Performance on The Scholastic Aptitude Test-Verbal (SAT-V) and Mathematical (SAT-M), the applicant's rank in class or Converted Secondary School Rank (Rank), and the applicant's general level of measured secondary school achievement as indicated by the Average of CEEB Achievement Tests (ACH AV) has been used by Vassar College as admissions measures and as predictors of freshman-year performance. Six validity studies involving data for classes entering Vassar during the period 1963 through 1971 reveal a relatively consistent pattern of relationships between Freshman Average Grade and the admissions tests scores. In each study, the best single indicator of probable performance during the freshman year has been either the CEEB Achievement average of the Converted School Rank. The SAT-V was the third best single indicator, and the SAT-M provided information of least value. However, the combination of scores provides a better indication of probable performance than any single score. The most recent validity study of the scores of Vassar's Class of 1975 (324 women and 170 men) confirm the findings of the previous six studies. The findings of this study also showed that the combination of all four academic predictors is slightly higher for women than for men, and the aptitude measures tend to be more closely associated with freshman grades among the women than among the men. Eight tables provide the data for the various studies. (DB)
NOTES ON THE PREDICTION OF FRESHMAN GRADES AT VASSAR COLLEGE

April 25, 1973

Kenneth M. Wilson

CRC No. 73-04-25B
Relevant Reports

- Prediction of Freshman Average Grade at Five CRC Colleges: A, B, C, D, and E (CRC Memorandum, 22 November 1965)

- Some Differentiating Characteristics of High- and Low-Performing Seniors in the Class of 1968 at Vassar College (CRC Memorandum, July 1968)

- Some Correlates of Student Progress in the Class of 1968 at Vassar College (CRC Memorandum, 2 August 1968)


- Prediction of First-year Grades at Vassar College (CRC Memorandum, 27 October 1969)

- Study of the Validity of Entrance Measures, Class of 1970 (CRC Memorandum, 30 October 1967)

- Admissions, 1968-69, Vassar College (CRC Memorandum, 6 November 1969)

- Contribution of SAT's to Prediction of Freshman Grades at CRC-Member Colleges (CRC Memorandum, 8 May 1970)


- The CEEB Achievement Average (CRC Memorandum, 15 October 1970)

- The High School Average (CRC Memorandum, 2 November 1970)

- Predicting Cognitive Performance in Different Colleges (CRC Memorandum, 28 December 1970)

- The Utility of a Standard Composite for Predicting Freshman Average Grade in Eight Liberal Arts Colleges (CRC Memorandum, 25 June 1971)

- Center Notes on Institutional Research, Vol. 1, No. 1, February 1972

- Center Notes on Institutional Research, Vol. 1, No. 2, December 1972
NOTES ON THE PREDICTION OF FIRST-YEAR GRADES AT VASSAR COLLEGE

There is evidence to support the thesis that Vassar (like many other colleges) values, among other things, the qualities reflected in the performance of applicants on several "academic-qualifications indicators" namely, (a) The Scholastic Aptitude Test-Verbal (SAT-V) and Mathematical (SAT-M), (b) the applicant's rank in class, or Converted Secondary School Rank, (Rank) and the applicant's general level of measured secondary school achievement, as indicated by the Average of CEEB Achievement Tests (ACH AV).

WITH SOME VARIATION IN DETAIL AS A FUNCTION OF ANNUAL VARIATIONS IN THE SUPPLY OF APPLICANTS, individuals with the highest scores on these indicators have been offered admission, almost without exception. The proportion offered admission has decreased with level of scores, approaching zero at the lower end of the applicant score-range.

REPEATED STUDIES HAVE SHOWN, WITH SOME VARIATION IN DEGREE FROM YEAR TO YEAR, THAT THERE IS A MODERATE DEGREE OF CORRESPONDENCE BETWEEN STUDENTS' SCORES ON THE INDICATORS AND THEIR GRADES DURING THE FRESHMAN YEAR--students with higher scores earn better grades on the average than students with lower scores. When the four academic qualifications indicators are combined statistically to form a "best-weighted composite" (with major weight on Rank and ACH AV) for the purpose of predicting freshman average grade, the correspondence between predicted and actual standing has been about as shown, illustratively, for the Class of 1965:

- Of students whose combined admissions qualifications placed them in the top fifth, over half (56%) earned top-fifth grades, and almost three-fourths were in the high 40%.

- Of students in the lowest fifth on the predictive composite, almost two-thirds were in the lowest 40% in terms of actual freshman grades.

Despite the many individual reversals of form, the actuarial table lends support to the practice of favoring applicants with higher admissions credentials over those with lower credentials when freshman-year performance is the immediate criterion of the relative "value" or "worth" of students' performance or accomplishment.

THE MOST RECENT VALIDITY STUDY, CONDUCTED BY CRC FOR VASSAR'S CLASS OF 1975, WITH DATA FOR 324 WOMEN AND 170 MEN, yields results which, like those of earlier studies, (a) point up the moderate degree of relationship between a composite of the admissions measures and freshman grades, and (b) confirm the relative superiority of School Rank and the CEEB Achievement Average over the SAT's as predictors of freshman-year performance. 

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**Academic Qualifications versus Academic Performance During the Freshman Year: Vassar College, Class of 1965**

<table>
<thead>
<tr>
<th>Standing based on composite</th>
<th>Standing based on Freshman Year Average In percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low fifth 4th fifth 3rd fifth 2nd fifth Top fifth Total</td>
<td></td>
</tr>
<tr>
<td>Top fifth 2 2 22 18 56 (100)</td>
<td></td>
</tr>
<tr>
<td>2nd fifth 10 18 27 16 29 (100)</td>
<td></td>
</tr>
<tr>
<td>3rd fifth 23 17 30 12 18 (100)</td>
<td></td>
</tr>
<tr>
<td>4th fifth 31 21 25 16 7 (100)</td>
<td></td>
</tr>
<tr>
<td>Low fifth 33 30 19 12 6 (100)</td>
<td></td>
</tr>
<tr>
<td>Total class 20 20 20 20 20 (100)</td>
<td></td>
</tr>
</tbody>
</table>

Note: The correlation between the predictive composite, developed in a preceding class, and actual grades in the Class of 1965 is $r = .47$. This table reflects tabulations of actual freshman standing for students classified according to standing on the predictive composite, by fifths.

*a* Grade point average below 2.20; *b* 2.20-2.39; *c* 2.40-2.69; *d* 2.70-2.89; *e* 2.90+
Six validity studies, involving data for Classes entering Vassar during the period 1963 through 1971, inclusive, reveal a relatively consistent pattern of relationships between Freshman Average Grade and the several admissions scores.

IN EVERY STUDY, the best single indicator of probable performance during the freshman year has been either
- the CEEB Achievement average, or
- Converted School Rank.

The Scholastic Aptitude Test-Verbal section typically has been the third best single indicator. The SAT-Mathematical score has provided information of least value for forecasting freshman year performance.

WHEN ALL FOUR ADMISSIONS VARIABLES ARE CONSIDERED JOINTLY, as a battery of predictors, the combination of scores provides a better indication of probable performance than any single score--on the average, the four predictors correlate about .12 points higher than the best single predictor for public school graduates and .07 points higher for private school graduates.

The figures in the body of this table are correlation coefficients showing the relationship of individual admissions measures and weighted composites of these measures, respectively, to Freshman Average Grade. Leading decimals have been omitted. V corresponds to SAT-Verbal, M to SAT-Mathematical, Rk to Converted School Rank, AA to the Average of CEEB Achievement tests, R to the coefficient of multiple correlation between the set of predictors and grades in the designated class, and PFG to Predicted Freshman Grade, with the coefficient representing a relationship in the designated class of predicted and actual freshman grades.

Note: The figures in the body of this table are correlation coefficients showing the relationship of individual admissions measures and weighted composites of these measures, respectively, to Freshman Average Grade. Leading decimals have been omitted. V corresponds to SAT-Verbal, M to SAT-Mathematical, Rk to Converted School Rank, AA to the Average of CEEB Achievement tests, R to the coefficient of multiple correlation between the set of predictors and grades in the designated class, and PFG to Predicted Freshman Grade, with the coefficient representing a relationship in the designated class of predicted and actual freshman grades.

### Weights Reflecting the Contribution of Basic Entrance Measures to Prediction of Freshman Grades When Measures are Considered Jointly, Classes of '67, '68, '70, '72, and '75, Respectively: Vassar College

<table>
<thead>
<tr>
<th>Class</th>
<th>Public School Graduates</th>
<th>Private School Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Joint predictors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V  M  Rk  AA (R)</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>14  -05  24  31  (47)</td>
<td>08  -03  22  37  (49)</td>
</tr>
<tr>
<td>1968</td>
<td>07  -02  36  33  (55)</td>
<td>09  -02  18  24  (34)</td>
</tr>
<tr>
<td>1970</td>
<td>18  -06  30  15  (43)</td>
<td>22  -05  24  01  (35)</td>
</tr>
<tr>
<td>1972</td>
<td>12  -19** 22  22  (37)</td>
<td>-06** 01  45  27  (49)</td>
</tr>
<tr>
<td>1975a</td>
<td>01  -02** 23  30  (44)**</td>
<td>-01* 04  17  25  (39)</td>
</tr>
</tbody>
</table>

Notes: All numerical entries in the table should be preceded by a decimal point. The weights shown in the first four data columns under each school-group are those which are applicable to the respective component variables designated as head of column when all have been expressed in comparable, standard score, units. The parenthetical entry is the coefficient of multiple correlation between the four measures (weighted as indicated) and Freshman Average Grade in the respective samples.

*Suppression effect--simple correlation with PFG is positive.
**Reflects negative correlation with Freshman Average Grade.
†Men and women freshmen

This multiple correlation coefficient reflects the inclusion of sex as a predictor variable along with the four academic predictors.
related to Freshman Average Grade when considered individually, but are negatively weighted when included in the full battery.

The relative weighting of the several predictors is about the same for the Class entering in 1971 as for the Class entering in 1963, in both public and private school groups. This means that student rankings based on the 1963 weighting of admissions scores would correspond extremely closely to student rankings based on the 1971 weighting of the admissions scores.

The Class of 1975 included approximately 34 percent men.

Findings summarized in the table (at right) indicate that the correlation between Freshman Grades and the best combination of all four academic predictors is slightly higher for women than for men, and that the aptitude measures (SAT-V and SAT-M) tend to be more closely associated with Freshman Grades among the women freshmen than among the men.

The negative weighting for Sex (coded 2 = Male, 1 = Female) reflects the fact that men earned lower freshman averages than women.

Some increase in multiple correlation occurs when Sex is added to Rank and Achievement Average (Row 8 vs. Row 6 in table) indicating that information about the Sex of an applicant should be taken into account in estimating probable performance during the freshman year.

*However, knowledge of the freshman's SAT scores does not shed a useful amount of additional light on performance potential, once the student's Converted School Rank and CEEB Achievement Average have been taken into account. (Compare coefficients in Rows 6 and 7, and Rows 8 and 9 respectively.)*

---

<table>
<thead>
<tr>
<th>Row</th>
<th>Admissions variable</th>
<th>Correlation with Freshman average grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>men</td>
</tr>
<tr>
<td>(1)</td>
<td>Converted school rank</td>
<td>.22</td>
</tr>
<tr>
<td>(2)</td>
<td>SAT-Verbal</td>
<td>.19*</td>
</tr>
<tr>
<td>(3)</td>
<td>SAT-Mathematics</td>
<td>.15*</td>
</tr>
<tr>
<td>(4)</td>
<td>Achievement average</td>
<td>.35</td>
</tr>
<tr>
<td>(5)</td>
<td>Sex (M = 2, W = 1)</td>
<td>--</td>
</tr>
<tr>
<td>(6)</td>
<td>Rank + Achievement</td>
<td>.365</td>
</tr>
<tr>
<td>(7)</td>
<td>Rank + Ach + V + M</td>
<td>.374</td>
</tr>
<tr>
<td>(8)</td>
<td>Rank + Ach + Sex</td>
<td>--</td>
</tr>
<tr>
<td>(9)</td>
<td>Rank + Ach + Sex + V + M</td>
<td>--</td>
</tr>
</tbody>
</table>

* These variables are negatively weighted when combined with Rank and Achievement.

The best single predictor of freshman year performance at Vassar College for men and women, respectively, and for public and private school subgroups, respectively, is the Average of CEEB Achievements.

- Best predictor: CEEB ACHAV
- 2nd best: Converted School Rank
- 3rd best: SAT-V
- 4th best: SAT-M

The best combination of two predictors at Vassar for the same subgroups, is Achievement Average and Converted School Rank.

When sex is treated as a coded variable and included as a predictor, the best combination of three predictors is Achievement Average, Converted School Rank, and Sex.

Scores on the Scholastic Aptitude Test do not contribute any new predictive information when SAT-V and SAT-M scores are added to the best combination of three. There is no increase in the multiple correlation when these two scores are added to the best three. Moreover, when they are included in the battery, both SAT scores are negatively weighted (i.e., act as suppressor variables) for men, SAT-M is negatively weighted for public school graduates, and SAT-V is negatively weighted for private school graduates.
When relationships between FAG and the several admissions scores are studied by sex, we find that the SAT's are negatively weighted when included in the battery for men; the SAT's have small positive weights in the battery for women. In the analysis by school origin, SAT is has a negative weight in the private school sample, although, as we have seen, these scores have a positive albeit low relationship to FAG when considered individually.

Taken in conjunction with evidence that Rank and Achievement Average provide essentially all the grade-related information contained in the entire battery of four academic indicators, the finding that SAT's make their limited contribution to prediction by functioning as suppressor variables (more often than not) suggests that SAT's, per se, have very limited utility for ranking applicants according to probable level of performance during the freshman year.

The combination of low predictive validity and suppressor variable functioning when the SAT is added to a battery which includes the CEEB Achievement Average has been found in similar studies at several liberal arts colleges. (see The Contribution of SAT's to the Prediction of Freshman Grades at CRC-member Colleges, CRC, 8 May 1970). Generally speaking, this does not mean that SAT-type abilities are unimportant. Rather, because of the overlap between the SAT's and the Achievement Average, and the closer relationship of the Achievement Average to grades, the information provided by the SAT's, per se, is redundant.

Weights reflecting the contribution of basic entrance measures to prediction of freshman grades when measures are considered jointly:

<table>
<thead>
<tr>
<th>Admissions variable</th>
<th>Standard score regression weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Converted School Rank</td>
<td>179.235 231 172 203</td>
</tr>
<tr>
<td>SAT-Verbal</td>
<td>-063 034 008 006</td>
</tr>
<tr>
<td>SAT-Mathematical</td>
<td>-089 051 -022 044 000</td>
</tr>
<tr>
<td>Achievement Average</td>
<td>405 271 304 251 295</td>
</tr>
<tr>
<td>Sex</td>
<td>-- -- -087** -130** -105*</td>
</tr>
</tbody>
</table>

Note: Leading decimals have been omitted. The weights shown are those which are applicable to the respective admissions variables when all are expressed in comparable, standard score, units and considered jointly as a battery of predictors.

* This variable is positively related to Freshman Average Grade in the sample, but is negatively weighted when included in the composite.

** In coding this variable, men were assigned a code of 2 and women a code of 1. The negative sign for this regression weight indicates that men earned lower average grades than women with comparable Rank, Verbal, Mathematical, and Achievement Average scores.

School Rank and the average of CEEB Achievements, both of which are more "complex" measures than the SAT, appear to provide essentially all the freshman-grade related information contained in the admissions variables, although information regarding the sex of the student appears to be a useful addition to that provided by the academic measures.

The functional contribution of the SAT, per se, to prediction of Freshman Average Grade is perhaps best reflected in the data for the total sample of freshmen—i.e., zero weighting for SAT's, given the student's Converted Rank and CEEB Achievement Average. The average of CEEB achievements is relatively heavily "saturated" with SAT-type "information". Evidently all the SAT-type information that can usefully be applied in the prediction of freshman grades in the Vassar setting is provided by the Achievement Average.

This phenomenon, which has been observed in other liberal arts settings, raises general questions regarding the most effective and efficient allocation of "admissions testing time" as between tests of "aptitude" and tests of "achievement."
Apart from the fact that men make up some 34 percent of the Class of 1975, insofar as comparative admissions data and first-year performance data are concerned the major difference between the Classes of 1965 and 1975 is in the level of freshman-year grades—the more recent Class posted a considerably higher freshman year average (2.79) than the earlier Class (2.50) even though their admissions-test scores are about the same and their School Rank slightly lower. This suggests that grade average return per unit of academic qualifications was greater for the Class of '75 than for the Class of '65. The most efficient prediction formula for predicting Freshman Average Grade in the Class of 1965 was developed in a 2/3 sample of the Classes of 1962, 1963, and 1964, combined, and it yields a "best estimate" of Freshman Average Grade, circa 1965, for students with a given combination of School Rank and Achievement Average:

Predicted FAG (1965)

\[ \text{Predicted FAG} = 0.02316 \times \text{Rank} + 0.02621 \times \text{ACH} - 0.60668 \]

Substituting the average scores of freshmen entering in 1961, shown in the table, we get a Predicted FAG of approximately 2.55 for the Class of 1965, as compared to actual of 2.50.

Substituting the average scores of women freshmen in the Class of 1975, we get a Predicted FAG of 2.51 as compared to the actual average of 2.84.

Thus, we find that the average of grades awarded to freshmen during 1971-72 was about one-third a grade point higher than that expected for freshmen with similar admissions qualifications during 1961-62.

Current grading standards would appear to be somewhat less stringent than those which obtained for the Class of 1965.
AS NOTED AT THE OUTSET, VASSAR COLLEGE HAS PLACED CONSIDERABLE EMPHASIS ON THE SEVERAL ACADEMIC QUALIFICATIONS INDICATORS UNDER CONSIDERATION IN THIS STUDY IN ASSESSING THE ELIGIBILITY OF CANDIDATES FOR ADMISSION TO THE COLLEGE. The same can be said of other liberal arts colleges which have participated in CRC studies.

For a relatively recent Class, offers of admission and candidate acceptances were tabulated by level of Predicted Freshman Average Grade (a composite of the four admissions scores). The pattern of offers points up the extent to which judgments of eligibility for admission corresponded with the standing of candidates on the composite index. It does not follow, of course, that the Predicted Freshman Grade index, per se, was necessarily available to or considered by the College in each case. A similar degree of correspondence could result from reliance on the individual admissions scores involved when forming judgments regarding the eligibility of candidates for admission.

This study and others indicate that higher-scoring students earn higher grades on the average than their lower-scoring classmates. However all studies that have been made to date indicate that admissions scores are not predictive of continuance in the College.

In the Class of 1968, for example, dropouts had admissions credentials which, on the average, were equal or superior to those of graduating seniors with medium or low grade-point averages during their junior year.

The current analysis indicates that in making judgments regarding the relative grade-earning potential of several candidates, the College should give more weight to the Average of CEEB Achievements, the Converted School Rank and Sex, than to Scholastic Aptitude Test scores.

SAT-Verbal scores would appear to provide a useful basis for "in the ballpark" types of judgments regarding the fit between candidates and the normal or typical distribution of scores for Vassar students.