

# Inflated or Not? An Examination of Grade Change

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## ***Abstract***

*This study examines the change in undergraduate term grade point average (GPA) for students at one large research university over a 20-year period. Results show that SAT scores, high school GPA, receipt of merit aid, gender, race, and major play a significant role in predicting term GPA. A decomposition of the net change in term GPA (assessing the effects of change in student demographics) indicates SAT scores, high school GPA, and the receipt of merit scholarship have the greatest impact on term GPA. Although evidence demonstrates that these factors influence the change in GPA over time, the results account for a relatively small proportion of the variance, indicating the likelihood that other factors not included in this study have a greater influence on student GPA.*

Course grades and overall grade point average (GPA) are important indicators of college success. High school GPA is often used as a primary measurement of qualification for college acceptance and merit financial aid awards. College GPA impacts retention and graduation rates, serves as a criterion for upper-level courses, and often is linked to continued receipt of institutional financial aid. In addition, undergraduate GPA is important for admission into graduate school and to finding employment.

With increasing pressures to improve retention and graduation rates, grade inflation has been a consistent concern among American higher education and government officials over the last few decades. Institutional and governmental officials are interested in universities achieving greater efficiency of resources while not diminishing the quality of the education provided. A primary concern of many administrators is to understand and recognize whether grade inflation is occurring on their campuses. Although often intermingled with the

related concepts of grade compression and grade disparity (Hu, 2005), grade inflation refers to a rise in a grade or grade point average without evidence it was earned (Bejar & Blew, 1981; Birnbaum, 1977; Breland, 1976). To show that grade inflation exists, it is important to demonstrate that achievement has not increased (or risen at the same pace) while grades have increased (Bejar & Blew, 1981). The purpose of this study was to identify whether grades had increased and, if they had, whether the increase was earned.

## **Literature Review**

### ***Factors Contributing to Grade Point Average***

A student's GPA is determined by a number of internal and external characteristics, including the student's intelligence and ability, prior knowledge of the specific subject matter, and motivation. According to numerous educational and social science scholars, student learning results from ability combined with allocation of effort (Bandura, 1977; Brown & Saks, 1975; Deci & Ryan, 1985; Farkas & Hotchkiss, 1989). Critical components of effort include time spent on activities and the intensity of work performed.

Because motivation and the need for achievement are important constructs in learning and education (Atkinson & Feather, 1966; Bandura, 1977; Deci & Ryan, 1985; Pintrich, 2004; White, 1959), high school and college grades rely on the student's level of motivation. Knowles (1975) argues that people who take the initiative in learning (termed proactive learners) do more and learn better. Blasi (1976) believes that intrinsic motivation is based on proactive engagement with the environment. Garcia and Pintrich (1994) report that motivation and cognition affect student learning. The interaction of these two constructs, in addition to student knowledge of the content, beliefs about the task's difficulty, cognitive learning strategies, and the quality of effort put forth, will determine the level of success for the learning outcome. In the college environment, Bean and Eaton (2000) propose that personality traits such as self-efficacy help a student persist when faced with academic challenges, and those with an internal locus of control believe they can persevere and work through challenging tasks and situations. Following the premises of self-efficacy and motivational theory, Kuh's (1999) examination of students over multiple decades shows that students with high expectations and motivation choose to spend their time in ways that positively affect their performance inside and outside the classroom.

### ***High School Performance as a Predictor of College Success***

Numerous studies report the strong correlation between high school grades and college success (Adelman, 1999; Olsen, Kuh, Schilling, Connolly, Simmons, & Vesper, 1998; Pascarella & Terenzini, 2005; Pike & Saupe, 2002). Olsen et al. (1998) found that students with strong high school academic records were more likely to get involved in a range of activities in college. Kuh, Kinsey, Buckley, Bridges, and Hayek (2006) argue that the intensity of the high school curriculum “affects almost every dimension of success in postsecondary education” (p. 19). Adelman (1999, 2006) reports that completing high-level math classes in high school is the single best predictor of performing well academically in college. All these studies purport the importance of high school preparation and assert that it contributes greatly to success in college.

### ***Causes of Grade Inflation***

There is a healthy academic debate regarding the underlying causes of grade inflation. Some researchers cite the rise in student ability as the main cause in the rise of grades (Hanson, 1998; Olsen, 1997), while others provide evidence that student ability alone does not account for the rise in grades (Bejar & Blew, 1981; Fetter, Stowe, & Owings, 1984; McSpirit & Jones, 1999; Mellow, 2004; Mullen, 1995; Wilson, 1999). Kuh and Hu (1999), researching grades over two time periods (mid-1980s and mid-1990s) and across multiple institutions and majors, found evidence supporting grade inflation at research universities and selective admissions liberal arts colleges. They also found grade deflation at liberal arts colleges and comprehensive universities and within the humanities and social sciences disciplines.

Financial pressures facing students, governments, and institutions are another frequently cited reason for grade inflation. Institutions have been perceived by some government officials as seeking higher appropriations without a concern for the quality of education they provide students. In some cases, government officials believe changes in college grading may not be responsible only for the growing budgets of higher education, but also for a lower academic standard and outcomes (Stone, 1995). Enrollment-driven formula funding has created an imbalance in the priorities of publicly funded higher education, where student enrollment counts greatly while student achievement counts little (Stone, 1995).

In the past decade, institutions have increasingly felt a financial strain and have become more dependent on nongovernment revenues (e.g., tuition dollars). In some cases, institutional officials believe that if they do not satisfy student expectations, students will transfer to another school that offers easier grades. According to Barndt (2001), student expectations “for higher education are exactly the same as . . . for any other commercial enterprise,” (p. 12) for when they spend top dollar they expect to be happy with their purchase. For some colleges and universities, survival means satisfying these consumer expectations and keeping tuition dollars coming. In these cases, schools are simply responding to the changing market of higher education, one that has become more consumer based.

Financial pressures on students have created situations that some researchers believe are leading to grade inflation. In states with merit-based scholarships, some are questioning whether faculty are reluctant to give low grades because these merit aid scholarships are only available to students if they maintain a B (or comparable) GPA. This is similar to the debate some states are having over college tax credits; faculty hesitate denying students a “B” because the student needs a “B” average to receive the tax credits (Reischauer & Gladieux, 1996). In a number of cases, if a student loses a tax credit or merit scholarship, the student will not be financially able to continue his or her education.

Some scholars argue that students from minority groups and low socioeconomic status (SES) are at a disadvantage. It is argued these students generally have fewer incentives to perform well academically, are more often in non-college-preparatory tracks, earn lower test scores, and are less likely to pursue postsecondary education. In examining high school grades, Fetters, Stowe, and Owings (1984) found that Black students scored lower than Whites and urged scholars to continue exploring the effects of race and class on high school GPA. However, other scholars have not found race or SES to be among the most important factors in high school GPA. Using a large national dataset from *High School & Beyond* (HS&B, NCES), Brown and Saks (1975) explored possible differential effects of social class on high school performance. They found that time spent on homework increased grades for all students, but that minority and low-SES students were not disadvantaged simply by their race or social class. In a related study on math achievement, Jones (1987) found that

race (among Black versus White students) did not matter. His results indicated that senior-year math scores were not related to race, but were highly dependent on the number of advanced-math courses previously completed.

Students' choice of major and ability has been cited as another possible contributing factor to grade inflation. Prather, Smith, and Kodras (1979) found students increasingly moving into degree programs that more accurately reflected their abilities and interests. In doing so, these students found grading standards and course content to be parallel with their interests, leading to greater proficiency and higher grades. With SAT scores steadily increasing, even when adjusted for recentering, there is an argument that the skills and abilities of today's undergraduates exceed those of a generation ago; thus students should be earning higher grades (Student Academic and Financial Affairs Committee of the Academic Senate Georgia Tech, 2003).

Some argue that today's students learn differently than previous generations. Multitasking and use of the computer (Internet) as the primary vehicle for acquisition of knowledge and research are the *modus operandi* for most current students. In comparison to previous decades, many more high school students are enrolling in SAT-prep courses, and these tutoring services are likely helping students score higher. There are, however, skeptics of the claim that today's students are brighter than previous generations. Many such skeptics include faculty who are more comfortable with the traditional lecture and resist the wide-scale introduction of technology and innovative active-learning pedagogies.

Some additional studies assert that educational credentialism (Brown, 2001), student consumerism (Barndt, 2001; Farley, 1995; Rosovsky & Harley, 2002), admission of more unprepared students (Birnbaum, 1977), response to diversity concerns (Rosovsky & Harley, 2002), giving higher grades in return for better teaching evaluations (Rosovsky & Harley, 20002), and increased faculty interest in graduate students and research (Merrow, 2004) are reasons for grade inflation. Finally, other possible reasons cited, but not researched, include the combination of changing demographics of students and faculty, perceptions of

the teaching-learning process, and the introduction of new technologies into the classroom. Although there is no definitive answer to this debate, it is clear that individual student characteristics and motivations combined with the influence of instructor attitudes and ability, instructional techniques, and technologies influence student grades (Hu, 2005).

### ***Outcomes from Possible Grade Inflation***

While the issue of increasing grades alone is a concern, so too are the outcomes from escalating grades. Perhaps the most frequently mentioned concern is the devaluation of the undergraduate degree. Since grades are often used as a method of evaluating the talent/merit of college students, a widespread rise in GPAs across the country could make a college degree less valuable. Some individuals, such as employers, might have trouble distinguishing who is and who is not properly prepared for a job. Further, graduate school admissions officials may look askance at those individuals with high GPAs/grades. It also makes it more difficult for these officials' to distinguish between students capable of advanced critical thinking and research skills and those who are not.

Institutionally, there are concerns that there are changing views on what is an acceptable grade distribution. Current grade distributions fly in the face of one of our most deeply cherished educational theories, the bell-shaped curve; even though the distribution has been skewed toward higher grades for some time, it has become even more skewed lately, with As being numerous, Bs common, and Cs, Ds, and Fs infrequent (Cosgrove, 1995). Grade distributions in fact have become an upward slope with the "gentleman's C" being replaced by the "gentleman's A" as the ratio of Cs to As appears to have reversed itself (Levine & Cureton, 1998). Over the last number of years, scores of institutions across the country have reported concerns over rising GPAs and increasing numbers of honor graduates. Many of these same institutions are also reporting (and touting) increased SAT scores and high school GPAs by their incoming freshman classes.

## Research Questions

These previous studies, coupled with numerous concerns over grade inflation from the literature, lead to the research questions guiding this study:

1. What is the average term grade point average (GPA) for full-time undergraduates over the 20-year period from fall 1985 through fall 2004?
2. What are the demographics of the enrolled full-time undergraduate students?
3. Is there a change in average GPA, and if so, what factors contributed to the increase or decrease in grades?
  - a. Particular factors to examine include student demographics, SAT scores, and receipt or loss of the merit aid scholarship.

## Methods

### *Sample*

The sample for this study is drawn from a large, research-extensive public university located in the Southeast. As the state's flagship, land-grant university, it offers over 150 degree programs in 15 schools and colleges. The undergraduate student body of approximately 25,000 is comprised primarily of traditional age students (18–22 yrs) enrolling predominately from the local region (85% of students are in state). The sample consists of 259,661 undergraduate students' cases (94,899 individual students). Only full-time students enrolled for 12 or more hours during the fall terms 1985 through 2004 were included. The data were extracted from official institutional census files. Students included in the study had a viable SAT/ACT score, term GPA, high school GPA, gender, and race/ethnicity identified in official institutional census files. The SAT/ACT is the student's highest combined score consisting of the highest individual math and verbal score regardless of exam sitting.<sup>1</sup> The entire sample consisted of 57% female and 88% White/Caucasian students. Students in this sample were representative of all undergraduate students at the institution in terms of race and gender compositions.

Starting in 1994, the state has provided merit-based financial aid to students who graduate from an in-state high school and attend either a public or private

<sup>1</sup>*This is based on an institutional policy of evaluating students and storing data—not the authors' choice.*

in-state institution of higher education (GSFC, 2005). The merit aid scholarship provides full tuition and approved mandatory fees for all students and a small academic book allowance per year for students enrolled at a public institution. The merit aid scholarship can be earned by a graduating high school senior who earns a 3.0 cumulative grade point average (GPA) or an 80 numeric average for all college-prep core curriculum subjects. Students who do not earn the merit aid scholarship as freshmen are able to earn it after checkpoints of 30, 60, and 90 semester hours (45, 90, and 120 quarter hours) if they have a cumulative collegiate GPA above 3.0. Conversely, students can lose the merit aid scholarship at the 30, 60, and 90 semester hour checkpoints if they do not maintain a 3.0 cumulative GPA. Students can receive the merit aid scholarship through the term in which they reach 127 (semester) attempted hours.

### ***Models***

Basic descriptive statistics and correlation analyses were completed to provide an understanding of average SAT scores and GPA each year and over time, as well as to ascertain the general relationship among GPA, SAT, and the demographics of the sample. Multiple linear-regression models were developed—one for each year and one with all years combined, 1985 through 2004, to determine the effect of the independent variables on the dependent variable, term GPA. A predicted term GPA was calculated for each year using the combined regression model and the individual yearly means for each independent variable.

Previous studies have researched the influence of student characteristics on grades received by undergraduate students. Factors showing influence include standardized achievement test scores (Birnbaum, 1977; McSpirit & Jones, 1999; Olsen, 1997), gender (Birnbaum, 1977; McSpirit & Jones, 1999; Olsen, 1997), high school GPA (Olsen, 1997), class level (Olsen, 1997), and choice of major (Birnbaum, 1977; McSpirit & Jones, 1999). In addition, race/ethnicity and merit-based financial aid were added as factors in the analysis to address research question number three. All non-White students were grouped together into one race/ethnicity variable due to the relatively small number of non-White students enrolled at the university from 1985 to 2004 (all non-White students combined constituted 11.6% of the sample). The independent variables for this analysis were as follows:

- SAT score (For this analysis, all SAT scores prior to the recentering in mid-1990s were recentered to compensate for the change in scoring. Students with an ACT and no accompanying SAT score had their ACT score converted into an SAT score.)
- Gender (defined as female = 1, male = 0)
- Race/Ethnicity (defined as White = 1, non-White = 0)
- College of enrollment (Each college was coded as a dummy variable; the College of Arts & Sciences majors were broken into six disciplines: Biological Sciences, Fine Arts, Physical Sciences, Language & Literature, Social Sciences, and Other.)
- Transfer admit (defined as yes = 1, no = 0)
- High school GPA
- Presence of the merit aid scholarship (defined as yes = 1, no = 0. Note: The merit aid scholarship program began in 1994 and was only available for those subsequent terms. For years prior to 1993 all students received “no” for receiving aid.)

The time dimension of the analysis allows an opportunity to assess the effect of demographic change in the student body on the net change in term GPA. To assess the effect of demographic change in the student body, a decomposition of the net change in term GPA was developed. This decomposition reflects how much of the difference between the mean term GPA in 1985 and 2004 is accounted for by: 1) the change in the characteristics of the student body from 1985 to 2004, and 2) the change in the relationship between student characteristics and term GPA from 1985 to 2004.

This decomposition is derived from the framework “components of a difference between two rates.” The purpose of this framework is to “explain the difference between the total rates of two groups in terms of differences in their specific rates and differences in their composition” (Kitagawa, 1955, p. 1169). For this decomposition analysis students enrolled in the years 1985 and 2004 were selected. The main objective of this component’s framework is to allocate differences in specific rates of the two crude rates into components which reflect differences in specific rates of the two groups and differences in their composition (Kitagawa, 1955). The equations below suggest that the differences

between the standardized rates of two groups might be used as the “component due to differences in specific rates,” since this difference may be considered a measure of their differences in specific rates (Kitagawa, 1955, p. 1172). If the difference between two standardized rates is subtracted from the corresponding difference between two crude rates, it is easily demonstrated that the result is a weighted average of differences between the compositions of the two groups (Kitagawa, 1955).

To complete the decomposition, the following equality is solved:

$$(\text{TermGPA}_{04}) - (\text{TermGPA}_{85}) = (a_{04} + \sum b_{04}X_{04}) - (a_{85} + \sum b_{85}X_{85})$$

Where *TermGPA* represents an average at two points in time, *b* represents unstandardized regression coefficients, *X* represents the means for a set of independent variables, and *a* represents the constant for an unstandardized regression equation.

To reflect how much of the difference in GPA between 1985 and 2004 is accounted for by the change in the background of the student body and the change in the relationship between student characteristics and term GPA, a series of computations are conducted. First, linear regression equations for the years 1985 and 2004 are computed with TermGPA as the dependent variable. Second, performing the computation:

$$\sum b_{85}(X_{04} - X_{85})$$

generates the component of the difference attributable to a changing student body (e.g., the student body has more females in 2004 than in 1985). Third, performing the computation:

$$\sum X_{85}(b_{04} - b_{85})$$

creates the component of the difference attributable to a change in the impact of background characteristics on term GPA (e.g., females in 2004 are associated with higher term GPA than in 1985). Finally, performing the computation:

$$a_{04} - a_{85}$$

generates the change that took place that was unmeasured by any independent variables. After the decomposition is complete, the impact of each variable in terms of simple demographic change of the sample, the change in relationship between variables, or the change on both accounts can be described.

The complete decomposition reveals a complex mix of pluses and minuses, which results in the net change of term GPA from 1985 to 2004.

### Findings

Table 1 delineates mean SAT scores and term GPA, as well as the percentage change for these variables over the previous year and from the initial year of 1985.

**TABLE 1** | Means and Standard Deviations of Term GPA and SAT Scores

Year	Mean	GPA	GPA	SD	Mean	SAT %	SAT %	SD	N
1985	<b>2.56</b>	0.0%	0.0%	0.88	<b>1085</b>	0.0%	0.0%	123.8	6,323
1986	<b>2.59</b>	1.1%	1.1%	0.86	<b>1089</b>	0.4%	0.4%	125.3	8,276
1987	<b>2.61</b>	0.8%	1.9%	0.89	<b>1095</b>	0.5%	1.0%	126.7	9,359
1988	<b>2.62</b>	0.5%	2.4%	0.89	<b>1102</b>	0.6%	1.6%	127.1	10,375
1989	<b>2.65</b>	1.3%	3.8%	0.90	<b>1106</b>	0.4%	2.0%	127.1	11,010
1990	<b>2.63</b>	-1.1%	2.6%	0.94	<b>1106</b>	0.0%	2.0%	128.7	12,474
1991	<b>2.72</b>	3.7%	6.5%	0.86	<b>1111</b>	0.4%	2.4%	126.3	13,483
1992	<b>2.79</b>	2.3%	8.9%	0.84	<b>1120</b>	0.8%	3.3%	127.2	13,127
1993	<b>2.81</b>	0.8%	9.7%	0.85	<b>1131</b>	1.0%	4.2%	129.1	12,651
1994	<b>2.88</b>	2.6%	12.6%	0.82	<b>1137</b>	0.5%	4.8%	128.0	13,229
1995	<b>2.93</b>	1.6%	14.5%	0.80	<b>1150</b>	1.2%	6.0%	127.8	13,561
1996	<b>2.98</b>	1.6%	16.3%	0.78	<b>1157</b>	0.6%	6.7%	128.0	13,334
1997	<b>3.03</b>	1.7%	18.4%	0.77	<b>1160</b>	0.3%	7.0%	127.7	14,093
1998	<b>3.05</b>	0.9%	19.4%	0.74	<b>1169</b>	0.7%	7.8%	127.1	14,189
1999	<b>3.08</b>	1.0%	20.5%	0.72	<b>1174</b>	0.4%	8.2%	125.9	14,430
2000	<b>3.14</b>	1.9%	22.8%	0.70	<b>1179</b>	0.4%	8.7%	125.3	14,921
2001	<b>3.16</b>	0.5%	23.5%	0.70	<b>1183</b>	0.4%	9.1%	123.8	15,792
2002	<b>3.18</b>	0.8%	24.5%	0.69	<b>1188</b>	0.5%	9.6%	122.8	16,087
2003	<b>3.24</b>	1.7%	26.6%	0.66	<b>1197</b>	0.7%	10.3%	123.0	16,425
2004	<b>3.25</b>	0.6%	27.2%	0.66	<b>1206</b>	0.8%	11.2%	123.5	16,522
All Years	<b>2.94</b>			0.82	<b>1149</b>			131.4	259,661

As shown, the mean term GPA rose from 2.56 in 1985 to 3.25 in 2004 ( $p < .01$ ) while mean SAT scores rose from 1085 to 1206 ( $p < .01$ ). For the first six years of the analysis (1985–1990), the mean term GPA remained relatively stable, but then started to rise sharply; it has continued to do so throughout the remaining years of the study. As with mean term GPA, the mean SAT scores were relatively unchanged during the first years of the study, remaining relatively stable. However, unlike mean term GPA, the mean SAT scores increased at a slower pace throughout the remaining years of the study.

In addition to examining the change in the mean term GPA over time, it is also important to note the relationship between the variances as well. While the mean term GPA rose over time, the standard deviation decreased. This indicates that while grades have increased, the variation between the grades earned decreased.

Table 1 also charts the change of the mean term GPA and mean SAT scores from the previous year and the change in mean term GPA and mean SAT scores from the start of the analysis (1985). While the change year-to-year has generally been positive for both mean term GPA and mean SAT scores, the patterns have differed. The mean SAT scores show steady yearly increases from 0.4% to 1.1%, while the mean term GPA has been more varied from a yearly decrease of –1.1% to a yearly increase of 3.7%. Mean term GPA increased in all but one year (1990) and in most years increased at a higher rate than the mean SAT scores. Over the 20 years of the study, the overall change in the mean term GPA (27.2%) outpaced the increase in the mean SAT scores (11.2%), with the sharpest increases in mean term GPA occurring in the last 13 years (1991–2004).

Comparing the year-to-year change, the change patterns of mean SAT and mean term GPA across all years (1985–2004) reveals that the year-to-year change in mean term GPA was relatively stable until the early 1990s, with a rapid increase throughout the remaining years. The year-to-year change in mean SAT scores differed in that scores steadily increased over all years in the study. The year-to-year changes for SAT and term GPA across all years are presented graphically in Figure 1, illustrating these two change patterns.

**FIGURE 1** | % Change from 1985

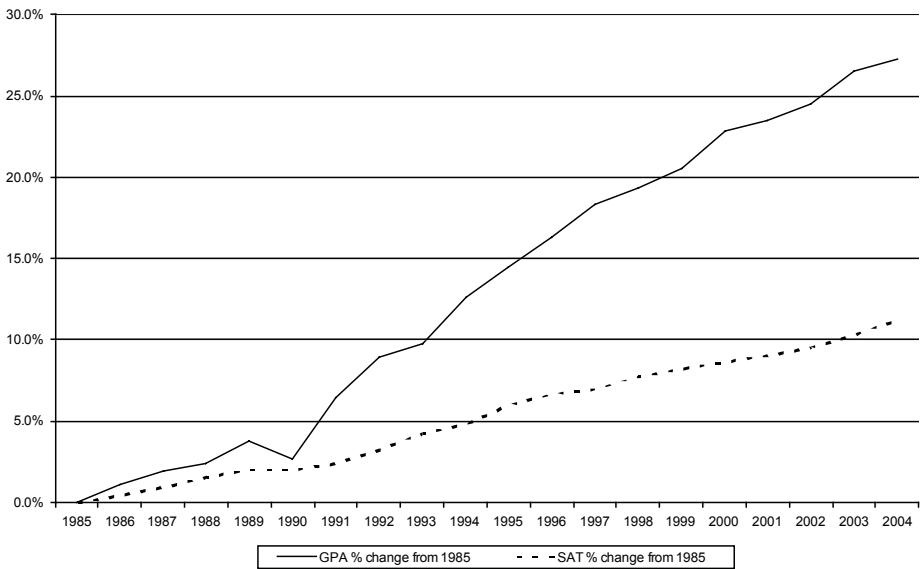


Table 2 displays a correlation matrix for select variables in this analysis.

**TABLE 2** | Correlations Between Student Background Variables

		<b>Gender</b>	<b>Race</b>	<b>Term GPA</b>	<b>SAT score</b>	<b>HS GPA</b>	<b>Merit aid</b>
<b>Gender</b>	Pearson Correlation	1	-0.049	0.120	-0.123	0.186	0.060
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000
	N	259661	259661	259661	259661	259661	259661
<b>Race</b>	Pearson Correlation		1	0.089	0.165	-0.010	-0.017
	Sig. (2-tailed)			0.000	0.000	0.000	0.000
	N		259661	259661	259661	259661	259661
<b>Term GPA</b>	Pearson Correlation			1	0.329	0.432	0.313
	Sig. (2-tailed)				0.000	0.000	0.000
	N			259661	259661	259661	259661
<b>SAT score</b>	Pearson Correlation				1	0.408	0.276
	Sig. (2-tailed)					0.000	0.000
	N				259661	259661	259661
<b>HS GPA</b>	Pearson Correlation					1	0.441
	Sig. (2-tailed)						0.000
	N					259661	259661
<b>Merit aid</b>	Pearson Correlation						1
	Sig. (2-tailed)						
	N						259661

Note: All correlations significant at the 0.01 level (2-tailed)

In general, the correlation analysis indicates no significant relationship between academic ability measures and student gender or race/ethnicity. The Pearson correlation value between mean GPA and SAT is .329 ( $p < .01$ ), indicating a significant (but not a strong) positive relationship between the increase in term GPA and SAT total score from 1985 through 2004. Not surprisingly, the correlation values relating high school GPA, term GPA, SAT, and receipt of merit aid are positive and significant. High school GPA shows the highest correlation with other variables, particularly measures of merit (term GPA, SAT, and receipt of merit aid), but the relationship was also not strong.

In order to examine the relationship between student characteristics and term GPA, multiple linear regressions were developed for each year of the sample as well as one for all combined years of the sample. Table 3 displays the results of three regression models, individual years 1985 and 2004, and a combined model that includes all years between 1985 and 2004. It is important to note

that the merit-based scholarships were not available prior to 1994; for modeling and coding purposes, students from 1985–1993 were marked as not receiving the merit aid scholarship. Two of the college enrollment variables were not statistically significant in this model, but the choice was made to leave them in the model to have all colleges represented. The comprehensive model is helpful in comparing the contribution of an independent variable to a student’s term GPA over the 20 years of the sample.

**TABLE 3** | Regression Models

	1985–2004	1985	2004
R	0.515	0.539	0.455
R-square	0.265	0.291	0.207
Constant	-0.140* (.015)	-0.916* (.101)	0.357* (.063)
Female	0.093* (.003)	0.077* (.021)	0.146* (.010)
White	0.148* (.004)	0.237* (.037)	0.112* (.013)
SAT	0.001* (.000)	0.002* (.000)	0.001* (.000)
HS GPA	0.459* (.003)	0.518* (.020)	0.393* (.014)
Transfer student	0.121* (.009)	0.141 (.113)	0.042 (.077)
Received merit aid	0.238* (.003)	0.000* (.000)	0.251* (.011)
<b>Colleges/Schools</b>			
Journalism	0.307* (.008)	0.322* (.042)	0.174* (.027)
Agriculture	-0.101* (.007)	-0.170* (.058)	-0.244* (.026)
Education	0.160* (.005)	0.187* (.038)	-0.039 (.021)
Family & Consumer Sciences	0.093* (.008)	0.070 (.054)	-0.121* (.024)
Forestry	-0.013 (.016)	-0.081 (.145)	-0.198* (.059)
Social Work	0.566* (.018)	0.347** (.172)	0.482* (.069)
Environment & Design	0.196* (.013)	0.225 (.124)	0.102** (.040)
Public & International Affairs	-0.015 (.016)	0.000* (.000)	-0.016 (.023)
A&S Biological Sciences	-0.027* (.006)	0.154* (.050)	-0.112* (.022)
A&S Fine Arts	0.121* (.007)	0.042 (.045)	0.005 (.026)
A&S Language & Literature	0.043* (.008)	0.000 (.063)	-0.050 (.027)
A&S Physical Sciences	-0.209* (.009)	-0.229* (.048)	-0.243* (.035)
A&S Social Sciences	0.051* (.005)	-0.040 (.037)	-0.092* (.019)
A&S other	-0.160* (.004)	-0.259* (.025)	-0.153* (.017)

*Note:* Standard errors are shown in parentheses. \* = p < .01, \*\* = p < .05  
*Note:* The College of Business was omitted and used as control group.

As shown in table 3, being female, White, receiving merit aid, and being a transfer student had a positive impact on term GPA. The measures of student ability (SAT and high school GPA) also show positive impact on term GPA; the higher the SAT score and high school GPA, the higher term GPA a student can expect. As for college of enrollment, students enrolled in the colleges of

Journalism/Mass Communication, Education, Family and Consumer Sciences, Social Work, Environment and Design, Arts and Sciences–Fine Arts, Arts and Sciences–Language and Literature, and Arts and Sciences–Social Sciences earned higher GPAs compared to College of Business majors. Students enrolled in the colleges of Agricultural and Environmental Sciences, Forest Resources, Public and International Affairs, Arts and Sciences–Biological Sciences, Arts and Sciences–Physical Sciences, and Arts and Sciences–Other earned lower GPAs compared to College of Business majors.

As shown in Table 4, a predicted term GPA was calculated for each year (1985–2004) using the combined regression model; this table also displays the means of the corresponding years for each independent variable.

**TABLE 4** | Predicted GPA by 1985–2004 Regression Model

<b>Year</b>	<b>Predicted GPA</b>	<b>Actual Term GPA</b>	<b>Difference</b>
1985	2.65	2.56	-0.096
1986	2.66	2.59	-0.075
1987	2.66	2.61	-0.051
1988	2.67	2.62	-0.053
1989	2.68	2.65	-0.028
1990	2.67	2.63	-0.044
1991	2.69	2.72	0.035
1992	2.72	2.79	0.061
1993	2.76	2.81	0.052
1994	2.86	2.88	0.017
1995	2.94	2.93	-0.012
1996	3.00	2.98	-0.022
1997	3.03	3.03	-0.004
1998	3.08	3.05	-0.023
1999	3.10	3.08	-0.014
2000	3.12	3.14	0.021
2001	3.14	3.16	0.022
2002	3.17	3.18	0.017
2003	3.20	3.24	0.033
2004	3.22	3.25	0.032

For the first six years of the analysis, the predicted GPA is slightly higher than actual term GPA (1985–1990). In the following four years, the predicted GPA is slightly lower than the actual term GPA (1991–1994). The subsequent five years show the predicted GPA slightly higher than the actual term GPA (1995–1999). For the last five years, the predicted GPA is again slightly lower than the actual term GPA (2000–2005). While the regression model goes back and forth between overpredicting and underpredicting term GPA, the predicted GPA is never more than 0.1 off the actual term GPA earned for each year (in most years, including the last 11, the model is only off .03 or less). This finding suggests that the independent variables used in the model are effective in predicting a term GPA.

Table 5 shows the results of the decomposition, reflecting how much of the difference between the mean term GPAs in 1985 and 2004 is attributable to changes over time in student body composition and the changes in the influence of student characteristics on term GPA.

**TABLE 5** | Decomposition of Term GPA

Variable	Difference attributable to changes in composition of student body	Difference attributable to changes in impact of background characteristics
Female	0.00	0.04
White	-0.02	-0.11
SAT	0.19	-0.67
HS GPA	0.30	-0.45
Received merit aid	0.00	0.17
Transfer student	0.00	0.00
<b>Colleges/Schools</b>		
Journalism	-0.01	-0.01
Agriculture	0.00	0.00
Education	0.01	-0.02
Family & Consumer Sciences	0.00	-0.01
Forestry	0.00	0.00
Social Work	0.00	0.00
Environment & Design	0.00	0.00
Public & International Affairs	0.00	0.00
A&S Biological Sciences	0.01	-0.02
A&S Fine Arts	0.00	0.00
A&S Language & Literature	0.00	0.00
A&S Physical Sciences	0.01	0.00
A&S Social Sciences	0.00	-0.01
A&S other	0.00	0.03

The results show that for the changes in the composition of the study body from 1985 through 2004, only the changes in SAT scores and high school GPAs had sizeable effects on term GPA. All other variables, including all variables for college enrollment, had an influence of .02 or less on term GPA. Results also indicate that, for the change in relationship between student characteristics and term GPA, SAT scores, high school GPAs, and being White had a sizable negative effect on the change in term GPA from 1985 through 2004, meaning these variables are associated with lower term GPA in 2004 than in 1985. Being female and receiving merit-based aid had a sizable positive impact on the change of term GPA from 1985 through 2004, meaning these variables are associated with higher term GPA in 2004 than in 1985. College of enrollment and transfer variables did not have a sizable change in their influence on term GPA from 1985 through 2004. The change unmeasured by the independent variables is the difference between the constants of the regression formulas in 1985 and 2004. The difference of the constants from the 1985 and 2004 models is 1.273 (−0.916 in 1985 and 0.357 in 2004), suggesting that the majority of the change in term GPA from 1985 to 2004 is attributable to variables not measured in the models.

Concerns about collinearity are raised due to the mix of variables included in the analysis. A prime example is the receipt of merit aid for the first year of college, which is dependent on high school grades. Collinearity statistics were developed for each of the independent variables for all the models, and all fell within acceptable ranges. Tolerance levels lower than .25 and VIFs greater than 4 are arbitrary but common cut-off criteria for deciding when a given independent variable displays “too much” multicollinearity: values below .25 or above 4 suggest a multicollinearity problem. The lowest tolerance levels and highest VIF for the complete model 1985 through 2004 were .632 and 1.58 respectively. Most VIFs in each individual year were around 1.0–1.5, while tolerance levels were around .800 for all variables. The collinearity diagnostic also shows evidence supporting the notion that none or very limited dependency between variables exists. Finally, a recheck of the correlations between variables shows no correlations between these variables higher than .442.

The time dimension of the study calls for an examination of the estimated standard errors that, if violated, would cause the estimated standard errors to be biased downward. This would lead researchers to mistakenly declare a coefficient significant when in fact it is not (Ethington, Thomas, & Pike, 2002). The Durbin-Watson autocorrelation statistic for each of the models was around 2.0, with the lowest score in the 1.68 range for the complete model 1985 through 2004. This finding indicates the assumption of independent errors has been met.

## **Discussion**

The findings from this study point to four main conclusions. First, moving from 2.56 in 1985 to 3.25 in 2004, the average GPA earned by students in this sample rose over these 20 years. As shown in Figure 1, much of this 27% increase in the term GPA occurred in the past 10 to 15 years. This increase is consistent with the finding of Kuh and Hu (1999) that grades of students with similar background characteristics in the mid-1990s were higher than in the mid-1980s.

Second, the increase in grades over the 20-year period appears to be a combination of a number of factors. Although the literature suggests that a student's race, gender, academic ability, and college of enrollment should explain a good bit of the variance in grades, the findings from the regression analyses and the decomposition show that much of the change in GPA is a result of unmeasured variables. This is supported by both the low R-square values in the regression analyses (.2 to .26) and the decomposition value of 1.273 for the change in term GPA from 1985 through 2004 unmeasured by the independent variables. This suggests that the influence of SAT, high school GPA, gender, race, and college of major are important, yet only a part of the full answer. Taken together, this leads us to the conclusion that other factors not measured in the analysis account for much of the influence on student grades.

Third, the findings from the decomposition analysis indicate that the demographic changes in the student body account for a portion of the change in the term GPA over the 20 years of the analysis. The findings show that the changes in SAT scores and high school GPAs accounted for a sizable share of the .69 increase in term GPA from 1985 to 2004. This suggests that the increase in

the number of “better” prepared students in the latter years did account for a portion of the increase in the term GPA from 1985 to 2004.

It is also important to examine the change in the relationship between term GPA and background characteristics over the 20 years. A number of variables accounted for sizable increases and decreases of the .69 increase in term GPA from 1985 to 2004. The effects from SAT scores, high school GPAs, and being White accounted for decreases in the change in term GPA from 1985 to 2004 (i.e., these variables are associated with lower GPAs than before). Conversely, the effects of being female and receiving a merit aid scholarship accounted for increases in the change of term GPA from 1985 to 2004 (i.e., these variables are associated with higher GPAs than before).

This results in a situation where the growth in the number of high-achieving students accounts for an increase in the term GPA, while the value of SAT scores and high school GPAs account for a decrease in term GPA. Put plainly, college term GPA has increased because greater numbers of high achieving students are enrolling. As a consequence, the influence of SAT scores and high school GPAs counts less toward the college term GPA than it did before. This suggests that some peer effects might be impacting term GPA, from students being surrounded by other “good” students and picking up “good” study habits to students having to compete more for grades. While the changing demographics of the student body did appear to influence student grades, the decomposition also showed that it was not the main source for the increase in term GPA; the largest increase in term GPA came from variables unmeasured in the models (1.273).

Fourth, institutional and state policies appear to influence student GPAs. The regression model for the entire sample (1985–2004) shows that receiving merit-based aid increases term GPA by .238. This makes sense because the merit-based scholarships are indexed to term GPA; students are required to earn above a 3.0 GPA to keep the merit-based aid. This provides students a financial incentive to achieve and maintain good grades. Merit-based scholarships also have specific credit hour requirements, which encourage students to “game” the system by accumulating attempted credit hours just under the credit hour checkpoints. Cornwell, Lee, and Mustard (2005) found that, in terms of credit hours, merit-based scholarships decrease the full-load enrollment. One

explanation for this decrease in credit hour load is that students want to protect their GPAs. Students are withdrawing from difficult courses and taking lighter loads in an effort to get better grades, allowing them to keep their merit-based scholarships (Cornwell, Lee, & Mustard, 2005).

Some additional evidence from the sample institution supports the notion of students “gaming” the system to their advantage by enrolling in “easy” courses and withdrawing from courses in which they are having difficulty. A grade “key” displaying faculty members and their grade distributions was started at the sample institution during the academic year 1994–1995. This key provides a student a means to control their grades by judiciously choosing which classes they take and avoiding low-grading classes and/or teachers. In addition, examining some generalized data from the sample institution’s fact books reveals that undergraduates have a higher rate of course withdrawals in the past ten years compared to the prior ten years.

While the analysis provided in this report does not allow us to pinpoint the exact source of the rise in GPA, it does provide some insights into the factors that affect changes in student grades. Clearly, the ability level of students entering college as defined by SAT scores has increased over the 20-year period. However, this increase has not been at the same pace as the increase in term GPA. This would cause some to conclude that there is in fact grade inflation. Consider, however, that high school students are enrolling in SAT/ACT preparation classes, many for the sole purpose of raising test scores, in larger numbers during the later years of this study. These preparation classes have most assuredly raised student test scores, but their direct impact cannot be measured because most institutions do not track who has or has not taken a test preparation course. Coupled with the issues associated with standardized tests as an accurate measure of student ability, to conclude that grade inflation has or has not occurred based solely on the difference in the percentage change of SAT scores and term GPA would not be acceptable. Many factors that likely contribute to the increase in term GPA are difficult to model. For example, changes in faculty demographics, faculty attitudes toward teaching, and the distribution of faculty (by courses taught) are likely contributors to the rise in grades.

In another look at some generalized data from fact books from the sample institution, roughly 50% of the lower-level undergraduate courses were taught by full, associate, or assistant professors in 1984. In 2004, however, only 44% of lower-level undergraduate courses were taught by full, associate, or assistant professors. For upper division courses, roughly 75% of undergraduate courses were taught by full, associate, or assistant professors in 1984. In 2004, only 66% of upper-level undergraduate courses were taught by full, associate, and assistant professors. These shifts indicate that more undergraduate students are being taught by part-time faculty and graduate students during the later years of this study. This shift away from the traditional professorial faculty teaching undergraduates coincides with rising grades. Does this suggest that part-time faculty and graduate assistants assign different (higher) grades than tenured/tenure track faculty? One could argue either way, but clearly this is one area to explore as a possible unexamined reason for the rise in student grades.

Another possible contributor to increased grades that is difficult to model consists of the rewards for faculty to teach and teach well at a research university. In many research universities, faculty promotion may be highly dependent on the faculty member's research, not necessarily their ability as an instructor. A faculty member who is a good researcher is well-known throughout their field, while a good teacher is usually only well-known on their campus. The faculty rewards system has been in place for quite some time, while the financial incentive for faculty to conduct research (contracts, grants, and additional available salary), has grown tremendously over the years. This suggests that the relationship between the rise in grades and faculty incentives for quality instruction should be examined.

In 2002, the American Academy of Arts and Sciences commissioned a report to investigate grade inflation (Rosovsky & Hartley). One of the causes suggested in the report is that faculty members are giving higher grades in return for higher teaching evaluations. A faculty member not wanting or having the time to deal with undergraduate students has an incentive to give higher grades. This more often than not casts the faculty member in a more positive light in the eyes of the undergraduate student, who in turn will likely give less negative feedback on evaluations. This suggests that the relationship between faculty evaluations and grades given also needs to be taken into account as a possible unexamined reason for the rise in grades.

A contextual issue that also needs to be considered consists in the pedagogical changes that have occurred since the first year (1985) of the study. These have most assuredly affected course content, as have the changing methods of teaching and criteria for evaluation within every discipline. Although the changes in some disciplines have been relatively small, other disciplines have experienced tremendous changes over the 20 years of the study. Students and faculty are communicating and teaching/learning via computers, the Internet, e-mail, and PowerPoint, and have access to vast digital libraries providing more information to students than ever before. But does access to more information and better means of communication necessarily equate to more learning? The difficulty of capturing these changes and their direct impact on learning in a quantifiable manner suggests that the factors causing grades to rise over the last 20 years were not measured in this analysis.

## **Implications**

The answer to the question of whether grade inflation was found in this study is not clear. While it appears that an increase in grades has outpaced the increase in student ability (SAT scores), it is not possible to definitively state that grade inflation has occurred. The low R-square values and the decomposition values indicate that a number of factors outside of the models have contributed to the increase in grades over the 20-year period. While this could be evidence of grade inflation, we believe that this might not necessarily be the case. This study identified a number of potential factors that posed significant challenges in determining how to quantifiably measure them. So the question remains: Because a number of the potential reasons why grades have risen are difficult to measure, does that necessarily mean that there is grade inflation? Or does this suggest the need to examine the issue more broadly and incorporate a variety of methods to understand truly what is happening with student grades?

Perhaps the American Academy of Arts and Sciences' report on grade inflation (Rosovsky & Hartley, 2002) offers the best advice, pointing out that "each institution has to determine and be responsible for its own standards, and the best beginning is awareness of the issues" (p. 1). Results of this study can assist school officials in understanding and framing the issues around grade change for their campuses. The models used in this analysis point to some specific factors, but they also highlight additional areas where campuses could employ useful

qualitative research methods, such as focus group interviews (of faculty and students), surveys, and institutional assessments. In short, there are advantages for any institution to consider whether grade inflation has happened and, if it has, why.

In the process of addressing the issue of grade inflation, each institution should begin by asking two important questions: Do grades actually tell us how well students are doing? Does the rise in term GPA really indicate grade inflation, or is the change in grades a tangled mix of many factors? In light of our findings, we feel a mix of numerous factors, many difficult to measure, led to this change of grades on the sample campus. If campus officials engage in a similar analysis, we urge caution in the interpretation of rising grades on college campuses based on only one set of particular factors and encourage using multiple methods to address the question.

This study points to at least two factors that can help frame campus discussions on grade inflation. The declining influence of high school grades and SAT scores on college GPAs suggests a reevaluation of the use of these measures in the admissions process might be warranted. While the findings of the study show these measures are important drivers of student GPA, the decrease in the amount of influence they have on student GPA over time raises the question of whether their inclusion in campus discussions on admission policies is still appropriate.

Another important area for a campus to include in the discussion on grade inflation is the role of teaching. The university in this study is a land grant, flagship state university where research is highly valued. Historically, universities have tried to achieve balance among research, teaching, and service, though in recent years the trend has been for universities to increase their focus on research (Geiger, 2004). This suggests that the role of teaching on campus needs to be brought to the fore instead of remaining in the back of the discussion.

## Limitations

The findings from this study are limited in several ways. First, the sample was drawn from a single institution; thus generalizations to students at other institutions are difficult. However, the authors felt the approach, methods, and results of this study were important enough to share so other institutions could make their own judgments about grade inflation on their campuses. This study is intended to highlight both past and current research on grade inflation and provide a method to explore an important issue facing many campuses.

Second, this analysis assumed that the courses students enrolled in have remained similar in content and instructional methodology over the 20-year period. The authors recognize that pedagogical changes within some fields have been dramatic over the past 20 years. How to capture this dynamic was discussed at length, but no adequate measure was devised or conceived. Pedagogical approaches and changes most certainly need to be discussed and explored on any campus that attempts to tackle the issue of grade inflation.

Third, SAT scores were used as a proxy for student ability in this study. This approach, however, does have its limitations. Standardized achievement tests are designed to measure a student's college readiness, not necessarily to describe the level of ability a student may or may not possess. We incorporated SAT scores in the study, recognizing the limitations, as we were not able to identify any other adequate alternative.

Fourth, the sample institution had a low number of minority students compared to white students. For the purpose of this study minority students were grouped together. This might have masked some real effects race had on grade change.

*The declining influence of high school grades and SAT scores on college GPAs suggests a reevaluation of the use of these measures in the admissions process might be warranted.*

The choice to group all minority students together was a difficult one, but one the authors deemed necessary due to the very low number of minority students enrolled during the initial years included in the study. If an institution replicates this study, and there is sufficient representation among historically underrepresented populations, we would suggest that the analysis be

conducted using specific racial or ethnic categories rather than including minority students as a singular category.

Fifth, the overall proportion of nontraditional letter grades has increased over the years of this study. This is consistent with Adelman (1999, 2006), who examined national datasets and found the proportion of nontraditional letter grades has doubled as a percentage of all grades. This leads to a possible masking of student performance in college. Some students could be opting to take courses without a letter grade, which in turn does not impact their GPA. A look at institution policies regarding pass/fail and other nontraditional grading systems is warranted in any future studies.

Sixth, student withdrawals were not incorporated into the statistical analysis. Descriptive analysis pointed to an increase in the rate of withdrawals on campus. One possible explanation of grade inflation is that students are “gaming the system.” When they are in trouble in a course, they simply withdraw so it does not adversely affect their GPA. Any future studies should include an examination of withdrawals on campus and the possible impact they might have on student GPAs.

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