarity with the technology that is being used because some students might not have the luxury of being exposed to different types of technology on a regular basis.

Introduction

The State of New Jersey had the first PARCC test administration in the Spring of 2015. Prior to this all students were tested with the NJASK (Grades 3-8) and HSPA (Grade 11), both a paper and pencil test. Students did not need to know how to navigate a computer screen to give their answer. They simply bubbled in their answer or wrote their open ended answer on a test booklet. With the PARCC test students have to practice how to drag an answer into a answer box with a mouse, watch and listen to videos, and use mathematical tools to derive at the correct answer. Some students are fortunate to have the technology they need to be a master PARCC tester, but others are not. Some students are not heavily exposed to different types of technology, at home and school, leading them at a disadvantage when they take the PARCC.

Data

The data for this study is from the PARCC results of Spring 2015 and Spring 2016 published in the State of New Jersey's Department of Education website [5]. The PARCC tests students from Grades 3 to 11 in English Language Arts (ELA) and Mathematics. For this study the high school PARCC tests ELA Grades 9 to 11 and Mathematics: Algebra 1, Algebra 2, and Geometry were used. The District Factor Groups (DFGs) in the report will be used which provides a systematic approach for classifying New Jersey school districts based on the socioeconomic status (SES) observed within the communities served by the district. The DFGs range from A (lowest socioeconomic districts) to J (highest socioeconomic districts) and are labeled as: A, B, CD, DE, FG, GH, I, J. Additionally, charter schools are labeled as R and vocational schools are labeled as V. The subgroup of Race/Ethnicity will be used. The Mean scale Score in the report will be used to gauge how the school district's students performed. Also, data from U.S. Census Bureau's 2011-2015 American Community Survey 5-Year Estimates of median household income by county will be used [2].

Methods

The method involved cleaning and preparing the Spring 2015 and Spring 2016 assessment reports. County, district name, DFGs, Race/Ethnicity subgroups, and the Mean Scale Score were kept. With this information the averages of the mean scores will be analyzed and classify them in highest and lowest scoring. The 2015 Median household income were derived from the U.S. Census Bureau by county in New Jersey and used to analyze if there is a correlation of household income and high test scores.

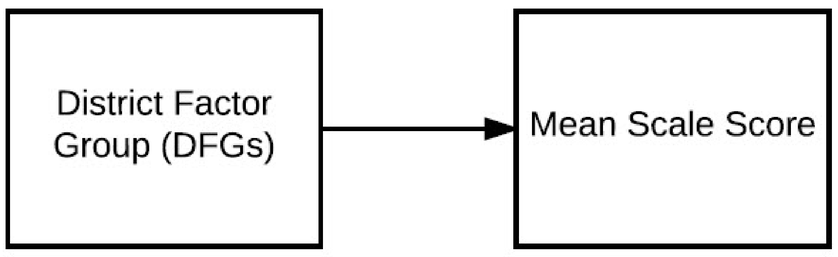

Figure 1: Are average mean scales scores influenced by DFGs?

Figure 2: Are average mean scales scores influenced by DFGs and Race/Ethnicity?

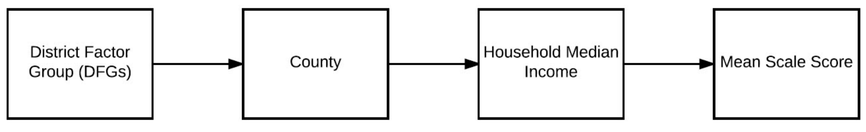

Figure 3: Is there a correlation between county's household median income, DFGs, and average mean scale score

Results

Utilizing the methods from Figure 1 a model was built to analyze PARCC test scores from Spring 2015 and Spring 2016. Algebra 1 test scores from Spring 2015 will be used as an example for this model. The passing scale score for Algebra 1 is a score equal or greater than 750. The DFGs ranges are A, B, CD, DE, FG, GH, I, J where A is the lowest socioeconomic districts and J is the highest socioeconomic districts. Charter and vocational schools were also included in this model and they have a range of C and V, respectively. The result for this model for Algebra 1 can be viewed in Table 1.

DFGs	Avg Scale Score
A	723
B	735
CD	741
DE	741
FG	747
GH	749
I	762
J	765
R	735
V	737

Table 1: Figure 1 Model - DFGs and Mean Scale Scores (Algebra 1, Spring 2015)

Table 1 does show that there is a correlation between a high socioeconomic district (I and J) and a high score for passing the Algebra 1 test.
To analyze the result from Figure 2 the subgroup of Race/Ethnicity were added into the equation. Does your socioeconomic background affect your test score? The result for this is below in Table 2.

Race/Ethnicity	A	B	CD	DE	FG	GH	I	J	R	V
AFRICAN AMERICAN	718	725	723	726	724	732	729	725	724	734
AMERICAN INDIAN	738	726	743	734	728	747	758			
ASIAN	746	757	767	761	766	771	783	790	783	769
HISPANIC	728	734	731	730	730	735	736	746	736	735
NATIVE HAWAIIAN	739	744	746	754	760	758	783			
OTHER	704	733	735	735	726	747	771	775	744	740
WHITE	740	746	750	751	756	756	766	766	763	747

Table 2: Figure 2 Model - DFGs and Race/Ethnicity correlating to Mean Scale Scores (Algebra 1, Spring 2015)

From the result in Table 2 above, Race/Ethnicity does have a factor in a student's test performance. Regardless if an African American student attended an I or a J DFG, the mean scale score within that DFG were still below the passing score for Algebra 1 (750). This is also the same for Hispanic students where the highest score was a 746 in a J DFG.
To analyze the result from Figure 3 household income by county were added into the equation. The table below shows the counties in New Jersey, from the lowest to highest median income.

County	HH Median Income	A	B	CD	DE	FG	GH	I	J	R	V
CUMBERLAND	49,984.00	733	731	768							680
ESSEX	53,976.00	721		702	742	735	742	750	761	728	733
ATLANTIC	54,461.00	729	750	746	739		786			709	729
CAPE MAY	57,637.00	723	726	779	728	765					729
PASSAIC	59,739.00	723	719	744	731	743	754			742	737
HUDSON	59,741.00	727	734	742	753	722				723	741
SALEM	61,831.00	712		739	762	734					710
OCEAN	61,994.00		731	739	736	746					721
CAMDEN	62,185.00	700	735	735	732	745	745	778	737	726	725
UNION	69,594.00	722	721	721	733	739	732	751		715	787
WARREN	70,471.00		735		746	731	771	787			722
MERCER	72,804.00	714			734	737	737	743	751	761	761
GLOUCESTER	76,727.00	716	730	736	745	745					718
BURLINGTON	78,621.00		720	722	733	742	742	767		739	732
MIDDLESEX	79,593.00	721	726	734	741	742	752	749	779	722	715
MONMOUTH	85,242.00	713	739	737	738	748	742	771	758	701	777
BERGEN	85,806.00		728	734	735	749	751	767	764	734	745
SUSSEX	86,565.00			720	741	739	716	745			719
MORRIS	100,214.00	744			761	753	740	760	762		742
SOMERSET	100,667.00		726	738	729	711	751	756	765	769	726
HUNTERDON	105,444.00					763	764	758	771		

Table 3: Figure 3 Model - Household Median Income by County, DFGs and mean scale score (Algebra 1, Spring 2015)

The above result shows that households with high median income have students who score higher in their Algebra 1 test. The table above can also be use to gauge prospective home buyers which county and school district's DFG would be more viable for the success of their child in the future.

Conclusions

- Model 1 indicates that depending on what type of DFG a school district is labeled the performance of the student's test score will be affected.
- Model 2 indicates that a student's race/ethnicity has a factor on how a student will perform, regardless of DFG.
- Model 3 indicates that a household's median income has a correlation to a student's test performance.

References

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