



# The Minimum Grading Controversy: Results of a Quantitative Study of Seven Years of Grading Data From an Urban High School

Theodore Carey<sup>1</sup> and James Carifio<sup>1</sup>

In an effort to reduce failure and drop-out rates, schools have been implementing **minimum grading**. One form involves raising catastrophically low student quarter grades to a predetermined **minimum—typically a 50**. Proponents argue it gives struggling students a reasonable chance to recover from failure. Critics contend the practice induces grade inflation and social promotion. The authors performed a quantitative study of seven years of grading data from one school where minimum grading had been implemented to better evaluate these competing claims. **Statistical analyses revealed no evidence that minimum grading was inducing either grade inflation or social promotion.** These and other related findings have implications for educators looking to institute reforms that lead to fairer and more accurate student assessment.

**Keywords:** ANOVA/MANOVA; assessment; at-risk students; dropouts; descriptive analysis; high schools; motivation; performance assessment; statistics

In an effort to reduce failure, grade-retention, and dropout rates, educators have been experimenting with modified grading procedures, including *minimum grading* (O'Connor & Wormeli, 2011). One popular form of minimum grading involves raising catastrophically low student quarter or term grades to a predetermined minimum—typically a 50 on the 100-point scale. The origins of minimum grading are found in various strategies used to address the problems associated **with students who post a first-quarter grade so low that there remains little probability of the student passing a year-long course, leaving few options for the student to recover or make effective use of the remaining school year** (Craft, 1997; Dunham, 2008).

The need for minimum grading is often expressed in terms of the inherent inequities of traditional 100-point grading, where failing grades cover a disproportionate three-fifths of the scale (Guskey, 2002; Marzano & Heflebower, 2011; Wormeli, 2006). When combined with the common practice of grade averaging, this nonlinearity of scale can result in a final grade unfairly skewed by one, typically low performance. Current 100-point

grading scales stand in sharp contrast to the original use of the 100-point scale in the 19th century, where an average grade was 50, and grades either above 75 or below 25 were rare (Smallwood, 1935). Modern grading schemes that typically define the average as 75 and set the passing threshold at 65 not only dramatically increase the likelihood for negative skewing but virtually eliminate the possibility for positive skewing, leaving a badly lopsided scale that is heavily gamed against the student.



Educational researchers have long questioned the need or the value of the 100-point grading scale (see Starch & Elliot, 1912, 1913a, 1913b), yet the literature reveals that other common grading scales are just as susceptible to the same distortions and skewing. Wormeli (2006, pp. 138–139) provides an extended and convincing argument that the 0.0 to 4.0 scale commonly used in colleges and universities is largely isomorphic to the 0 to 100 scale. **Although schools may consider switching to the 4.0 scale for a number of other reasons, Wormeli demonstrates that short of setting a minimum threshold of 1.0 in the 4.0 scale, the skewing of student averages due to zeroes or low outlying scores will remain largely unaddressed by such a change.**

In the absence of more comprehensive (and more difficult to implement and sustain) grading reform, schools are choosing to tinker with existing grading practices, including the implementation of minimum grading. **Proponents** of minimum grading claim the practice does more than just pass a few students who would otherwise fail. They **argue that minimum grading works to keep struggling students engaged in academic activities by contributing positively to student motivation—primarily through maintaining a healthy locus of control within the student** (Guskey, 1994, 2004; Reeves, 2004). **Critics** argue that the practice is a softening of minimum competency requirements that offers an **unfair and unearned assistance to low-performing students** and, by assigning grades that are not justified by demonstrated levels of academic performance, contributes to overall grade inflation and social promotion (Richmond, 2008).

Although schools have always struggled with student failure and attrition, the turn of the new century has seen added pressures for schools to reduce student dropout rates. In the current political and economic environment, high-cost intervention

<sup>1</sup>University of Massachusetts Lowell, MA

programs designed to keep  risk students in school are often among the first programs eliminated (see Chapman, 2009; Nettles, 2009). This economic reality leaves schools pondering a very short list of effective low-cost options. **The perception that minimum grading is both low cost and easy to implement makes it an attractive alternative for administrators.**

School- or districtwide implementation of minimum grading may be a relatively new idea, but these programs are based on strategies that individual teachers have long used to mediate the harsher effects of early catastrophic failure. Still, any district looking to newly implement minimum grading can quickly find itself at the center of intense controversy and heated ideological and political debate. Nowhere has this been more apparent than in **Texas, where the governor recently signed into law legislation that effectively bans school- and districtwide implementation of minimum grading** (Peters, 2009). Newspaper reports suggest that more than 1000 of the 1139 school districts in the state were implementing some form of minimum grading at the time (Montgomery, 2009). At least six school districts in the state filed suit in an effort to preserve the practice (Hernandez, 2009).

For a topic that generates such debate and for a practice that is growing more widespread, there is an unusual lack of research exploring the effectiveness of minimum grading. Proponents who argue for minimum grading do so largely in terms of the mathematics of grading and, even then, use hypothetical rather than actual data (e.g., see Guskey, 2002; Wormeli, 2006). Much of the literature supporting minimum grading cites the works of **Thomas Guskey, who has written eloquently and compellingly against the use of zeros in grading since the early 1990s. Yet, even Guskey stops short of recommending the assigning of minimum grades, admitting that he knows of no studies that explore its effects** (Friess, 2008).

**This study partially fills this vacuum in two important ways.** First, it presents a relevant framework informed by what the current literature has to say about acceptable grading practices and models of motivation, within which the practice of minimum grading may be explained and explored. Critically, this framework suggests testable hypotheses concerning the possible effects and outcomes of minimum grading. Second, this study tested these hypotheses through empirical research by performing a quantitative study of seven years of grading data from a large urban high school where minimum grading has been formally implemented as schoolwide policy since the late 1990's – an implementation predating and thus relatively free of the effects of the current controversies. The questions driving the research, therefore, were:

- **How often are minimum grades assigned and how often does a passing course grade follow the assigning of a minimum grading?**
- **Is grade inflation or social promotion in evidence in a school that has implemented minimum grading?**

By way of preview, we report finding no evidence of either grade inflation or social promotion at the subject school during **the 7-year period included in the study—a period when school attrition rates declined and student achievement (as measured on state tests) rose.** These and other related findings have implications for educators looking to institute grading reforms that

lead to fairer and more accurate and more consistent student assessment.

## Background

The literature reveals that **grading is made to serve a number of conflicted and confounded purposes, including** (a) providing salient formative feedback to students and parents for the purposes of informing students during the learning process, (b) providing teachers with information for instructional planning and administrators with information for program evaluation, and (c) to bear witness and certify that graduates have indeed mastered required skills and are ready for higher levels of learning or other outside opportunities (Brookhart, 2009; Cherry & Ellis, 2005). Recent grading reforms have looked either to prioritize these purposes, favoring one purpose over the other (Wormeli, 2006), or have added layers and procedures to existing assessment schemes in an attempt to better serve all these purposes, resulting in expanded report cards that contain multiple assessments (Guskey, 2006; Tomlinson & McTighe, 2006). As with all conflicts, there is not one perfect solution, but research suggests that simple, stable, straightforward, and easily understood grading systems that are administered consistently and result in predictable, fair, and accurate assessments of student achievement are best suited to serving all the stated purposes of grading (Brookhart, 1993, 1994; Cross & Frary, 1999). **Assigned grades that are negatively skewed or simply based on uneven standards applied in an uneven manner cannot possibly fulfill the primary informative purposes of grading.**

 The literature also reveals that assigned grades affect student interest, confidence, self-efficacy, motivation, and future performance (Brookhart, 1994; Docan, 2006; Guskey, 1994). These affective and motivating aspects of grading have long been acknowledged (Smallwood, 1935), yet current writings suggest **that present grading policies remain largely uninformed by accepted models of motivation** (Kohn, 2011). The results are grading practices that often and unwittingly produce opposite results from those intended (Covington, 1984; Kohn, 1993). Specifically ignored are the emotional effects that catastrophically low grades can have on student engagement, effort, and persistence. **Research confirms that the assigning of even one catastrophically low grade, especially early in the school year, can act as a salient cue that will often trigger defensive and self-destructive responses in students, including reductions in student effort and increases in disruptive behavior** (Carifio and Rhodes, 2002; Covington, 1992).

Considerable support for minimum grading can be found when examined in terms provided by the literature. Specifically, by setting a minimum threshold for assigned grades, minimum grading looks to eliminate the undesired and unintended negative skewing evident in common grading practices, while at the same time reducing the collateral emotional damage that results from the assigning of punishingly low grades. In addition, minimum grading attempts to accomplish this in a low-cost and easy-to-implement manner, all the while preserving a simple, straightforward, and easily understandable grading system that remains well suited to the key informative function of grades.

More tenuous in the present literature is support for the claim that minimum grading contributes positively to student motivation in ways that increase student engagement, performance, and

ultimately achievement. Yet, even if minimum grading could be shown to enhance student learning, concerns would remain that could bring the value of the practice into question. Specifically, if minimum grading also was found to contribute to grade inflation or induce social promotion, then endorsing the practice would become problematic.

Proponents of minimum grading contend that by eliminating the undesired effects of negative skewing, assigned grades better align with student achievement. Critics of the practice argue that by overreporting student achievement, minimum grading contributes to overall grade inflation. The primary purpose of this study, therefore, was to evaluate these competing claims.

## Method

The examined data consisted of all the grades issued from the fall of 2003 through the spring of 2010 by Mill City High School (a pseudonym), a large urban high school located in Massachusetts. The data were deidentified and proper steps, approved by both the cooperating district and the University of Massachusetts Lowell Institutional Review Board, were taken to prevent any data from being traced back to any individuals. In addition, the cooperating district supplied student scores from the Massachusetts Comprehensive Assessment System (MCAS) testing for the 2007 through 2010 school years. The MCAS is the mandated statewide assessment program used to measure the performance of students, schools, and school districts in fulfillment of the state's obligations under No Child Left Behind, and has been rated by National Center for Education Statistics (NCES) as one of the top five state assessment tests in the country and the state test most in one-to-one correspondence with NAEP scores (NCES, 2007).

This retrospective study used an *ex post facto* design as described in Campbell and Stanley (1966). The *ex post facto* design is relevant to causal hypotheses in that it exposes these hypotheses to disconfirmation. When a zero correlation is observed, simple, general, and causal hypotheses can be ruled out. Understanding this, the current exploratory study exposed critics' claims concerning minimum grading to *disconfirmation*, specifically, the claims that minimum grading contributes to overall grade inflation and social promotion. In simple terms, if there is no evidence of grade inflation or social promotion to be found in the grading data, then these critics' claims are likely untrue. Various descriptive statistics, rates, and percentages and their statistical analyses were the primary methods used to explore research questions in this study.

Mill City is a large, urban school district. The United States Census Three Year Estimates for the years included in the study lists the city population as 99,000. The city is 62% White, 18% Asian, and 6% African American. A growing Hispanic population comprises 16% of the city's residents. The median family income is \$57,000 and 15.5% of the city's families live below the poverty line as compared with \$64,684 and 7.1% for the state of Massachusetts and \$52,175 and 9.6% nationally during the same time period. Twenty-four percent of the city's residents are foreign-born and 42% speak a language other than English at home. The percentage of adults in Mill City who never finished ninth grade is 12.9%, which is more than twice the national percentage and more than 3 times the state percentage.

The district is served by a single high school with a population of just more than 3,400 students. The school's diverse population is characterized by a larger than usual number of Southeast Asian students. The student population is 39% White, 30% Asian, 22% Hispanic, and 9% African American. Sixty percent of the students come from low-income households. Twenty-five percent are limited by their proficiency in English.

All courses at Mill City High School are half-year, semester-long courses. Assigned grades are reported as percentages on the 100-point scale. Courses at Mill City High School are leveled for the stated purposes of serving the varied abilities and needs of the students. For the purpose of supplying higher educational institutes with an omnibus measure of overall student achievement, a weighted cumulative grade-point average (GPA) is computed and reported for each student. This GPA is based on assigned grades and is calculated using methods proscribed by the Massachusetts Board of Higher Education.

The final grade assigned in any course is the simple, arithmetic mean of the two quarter grades assigned during the half-year. A *set* of grades consists of the two quarter grades and the corresponding final course grade assigned to any given student for any given course. The threshold for passing at Mill City is 65.

With the exception of schoolwide minimum grading, the grading methods used at Mill City High School are largely similar to most other high schools in the state and, likely, most other high schools across the country. Assumed here is that the variation in teacher-to-teacher grading practices at Mill City is no more or less than would be found in a typical high school. Seminal studies have long established that the number and nature of factors considered when assigning grades can vary greatly from teacher to teacher, even within the same school (Brookhart, 1993, 1994; Cross & Frary, 1999). The consideration of nonacademic factors, such as student effort, behavior, or attendance, can result in a grade that does not necessarily align with student academic achievement.

Because no records were kept concerning individual teacher grading practices at Mill City High School, it is impossible to estimate either how much variation in grading practice existed from teacher to teacher, or what factors may have weighed heaviest when teachers determined student grades. Indeed, we are only left to wonder (along, we are sure, with some students and parents) why certain grades, particularly catastrophically low failing grades, were assigned in the first place. Was the failing grade assigned on the basis of poor performance on assessments of student achievement? Or was it assigned due to a lack of compliance with teachers' policies regarding homework, punctuality in turning in assignments, behavior in class, etc.? These questions remain unanswered.

It was known that some teachers at Mill City High School were also implementing their own version of minimum grading, but at a *micro-level*, where grades were raised to a predetermined minimum but on an assignment-by-assignment basis during the grading term. It should also be noted that much of the existing literature concerning minimum grading speaks directly to this kind of micro-level implementation (e.g., see Guskey, 2004; Reeves, 2004; Wormeli, 2006).

A Mill City administrator interviewed during the course of this study stated that schoolwide minimum grading was first

**Table 1**  
**Means, Standard Deviations, and Confidence Intervals for Key Variables Based on Yearly Trends**  
**in the Grading Data of Mill City High School, 2004–2010**

Year	Total Sets of Assigned Grades	Sets That End With a Passing Final Grade	Sets That End With a Failing Final Grade	Sets With Other Outcomes (Such as <i>Withdraw</i> or <i>Missing</i> )	Sets That Begin With Minimum Grade of 50	Sets With a Passing Final Grade After Minimum Grade
2004	50,819	37,097	9,708	4,014	5,112	138
2005	49,302	36,898	9,847	2,557	4,619	141
2006	49,688	36,360	9,606	3,722	4,811	141
2007	51,488	38,156	9,821	3,511	4,832	175
2008	49,280	38,123	8,292	2,865	3,605	168
2009	47,483	37,897	7,900	1,686	2,945	170
2010	45,365 <sup>a</sup>	36,033	7,454 <sup>a</sup>	1,878	3,263	226 <sup>a</sup>
Totals	343,425	260,564	62,628	20,233	29,187	1,159
	(100%)	(75.9%)	(18.2%)	(5.9%)	(8.5%)	(0.3%)
<i>M</i>	49,060.71	37,223.43	8,946.86	2,890.43	4,169.57	165.57
<i>SD</i>	2,066.824	858.015	1,028.069	906.138	873.746	30.913
Confidence intervals ( <i>df</i> = 6, <i>p</i> < .01)						
Size	±2,895.86	±1,202.18	±1,440.44	±1,269.60	±1,224.22	±43.31
Upper limit	51,956.57	38,425.61	10,387.30	4,160.03	5,393.79	208.88
Lower limit	46,164.85	36,021.25	7,506.42	1,620.83	2,945.35	122.26

<sup>a</sup>These numbers are outside the range of the calculated confidence intervals.

implemented when administrators became aware that some teachers were already practicing minimum grading on their own, while others were not. This led to a situation in a small number of cases where whether a student passed or failed was dependent on the teacher's grading practices rather than the student's performance. The schoolwide minimum grading program was implemented, in part, as an administratively easy way to mediate this situation and as an attempt to provide more uniformity in the way grades were assigned at the school. Under the schoolwide minimum grading policy, all first and third quarter grades (i.e., the first-term grades of each half-year course) are administratively raised to a minimum of 50.

### Findings

In the 7-year period included in the study, there were 343,425 complete or partial sets of grades generated and assigned to 10,958 different students at Mill City High School. Table 1 organizes and summarizes these grades. Key in understanding how minimum grading may (or may not) be working is understanding the role first-term grades play in determining whether students eventually pass. Table 1 shows that 29,187 (or 8.5%) of the 343,425 sets of grades began with the assigning of a minimum grade of 50. However, only 1,159 of these 29,187 sets that began with the assigning of a minimum grade of 50 ended with a passing course grade, representing just 0.3% of all assigned grades. Clearly, the assigning of minimum grades was not leading to large numbers of courses being passed that would otherwise be failed or anything remotely close to this claim and contention.

Table 1 also presents a year-by-year summary of the assigned grades at Mill City High School for the years 2004–2010. The availability of seven years of grading data allowed for the construction of confidence intervals, calculated at the  $p < .01$

level using Student's *t* distribution for the key variables listed in Table 1. These confidence intervals were used to evaluate the assertion made by critics that minimum grading inherently leads to significant numbers of passing grades being issued in cases where failing grades would otherwise be assigned.

As shown in Table 1, if the data from the past seven years can be viewed as being representative of typical patterns of grade distributions, the school can expect to issue approximately 165 passing final course grades each year after a minimum grade has been assigned during the first marking term of a semester-long course, with a 99% certainty that this number will fall between 122.26 and 208.88. It is noted that the 226 passing course grades issued after the assigning of a minimum grade in the 2010 school year falls above what may be expected when judged against the calculated confidence interval. Yet, even this higher, atypical result for 2010 is only a fraction of the observed yearly variance in either the number of assigned passing grades or the number of assigned failing grades, and it does not result in any statistically significant changes in the number of passing (or failing) grades issued by the school.

In none of the seven years of the study would the loss of the 226 passing grades (ostensibly and at most) due to minimum grading result in pulling the number of yearly passing grades below the upper limit of the defined confidence interval, the lone exception being 2010. This lone exception was somewhat expected and explained by factors other than the minimum grading policy, since the number of total assigned grades of *any kind* for 2010 falls well below the calculated confidence interval, leading to a situation where the number of final passing grades issued in 2010 is also much lower than expected and just barely falls within the confidence interval, even before adjusting for the effects from minimum grading. Even more importantly, the addition of 226 failing grades would not result in pushing the

number of yearly failing grades above the limits of the defined confidence interval for *any* of the years of the study.

The conclusion of importance and note here is that the numbers of passing course grades issued as a direct result of the minimum grading policies at Mill City High School do not reach statistical significance at the  $p < .01$  level when the seven years is considered *as a whole*. **These results suggest that social promotion due to minimum grading, if it was occurring at all at Mill City High School, was occurring on a very small scale, and likely comparable to schools that did not have a minimum grading policy given the realities of high schools in urban communities today.**

One of the most common criticisms of minimum grading is that the practice leads to grade inflation (e.g., see Friess, 2008; Richmond, 2008; Rosovsky and Hartley, 2002). *Grade inflation* has become somewhat of an omnibus term, used in the literature and in casual speaking to describe a wide range of grading effects. More specifically, *implicit grade inflation* refers to the assigning of grades that inappropriately overreport student academic performance due to changing teacher practice or institutional policies. **One consequence of implicit grade inflation can be *grading disparity*, where different grading standards are applied to different segments of the student body in a manner that gives one segment an unearned advantage over another** (Hu, 2006).

To explore these concerns, a one-way analysis of covariance (ANCOVA) was performed to detect evidence of grade inflation. Understanding that grade inflation can only be present when assigned grades are overreporting student progress (Koretz & Berends, 2001; Milton, Pollio, & Eison, 1986), the assumption tested by the ANCOVA was that students assigned similar grades should be able to demonstrate similar levels of academic achievement. The independent variable was the minimum grading status of the students (those who had received at least one grade of 50 while at Mill City versus those who had only received grades higher than 50). The dependent variable was student academic achievement as determined by student performance on the Massachusetts Comprehensive Assessment System (MCAS) in both English Language Arts (ELA) and Math.

There are many covariates hypothesized to influence student performance on state accountability tests in general and the MCAS in particular (Abedi & Dietel, 2004; Newton, Darling-Hammond, Haertel, & Thomas, 2010), not the least of which are student English proficiency, immigrant status, household income, and cultural and ethnic background. There is the natural tendency when doing data analysis to control for known biases, yet undue consideration of these factors when assigning student grades are typically what critics of minimum grading schemes object to most, which argues against making any adjustments for these factors to provide a fair test of this view. In addition, leaving these factors uncontrolled preserves a more statistically conservative test of the questions concerning grade inflation and social promotion. Thus, the only covariate used in the ANCOVA was student grade point average (GPA) as determined by the grades assigned by the high school.

**After controlling for grade point average, the two groups should demonstrate similar levels of achievement on the state tests.** If the group of students who had received minimum grades demonstrates significantly lower levels of academic achievement than the group of students who were never assigned minimum

grades, this would be considered evidence that the students who had been assigned minimum grades had also been assigned inflated grades.

Only students who arrived at Mill City High School as incoming freshmen, and therefore received the full treatment accorded the school's minimum grading practices, were included in the analysis. Because the district did not make MCAS results from before 2007 available, and as students do not take the MCAS until successfully reaching the sophomore year, this left two cohorts of incoming freshmen for which the required scores were available: those who arrived in the 2007 and 2008 school years (combined  $n = 2147$ ).

Each student included in the study needed not only scaled scores in the ELA and Math components of the MCAS, but also a school assigned grade point average. Although weighted grade point averages are computed for all active students using methods proscribed by the state, *only* active or graduated students are assigned either a class rank or a grade point average. If a student drops out of school, transfers or becomes otherwise inactive, the student loses his or her assigned class rank and the student's GPA is overwritten with a value of *0.00*. In the end, 1335 (62.3%) of the grading records of the students in the combined 2-year cohort contained all three measures needed for the analysis.

The requirement that students progress successfully through the freshman year before being able to take the MCAS, as well as the school policy of preserving cumulative grade point averages only for active and graduated students, prefilters more than one third of the prospective subjects from the analysis. Still, students who are dropping out or failing to progress past freshmen year cannot, by definition, be benefiting from social promotion and are not likely benefiting from grade inflation; the students who are being passed along past their freshmen year are the most likely to be receiving these benefits. These students have been concentrated in the remaining pool of active and graduated students, making the analysis more sensitive to detecting existent social promotion and grade inflation.

These 1,335 student records were further examined before the ANCOVA was attempted. Table 2 breaks these 1,335 student records into the two naturally occurring groups that were compared in the analysis. Table 2 shows that the range of grade point averages for these two groups overlapped to a large extent, but not completely. This overlap is important to consider since the analysis looked to disconfirm that students with comparable grade point averages demonstrated disparate levels of academic achievement on the State's MCAS tests.

Table 2 shows that 147 (24.7%) of the 596 students who had received at least one minimum grade had assigned grade point averages that were below the range of grade point averages for the group of students who had never been assigned a minimum grade. The result is that these 147 students had no one in the other group with comparable grade point averages with which to compare. Ferguson and Takane (1989) specifically warn against the use of the ANCOVA in such cases where large numbers of subjects from one group will be compared against hypothetical or nonexistent populations. Understanding this, these 147 cases were trimmed from the data before the ANCOVA was performed, leaving 449 students who had been assigned at least one minimum grade in the analysis. Likewise, 208 (28.1%) of the

**Table 2**  
**Number of Students With MCAS Data and GPA in the Combined Cohort of Incoming Freshmen, Mill City High School, 2007–2008**

Naturally Occurring Groups to Be Compared	Number of Students	Range of Assigned Grade Point Averages		Students Whose GPA Falls Within the Range of 0.8224 to 3.7743
		Low	High	
Students who were assigned at least one minimum grade	596 (44.6%)	0.1848	3.7743	449 (33.6%)
Students who were never assigned a minimum grade	739 (55.4%)	0.8224	4.6420	531 (39.8%)
Totals	1,335 (100%)			980 (73.4%)

Note. MCAS = Massachusetts Comprehensive Assessment System.

**Table 3**  
**ANCOVA Summary Table, Dependent Variable: Combined MCAS Scaled Score**

Source	SS	df	MS	F	p	$\eta^2$
Between treatments	1.0811E5	2	90559.242	191.086	.000	.281
Weighted GPA	150463.756	1	150463.756	317.488	.000	.245
Assigned MG Status	12347.398	1	12347.398	26.054	.000	.026
Error	463018.969	980	473.919			
Total	2.336E8	979				

Note. ANCOVA = analysis of covariance; MCAS = Massachusetts Comprehensive Assessment System; SS = sum of squares; MS = mean square; MG = minimum grading.

739 students who had never received a minimum grade and had assigned grade point averages that were above the range of grade point averages for the students who had received at least one minimum grade were also trimmed.

The screening and trimming described above resulted in 980 logically, theoretically, and statistically valid cases being selected for the analysis of covariance, all cases having grade point averages falling between 0.82 and 3.77. These are significant trims to the data and are likely to bias the results; however, these trims bias the analysis in a way that makes the test more sensitive to detecting any possible evidence of grade inflation. Trimming the lowest-performing members from the group of students who had received at least one minimum grade only further inflated the mean grade point average of this subgroup of students before the ANCOVA was performed, preserving, by design, a test that would be most sensitive to any signs of grade inflation.

The 980 valid cases identified were further screened to ensure the underlying assumptions of the ANCOVA were met. No outliers were found in the values of the combined MCAS-scaled scores for either group; however, six cases from the group of students who had never been assigned a minimum grade showed low, outlying grade point averages below 1.20. To compensate, each of these six values was raised to 1.20 before the ANCOVA was performed. Similarly, two cases from the group of students who received at least one minimum grade showed high, outlying grade point averages above 3.70. Both of these values were reduced to 3.70.

The data were also checked for normality. Only moderate skewing was noted in the distributions and no transformations were performed on the data. A preliminary ANCOVA was

performed to test for homogeneity of regression slopes to determine if there was a significant interaction between the dependent variable and the covariate. The results showed no significant interaction,  $F(1, 976) = 1.07, p = .30$ , partial  $\eta^2 = .001$ . A Levene's test for equal variances indicated the variances between groups were reasonably equivalent,  $F(1, 978) = 0.77, p = .38$ .

With the underlying assumptions of the test satisfied, the Analysis of Covariance was performed. The results, presented in Table 3, showed a significant difference between the groups with respect to combined MCAS scaled scores when controlling for school-assigned grade point average,  $F(1, 977) = 26.05, p = .000$ .

Table 4 presents the unadjusted and the adjusted group means for combined MCAS-scaled score. As can be seen in Table 4, the mean MCAS score for the students who had never received a minimum grade was adjusted *down* from 492.73 to 483.63, whereas the mean combined MCAS scaled score for the students who had received at least one minimum grade was adjusted *up* from 481.51 to 492.59. Both of these adjustments were slightly less than one half of a standard deviation on the combined MCAS scale.

The results here dramatically show that after adjusting for grade point average, the students who had received minimum grades were outperforming their peers who had never received a minimum grade on the state exams that measure academic achievement. These results, far from revealing evidence of grade inflation, are instead consistent with views that, even after minimum grading has taken place, the grades assigned to the struggling students are still *under-reporting* the academic achievement of these struggling students when compared to the grades assigned to their better-performing peers.

**Table 4**  
**Combined MCAS Scaled Scores: Unadjusted Group Means and Group Means After Adjusting for GPA, Mill City High School, 2004–2010**

Group	Unadjusted Group Mean	Adjusted Group Mean	99% Confidence Interval	
			Low	High
Students who were assigned at least one minimum grade	481.5056	492.585	489.486	495.685
Students who were never assigned a minimum grade	492.7307	483.362	480.572	486.152

Note. MCAS = Massachusetts Comprehensive Assessment System.

These results contradict critics' claims that struggling students are unfairly benefiting from minimum grading, and are instead consistent with claims found recurrently in the literature that common grading schemes can often lead to the assigning of punishingly low grades that are neither earned nor deserved (e.g., see Marzano & Heflebower, 2011; Reeves, 2004; Wormeli, 2006), grades that these students have difficulties recovering from in one way or another not only immediately but over time as well.

### Conclusions

The results of the analyses of the grading data from Mill City High School presented in this study support the claims made by proponents of the practice that minimum grading is both a low-cost and low-risk strategy based on sound educational and psychology theory. Specifically, evidence is presented here suggesting that if indeed minimum grading is working at all to mediate the inherent inequities of traditional grading schemes, it does so only on a limited scale and in a way that does not induce grade inflation or social promotion.

Although the number of courses being passed due to minimum grading did not reach the level of statistical significance, the nominal benefits of the practice are anything but insignificant to the staff and students of Mill City High School. The grading data showed that 1,159 grading sets that began with the assigning of a minimum grade ended with the student passing the course. Administrators are well aware of the financial costs of student failure. What is the cost to the district each time a student is forced to repeat a failed course? Or attend summer school to complete a failed course? Or be enrolled in a credit recovery program to make up a failed course? Multiply these costs by 1,159 failed courses (or approximately 165 cases per year) and this will provide a conservative estimate of the monetary savings realized by the district by its implementation of its (low-to-no-cost) minimum grading policy.

Importantly, these 1,159 cases were not concentrated in the grading records of a few students. The grading data reveal that 925 (or 8.4%) of the 10,958 students included in the study (or approximately 142 students each year) realized the benefit of passing at least one course after being assigned a minimum grade. For this urban high school, we estimated that minimum grading saved them at a minimum \$150,000 a year in summer school costs, or more than \$1,000,000 over the 7-year period. Further,

it should be noted that the school's attrition rate dropped during this period, from 16.1% to 13.5%, whereas the school's MCAS Composite Performance Indices rose significantly in both math, from 61.9 to 81.9 on the 100-point scale, and English-language arts, from 70.7 to 86.8 on the same scale (Massachusetts Department of Elementary and Secondary Education, 2010).

Still, despite the nominal positive effects of the practice documented in the results presented above, minimum grading was shown in this study to be insufficient in addressing the larger inequities of traditional 100-point grading. Specifically, the analysis found that even after the assigning of minimum grades, the grade point averages of struggling students are still underreporting student achievement as measured on the MCAS tests to a significant degree. The results suggest that policy makers who are looking to institute reforms that lead to fairer, more accurate, and more consistent student assessment will need to look beyond minimum grading and to more substantive reforms, such as instituting standards-based grading and proficiency scales, to address the inherent inequities now empirically established in this study to be a part of traditional grading schemes.

Still to be determined is whether the outcomes observed at Mill City High School and documented here are typical of what can be expected when schoolwide minimum grading is implemented in other and different contexts. Needed now are similar studies of other schools that have implemented minimum grading.

Also left unexplored in the present study are the more provocative claims that minimum grading, by mediating the harsher aspects of traditional grading, induces secondary effects, affecting student emotional states and contributing positively to student motivation, resulting in higher levels of student academic engagement and achievement. Such determinations remain far beyond the defined scope of the current exploratory study and are best explored by longitudinal, prospective, mixed-methods studies.

### REFERENCES

- Abedi, J., & Dieterl, R. (2004). Challenges in the No Child Left Behind Act for English language learners. *Phi Delta Kappan*, 85, 782–785.
- Brookhart, S. M. (1993). Teachers' grading practices: Meaning and values. *Journal of Educational Measurement*, 30, 123–142.
- Brookhart, S. M. (1994). Teachers' grading: Practice and theory. *Applied Measurement in Education*, 7, 279–301.

- Brookhart, S. M. (2009). *Grading* (2nd ed.). New York, NY: Merrill.
- Campbell, D. T., & Stanley, J. C. (1966). *Experimental and quasi-experimental designs for research*. Chicago, IL: Rand McNally College Publishing.
- Carifio, J., and Rhodes, L. (2002). Construct validities and the empirical relationships between optimism, hope, self-efficacy, and locus of control. *Work: A Journal of Prevention, Assessment, and Rehabilitation*, 19, 125–136.
- Chapman, C. (2009, December 12). State's failure to pay forces program cuts. *Morris Daily Herald*. Retrieved from <http://www.morrisdailyherald.com>
- Cherry, T. L., & Ellis, L. V. (2005). Does rank order grading improve student performance? Evidence from a classroom experiment. *International Review of Economics Education*, 4, 9–19.
- Covington, M. V. (1984). The self-worth theory of achievement motivation: Findings and implications. *The Elementary School Journal*, 85, 5–20.
- Covington, M. V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. New York, NY: Cambridge University Press.
- Craft, H. (1997). Grading: The games we play. *Principal*, 77(2), 57–58.
- Cross, L. H., & Frary, R. B. (1999). Hodgepodge grading: Endorsed by students and teachers alike. *Applied Measurement in Education*, 12, 53–72.
- Docan, T. N. (2006). Positive and negative incentives in the classroom: An analysis of grading systems and student motivation. *Journal of Scholarship of Teaching and Learning*, 6(2), 21–40.
- Dunham, L. (2008). Why zeros should not be permitted. *Principal*, 87(3), 62.
- Ferguson, G. A., & Takane, Y. (1989). *Statistical analysis in psychology and education* (6th ed.). New York, NY: McGraw-Hill Book.
- Friess, S. (2008, May 19). At some schools, failure goes from zero to 50. *USA Today*. Retrieved from <http://usatoday.com>
- Guskey, T. R. (1994). Making the grade: What benefits students? *Educational Leadership*, 52(2), 14–20.
- Guskey, T. R. (2002). Computerized gradebooks and the myth of objectivity. *Phi Delta Kappan*, 83, 775.
- Guskey, T. R. (2004). 0 alternatives. *Principal Leadership: High School Edition*, 5(2), 49–53.
- Guskey, T. R. (2006). Making high school grades meaningful. *Phi Delta Kappan*, 87, 670–675.
- Hernandez, M. D. (2009, November 17). Teachers pledge lawsuit if grade policy unchanged in El Paso. *El Paso Times*. Retrieved from <http://www.elpasotimes.com>
- Hu, S. (2006). *Beyond grade inflation: Grading problems in higher education*. ASHE Higher Education Report Series, 30(6). San Francisco, CA: Jossey-Bass.
- Kohn, A. (1993). Punished by rewards: The trouble with gold stars, incentive plans, A's, praise and other bribes. Boston: Houghton Mifflin Co.
- Kohn, A. (2011). The case against grades. *Educational Leadership*, 69(3), 28–33.
- Koretz, D., & Berends, M. (2001). *Changes in high school grading standards in mathematics*. Santa Monica, CA: RAND.
- Marzano, R. J., & Heflebower, T. (2011). Grades that show what students know. *Educational Leadership*, 69(3), 35–39.
- Massachusetts Department of Elementary and Secondary Education. (2010). *Mill City High School*. Retrieved from <http://www.doe.mass.edu/mcas/>
- Milton, O., Pollio, H. R., & Eison, J. A. (1986). *Making sense of college grades*. San Francisco, CA: Jossey-Bass.
- Montgomery, D. (2009, November 19). Half-dozen districts sue over Texas law prohibiting minimum grades. *Dallas Star-Telegram*. Retrieved from <http://www.star-telegram.com>
- National Center for Education Statistics. (2007). *Mapping 2005 state proficiency standards onto the NAEP scales* (NCES 2007–482). U.S. Department of Education. Washington, DC: Author.
- Nettles, A. (2009, December 21). Montgomery public schools cut funding to groups that aid at-risk students. *Montgomery Advertiser*. Retrieved from <http://www.montgomeryadvertiser.com>
- Newton, X. A., Darling-Hammond, L., Haertel, E., & Thomas, E. (2010). Value-added model of teacher effectiveness: An exploration of stability across models and contexts. *Educational Policy Analysis Archives*, 18(23), 1–24. Retrieved from <http://epaa.asu.edu/ojs/article/view/810>.
- O'Connor, K., & Wormeli, R. (2011). Reporting student learning. *Educational Leadership*, 69(3), 40–44.
- Peters, E. (2009 October 20). Minimum grades no longer allowed. *Abilene Reporter-News*, Retrieved November 20, 2009, from <http://m.reporternews.com>
- Reeves, D. R. (2004). The case against the zero. *Phi Delta Kappan*, 86, 324–326.
- Richmond, E. (2008, February 4). A floor for failing grades: Parents, educators debate whether kids should get 50 points for doing nothing. *Las Vegas Sun*. Retrieved from [www.lasvegassun.com](http://www.lasvegassun.com)
- Rosovsky, H., & Hartley, M. (2002). *Evaluation and the academy: Are we doing the right thing?* Cambridge, MA: American Academy of Arts and Sciences. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.126.3208&rep=rep1&type=pdf>
- Smallwood, M. L. (1935). *An historical study of examinations and grading systems in early American universities*. Cambridge, MA: Harvard University Press.
- Starch, D., & Elliot, E. C. (1912). Reliability of grading high school work in English. *School Review*, 20, 442–457.
- Starch, D., & Elliot, E. C. (1913a). Reliability of grading work in mathematics. *School Review*, 21, 254–259.
- Starch, D., & Elliot, E. C. (1913b). Reliability of grading work in history. *School Review*, 21, 676–681.
- Tomlinson, C. A., & McTighe, J. (2006). *Integrating differentiated instruction & understanding by design: Connecting content and kids*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Wormeli, R. (2006). *Fair isn't always equal: Assessing and grading in the differentiated classroom*. Portland, ME: Stenhouse Publishers.

## AUTHORS

**THEODORE CAREY** recently completed his Doctor of Education degree at the University of Massachusetts Lowell, 61 Wilder Street, Lowell, MA 01854. [tedcarey@comcast.net](mailto:tedcarey@comcast.net). His current research explores common high school grading practices.

**JAMES CARIFIO** is a Professor of Learning Theory, Research, and Statistics at University of Massachusetts Lowell, Graduate School of Education, O'Leary Library 57, 61 Wilder Street, Lowell, MA 01854; [James\\_Carifio@uml.edu](mailto:James_Carifio@uml.edu). His research focuses on complex learning, non-linear dynamics, and theory construction and testing.

Manuscript received January 18, 2012

Revisions received March 15, 2012, April 16, 2012,

and June 4, 2012

Accepted June 6, 2012