

COMMENTARIES

METAMORPHOSIS: FROM STATISTICS INTO COCKROACHES, A RESPONSE TO PROFESSOR COHEN'S *A STUDY OF INVIDIOUS RACIAL DISCRIMINATION IN ADMISSIONS AT THOMAS JEFFERSON HIGH SCHOOL FOR SCIENCE AND TECHNOLOGY: MONTY PYTHON AND FRANZ KAFKA MEET A PROBIT REGRESSION*

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In a recent Albany Law Review symposium issue regarding diversity,¹ Dr. Lloyd Cohen argued that the process used by the Fairfax County Public Schools to select students for admission to the Thomas Jefferson High School for Science and Technology ("TJ") results in invidious racial discrimination.² He claimed that the TJ admissions process, even if facially neutral, is calculated to admit substantially more African-American students than would be chosen on merit alone, in violation of both the Equal Protection Clause of the United States Constitution and the Civil Rights Act of 1964.³ Cohen bases his argument on the result of a regression analysis of admissions data for the TJ class of 2006, to which TJ offered admission to 449 students, ten of whom are African-American.⁴

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¹ *Symposium on Confronting Realities: The Legal, Moral, and Constitutional Issues Involving Diversity*, 66 ALB. L. REV. 329 (2003).

² Lloyd Cohen, *A Study of Invidious Racial Discrimination in Admissions at Thomas Jefferson High School for Science and Technology: Monty Python and Franz Kafka Meet a Probit Regression*, 66 ALB. L. REV. 447 (2003).

³ *Id.* at 450.

⁴ Cohen states that he utilized data concerning the students' ethnicity, sex, percentile rank among the applicants on the verbal portion of the TJ admissions examination, percentile rank among the applicants on the math portion of the TJ admissions examination, weighted grade point average for the first quarter of the eighth grade and the entire seventh grade in core academic courses, combined index score—which is equal to their raw score on the verbal test

As Superintendent of the Fairfax County Public Schools, I must respond to the offensive and untrue implication that the African-American students at TJ are less qualified than their white counterparts. The regression analysis conducted by Cohen is fundamentally flawed. Careful analysis of the data demonstrates clearly that there is no meaningful difference between the test scores and qualifications of the African-American students and those of most of the white students admitted to TJ.

I. FLAWS IN COHEN'S ANALYSES

The TJ admissions pool consists of 800 semifinalists, all of whom are qualified to attend the school. Relying on the fact that some African-American students who were admitted ranked lower in the pool of 800 than some white students who were rejected, Cohen asserts that his regression analysis shows that the differences in academic merit between these two groups were so disparate that the only plausible explanation is that the admissions committee used race as the predominant factor in making its selections.

Cohen's article is rife with statistical and analytical errors,⁵ but the most significant flaw is his failure to account for the standard error of measurement (SEM) when considering the students' performance on the *Specialized High School Admissions Test*⁶ as well as their resulting rankings. This failure fatally undermines his conclusion that significant differences exist between the academic merit of the African-American students admitted to TJ and white applicants who were rejected.

A. Taking the SEM into Account

The SEM is a fundamental statistical concept, universally considered by professional researchers when considering student performance on assessments. It represents an estimate of the error around an individual's score. If an individual were to take a test multiple times, that person's score would fluctuate. The SEM captures the amount of expected fluctuation.⁷ When interpreting

+ (1.4x their raw score on the math test) + (8.75 x their GPA in core courses)—their rank in the 800-student admissions pool based on their combined index score and whether the student was offered admission to TJ. *Id.* at 470–71.

⁵ See footnotes 10–14, *infra*, and accompanying text.

⁶ The *Specialized High School Admissions Test* is norm referenced.

⁷ SEM is a function of a test's reliability (r) and the standard deviation (SD) of the scores: $SEM = SD\sqrt{1-r}$.

test scores, one must think of scores in terms of bands, namely the score received plus or minus the SEM. The band around a score of plus or minus one SEM represents a 68% confidence interval. For a 95% confidence interval, one would need to expand the band to plus or minus two SEM. In either case, the band around a given student's score will overlap with the bands from many other scores.⁸ For the 2001-2002 administration, the SEM for both forms of the verbal test was 3.4. For the math test, the SEM was 2.8 for Form A and 2.9 for Form B. What this means is that a student who received a score of 59 on the verbal test could easily have received anywhere from a 55.6 to 62.4. So, the difference in performance between a student scoring 59 and one scoring 62 should certainly not be considered meaningful.

TABLE 1: MEAN VERBAL AND MATH SCORES BY APPLICANT RANK

RANK	MEAN VERBAL SCORE	MEAN MATH SCORE
1-200	62.76	47.08
201-400	59.06	44.17
401-600	56.45	41.89
601-800	54.21	39.56

Table 1 illustrates that the top 200 ranked students had scores that were more than one SEM higher than all of the other groups on both the verbal and math tests. Conversely, the table also shows that the group of students ranked 201-400 and the group ranked 401-600 had mean scores that fell within one SEM of each other on both tests. This means that if these students were tested again, those students in the 401-600 group could easily have ended up among the 201-400 group. The same would be true for students ranked 401-600 and 601-800.

Table 2 illustrates that Cohen treated individual rankings as precise measures of merit, when they were not. Table 2 contains data from selected applicants regarding rank and score bands. The overlapping nature of any two bands means that the students could easily have had the other rank. For example, the students ranked 415 and 716 were nearly identical in terms of their scores. Cohen argued that the student ranked 716 must have been admitted as a result of a suspect process. However, the data show that the

⁸ Some measurement texts suggest considering a difference between two scores as meaningful only if that difference is greater than two SEM. ROBERT M. THORNDIKE, ET AL., MEASUREMENT AND EVALUATION IN PSYCHOLOGY AND EDUCATION 102-03, 377 (5th Ed. 1991).

student ranked 716 was similar not only to student 415, who was rejected, but also to student 370, who was accepted.

TABLE 2: SCORE BANDS FOR SELECTED STUDENTS

RANK	DECISION	ETHNICITY	Verbal Score (\pm one SEM)	Math Score (\pm one SEM)
366*	A	Black	58 (54.6 – 61.4)	42 (39.1 – 44.9)
366*	A	White	58 (54.6 – 61.4)	42 (39.1 – 44.9)
370	A	White	61 (57.6 – 64.4)	40 (37.1 – 42.9)
394	R	White	51 (47.6 – 54.4)	47 (44.1 – 49.9)
415	R	White	62 (58.6 – 65.4)	38 (35.1 – 40.9)
487	A	Black	61 (57.6 – 64.4)	38 (35.1 – 40.9)
521	R	Black	57 (53.6 – 60.4)	40 (37.1 – 42.9)
589	A	White	51 (47.6 – 54.4)	44 (41.1 – 46.9)
716	A	Black	59 (55.6 – 62.4)	37 (34.1 – 39.9)

* Ties occurred when students had the same index score.

Although it is unlikely that a student in the top 100 would be ranked between 700-800 if that student were to retake the test, it is quite possible for student 400 to be ranked 700 or vice versa, as a result of changes in the student's test scores. Cohen's disregard of the SEM is so fundamental that it taints the rest of his analysis.⁹

B. Impact of Other Methodological Errors

Cohen's article contains other errors in addition to those relating to the SEM. For example, he omits data when those data are inconvenient or unavailable, as he did with the phase II admissions essays and recommendations.¹⁰ He creates "facts" when the real ones do not support his thesis. For example, despite the allegedly pro-minority bias of the admissions process, no Native Americans were admitted to the class of 2006, so Cohen speculates that the admissions committee concluded that the Native American applicants were lying about their tribal status.¹¹ He opines that the admissions process improperly weights math scores¹² without noting

⁹ The analysis is tainted because the ranking that Cohen relies on (developed from test scores and GPA) as a primary component for his analysis should not be considered as a definitive or exclusive measure. His entire discussion of Table 6 depends on student rankings, for example.

¹⁰ 66 ALB. L. REV. at 467-68.

¹¹ *Id.* at 483.

¹² *Id.* at 453.

that a different weighting may not have affected the outcome: the average math scores of the top five rejected applicants are within one SEM of the bottom five accepted applicants. Cohen includes these groups in his discussion of anomalies.¹⁴

In short, a methodologically sound analysis shows that the vast majority of students in the pool of 800 semifinalists have no meaningful differences in their levels of academic skills and achievement. These extremely talented students are all qualified and likely to succeed at TJ. Any other conclusion is simply untrue. That is why the admissions process must take a closer look at the “whole person” when determining who among these gifted students should be admitted to TJ considering a variety of factors, including how a student may contribute to sustaining a well-rounded and diverse community of learners at TJ.

II. THE ROLE THAT RACE MAY PLAY IN AN ADMISSIONS PROCESS

Cohen’s article was based not only on flawed statistics, but also on a legal analysis that was minimal at best. In asserting that case precedent forbade any consideration of race in admissions decisions, Cohen cited only one case in support of his conclusion, and disregarded the fact that the federal circuit courts were in conflict on this important issue at the time he wrote his article.¹⁵

Thankfully, however, the United States Supreme Court recently resolved much of this debate. In *Grutter v. Bollinger*,¹⁶ the Court concluded that “the Equal Protection Clause does not prohibit the . . . narrowly tailored use of race in admissions decisions to further a compelling interest in obtaining the benefits that flow from a diverse student body.”¹⁷ *Grutter* establishes that a diverse student body is a legitimate goal for a public university and to that

¹⁴ Additional problems include Cohen’s use of a small sample size, which magnifies methodological errors. Cohen does not acknowledge the importance of treating his sample of eleven African-American students in the semi-final pool with caution. He does not recognize that his use of this small group led to an inflation of the proportion of accepted students, and that his reliance on proportions and dichotomies (accepted/not accepted) created additional problems in his analysis.

¹⁵ Compare *Texas v. Hopwood*, 78 F.3d 934 (5th Cir. 1996), *cert. denied*, 518 U.S. 1033 (1996) (schools may not give substantial preference to black and Mexican American applicants) and *Tuttle v. Arlington County School Board*, 195 F.3d 698 (4th Cir. 1999), *cert. dismissed*, 529 U.S. 1050 (2000) (overturning race weighted lottery for admission to magnet school) with *Smith v. Washington Law School*, 233 F.3d 1188 (9th Cir. 2000), *cert. denied*, 532 U.S. 1050 (2001) (educational diversity is compelling governmental interest).

¹⁶ —U.S. —, 123 S. Ct. 2325 (2003).

¹⁷ *Id.* at 2347.

end, admissions committees may consider race as one of many factors that bear upon whether a student should be offered admission.

III. CONCLUSION

The quality of students of all races admitted to TJ is outstanding. Statistical analysis shows that African-American students admitted to TJ have the same high level of academic skill as do other TJ students. Contrary to Cohen's overwrought metaphors, the only thing Kafka-esque about TJ admissions is Cohen's misuse of statistics and incomplete legal analysis to create untruths about our students.