Grade Inflation: An Elementary and Secondary Perspective

by

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Abstract

School administrators in a small suburban school district in Southeastern Pennsylvania were concerned about grade inflation at the elementary and secondary levels. Specifically, they wanted to know if students in grades 5, 8, and 11 who scored at the basic or below basic performance level on the 2003-2004 Pennsylvania System of School Assessment (PSSA) received inflated end of semester grades in reading and mathematics.

Data for this study were collected from the PSSA reading and mathematics assessments and the end of year report card grades for students in the 5th, 8th, and 11th grade during the 2003-2004 academic year. A total of 407 student records were examined. The researchers found no grade inflation for students in grade 5 for the combined sample of reading and math. However when the sample was split according to subject, the reading final grades were inflated. Grade inflation was also present for both grades 8 and 11 for the combined samples and for individual subjects (Reading and Math).

Introduction

A small suburban school district in Southeastern Pennsylvania is concerned about grade inflation at the elementary and secondary levels. Specifically, school officials want to know if students in grades 5, 8, and 11 who scored at the basic or below basic performance level on the 2003-2004 Pennsylvania System of School Assessment (PSSA) received inflated end of semester grades in reading and mathematics. These individuals were chosen because their work has not reached satisfactory performance as determined by the Pennsylvania Department of Education (PDE). Furthermore, these youngsters require additional instructional opportunities and/or increased student academic commitment to achieve a level of proficiency.

In order to determine if students are achieving expected standards, The PDE developed the PSSA exam which is a standards based criterion-referenced assessment. This measurement also determines the degree to which students attain proficiency on the standards in grades 5, 8, and 11 in reading and mathematics. The performance levels include advanced, proficient, basic, and below basic. The level of advanced standing reflects superior academic performance while proficient indicates satisfactory performance. The basic level suggests marginal achievement performance and the below basic level reflects inadequate academic performance (Pennsylvania Department of Education, 2001).

Literature

Bracey (1994) reported that there is much speculation on the existence and degree of grade inflation, but there is a lack of empirical data documenting the extent of this phenomenon. Roth (2000) explained that academic grades are used to identify how

students are performing in the classroom. Grade inflation is a rise in academic grades without accompanied by a commensurate increase in achievement (Zirkel 1999; Cluskey, Griffin, & Ehlen, 1997). Sobel (1998) stated that grade inflation provides students an unrealistic view of their abilities. Knore (1996) suggested that one possible reason for grade inflation can be tied to homework and extra credit projects. The author also feels that grades should not create a false impression of abilities. The job of educators is to report grades that are equivalent to student achievement. Another alternative to traditional grading that can be used is portfolio assessment (Agnew, 1995). Cluskey, Griffin, and Ehlen (1997) postulated that grades may indicate a level of knowledge, skill, or achievement and reflect an attitude toward work ethic and an indicator of future success. However, the authors agree there is no mechanism to ensure grading is fair, accurate, or standardized.

In his book, Reeves (2002) explains that report cards alone rarely provide a clear response on how students are doing in the classroom. Many of these youngsters who receive high grades are not proficient. Reeves suggested that when looking at student achievement, one should consult report card data, test information, and a clear and equivocal statement about standards the learner can or cannot meet. “As a rule, the more that grades are used to decide who is better than whom, the more people will worry about making sure that the number of good grades is kept in check” (Kohn, 1999, p. 45).

A 5 year study by Ziomek and Svec (1995) found that grade inflation does exist. The authors sampled 5,136 public schools and examined the American College Test (ACT) results and grade point averages (GPA) of high school students. The authors

found that grade inflation appears to be significant at GPAs greater than 3.00 with no significant improvement in achievement. Ziomek and Svec reported that educators award the highest grades to the best students in the class. In another study, Koretz and Berends (2001) examined high school mathematics grades and possible changes in the distribution of the grades of more than 1,100 schools. They found no significant grade inflation. However, there descriptive analysis did find small increases in the mean overall GPA and in the percentage of grades greater than or equal to a B over a 10 year period.

Method

Data for this study were collected from two sources for a total of 407 student records. First, the 2003-2004 reading and mathematics PSSA results for students in grades 5, 8, and 11 from a suburban school district in Southeastern Pennsylvania. Students who scored at the basic or below basic performance level were chosen for this study because these youngsters have not achieved a proficiency level as determined by the Pennsylvania Department of Education. Second, the 2004 end of year report card grades for these same individuals were also collected. Only those students who received four semester grades in English and mathematics were utilized in this study. Students who entered or withdrew from the district during the year and did not receive credit for all four semesters were removed from the sample. The researchers used common statistical analyzes on the PSSA math and reading scores, as well as report card grades to determine if grade inflation existed.

There are several tests the researchers used to determine whether or not grade inflation was present. The first was a correlation between the PSSA performance level

and the grade received by the student. A statistically significant negative correlation between grade and performance level indicates that grade inflation does exist. More formally a test of the following hypothesis:

H_O: $\rho \leq 0$

H_A: $\rho > 0$

where ρ (Rho) is the population correlation coefficient between grade earned and performance level on the State test. The objective is to reject the null hypothesis which means that grade inflation is not present. The second statistical test is the difference between two sample mean grades earned according to the student's performance level. If the mean difference is negative and statistically significant, grade inflation is present. More formally the following hypothesis will be tested:

H_O: $\mu_{Basic} - \mu_{Below\ Basic} \leq 0$

H_A: $\mu_{Basic} - \mu_{Below\ Basic} > 0$

If the null is rejected, grade inflation is not present; otherwise grade inflation is a problem. A third test is nonparametric Chi-Square test of independence. Because the data consist of counts (rather than measurements), a nonparametric test is more appropriate. Formally stated:

H_O: Grade received is independent of performance level

H_A: Grade received is not independent of performance level

The objective is to reject the null hypothesis and conclude that grade inflation is not a problem.

Results

Table 1 lists variables for which data were collected, their definitions, and values as used in the study.

TABLE 1: List of Variables Included in the Study,

Variable	Definition	Value
Grade	Final grade earned by student	A = 4, B = 3, C = 2, D = 1, F = 0
Reading or Math	Total score on the PSSA test for Reading and Math	Alpha numeric
Performance Level	Performance level on the PSSA test	Basic = 1, Below Basic = 0
IEP	Individualized Education Plan	Yes = 1, No = 0
Gender	Gender of Student	Male = 1, Female = 0
Subject	Subject taken by students	Math = 1, Reading = 0

Table 2 provides summary statistics for the key variables in the study for grades 5, 8, and 11. The grades for mathematics and reading were combined to produce a single large sample.

TABLE 2: Descriptive Statistics for Variables Included in the Study Classified by Grade

	5Th Grade			8Th Grade			11Th Grade		
Variable	N	Mean	Standard Deviation	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Grade	153	2.35	0.7101	123	2.02	1.0824	131	2.51	1.0478
Reading & Math		1171	100.81		1155	120.4278		1156	130.9434
Performance Level		0.65	0.479		0.62	0.4879		0.59	0.4941
IEP		0.55	0.499		0.35	0.4788		0.35	0.4792
Gender		0.58	0.496		0.54	0.5001		0.53	0.5007

Assuming 2.0 is equivalent to a “C”, table 2 shows that 8th graders have the lowest C average followed by 5th graders with an average grade of less than C+, and 11th graders with an average of slightly more than C+. Sixty-five percent of students in 5th grade performed at basic level, 55% of them have individualized education plans, and 58% of those students are males. Sixty-two percent of students in 8th grade performed

at basic level, 35% of them have individualized education plans, and 54% of those students are males, Fifty-nine percent of students in 11th grade performed at basic level, 35% of them have individualized education plans, and 53% of those students are males.

Table 3 provides sample correlation coefficients between the grade received by students and the variables included in the study.

TABLE 3: Pearson Sample Correlation Coefficients (r) Between Grade Earned and Key Variables in the Study

	5Th Grade		**8Th Grade**		**11th Grade**	
Variable	N	r	N	r	N	r
Reading & Math	153	0.1230	123	0.0004	131	-0.0975
Performance Level		0.1489*		0.0799		0.0538
IEP		0.1652**		0.3788***		0.0685
Gender		-0.0464		-0.1301		-0.0264
Ethnicity		-0.0862		0.0752		0.2068**
Subject		-0.2009**		-0.0417		-0.1804**

* Significant at the 90% level
** Significant at the 95% level
*** Significant at the 99% level.

The correlation coefficient between grade earned and the performance level for grades 5, 8, and 11 are all positive but only the 5th grade correlation coefficient is significantly greater than zero. The null hypothesis for grade 5 was not rejected. Thus, grade inflation is not present for 5th graders in this study. Although the correlation coefficients between grade earned and the State performance level for 8th and 11th grades are positive, both coefficients are not significantly different from zero. The null hypothesis is rejected which may imply that grade inflation is present.

Table 4 shows average grade for grades 5, 8, and 11 classified by the State performance level. Standard error of sample means, t-ratio and p-value (significance level) are also reported. The objective is to test whether or not the difference between

the average grade for those students who scored at the basic level on the PSSA exam is significantly different from the average grade of those students who scored below basic.

TABLE 4: Average Grade Earned by students for Grades 5, 8 and 11 Classified by State Performance Level.

	N	Basic	N	Below Basic	Standard Error	t-ratio	p-value
5th Grade	88	2.424	65	2.204	0.1192	1.85*	0.07
8th Grade	76	2.092	47	1.919	0.2010	0.88	0.38
11th Grade	77	2.558	54	2.444	0.1864	0.61	0.54

* Significant at the 90% level

From table 4, the null hypothesis for the mean grade difference in grade 5 was rejected and we fail to reject the null for grades 8 and 11. Therefore, grade inflation is not a problem for the 5th grade class but it may be present for the 8th and 11th grade. The average grade difference for basic and below basic performers is not significantly different from zero. This means that both groups received on average the same grade. These conclusions are consistent with the correlation coefficients test mentioned earlier.

The final test utilized was a nonparametric test of statistical independence between the grade earned and the PSSA performance level. The Chi-Square value is 14.91 for 5th grade, 2.02 for 8th grade and 1.579 for 11th grade. Only the null hypothesis for the 5th grade is rejected. Grades are dependent on the performance level. This means that students who performed at the basic level received higher final grades than those who performed at the below basic performance level. For the 8th and the 11th grade levels, course grades are independent of the students' performance level on the PSSA exam. This may lead us to conclude that grade inflation is not present for 5th grade students but it could be a problem for 8th and 11th grade students.

Summary and Conclusions

Is grade inflation present for students in grades 5, 8 and 11 in the school district? To answer such a question we carried out several statistical procedures that led us to the following conclusions.

1. No grade inflation was present for students in the 5th grade for the combined sample of reading and mathematics. However when the sample split according to these subjects, the math final grades were not inflated, while those for reading were magnified.
2. Grade inflation is present for both grades 8 and 11 for the combined samples and for individual subjects (reading and mathematics).
3. Using the raw score instead of performance level on the PSSA, the 8th grade final grades were inflated for mathematics but not for reading. In 11th grade, the conclusion of grade inflation remains the same.
4. These conclusions are applicable to this sample only. As more data becomes available, further investigation is needed to determine the extent to which grade inflation is present in elementary and secondary education.

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