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PREDICTORS OF SCHOLASTIC SUCCESS

AT THE

UNIVERSITY OF RHODE ISLAND

BY

JAMES WILSON EASTWOOD

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN
EDUCATION

UNIVERSITY OF RHODE ISLAND

1955

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ABSTRACT

The objective of this study has been to determine whether any relationship exists between the criteria on which students are selected for admission to the University and the subsequent achievement of the students. Data were assembled on 841 students in the Class of 1950 and 615 students in the Class of 1954. Listings included the students' high school grade averages, their high school principals' ratings, their quartile rank in high school classes, and their scores on the American Council on Education Psychological Examination. The college grade point averages of all students were also tabulated, and distributions were prepared to show the relationship of each predictor to the students' first-year experience and to their four-year college average. Comparisons were also made of each of the predictors as they applied in each college of the University.

Findings support the experience of researchers on other campuses and strongly suggest a definite relationship between superior school credentials and later success in college studies. High school grade averages, the principals' ratings, and the quartile rank of students all showed some competence in predicting satisfactory achievement. The psychological examination also appeared to have some value in anticipating student performance, but it appears to be the weakest single predictor.

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I. INTRODUCTION

Shortly before the United States became involved in World War II, it was estimated that twenty out of every hundred high school graduates entered some institution of higher learning, but only ten of these young people remained to complete the requirements for a bachelor's degree. Following the war all college enrollments were swollen by the flood of returning veterans eager to continue their schooling under the provisions of the so-called "G. I. Bill", and the proportion of total high school graduates registering in college advanced sharply. However, the substantial mortality noted above continued to plague college admissions officers and classroom instructors.

Further increases in enrollments are inevitable as a consequence of the upturn in the nation's birthrate, and conservative estimates now suggest that total college registrations will be doubled within the next twenty years. Despite this turn of events--or perhaps because of it--only passing attention has been given to the serious problem of student survival, and the colleges have continued to graduate only about half of the young men and women who enter so hopefully as freshmen. Serious economic waste--to say nothing of the cost in heartbreak and disillusionment--results when family savings are risked on the education of a son or daughter who later is forced to withdraw from college before completing the attempted course of study. Every college, therefore, has a solemn duty to accept any candidate for admission only if it is reasonable to anticipate that he will succeed in his chosen curriculum. That the University of Rhode Island faces a problem of considerable magnitude in this area is evident on inspection of Table 1.

TABLE 1

A COMPARISON OF POST-WAR ENTERING AND GRADUATING CLASSES
AT THE UNIVERSITY OF RHODE ISLAND

Period of Registration	Admitted	Graduated
1946-1950	917	645
1947-1951	724	504
1948-1952	686	386
1949-1953	669	382
1950-1954	671	366

If one accepts the premise that the effectiveness of the admissions office is measureable in terms of the subsequent success or failure of the candidates who are accepted for study, the University admissions staff might well have cause for concern. However, there are many factors which influence each student's progress in his program and which contribute in some degree to the quality of his academic performance. The adjustment each student makes to the college situation is largely dependent upon his educational and vocational goals, his health and physical development, his social and recreational interests, his finances, his living conditions and employment, his home and family relations, his religious and moral background, his choice of curriculum, and his response to a variety of teaching techniques. Any college administrative officer or instructor could probably justify all academic failures in terms of one or more of these factors, but realistic answers to some instances of student mortality will be found only as the University examines its initial admissions procedures and its subsequent relationship with its students.

For many years the University of Rhode Island employed a system of selection of candidates in which primary emphasis was placed on the high school record. The recommendation of the school principal and the student's rank in his graduating class were also weighed in the total evaluation. Entrance examinations were not established as a prerequisite for admission until the influx of veterans necessitated additional criteria for measuring the potentialities of candidates. Initially, applicants were permitted to present scores on a variety of tests administered by the College Entrance Examination Board, the Veterans Administration, and other agencies, and it was not until 1950 that the University insisted on general participation in a testing program of its own. The present system of selection has been in operation for five years, but, apart from a sampling study undertaken in 1951, no effort has been made to appraise the effectiveness of the process or to evaluate the experience of the students enrolled under its terms.

The immediate concern of this study is to investigate the extent to which high school grades, principals' ratings, high school class rank, and scores on entrance tests may be accepted as indices of future achievement in the college classroom. The conclusions of the study will be based upon a comparison of the academic experience of the class entering in September 1946 (hereafter referred to as the Class of 1950) with that of the class enrolling in September 1950 (hereafter referred to as the Class of 1954). Comparable data are available on each of these classes in all respects excepting that the Class of 1954 was further screened by means of the entrance examination mentioned above.

II. PREVIOUS INVESTIGATIONS

Studies At Other Colleges

Correspondence with the admissions officers of the other New England state universities disclosed that only the Universities of Connecticut and New Hampshire have made any formal studies in this area. The Connecticut investigations¹ covered the classes entering the University from 1933 to 1944, and correlations were developed with high school percentile ranks, and on performances on the Ohio State University Psychological Examination and the American Council on Education (ACE) Psychological Examination in terms of first semester quality point ratios. Correlations varied considerably from year to year, and ranged from 0.42 to 0.58 on class ranks and from 0.159 to 0.527 on the tests. The study is being continued at Connecticut, but the correlations noted in Table 2 are those most recently tabulated.

TABLE 2

UNIVERSITY OF CONNECTICUT CORRELATIONS, 1944

Freshman Class Grade Point Average vs.	First Semester
High School Percentile Rank	0.434
ACE Psychological Examination	0.265

¹J. R. Gerberich, "Prediction of General Scholastic Success At The University of Connecticut--1933 to 1944." Educational Research and Service Studies, No. 2. Storrs, Connecticut: University of Connecticut, 1946. Pp. 10 (mimeographed).

The University of New Hampshire survey¹ covered only the class entering in September 1951, and it compared high school class quintile ranks and psychological examination scores with the cumulative grade point average at the end of the first college year. The test scores were found to have very little relation to academic success, but quintile rankings produced a more definite pattern as predictors of satisfactory achievement. The comparative experience of students in each quintile group is noted in Table 3.

TABLE 3

UNIVERSITY OF NEW HAMPSHIRE STUDENT SUCCESS, 1952

High School Class Rank	Satisfactory First Year Experience
First Quintile	85 %
Second Quintile	71 %
Third Quintile	57 %
Fourth Quintile	43 %
Fifth Quintile	45 %

Inquiries addressed to a number of private colleges in New England revealed that little has been done on most campuses beyond an inspection of graduating lists and a spot-check of achievement as compared to entrance test scores and the predictions of high school officials. Yale University reported that secondary school grades were found to correlate better with freshmen averages than do entrance examination scores.

¹D. H. Richards and H. R. Carroll, "Report on the Entering Freshman Class of 1951-1952." Unpublished memorandum to the faculty, Office of Admissions, University of New Hampshire, 1953. Pp. 4 (mimeographed).

Yale maintains detailed records on the performance of students entering from various preparatory schools, and over a period of years has been able to develop differential correction factors which are applied in predicting the relative prospect for success of a given school's graduates. Similar reports were received from Harvard University and Massachusetts Institute of Technology, but in all cases the specific details are classified as restricted information and have not been published.

The University of Chicago responded to the stimulus of the Eight Year Study¹, an experiment conducted to determine if the traditional college-preparatory program was really necessary to insure success in college, by abolishing specific subject requirements. It has developed a unique program for student selection and placement which has been widely discussed. Candidates are asked to complete a battery of three entrance tests which may be administered anywhere under the direction of a responsible proctor. This battery includes a Chicago-prepared test of reading comprehension, their own objective test of writing skill, and the ACE Psychological Examination.

In 1949 Diederich² reported that early studies showed a multiple correlation of 0.72 with grade point averages at Chicago. Separately, the reading comprehension test yielded a correlation of 0.65, the writing skills test about 0.45, and the Psychological Examination about 0.55. However, with the introduction of the College Placement Tests which advance able students to more difficult courses and require the less

¹Dean Chamberlin, E. Chamberlin, N. E. Drought, and W. E. Scott, Did They Succeed In College? Adventure In American Education, Vol. IV, New York: Harper and Bros., 1942.

²P. E. Diederich, "The Abolition of Subject Requirements for Admission to College," The School Review, September 1949, pp. 364-370.

able to take preliminary or remedial courses, the established pattern changes and the correlations declined substantially. Dr. Benjamin Bloom, present university examiner, responded to an inquiry with the statement that Chicago is "reasonably satisfied with these tests, but we are beginning to recognize the place of interests and adjustments in the selection of students and have done considerable research in this general area." Nothing has been published on this research as yet.

The University of Wisconsin in 1941 released an extensive report by Gustav Froehlich¹ summarizing all the efforts made by the University from 1909 to 1941 to predict scholastic achievement in college. Initial investigations had led to the conclusion that high school rank alone was an adequate basis for selection. However, in 1928 the Wisconsin Cooperative Testing Program was launched with the assistance of the secondary schools and the other colleges in the state. Correlations were subsequently computed at the University for the grade point averages versus the ACE Psychological Examination, the average of high school marks, and high school percentile ranks. The correlations shown in Table 4 were obtained.

These results strongly suggest that the ACE Psychological Examination is as good an index of academic success as the average of high school marks. Thus it appears that data collected through a one-hour testing period--uniform in all cases--is as efficient in predicting success for the freshman class as the cumulative record of high school marks collected over a period of three and one-half years--under a variety

¹G. J. Froehlich, "The Prediction of Academic Success at the University of Wisconsin." Bulletin of the Bureau of Guidance and Records of the University of Wisconsin. October 1941.

of conditions. Significantly, high school percentile rank appears to be the best single predictive index.

TABLE 4
UNIVERSITY OF WISCONSIN CORRELATIONS, 1941

Grade Point Average vs.	First Semester	First Year
ACE Psychological Examination		
Freshman Class	0.52	0.50
Letters and Sciences	.58	.53
Engineering	.51	.47
Agriculture (and Home Economics)	.60	.51
Average of High School Marks		
Freshman Class	.53	.51
Letters and Sciences	.61	.55
Engineering	.41	.41
Agriculture (and Home Economics)	.35	.37
High School Percentile Ranks		
Freshman Class	0.61	0.58

A more recent article published by the admissions staff at Wisconsin¹ reveals that a student's ability to survive the first year is no firm indication of his ultimate success. Of 1994 students entered in 1943, 36.4 per cent had dropped out by the end of the second semester, 49.5 per cent had dropped out by the end of the second year, and only 29.8 per cent were graduated at the end of the usual eight semester period.

¹L. J. Lins and Hy Pitt, "The 'Staying Power' and Rate of Progress of University of Wisconsin Freshmen," College and University, Vol. 29, October 1953, pp. 86-99.

Earlier Studies At Rhode Island

The first recorded formal analysis of academic progress at the University of Rhode Island is found in the thesis of Hazard¹ who in 1934 reported on the relationship of grades earned by college students to their previous high school records and to their scores on a battery of tests administered during the orientation period of the freshman year. His findings are noted in Table 5 below.

TABLE 5

RHODE ISLAND STATE COLLEGE CORRELATIONS, 1934

Grade Point Average vs.	First Semester	First Year
ACE Psychological Examination	0.39	0.32
High School Grade Average	0.41	0.34

In 1947 two graduate students prepared a report of their findings in a study made of the freshman class enrolled in 1946. In their paper, Brown and Kettelle² compared the grade point averages of selected freshman students with their scores on the ACE Psychological Examination and other tests. A comparison of their correlation coefficients derived from first and second semester grade ratios and the test scores is noted in Table 6.

¹G. N. Hazard, "A Study of Freshmen Psychological Examinations At Rhode Island State College." Unpublished Master's Thesis, Department of Education, Rhode Island State College, 1934, Pp. 65.

²O. Brown and D. Kettelle, "A Study of the Relationship Between Entrance Examinations and Success in College." Unpublished report, Rhode Island State College, 1947.

TABLE 6

RHODE ISLAND STATE COLLEGE CORRELATIONS, 1947

Grade Point Average vs.	First Semester	Second Semester
ACE Psychological Examination		
Freshman Class	0.42	0.39
Agriculture	.54	.61
Business Administration	.44	.36
Engineering	.34	.28
Home Economics	.43	.48
Science	0.53	0.48

In the fall of 1951, the University admissions office enlisted the aid of Mr. Harold Sternbach, Assistant Professor of Statistics and Industrial Management in the College of Business Administration, to determine the correlations existing between the college achievement of the students enrolled the previous year and such factors as the high school senior year average, scores on the ACE Psychological Examination, the Cooperative Mechanics of Expression in English Test, and the Iowa Silent Reading Test. While his results have never been published, Table 7 shows his computations. These calculations do not show as strong relationships between academic success and performance on the ACE Psychological Examination as were derived in the earlier studies by Brown and Kettelle. While the small differences are possibly attributable to the use of different editions of the same test, it is interesting to observe the significant differences in the make-up of the two classes studied by these researchers as discovered by this writer and reported in succeeding pages. The relationship of the high school senior year average to the

freshman year grade average is higher than any other correlations developed for University students to date.

TABLE 7

UNIVERSITY OF RHODE ISLAND CORRELATIONS, 1951

Grade Point Average vs.	Freshman Year
ACE Psychological Examination	0.363
Mechanics of Expression in English	.35
Iowa Silent Reading Test	.301
High School Senior Year Average	0.569

III. PRESENTATION AND DISCUSSION OF DATA

Organization Of The Investigation

Anticipating new and lasting increases in the number of applications for admission to the University, and recognizing the impossibility of accommodating all candidates, the administration is faced with the problem of insuring that assignments of membership in each succeeding freshman class will be made as objectively and fairly as possible. It is, therefore, proposed to scrutinize the presently accepted criteria for the selection of students and to measure their effectiveness in gauging the probable success of candidates who are approved for admission.

Data were collected on two classes for the study. The Class of 1950, registering in September 1946, was selected because of its status as the largest class ever to be enrolled at the University and because it was anticipated that some interesting information might be obtained by studying the experiences of the considerable number of students who spent their first year at off-campus centers in Providence and Bristol. The Class of 1954, registering in September 1950, was selected because of its position as the first graduating class for which uniform entrance test scores were available. It was also felt that these choices would permit cross-reference with the findings of Brown and Kettelle and Sternbach as previously cited.

McBee Keysort file cards were prepared for each student listed as a freshman in the official class lists for June 1947 and June 1951. Data were entered thereafter on each of these cards from the student's original application form and from his permanent record card in the registrar's office. The data included place of legal residence, high

school attended, date of graduation, date of birth, sex, marital status, military service, over-all high school grade average, principal's endorsement, high school class rank, scores on the ACE Psychological Examination, age on entry to the University, place of entry (Kingston, Providence, or Bristol), choice of college within the University, grade point average for the first semester and each succeeding yearly average, number of semesters completed, final average, and rank in graduating class. Academic warnings, probationary status, suspensions, dismissals, withdrawals under failing conditions and for other cause were also noted.

The data from the preparatory schools were entered on the cards in accord with the University admissions office procedure. Because a number of high schools report school averages in letter grades while others use a numerical system, all numerical grades falling in the range of 90-100 were assigned a letter value of A; all in the range of 80-89, a letter value of B; and all passing grades below 79, a letter value of C. Similarly, the school's endorsement or rating of the candidate in terms of excellent, superior, good, or fair was assigned a letter value of A, B, C, or D. The rank of the candidate in the first, second, third, or lowest quartile of his graduating class was also indicated by A, B, C, or D values.

The scores attained by members of the Class of 1954 on the ACE Psychological Examination were ranked in a frequency table. Scores falling in the top ten per cent were assigned a grade of A; scores in the next twenty per cent were graded B; scores in the next thirty per cent were given a C rating; and those in the lowest forty per cent were rated D. This procedure again was based on the usual practise of the admissions office.

Each student's academic progress at the University was recorded in terms of his exact grade point average, but in punching the cards, groupings were made in terms of half grade-point intervals ranging from -1.0 to +3.0.

Presentation Of The Data

The official reports of the University's director of admissions reveal that 533 students were entered in the Class of 1950 at Kingston while 318 students and 66 students were enrolled in the Providence and Bristol centers respectively. Eliminations were made of all students registering with advanced standing, and the actual number of cases considered in this study included 490 students at Kingston, 294 students in Providence, and 57 students at Bristol.

The Class of 1954 is officially recorded as numbering 671 students, all enrolled at Kingston. Making eliminations again for those entering with transfer credits, the total cases reviewed numbered 615.

The make-up of the two classes differed somewhat in sex, age, and military status. The Class of 1950 included 632 men and 209 women as compared to 422 men and 193 women in the Class of 1954. Male students included 472 veterans of military service in the Class of 1950 against 62 veterans in the Class of 1954. In the Class of 1950, the median age of the non-veteran men was found to be 18 years and 2 months; of veterans, 21 years and 5 months; of women, 18 years and 1 month. These figures approximate the medians of the Class of 1954 for the non-veteran men which was 18 years and 4 months, and for the women which was 18 years even. Veterans of the Korean Campaign were generally older than the men who had acquired "veteran" status in the waning months of World War II,

and the median of the group entering with the Class of 1954 was 23 years and 3 months.

With these differences in mind, it was felt desirable to seek other distinguishing characteristics of the two classes. Accordingly, tabulations were prepared to show the distribution of admitted students among the several colleges of the University, and the number of graduates. Tables 8 and 9 summarize this information.

Reference to Table 8 discloses no significant differences in the achievement of non-veteran men as compared to veteran students in the Class of 1950, but Table 9 reveals the veterans of 1954 as somewhat less successful students than non-veterans in the same class. Women students graduated in approximately equal proportion in the two classes. There is a surprising equivalence in the percentages of graduates of each major division in the Class of 1950 which is reflected in the class average of 63.7 per cent. Only the Division of Nursing veers wide of this figure, but even this aberration is cancelled for all practical purposes, inasmuch as five of the original Nursing students transferred to other programs in the University and subsequently graduated.

Sharp differences occur in considering other aspects of the two groups. Table 9 shows that only 47.5 per cent of the students successfully completed their studies at the University in 1954, as contrasted with 63.7 per cent in 1950. Drop-outs and separations were particularly heavy among the male students. In part, this condition may be attributed to the uneasy international situation prevailing in 1951 and 1952 which resulted in many students forsaking their books and enlisting in the armed forces. Undoubtedly, many of those withdrawing to enter military service will resume their studies upon completion of their tour of duty.

TABLE 8

COMPARISON OF ADMISSIONS AND GRADUATIONS, CLASS OF 1950

Division	Admitted				Graduated	Per Cent Graduated
	Non-veteran Men	Veterans	Women	Total		
Agriculture	14	30	...	44	32	72.7
Arts and Sciences	37	88	85	210	133	63.3
Business Admin.	41	169	31	241	160	66.3
Engineering	68	185	3	256	161	62.8
Home Economics	...	...	75	75	45	60.0
Nursing	...	...	15	15	5	33.3
Total Admissions	160	472	209	841		
Total Graduates	104	314	118		536	
Per Cent Graduating	65.0	66.5	56.4			63.7

TABLE 9

COMPARISON OF ADMISSIONS AND GRADUATIONS, CLASS OF 1954

Division	Admitted				Graduated	Per Cent Graduated
	Non-veteran Men	Veterans	Women	Total		
Agriculture	47	11	1	59	30	50.8
Arts and Sciences	93	16	54	163	66	40.4
Business Admin.	136	20	17	173	78	45.0
Engineering	85	15	1	101	46	45.5
Home Economics	...	...	101	101	62	61.3
Nursing	...	...	19	19	11	57.8
Total Admissions	361	62	193	616		
Total Graduates	163	24	106		293	
Per Cent Graduating	45.1	38.7	54.9			47.5

Twenty-two such returnees are now enrolled at the University. Veteran withdrawals may also be explained partly by a return to service in response to attractive recruiting offers. Financial difficulties appear to loom as a large factor in dictating the withdrawals of veterans of the Korean campaign, inasmuch as benefits paid to these servicemen are not as generous as those allowed under the original "G. I. Bill". In contrast to the changes in the men's enrollments, registrations of women students were relatively stable. Table 9 illustrates that the drop-outs occurred almost equally in the colleges having a large male enrollment while the divisions registering only women were not so affected.

As an aside to the discussion of these two classes, it is interesting to consider a special situation which conceivably might have been cause for many withdrawals from the Class of 1950. The great mass of candidates seeking admission immediately following the cessation of hostilities in World War II vastly exceeded the housing and classroom facilities at Kingston. Two off-campus centers were established to provide freshman level instruction for this overflow, one being set up in a junior high school building in Providence and the other in temporary quarters in Bristol. The work of the students beginning their studies in these centers was found to be of comparable quality to that of the students on the Kingston campus. Withdrawals after the first year were somewhat higher among the center students, but the greater expense attending a transfer to Kingston to continue the work of the sophomore year undoubtedly accounted for many resignations. Comparing Table 8 with Table 10, one is persuaded that the fears sometimes expressed about lower standards of instruction in the centers were without foundation. This is a pertinent observation as the time is rapidly approaching when

the University may face again the necessity of operating centers apart from the parent plant to provide for the growing school population.

TABLE 10

ENROLLMENTS AT KINGSTON AND OFF-CAMPUS CENTERS, CLASS OF 1950

	Admitted				Graduated	Per Cent Graduated
	Non-Veteran Men	Veterans	Women	Total		
Kingston	91	225	174	490	337	68.8
Providence	61	202	31	294	170	57.8
Bristol	8	45	4	57	29	50.9
	160	472	209	841	536	63.7

To determine whether any clear-cut differences in academic preparation existed between the students of the two classes, distribution tables were prepared to show the distribution of college grades earned by the registrants in each of the classes in relation to those factors which had originally been weighed at the time of selection for admission, including the high school grade average, the principal's rating, the high school class rank, and the scores on entrance tests.

Tables 11 and 12 show a definite consistency in demonstrating the superior prospect for collegiate success of the A high school student over the B student, and a similar superiority of the latter over the high school graduate with a C average. This situation is to be noted, not only from the figures showing that the percentages of students separated with failing grades rise sharply as one moves down the scale of preparatory school grades, but also by observing that proportionally higher college grade point averages accrue to the credit of the better secondary school graduate. It will also be noted the number of voluntary withdrawals shows a

TABLE 11

THE DISTRIBUTION OF FIRST YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL GRADE AVERAGES

College G.P.A.	Class of 1950 High School Average			Class of 1954 High School Average		
	A	B	C	A	B	C
2.5	12	22	5	10	3	...
2.0	25	60	33	15	18	10
1.5	28	84	57	17	51	24
1.0	15	113	116	8	70	51
.5	11	55	54	2	56	70
.0	1	15	30	3	33	50
-.5	...	2	7	1	5	7
-1.0	...	2	1	...	...	...
Withdr. Passing	4	17	28	3	18	23
Withdr. Failing	1	15	28	2	17	48
Totals	97	385	359	61	271	283
Per Cent Separated	5.2	8.3	15.6	8.2	12.9	25.1
Per Cent						
Unsatisfactory	12.3	19.2	25.6	9.8	34.7	44.9
Per Cent Passing	82.5	72.5	58.8	82.0	52.4	30.0

TABLE 12

THE DISTRIBUTION OF FOUR-YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL GRADE AVERAGES

College G.P.A.	Class of 1950 High School Average			Class of 1954 High School Average		
	A	B	C	A	B	C
2.5	4	6	2	10	4	1
2.0	28	51	17	11	18	9
1.5	28	94	50	14	56	31
1.0	11	111	134	5	59	66
Withdr. Passing	22	79	77	16	68	52
Other Separations	4	44	79	5	66	124
Totals	97	385	359	61	271	283
Per Cent Separated						
Failing	4.2	11.4	22.1	8.3	24.5	43.8
Per Cent Separated						
Passing	22.6	20.5	21.4	26.2	25.0	18.3
Per Cent Graduated	73.2	68.1	56.5	65.5	50.5	37.9

strong inverse relationship to strength of preparation as measured by high school grades. Seemingly, large numbers of students in the lower brackets find their studies a constant struggle and so bow out before incurring dismissal action.

Despite the trends which may be observed from the tables, it must be recorded that substantial numbers of the comparatively weaker students do succeed, and distressingly large numbers of the stronger students fail. In an earlier section of this paper mention has been made of some of the factors such as ill health, financial difficulties, etc., which impede the progress of students, but the figures reporting superior college performance for many C students suggest the importance of the individual student's will to succeed. The motivation of the student is not measured by any of the predictors, but clearly is a great force in determining his ultimate success.

The distribution of high school ratings of the students as excellent (A), superior (B), good (C), or fair (D) prospects for success in college are contrasted with their actual achievement in Tables 13 and 14. The total numbers of such ratings are slightly less than are tabulated for the grade averages as character reports, class ranks, and test scores were not reported for every registrant. However, it is fair to assume that the data used are characteristic of the classes studied. Here again, there is a definitely higher proportion of successful students among those who merit the enthusiastic endorsement of their preparatory teachers and pronouncedly fewer among those receiving a qualified recommendation. Here is an answer to those critics of the character report and academic rating sections of the application form who challenge their reliability on the premise that in the average school the principal is

TABLE 13

THE DISTRIBUTION OF FIRST YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL RATINGS

College G.P.A.	Class of 1950 High School Ratings				Class of 1954 High School Rating			
	A	B	C	D	A	B	C	D
2.5	15	19	4	...	9	3	...	...
2.0	25	50	36	1	16	16	5	...
1.5	19	78	50	6	15	65	14	...
1.0	6	105	112	8	10	67	43	1
-----	-----	-----	-----	-----	-----	-----	-----	-----
.5	5	56	61	9	1	64	57	3
.0	1	12	26	...	2	21	49	9
-.5	...	2	5	2	...	...	5	2
-1.0	...	...	1	...	...	...	...	...
Separated	5	25	56	3	1	36	46	7
Totals	76	347	351	29	54	272	219	22
Per Cent Separated	6.7	7.3	15.9	10.4	2.0	13.3	21.1	31.9
Per Cent Unsatisfactory	7.8	20.1	26.5	37.9	5.5	31.2	50.6	63.6
Per Cent Passing	85.5	72.6	57.6	51.7	92.5	55.5	28.3	4.5

TABLE 14

THE DISTRIBUTION OF FOUR-YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL RATINGS

College G.P.A.	Class of 1950 High School Rating				Class of 1954 High School Rating			
	A	B	C	D	A	B	C	D
2.5	4	7	...	...	9	4	1	...
2.0	20	49	24	...	14	20	6	...
1.5	20	81	57	6	12	63	25	1
1.0	8	102	125	13	5	63	53	1
Separated	24	108	145	10	14	122	134	20
Totals	76	347	351	29	54	272	219	22
Per Cent Graduated	68.4	68.8	58.6	65.5	74.1	55.1	39.9	9.1

too remote from his pupils to make a worthwhile appraisal. While there may be situations where this condition prevails, it is apparent that usually the principal heeds the printed instruction requesting that he or someone appointed by him, "having a personal knowledge of the candidate", execute the form. Although returned over the principal's signature, the rating stands as a fair reflection of professional opinion having statistical validity.

A certain measure of skill in equating the ratings of individual principals is required of the admissions officer, and here a knowledge of the rater as optimistic and generous or as cautious and taciturn is important in interpreting the reports. The ratings of veteran students generally reflected a cautious optimism, conditioned repeatedly by the comment that "service experience undoubtedly has matured this candidate." The value of the school rating appears to be influenced in some degree by the recency of the student's attendance in high school. Thus, in the Class of 1954 the proportion of correct ratings of students who were still under the day-to-day observation of the rater is fairly high. By contrast, the veterans in the Class of 1950 were not judged with anything approaching the same accuracy.

Rank in the high school graduating class also appears to have some validity as an index of probable success in college. Tables 15 and 16 show that the students graduating in the top quarter of their class enjoy a much greater prospect for a successful experience on the Rhode Island campus than their classmates ranging further down the scale. However, quartile rank appears to be a somewhat less dependable criterion than the two previously discussed. At the end of the first year, students in the Class of 1950 who ranked in the upper half of their high school

TABLE 15

THE DISTRIBUTION OF FIRST YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL QUARTILE RANK

College G.P.A.	Class of 1950 Quartile Rank				Class of 1954 Quartile Rank			
	First	Second	Third	Fourth	First	Second	Third	Fourth
2.5	25	10	3	1	9	1	1	...
2.0	55	29	18	4	25	10	2	2
1.5	82	46	22	9	47	24	14	4
1.0	66	80	52	27	40	46	27	9
-----	-----	-----	-----	-----	-----	-----	-----	-----
.5	31	44	36	17	17	51	39	18
.0	6	19	15	4	6	33	32	11
-.5	...	4	1	1	2	5	3	3
-1.0	...	...	1	...	...	...	...	...
Separated	17	22	38	9	17	26	30	28
Totals	282	254	186	72	163	196	148	75
Per Cent Separated	6.1	8.6	20.4	12.5	10.5	13.3	20.3	37.3
Per Cent Unsatisfactory	13.1	26.4	28.5	30.6	15.3	45.4	50.0	42.7
Per Cent Passing	86.8	73.5	71.5	69.4	84.7	54.6	49.7	57.3

TABLE 16

THE DISTRIBUTION OF FOUR-YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO HIGH SCHOOL QUARTILE RANK

College G.P.A.	Class of 1950 Quartile Rank				Class of 1954 Quartile Rank			
	First	Second	Third	Fourth	First	Second	Third	Fourth
2.5	8	3	1	...	13	1	...	...
2.0	61	21	11	2	26	8	4	3
1.5	78	52	23	10	45	36	15	7
1.0	53	90	68	35	29	49	37	15
Separated	82	88	83	25	50	102	92	50
Totals	282	254	186	72	163	196	148	75
Per Cent Graduated	70.9	65.4	55.4	65.3	69.3	48.0	37.8	33.3

groups led their college classmates in percentages doing satisfactory work, and their actual grade point averages were generally much higher. However, by the time of graduation the surviving students from the third and the lowest quartiles of the preparatory school groups had adjusted to the demands of their academic work and were performing on substantially equal terms. By contrast, a definite progression in the totals and in the quality of grade standings is observed in studying the performance of the students finishing their work at the University in 1954. In some degree the differences that may be observed in the performance of the two classes might be explained in terms of the greater maturity or the peace of mind enjoyed by the students of 1950 who had experienced military service before enrolling, but this is merely conjecture. Differences were noted in the bases of ranking students, some being reported in terms of the whole graduating class and others being limited to the college preparatory group. It was also noted that many students entered the University from schools specializing in preparation for college while others enrolled from general high schools. All of these factors detract from the reliability of rank as a predictor.

Reports of performance on the ACE Psychological Examination were available only for the students enrolled in the Class of 1954. Tables 17 and 18 show the distribution of college grade point averages of these students in relation to their examination scores, ratings being assigned as previously described on page 16. At the end of the first year, students with A or B scores were generally performing better quantitatively and qualitatively. The numbers withdrawing because of failure are lower in these categories than in the C and D groups. The percentage of students whose work fell below the required 1.0 average was

TABLE 17

THE DISTRIBUTION OF FIRST YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO ACE PSYCHOLOGICAL EXAM SCORES

College G.P.A.	Class of 1954			
	A Scores	B Scores	C Scores	D Scores
2.5	8	...	1	...
2.0	7	11	9	6
1.5	9	26	24	15
1.0	23	15	40	36
.5	10	20	39	37
.0	10	6	25	29
-.5	2	1	5	3
Withdr. Passing	3	5	12	10
Withdr. Failing	5	7	13	28
Totals	77	91	168	164
Per Cent Separated	10.4	13.2	14.9	23.1
Per Cent Unsatisfactory	28.6	29.7	41.1	42.1
Per Cent Passing	61.0	57.1	44.0	34.8

TABLE 18

THE DISTRIBUTION OF FOUR-YEAR COLLEGE GRADE POINT AVERAGES
IN RELATION TO ACE PSYCHOLOGICAL EXAM SCORES

College G. P. A.	Class of 1954			
	A Scores	B Scores	C Scores	D Scores
2.5	9	...	3	1
2.0	2	13	10	7
1.5	16	17	28	26
1.0	14	25	38	36
Withdr. Passing	14	9	23	17
Other Separations	22	27	66	77
Totals	77	91	168	164
Per Cent Sep. Passing	18.2	9.9	13.7	10.4
Per Cent Sep. Failing	28.6	29.6	39.3	47.0
Per Cent Graduated	53.2	60.5	47.0	42.6

also much lower in the top-scoring groups. While the percentages actually graduated do not parallel those attaining a satisfactory standing at the end of the first year, the superior position of the A and B scores is maintained. Explanation of the fall in the number of graduates in the A group is found in the increase of separations with passing grades. Reference to the withdrawal cards of these students disclosed that many transferred to professional schools in other colleges to continue their studies in law, dentistry, physical therapy, etc. With this circumstance in mind, it may be said that the test scores establish a pattern from which it may be assumed that high ranking scores give indication of a greater probability of scholastic success at the University.

The data discussed up to this point have been reported in terms of the experience of each class as a whole unit. In actual fact, of course, the students were distributed among the several colleges of the University, and the class schedule of each individual student had its own peculiarities depending on his selection of major and minor concentrations as well as his choice of elective subjects. Probably no two students followed exactly the same schedule, studying under the same instructors in the same sections, and direct comparison of the work of the individual students is, therefore, impossible. However, in spite of the fact that some engineering students were studying stresses and strains in mechanical engineering while certain of their classmates were directing their energies to the distilling of spirits in the chemical engineering laboratory, a measure of similarity in interests and aptitudes might be presumed to mark both of these groups and all other engineering students. In like manner, it would not seem inappropriate to typify all agricultural students, all business students, and all the

registrants in each of the other colleges for purposes of comparing the effectiveness of high school grade averages, ratings, and class ranks as predictors of success in the individual colleges. Tables 19 through 24 summarize the data for each of the major divisions of the University.

The actual number of cases falling in specific categories are frequently extremely small as a consequence of this splintering of the whole classes. Thus, it will be noted in Table 19 that only two students with an A high school average were enrolled in the College of Agriculture in the Class of 1950 as against one student in the Class of 1954. In the first case, one student failed to graduate and a 50 per cent survival is reported, while in the second instance the same actual mortality gives a zero per cent survival. Interpretation of the tables must be made with their statistical imperfections constantly in mind. Nonetheless, some interesting observations are possible.

Comparing Tables 19 through 24, one marks the fact that each college enrolled a fairly constant proportion of students having a high school grade average of A or B in the Class of 1950 and in the Class of 1954. Thus, about 30 per cent of each class enrolled in Agriculture had a high school average of B or better. Arts and Sciences drew 62 per cent of their 1950 freshmen and 56 per cent of their 1954 freshmen from the B or better high school group. Registrations of A and B students in each of the colleges may be noted as follows:

	<u>1950</u>	<u>1954</u>
Agriculture	30 per cent	30 per cent
Arts and Sciences	62 per cent	56 per cent
Business Administration	44 per cent	45 per cent
Engineering	62 per cent	59 per cent
Home Economics	84 per cent	70 per cent
Nursing	73 per cent	90 per cent

TABLE 19
COMPARATIVE SUMMARY OF PREDICTORS,
COLLEGE OF AGRICULTURE

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	2	1	1	0	50.0	0.0
B	12	11	15	11	91.6	73.3
C	30	20	43	19	66.6	41.1
High School Rating						
A	1	1	...	...	100.0	...
B	12	10	11	10	83.3	90.9
C	23	17	31	18	73.9	58.0
D	1	1	4	0	100.0	0.0
High School Quartile						
1	5	4	4	4	80.0	100.0
2	8	8	17	12	100.0	70.5
3	23	17	16	8	73.9	50.0
4	3	2	13	4	66.0	30.7
Entrance Test Score						
A	...	...	5	2	...	40.0
B	...	...	7	5	...	71.4
C	...	...	14	9	...	64.2
D	...	...	23	10	...	43.4

TABLE 20
COMPARATIVE SUMMARY OF PREDICTORS,
COLLEGE OF ARTS AND SCIENCES

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	34	25	19	10	73.5	52.6
B	97	64	73	32	65.8	43.8
C	79	44	71	24	55.6	33.8
High School Rating						
A	25	17	18	11	68.0	61.1
B	103	71	87	29	68.9	33.3
C	72	39	66	18	54.1	27.2
D	4	4	5	1	100.0	20.0
High School Quartile						
1	80	58	54	28	72.5	51.8
2	58	38	63	20	65.5	31.7
3	45	18	44	8	40.0	18.1
4	21	14	23	6	66.7	26.0
Entrance Test Score						
A	...	...	27	15	...	55.5
B	...	...	29	13	...	44.8
C	...	...	55	15	...	27.2
D	...	...	43	11	...	25.5

TABLE 21

COMPARATIVE SUMMARY OF PREDICTORS,
COLLEGE OF BUSINESS ADMINISTRATION

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	14	16	8	3	88.8	37.5
B	92	64	70	35	67.3	50.0
C	135	80	95	40	59.2	42.1
High School Rating						
A	13	11	8	5	84.6	62.5
B	79	59	52	36	74.6	69.2
C	124	71	66	29	57.2	43.9
D	12	9	9	0	75.0	0.0
High School Quartile						
1	51	43	23	13	84.3	56.5
2	67	46	39	23	68.6	53.9
3	73	42	49	28	57.5	57.1
4	37	24	26	7	64.8	26.9
Entrance Test Score						
A	...	...	18	7	...	38.8
B	...	...	19	11	...	57.8
C	...	...	45	27	...	60.0
D	...	...	43	15	...	34.8

TABLE 22
COMPARATIVE SUMMARY OF PREDICTORS,
COLLEGE OF ENGINEERING

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	34	24	12	8	74.4	66.7
B	126	86	53	27	68.3	50.9
C	96	51	46	11	53.1	23.9
High School Rating						
A	29	20	10	6	68.9	60.0
B	103	72	52	21	69.9	40.3
C	95	60	34	10	63.2	29.4
D	9	4	2	1	44.4	50.0
High School Quartile						
1	102	71	36	21	69.6	58.3
2	88	55	40	17	62.5	42.5
3	42	21	19	5	50.0	26.3
4	8	6	6	1	75.0	16.7
Entrance Test Score						
A	...	...	19	7	...	36.8
B	...	...	24	15	...	62.5
C	...	...	32	8	...	25.0
D	...	...	16	6	...	37.5

TABLE 23

COMPARATIVE SUMMARY OF PREDICTORS,
COLLEGE OF HOME ECONOMICS

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	12	6	13	11	50.0	84.6
B	51	33	58	35	64.7	60.3
C	12	6	30	16	50.0	53.3
High School Rating						
A	7	3	17	15	42.8	88.2
B	40	25	60	38	62.5	63.3
C	27	15	20	8	55.5	40.0
D	1	0	2	1	0.0	50.0
High School Quartile						
1	36	22	33	28	61.1	84.8
2	26	17	38	21	65.3	55.2
3	12	5	17	7	41.6	41.1
4	1	1	13	6	100.00	46.1
Entrance Test Score						
A	...	...	10	8	...	80.0
B	...	...	16	10	...	62.5
C	...	...	26	16	...	61.5
D	...	...	39	24	...	61.5

TABLE 24

COMPARATIVE SUMMARY OF PREDICTORS,
SCHOOL OF NURSING

Predictor	Class of 1950		Class of 1954		Per Cent Surviving	
	Admitted	Graduated	Admitted	Graduated	1950	1954
High School Grade Average						
A	2	0	7	7	0.0	100.0
B	9	3	10	4	33.3	40.0
C	4	2	2	0	50.0	0.0
High School Rating						
A	1	0	4	1	0.0	25.0
B	7	2	13	8	23.6	61.5
C	6	3	5	2	50.0	40.0
D	1	0	...	...	0.0	...
High School Quartile						
1	7	2	12	10	23.6	83.3
2	8	3	4	1	37.5	25.0
3	...	...	5	0	...	0.0
4	...	...	...	...	...	...
Entrance Test Score						
A	...	...	...	...	...	...
B	...	...	...	...	...	...
C	...	...	6	4	...	66.7
D	...	...	5	3	...	60.0

One may conclude that the Classes of 1950 and 1954 were of relatively equal quality in high school preparation, but the separate colleges did not register equal portions of what might be regarded as the superior candidates.

Analysis of the Per Cent Surviving columns discloses a rather definite pattern in the survival prospects of the A, B, C, or D student as rated in terms of each of the predictors. While the actual number of registrants involved in each category is sometimes so small that a difference of one or two students passing or failing would produce a sharp deviation from the usual pattern, the tables for each college support the view that the registrants with the stronger credentials from high school enjoy a distinctly better prospect for graduation.

It is to be observed that despite some substantial differences in the background of the candidates enrolled, there is very close agreement among the colleges in the total proportion of students meriting a diploma (see Tables 8 and 9, page 19). Before indulging in any wild conjectures about the reasons for this agreement, the reader is reminded that there is considerable differentiation among all colleges—even those within the same University. A student who fails in one college might very well succeed in another—not because the standards of one are necessarily higher than the standards of the other, but because of qualitative differences as where one school requires more courses in mathematics, modern languages, or science than another. Additional data must be collected on the experience of students in the several curricula of each college before any definite conclusions on this point may be adduced.

IV. SUMMARY AND CONCLUSIONS

The data here developed support the findings of researchers on other campuses and strongly suggest that there is a definite relationship between the reports submitted from the high school (grade average, principal's estimate or rating, and rank in class) and the student's achievement at the University. Considering any entering class as a whole, it may be said that proportionally more of the students earning an A or a B average in high school will be doing satisfactory work at the end of the first year and will ultimately qualify for a diploma from the University. External pressures, such as political unrest and changing social standards, seem to contribute to some variance in the total percentages of students continuing their studies through the usual eight-semester period, but the advantage of the A or B student over his classmate with a C average in high school remains fairly constant.

Similar conclusions may be drawn from an analysis of the data measuring college student performance in comparison with the readiness ratings furnished by the high school. Recency of opportunity to observe the student in a pupil-teacher relationship apparently has a definite influence on the dependability of high school ratings as the prognoses for veterans were substantially less accurate than for the students entering college directly from high school.

Rank in the upper quarter of the high school graduating class appears to offer a fairly strong indication of success in college. While a definite progression was observed in the percentages of students succeeding as they moved up the roster toward the head of the high school class, no great differences were found in the relative numbers of

graduates finishing in the second, third or lowest quartile. Possibly this anomaly may be accounted for by the fact that certain of the students entered the University from preparatory schools or high schools devoting all their efforts to preparing for college while other candidates were accepted from high schools offering a diversified program. Presumably all the graduates of the former schools were qualified for college work, while a greater selectivity was necessary in reviewing the ranks of students from the latter schools.

Least reliable predictor of collegiate success was the entrance examination score. While students with superior scores were found to achieve at higher levels than their classmates, the margin between the A performers and the D performers was very narrow. It must be recognized that the tests were administered on dates specified by the University and under conditions which made no allowance for physical, mental, or emotional disturbances that may have affected certain students on the day of the test. It is not improbable that some of the low-scoring students would have done better had they been able to sit for the examination at a time of their own choosing. Familiarity with the test materials unquestionably gave an advantage to some candidates. While it is believed that the specific tests administered were new to all candidates, residents of Providence and several other communities had had more than a little experience with machine-scored tests and were, therefore, quicker in their responses to the test instructions. The test-wise student probably attained higher scores on the entrance examination, but indications are strong that he was not able to maintain his initial advantage when competing in the classroom at the University.

No firm conclusion can be drawn concerning the applicability of the four basic criteria in appraising the probable success of any

individual student. It is evident that selections must be based on a careful weighing of all information available on each candidate. Combinations of high grade reports, high ratings, high ranks, and high test scores presumably would augur greater success than any of these predictors considered alone. The use of a letter grade, as now employed by the admissions office, does not permit a ready combination of these factors, and accordingly it is suggested that a weighted numerical value be assigned to each. Thus, an A grade average might be given a value of 20 points; a B, 15 points; and a C, 10 points. Similar values could be assigned in accord with the degree of enthusiasm reflected in the school endorsement, and in terms of the student's decile rank in his graduating class and his rank on entrance tests. By experimentation it might then be possible to develop a Predictor Score for each student which would be of assistance in making the initial decision regarding admission and also in subsequent advisement concerning his academic progress.

The present use of letter values in interpreting the predictors has made it impossible to develop coefficients of correlation for analysis of the data or for direct comparison with other studies inasmuch as the present predictors span only three or four intervals, and a minimum of eight graduations are needed to develop any figures that would reflect the situation with any accuracy. Investigations similar to the one undertaken here should be made periodically, and modification of the admissions office forms now used would ensure greater ease in tabulating the material and greater statistical accuracy in the findings.

For purposes of better communication between the high schools and the University, it is suggested that a study be made of the terminology

now used in the principal's rating section of the application form with a view to the development of a rating scale that will mean essentially the same thing to all raters. When a pupil is rated "good", there is now some confusion whether the candidate is "good" as compared to other students in the whole school, in the graduating class, in the college preparatory section, or in his particular home-room. Similar confusion sometimes occurs in reporting high school ranks, and there are still irregularities in the grading systems employed in different schools. Possibly the Rhode Island High School Principals Association and the other colleges in this area could be persuaded to cooperate in working out a modification of the forms adopted by the National High School Principals Association, inasmuch as these forms have never been widely accepted in this state.

Examination of the data reveals that many students with superior qualifications withdraw voluntarily before graduating, and their withdrawal cards give only perfunctory explanations such as "illness", "finances", "military service", or "personal reasons." While the study of withdrawals was not a major concern of this writer, it is evident that some of the predictors would function much more accurately if some effort were made to assist the potentially good student in resolving his problems in a manner that would not require his separation before graduation. The admissions staff annually expend a great amount of energy in recruiting new students, but it would appear that the University could salvage substantial numbers of promising young people by the simple expedient of requiring an interview with a University counselor prior to withdrawal. Many personal problems could undoubtedly be solved in such a conference or through referral to the scholarship committee, the

placement office, or other counselling agencies.

This study does not in any sense presume to be final or complete. It is hoped that further investigations will be started as early as possible to determine the validity of the predictors here discussed as they apply to specific curricula. Such an analysis appears to be particularly desirable in the College of Arts and Sciences where a variety of programs attracts students with a broad range of interests and aptitudes, but other divisions might find the results of significance when new curricula or modifications of present programs are considered.

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