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# STRIVERS AND UNDERACHIEVERS: EFFECTS ON FIRST YEAR COLLEGE GRADES AND RETENTION

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## ABSTRACT

In 1999, the Educational Testing Service created a Strivers Index where students who scored 200 points higher than expected on the SAT exam, based on their socioeconomic background, were called Strivers. Similarly an Underachiever is a student who scores 200 below expected on the SAT. The presumption is that tagging a student as Striver or Underachiever will assist admissions offices in selecting the students. How Strivers and Underachievers perform in their first year academically and their college persistence patterns are examined in this paper.

## FIRST YEAR STUDENT GRADES AND PERSISTENCE

Many college admissions office have transformed into enrollment management centers. First-year and second-year retention are new areas of concern primarily because recruiting expenses are re-incurred for students who leave prior to graduation. Additionally college rankings by the US and News & World Report are affected positively by high graduation rates. Thus, no longer is the office merely concerned with admitting students, but with selecting students who will succeed academically and eventually graduate. Today, "making the first year class" implies not just hitting the admission goal for the number of incoming students, but choosing the right students so that "making" the following year's sophomore class number is simultaneously achieved.

The majority of colleges and universities continue to use educational assessment tests (the SAT or ACT) in their matrix for admission decisions, although some schools no longer require them or make them conditional/optional. The College Board, the purveyor of the SAT, contends SAT scores assist admissions directors to choose among candidates by offering a common point of reference for all candidates. By no means is the SAT the only measure used for admissions. There are other metrics, including high school grades, extracurricular activities, class rank, high school reputation, socioeconomic factors, etc., that assist in evaluating candidates. Recently, the Educational Testing Service, ETS, created a new metric, the Striver Index, though it has not been tested for its efficacy in predicting first year student grade point averages and persistence. The purpose of this paper is to assess the predictive power of the Striver

Index on first year grades and persistence using institutional data from a highly selective, private liberal arts college.

## First Year Grades Studies

There is much literature devoted to testing whether aptitude tests are indicators of college success, where success is often assumed to be a student's grade point average, GPA. Nettles, Thoeny and Gosman (1986) find significant positive correlation between students' cumulative college GPAs and total SAT scores and high school grades. Similarly, Kobrin, Camara and Milewski (2002) find for all ethnic groups the SAT I (the standard verbal and math test) scores, SAT II (subject test) scores and high school GPAs strongly correlate positively with first year college GPAs.

Another line of research examines whether socioeconomic factors, namely parental income and education, affect SAT scores. Students coming from middle and upper middle-income families with parents having college educations are expected to score higher on the SAT exam. These students may have attended better high schools, their parents may have higher educational expectations, and many may have been afforded an SAT preparation course. Stanfiel (1973) studying students at Howard University, a predominantly black university, and finds only the SAT math scores are directly correlated with higher socioeconomic status. Braxton, Milem and Sullivan (2000) find non-whites and females score lower on the composite SAT exam, whereas students from higher socioeconomic strata score better on the exam. Aitken (1982) shows grade point average at the end of the first year in college is significantly positively related to SAT scores, high school rank, being female, parents and siblings having college degrees and satisfaction with the major. He also finds class size, instructor ratings, connection with faculty and living arrangements affect first year grades.

## College Persistence Studies

Success in college can take on many meanings, and increasingly retention is a measure of success. Tinto (1993), in a seminal work, posits there are three clusters of student and institutional characteristics that lead to the decision to remain in school or leave. The overriding theme of his work is that students need to feel connected both socially and academically in order to persist. The programs and attributes that make this connection, however, change over the years the students matriculate. His model is therefore longitudinal



and dynamic and the significant factors affecting first year retention can be very different from those affecting second year retention.

While many studies use national data sets, this paper concentrates on institutional data sources. Somers (1996) uses institutional data to address the effect of financial aid on year-to-year student retention at a large urban, public university. Using a logistic model she finds three or sixteen statistically significant predictors of retention: the student's age, GPA and the form of financial aid. She finds older students are .9% more likely to persist. Students with GPA's in the lower third of the class were, surprisingly, 12.9% more likely to stay, while those receiving financial aid, especially in the form of scholarships, were 23.5% less likely to remain in school.

O'Neill (2000), using a multivariate, logistic regression model concentrates on first year versus second year attrition of students at a small liberal arts college. I find for first year students, higher GPA's and improving GPA's from the first to second semester reduce attrition. Males, students from large high schools, students from parochial schools and those with lower math SAT scores are more likely to persist to the second year. Ethnicity, verbal SAT scores, intended major and financial need did not significantly affect attrition.

Braxton, Milem and Sullivan (2000) study first year students from a highly selective private university to examine how active learning contributes to the intention to remain in college. They find higher high school grades, higher SAT scores, being female, being white, acknowledging the goal of getting a degree, and taking courses with discussions lead to a greater intention of staying in school. Exams geared to just finding facts reduced the intention of remaining in school. Parental income and education, group work and higher order thinking activities show no impact on intended retention.

### Striver Index

Over the years, ETS has altered the SAT I exam. First, questions believed to be biased in terms of race and gender were eliminated. Second, according to the Wall Street Journal, January 23, 2003, given the growth in both the number and percentage of high school students taking the exam, from about 10,000 in 1941 to 2.8 million today, the scores were re-centered in 1995. The influx of test takers reduced average scores so beginning in 1995 scores were re-centered to re-create means of 500. Third, the SAT II or subject exams were developed to test specific knowledge of a discipline. In 2005, a new 2,400-point SAT I test will be used, composed of tougher math questions, a verbal section and an essay writing component. ETS adapts the test over time to meet the demands of officials in higher education.

In a New York Times, August 31, 1999, article entitled "New Weights Can Alter SAT Scores" it was reported ETS had developed a "Striver's Index". Using fourteen socioeconomic and high school specific characteristics that could predict a student's SAT score, any student scoring 200 points higher than expected was deemed a Striver. Hence, a student who scores 1,000 on the SAT, but was expected to score 800 based on the fourteen factors, is rising above expectations and this could be noted and appreciated when comparing this student to another non-striving 1,000 point SAT taker. It is not clear why ETS chose 200 as the demarcation. If one assumes SAT scores are distributed normally with a mean 1000 and standard deviation 100, then approximately 5% of students would be Strivers. In developing the index, it was ETS's belief that the Striver Index would be another valuable piece of information for admissions offices. To date, ETS has not sent Strivers tags along with SAT scores.

Criticism of the index comes from two fronts. First, the index could be biased by race. Historically, blacks and Hispanics have on average lower SAT scores. Given a lower predicted score, blacks and Hispanics would be more likely to be Strivers. The politically charged issue of race-based admissions, especially in California, Michigan, Texas and Washington, finds a home in courts. Presently, some states are legally restricted from using affirmative action in admissions policies. Tagging a student as a Striver is seen by some as a statistical, legally defensible method of increasing minority admissions, however, the race-based form of the Striver Index could face legal challenges. A second challenge comes from the non-Strivers. Would a wealthier student with a solid, predicted SAT score fail to gain admission to various colleges because the score was not seen as exceptional? Similarly, if ETS is attempting to provide more valuable information to admissions offices, why not create the Underachiever Index, where students who perform well below their predicted score are tagged as Underachievers?

The questions addressed in this paper are how well do the Striver and Underachiever markers predict success in the first year in college, where success is measured in terms of first year grade point averages and retention at the institution to the second year? This additional information on student achievement could be a valuable tool to match students with appropriate colleges.

### ECONOMETRIC MODEL

The model is a three-step process. First, socioeconomic and high school characteristics are used to predict a student's SAT score. ETS chose fourteen variables: parental occupations, educations and employment status; family income; a measure of living standards that includes number of household books, computers, etc.; native language, student



age, percent of high school graduates attending colleges, number of rigorous high school courses offered, school location, percent of high school students receiving subsidized lunches and ethnicity. Given data restraints the ordinary least squares model in this paper is

$$(1) \text{ SAT} = B_1 + B_2\text{Gender} + B_3\text{Race} + B_4\text{Income} + B_5\text{Mother's Education} + B_6\text{Father's Education} + B_7\text{Mother's Employment Status} + B_8\text{Father's Employment Status} + B_9\text{High School Size} + B_{10}\text{High School Type} + u,$$

where the variable names are listed in the Appendix.

Based on previous research the coefficient on race is expected to be negative; black and Hispanics students generally have lower SAT scores. Parental income, education and employment status are expected to increase SAT scores, therefore  $B_4, B_5, B_6, B_7$  and  $B_8 > 0$ . The predicted sign of  $B_9$  is unknown. Smaller schools may afford more individual attention that might improve SAT scores, but larger schools might have a greater likelihood of advanced classes that would enhance scores. Private and parochial schools may contend their graduates will get higher SAT scores, but this need not be true. Thus, the sign of the coefficient on high school type is not known. The same holds true for gender. The stochastic error term is  $u$ .

Given the predicted SAT score, a Striver's Index and an Underachiever's Index are created. Rather than use the strict 200-point differential espoused by ETS, the notion of scoring in the 5% tails of the distribution is used. A Striver is one whose difference in actual from predicted SAT score is in the top 5% of all such differences. Underachievers are those whose residuals lie in the bottom 5%.

In the second step, first year GPA's are regressed on student high school GPA, SAT math and verbal scores, college academic intentions (intended college major), the socioeconomic variables in (1), and the Strivers and Underachievers markers. The model including a stochastic error,

$$(2) \text{ FRGPA} = A_1 + A_2\text{Gender} + A_3\text{Race} + A_4\text{Income} + A_5\text{Mother's Education} + A_6\text{Father's Education} + A_7\text{Mother's Employment Status} + A_8\text{Father's Employment Status} + A_9\text{High School Size} + A_{10}\text{High School Type} + A_{11}\text{High School Grades} + A_{12}\text{Math SAT Score} + A_{13}\text{Verbal SAT Score} + A_{14}\text{Intended Major} + A_{15}\text{Athlete} + A_{16}\text{Striver} + A_{17}\text{Underachiever} + u$$

The socioeconomic variables can be included with Striver and Underachiever because a different data set is used to create the Striver and Underachiever variables than used to

perform the regression in (2). The difference in data sets mitigates specification bias. Following Aitken (1982), students with college educated parents are expected to have higher GPA's;  $A_5$  and  $A_6 > 0$ . Having employed parents and higher family income are expected to raise FRGPA since both potentially reduce the student's reliance on working while in school, allowing more time for studying, and afford additional resources, such as computers, that enhance a student's productivity. Therefore, ceteris paribus,  $A_4, A_7$  and  $A_8 > 0$ . The type of high school attended can affect FRGPA. Parochial and private schools may advertise they better prepare their students for the rigors of college, but this may or may not be the case. Secondly, the results may be idiosyncratic to the institution. The expected impacts of gender, race and high school size are unknown, a priori, though included because they may provide insight to admissions officials at the institution. Similarly, observing the effects of participation in athletics on grades may be useful to officials and coaches. A priori the sign of  $A_{15}$  is unknown.

The separate math and verbal components of the SAT are included because Striver and Underachiever are not strictly formed by the individual components, but by using the total SAT score. Including the components introduces some multicollinearity, but they also enable one to assess their individual impacts on grades holding Striver and Underachiever constant. Research listed above suggests higher SAT scores and higher high school grades are expected to lead to higher first year GPA's, ceteris paribus, therefore  $A_{11}, A_{12}$  and  $A_{13} > 0$ . The predicted impacts of intended major,  $A_{14}$ , is generally unknown, though in some cases institutional characteristics may suggest a predicted sign. This will be discussed shortly.

The presumption is Strivers have surpassed expectations regarding what they could have achieved given their socioeconomic backgrounds and therefore they have the ability, and perhaps fortitude, to achieve higher first year grades than those who have not scored exceptionally. Given two students with identical SAT scores, but one whose SAT much higher than expected, the Striver is expected to achieve a higher FRGPA. This suggests  $A_{16} > 0$ . This is certainly within the spirit of what information ETS might be trying to give admissions offices using a Striver's Index.

The total impact of being a Striver on FRGPA is the sum of the direct and indirect components. If Strivers attain higher high school grades and higher high school grades increase FRGPA, then this indirect effect is added to the direct effect ( $A_{16}$ ) to arrive at the total impact. If Strivers simply score exceptionally, but do not have exceptional high school grades, then the indirect effect is zero.

Similarly, the information suggested by an Underachiever implies  $A_{17} < 0$ . A student whose SAT score lies far below



predicted is underachieving on the test. It is predicted that this person, compared to one with an identical SAT score, would not perform as well in college given lesser aptitude. It should be noted that this person may be the classic poor test taker, yet works hard and gets good high school grades, and would be predicted to continue with above average grades in college. This, however, depends upon the relative quality of their high school vs. their college. The data, however, do not differentiate between the classic poor test taker and Underachiever. Holding all else constant, including high school grades, the Underachiever is expected to have a lower first year GPA given the lesser aptitude.

The final step in modeling is a logistic regression model of first year college retention. Following the model in O'Neill (2000), the logs-odd ratio,  $Li$ , for likelihood to persist is

$$(3) Li = C_1 + C_2 \text{Gender} + C_3 \text{Race} + C_4 \text{High School Type} + C_5 \text{High School Size} + C_6 \text{High School Grades} + C_7 \text{High School Percentile} + C_8 \text{SAT Math Score} + C_9 \text{SAT Verbal Score} + C_{10} \text{Intended College Major} + C_{11} \text{Financial Need} + C_{12} \text{FRGPAPredicted} + C_{13} \text{Improving Grades in College} + C_{14} \text{Sports} + C_{15} \text{Striver} + C_{16} \text{Underachiever} + u$$

FRGPA is endogenous with retention and affected by Striver and Underachiever in (2). Therefore, the predicted FRGPA found from (2), but excluding Striver and Underachiever in the prediction, is used in (3).

Previous research results for gender, race and high school size and type are mixed, thus there are no predicted signs on  $C_2$ ,  $C_3$ ,  $C_4$ , and  $C_5$ . Superior performance in high school, measured by grades, class rank and SAT scores are predicted to increase retention because the student is better able to achieve success in the college classroom, making academic dismissals more unlikely. Therefore,  $C_6$ ,  $C_7$ ,  $C_8$ , and  $C_9 > 0$ . The coefficient on intended major,  $C_{10}$ , has an ambiguous sign universally, though may have a predictable sign institutionally. For example, students intending to major in the sciences that find their classroom expectations in the sciences are met are more likely to persist. This may be institutionally based. The greater the difference between financial need and how much of the need is met is expected to increase attrition. Students assessing the costs and benefits of persisting may find the additional unmet financial need a reason to leave, therefore  $C_{11} < 0$ . Higher first year grades and improving grades between the first and second semester increase the likelihood of retention,  $C_{12}$ , and  $C_{13} > 0$ . Better academic performance reduces the likelihood of academic dismissal and imparts a feeling of success that breeds retention. Connecting with others on the playing fields is also expected to increase retention, thus  $C_{14} > 0$ . In O'Neill (2000), males, parochial school graduates, students from larger high schools and legacies were more likely to persist. Additionally, higher first year GPA's and improving ones led

to a greater probability of persistence. Surprisingly, higher SAT math scores decreased the likelihood of persistence.

The impact of being a Striver on retention is direct and indirect. If Strivers attain higher FRGPA's, and higher FRGPA's increase the likelihood of persisting, then the indirect effect is positive. *Ceteris paribus*, including high school and college grades, what is the predicted direct impact of being a Striver on persistence? A Striver is more likely to persist if the exceptional SAT scores are related to other characteristics that would lead to persistence, such as tenacity, avid reading, curiosity, drive, etc. On the other hand, if the Striver is someone who tests well and does not apply oneself in the high school classroom, then persisting at the college level may not be greater, holding college and high school grades constant. In keeping with the spirit of ETS's Striver Index, the positive relationship between high school grades, class rank and exceptional SAT scores is not linked in calling someone a Striver. Thus, using ETS's version, the sign of  $C_{15}$  ambiguous. An additional reason for ambiguity may be institutionally driven. Strivers may not find a challenging academic environment at the college and leave after the first year; they may matriculate elsewhere. This cannot be tested at this time due to data unavailability.

A similar argument holds for Underachievers. The indirect effect is Underachievers may get lower FRGPA's, which in turn leads to a lesser likelihood of persistence. The direct effect, measured by  $C_{16}$ , assumes high school and college grades are being held constant. If the Underachiever shares characteristics that are consistent with leaving college, such as lack of focus and drive, then Underachievers will be more likely to leave, and  $C_{16} < 0$ . If the Underachievers are simply poor test takers, but have other strengths such as a solid work ethic, then  $C_{16} > 0$ .

#### Institutional Data

The data are institutional data for students from a highly selective, liberal arts college, spanning four years for the entering classes '97 to '00. Requests to ETS for the equation used to calculate Strivers were not answered. Using institutional data for all students who applied to the college and submitted SAT scores, a predicted SAT score from (1) was estimated. The initial sample size is 4800 for (1) and 1,248 for those who ultimately attend the college. This is a drawback to the paper in that only students interested in the college were used to estimate (1) and these students are generally wealthier and come from higher income classes than the general SAT-taking public. This implies fewer Strivers will be found using the institutional data than if one used ETS's equation. Table I supports this claim.

Table I shows the comparison of means for all students, Strivers and Underachievers. The 4.5% of the students



marked as Strivers implies 57 students. The Underachievers number 167. There is little difference in the percentage of males overall, 46%, and those who are Underachievers, 47% male. Fifty two percent of Strivers are male.

Significant differences occur in the type of schools attended. The percent of Strivers coming from public high schools, 82%, exceeding the 71% overall, though only 48% of the Underachievers come from public high schools. Private school attendance shows a whopping 42% in the Underachievers compared to a mere 11% overall and only 5% for Strivers. This can in part explain why so many in the sample are Underachievers, so many come from private schools. The parental educational and employment status show little differences across the groups, except for the percent of fathers with a college degree. Only 37% of Strivers do, compared to 44% overall and 52% for the Underachievers. Parental income is not available so financial need, as determined by the admissions office, is used as a proxy. Financial need is \$1,600 higher for Strivers and \$500 less for Underachievers relative to the \$14,629 in need overall. These characteristics are consistent with how Strivers and Underachievers are tagged.

Interestingly, the Strivers are also striving in the high school classroom. The Strivers have a higher high school percentile at 89% compared to 81% for all students and high school GPA's are 3.6 versus 3.2. The results are opposite for the Underachievers who are not performing as well in the high school classroom with a GPA average of 2.98 and high school percentile at 75%. Given the selective nature of the college, all of these students are solid performers in high school, but the Strivers are exceptional.

First year GPA is 2.84 (284 in basis points) for the overall sample compared to 3.48 for Strivers and 2.67 for the Underachievers. The improvement in GPA between the first and second semester is negligible for all groups. Despite the lower GPA for the Underachievers, the average lies above the college's required GPA for continuance. First year students participating in varsity sports is 32.2% overall, only 21% for Strivers, and 29.9% for the Underachievers. The variable FRD indicates the amount of unmet need, which averages \$284 for the total group. Strivers have more unmet need by an average of \$348. The Underachievers have less unmet need of \$267. The college does not appear to value the Strivers in terms of generous financial aid and in fact is less generous to them than to Underachievers.

## RESULTS

Table II shows the ordinary least squares results for predicting SAT total scores using 4800 applicants with SAT scores sent. Residuals in excess of 96 led to the 57 Strivers because 96 was the 95<sup>th</sup> percentile for residuals for those who applied. Residuals less than 288 represent the 5<sup>th</sup> percentile

and it leads to 167 Underachievers. Many more Underachievers matriculate relative to those that applied, causing the large difference in 57 versus 167. The adjusted  $R^2$  of .061 is significant at .0001. Nonetheless, only 6.1% of the variation in SAT scores is predicted by socioeconomic factors listed in the model. Blacks and Hispanics scored 76 points lower on the SAT, while male scored 8 points lower. Every \$1,000 increase in financial need, suggesting lower income, raised the SAT score by a mere .5 points. Though statistically significant, the result is numerically close to zero. Having a mother who attended college raised SAT scores by 15.7 points compared to the increase associated with a father with a college degree of 25.2 points. An employed father raised SAT scores by 21.7 points on average, *ceteris paribus*. Mothers working reduced scores by 11 points. This result is contrary to other research. Students from larger high schools tended to have higher SAT scores. Lastly, students from private high schools showed an average increase of 8.59 points on the SAT compared to public high school graduates. Parochial school education had no bearing on predicted SAT scores.

Table III shows the ordinary least squares estimates for FRGPA, equation (2). Due to missing values, the total number of observations is 1,137 for (2). The adjusted  $R^2$  is highly significant at .3252. The statistically significant results are discussed. As expected, high school performance variables are statistically significant predictors of FRGPA. A one-point improvement in the high school GPA is expected to increase the FRGPA by .26. A 100-point increase in the SAT math or SAT verbal test is expected to increase FRGPA by .15 and .20, respectively. The intended science major relative to being humanities major reduces FRGPA by .10, probably due to the difficulty of first year science courses at a college that is noted for its demanding science programs. Other intended majors do not affect FRGPA. Males and black and Hispanic students have lower FRGPA's of .21 and .17, respectively. Having a father with a college degree increases the expected FRGPA, *ceteris paribus*, by .10. Each additional \$1,000 in financial need raises FRGPA by .005, which is virtually equal to zero. Lastly, attending a larger high school improves FRGPA a modest .00016.

Strivers and Underachievers show unusual results. As expected, Strivers have higher FRGPA's than non-Strivers, who are not Underachievers. The .114 coefficient (measured in non-basis points) is only significant at .1572. The surprising result is the increase in the expected FRGPA of .167 for Underachievers. The sign is contrary to expectations and highly significant. Given two people with the same SAT scores, high school grades, and intended major, etc., except that one scored 288 points or more below expected on the SAT, why would this person achieve higher first year college grades?



Table IV shows the logistic regression model results. A negative sign on a coefficient means attrition falls or persistence increases. Ten of seventeen factors are statistically significant. Males and blacks and Hispanics are more likely to persist, and the magnitude of their coefficients is large relative to most other significant effects. Parochial school students relative to public school students persist and at the same magnitude as race and gender show. Higher high school grades, surprisingly, reduce persistence at a large order of magnitude. Higher verbal SAT scores modestly decrease the likelihood of persistence. Athletes are more likely to persist, indicating this connection to the college enhances retention. Higher predicted FRGPA's and improving FRGPA's between semesters are more likely to lead to greater persistence, *ceteris paribus*. These last two effects are consistent with what is expected across all colleges, whereas the former effects may be idiosyncratic to the college.

Strivers are less likely to persist. This is surprising in that the Strivers also strive in the high school and college classroom in terms of GPA. Holding all things constant they are leaving at a greater rate than non-Strivers. Looking at the traits of the Strivers at the school, one sees a very intelligent and motivated student who can certainly do the schoolwork. These Strivers are hardly representative of what Strivers would look like nationally; they are not from substantially lower income groups. What is missing for these students must be a connection to the college. Perhaps the college does not provide the academic and social environments demanded by these students. They get grades well above those needed to persist, but they could still be bored or lacking a connection to the college.

Underachievers are more likely to stay despite the fact they are not superior high school students, though decent performers in the high school and college classrooms. Their traits that create these successes in high school can be the same ones that keep them motivated and connected in college. The magnitude of the coefficient is nearly double that of the nearest impact variables, parochial school or gender. It appears the school creates an environment that continues to allow these student academic success and persistence greater than what their aptitude tests indicate.

### CONCLUSION

The use of a Striver's Index, as defined by ETS, could not be used in this study. Given the selective nature of the students applying to the college in question, too few ETS Strivers exist. For example, in this study a poor Hispanic student who scores 1,100 on the SAT might not be considered a Striver

because only strong SAT takers bother to apply to this selective college. The Striver index in the paper uses these selective students to build the Striver Index. That being the case, this student who would be a Striver nationally might not be in this paper. This leads to too few Strivers. This also implies the coefficient on Striver is biased upward in Table III. With more students of poorer backgrounds in the Striver category, the impact on FRGPA would be smaller. The Strivers in this paper are highly successful people. The relationship between Striver and persistence can be fleshed out if information from exit interviews or transfer patterns is known. Are these students leaving due to a lack of connection, boredom, etc.?

The Underachievers present a different picture. The school's traditional applicant, measured by SAT scores, is much stronger than those that attend. Though the school is highly selective, perhaps it is a safety school to students whose average SAT is 1254. This leads to a predicted SAT score using the applicants that outstrips many of the students attending. The slew of Underachievers caused a -288 point residual to be used to define Underachievers. The average SAT score for Underachievers is 1,069, which is not a low score nationally. Too many in the pool are termed Underachievers compared a national data set. Underachievers as defined, turn out to be overachievers in the sense that they are poor test takers compared to very strong candidates, but who work hard enough to get solid, though not stellar, grades. These students may have the social skills, street savvy and drive to persist in college and achieve first year grades higher than aptitude may have suggested. They may also find greater connectedness. An enrollment management office may find the results provocative. Blacks and Hispanics buck the national trend and are more likely to persist at this institution. The summer bridge program aimed at minorities may be one of the reasons for this. While attracting parochial school, male athletes enhances persistence, why are females more likely to leave? The large effect of higher high school grades leading to more attrition is telling and troubling. Why do high achievers in high school tend to leave? Are they not being challenged or is the environment one that is not conducive to much brighter students?

Further research is threefold. First is to find a better way of tagging Strivers and Underachievers. Second, to be more useful to admissions offices, create indices of classic poor test takers who achieve classroom success and compare them to smart, lazy, classic underachieving students. Third, trying to capture additional measures of connectedness and why people leave will enable enrollment management offices to develop appropriate programs.



TABLE I

Variable	N	Overall Mean	Mean for Strivers	Mean for Underachievers
GENDER	1248	0.46	0.526	0.473
BLACKHIS	1248	0.064	0.052	0.101
PRIVATE	1237	0.121	0.052	0.423
PAROCH	1237	0.155	0.122	0.083
PUBLIC	1237	0.717	0.824	0.487
MOMCOLGR	1237	0.461	0.491	0.455
DADCOLGR	1237	0.442	0.368	0.519
MOMWORKS	1237	0.815	0.807	0.833
DADWORKS	1237	0.964	0.947	0.961
NEED	1248	14629.66	15997.56	14176.07
HSPERTLE	1203	80.991	89.134	75.519
HSGRADES	1141	3.199	3.639	2.98
SATMATH	1248	581.56	698.59	534.67
SATVERB	1248	583.24	714.21	534.91
SATTOTALS	1248	1164.81	1412.81	1069.58
SATPRED	1140	1265.41	1265.72	1263.36
HUMANITZ	1248	0.072	0.087	0.035
SOCSCIZ	1248	0.149	0.086	0.143
SCIENCEZ	1248	0.469	0.491	0.359
UNDAP	1248	0.295	0.316	0.449
FRSHJOCK	1248	0.322	0.210	0.299
FRD	1248	440.96	466.82	590.32
FRGPA	1243	284.19	348.07	267.26
DGPA1	1243	0.884	-1.38	-4.73
FYRRET	1248	0.931	0.929	0.910
STRIVER	1248	0.045		
UNDERAC	1248	0.133		

Table II

Dependent Variable SATTOTALS

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	1227.09996	13.27608	92.43	<.0001
GENDER	1	-8.03664	3.25783	-2.47	0.0137
BLACKHIS	1	-76.17472	5.52223	-13.79	<.0001
FAMNEED	1	0.00052808	0.00015983	3.30	0.0010
MOMCOLGR	1	15.72520	4.66869	3.37	0.0008
DADCOLGR	1	25.20496	4.59277	5.49	<.0001
MOMWORKS	1	-11.02870	6.13251	-1.80	0.0722
DADWORKS	1	21.70142	11.32289	1.92	0.0553
HSSIZE	1	0.04751	0.00916	5.18	<.0001
PAROCH	1	-4.63334	4.77601	-0.97	0.3320
PRIVATE	1	8.59379	5.12059	1.68	0.0934

Adjusted R<sup>2</sup> = .0609



Table III

Dependent Variable FRGPA

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	-18.40949	17.43885	-1.06	0.2914
GENDER	1	-21.533	3.172	-6.79	<.0001
BLACKHIS	1	-17.5378	6.960	-2.50	.0127
PRIVATE	1	-.439	6.470	-0.07	.9459
PAROCH	1	-4.471	4.177	-1.07	.2847
HSGRADES	1	26.105	2.642	9.88	<.0001
SATMATH	1	0.148	0.028	5.31	<.0001
SATVERB	1	0.199	0.027	7.13	<.0001
SOCSCIZ	1	-3.566	6.395	-0.56	0.5572
SCIENCEZ	1	-10.199	5.555	-1.84	0.0667
UNDAP	1	-4.765	5.839	-0.82	0.4147
FRSHJOCK	1	-1.067	3.266	-0.33	0.7439
NEED	1	0.00051	0.00018	2.72	0.0066
MOMCOLGR	1	-4.765	5.839	-0.82	0.4147
DADCOLGR	1	-4.765	5.839	-0.82	0.4147
MOMWORKS	1	-3.868	3.918	-0.99	0.3237
DADWORKS	1	0.900	8.087	0.11	0.9114
HSSIZE	1	0.016	0.010	1.62	0.1052
STRIVER	1	11.437	8.093	1.41	0.1579
UNDERAC	1	16.763	8.075	2.08	0.0381

Adjusted R-Sq = 0.3583

Table IV

Dependent Variable: Log-Odds Ratio for Attrition

Parameter	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	4.6105	2.0807	4.9099	0.0267
GENDER	1	-1.6094	0.6099	6.9628	0.0083
BLACKHIS	1	-1.4003	0.7534	3.4549	0.0631
PRIVATE	1	-0.3451	0.5588	0.3814	0.5368
PAROCH	1	-1.6593	0.6027	7.5787	0.0059
HSSIZE	1	-0.00178	0.00131	1.8250	0.1767
HSPERTLE	1	-0.00274	0.0113	0.0588	0.8085
HSGRADES	1	1.5685	0.7222	4.7172	0.0299
SATMATH	1	0.00612	0.00481	1.6188	0.2033
SATVERB	1	0.00983	0.00581	2.8643	0.0906
SOCSCIZ	1	-0.7343	0.6585	1.2436	0.2648
SCIENCEZ	1	-0.5986	0.5830	1.0541	0.3046
UNDAP	1	-0.1925	0.5621	0.1173	0.7320
FRD	1	-0.0001	0.000028	0.1530	0.6957
FRGPAPRED	1	-0.0693	0.0251	7.5975	0.0058
DGPA1	1	-0.0151	0.00189	64.1007	<.0001
FRSHJOCK	1	-0.6123	0.3510	3.0437	0.0811
STRIVER	1	1.2092	0.7801	2.4023	0.1212
UNDERAC	1	-2.7997	1.2572	4.9590	0.0260



## APPENDIX

Gender:	Male=0, Female=1
Blackhis:	Black or Hispanic students=1; Others=0
Private:	Attended Private School=1; Not=0
Paroch:	Attended Parochial School=1; Not=0
Public:	Attended Public School=1; Not=0
Momcolgr:	Mother attended college =1; Never attended=0
Dadcolgr:	Father graduated with at least a baccalaureate degree=1; Else=0
Momworks:	Mother employed, as noted on admission's application=1; Else=0
Dadworks:	Father employed, as noted on admission's application=1; Else=0
Need:	Family financial aid need determined by admissions office, \$ amount
Hspertle:	High school class rank percentile
Hsgrades:	High school GPA on 4.0 scale.
SAT scores:	Re-centered SAT scores for those taking test after April, 1995
Humanitiz:	If first choice intended college major is in humanities=1; Else=0
Socssciz:	If first choice intended college major is in social sciences=1; Else=0
Undap:	If first choice intended college major is undecided=1; Else=0
Frshjock:	If played at least one college sport in first year=1; Else=0
Frd:	Financial aid award less admissions determined need in \$ amount
Frgpa:	First year grade point average on 4.0 scale (in basis points 400 point scale)
Dgp1:	Change in GPA between fall and spring semester in basis points
Fyrret:	First year retention=1 if matriculates to sophomore year; Else=0
Underac:	Underachiever=1; Not=0
Striver:	Striver=1; Not=0



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**DISCUSSANT COMMENTS**  
**STRIVERS AND UNDERACHIEVERS: EFFECTS ON FIRST YEAR COLLEGE GRADES AND RETENTION**

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Dr. O'Neill actually covers three topics in the paper: The prediction of SAT scores; the prediction of freshman grade point averages (FRGPA); and the first-year retention (persistence) of students. Literature reviews and econometric models are presented for each, and the reader is tempted to believe that the paper will become more than one article.

In the discussion of means, there were a few surprising results, such as the large number of SAT "underachievers" and small number of SAT "achievers" from private schools. Are any of these results related to truncation? A short note would help the reader.

Since the study was based upon a single college, the reader would also benefit from the inclusion of admissions criteria. For example, are SATs built in? If so, how? How are equity considerations handled? Without these, the discussion of results is difficult to interpret or evaluate. If the study is ever generalized, or replicated at other institutions, it would be interesting to see how admissions criteria might affect many of the outcomes discussed.

Some of the unexpected results could be explained *post hoc*: People paying their own way seem to work harder;

underachievers (those scored lower than maybe warranted by the SAT) did better than expected on grades; and those who had an easy time in high school persisted less (sometimes called "frosh shock") when confronted with more difficult college work. One result is changing in data over time. A new trend in high schools and colleges is for female students to dominate academic subjects. Given changing behavior, variable parameter estimation might be useful.

The results for the SAT prediction were disappointing ( $R^2=.0609$ ) due to limitations of the data. As the author mentioned in the Conclusion, it will be interesting to get the actual "striver" and "underachiever" indices or designations from ETS, to see if they would change the subsequent results. It's a shame that the indices were discontinued, since the accuracy of this step determines the usefulness of subsequent research.

The typical reader will be nagged by one thing that might be made explicit in the paper - multicollinearity. What effects are present, and what techniques were used to deal with it? Given the variables in question, it might be an important point.