ACT

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COMPARATIVE PREDICTIVE VALIDITIES OF THE AMERICAN COLLEGE TESTS AND TWO OTHER SCHOLASTIC APTITUDE TESTS

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Summary

This investigation compared the predictive validity of the ACT tests with the SAT and SCAT tests for a sample of 21 colleges and universities. Grades in specific courses as well as over-all grade point average were studied. Multiple R's were computed for each test battery. The ACT and SAT tests possessed about the same degree of predictive validity, and both were better predictors than the SCAT.

Predictive results varied from school to school and from course subject to course subject, thereby suggesting that predictive validity for individual colleges and universities and for specific subject matter areas should be established. In addition, a college's choice between the ACT or SAT probably can not be made on the basis of their relative predictive validities, but rather should be made on the basis of the total programs of services offered by the respective testing agencies.

Comparative Predictive Validities of the American College Tests and Two Other Scholastic Aptitude Tests

Leo Munday

Standardized tests of academic potential are used in nearly all American colleges and universities for admissions and guidance purposes. Institutions have a wide variety of such tests from which to choose. While many considerations are relevant to this choice, a major consideration is predictive validity.

This report compares the predictive validities of three of the most widely used tests of scholastic potential. These were the American College Testing Program's tests (ACT), the College Entrance Examination Board's Scholastic Aptitude Test (SAT), and the Educational Testing Service's School and College Ability Test (SCAT). The ACT battery consists of tests in English, mathematics, social studies, and natural science; it requires 180 minutes. Both the SAT and the SCAT have verbal and quantitative parts; the SAT requires 180 minutes and the SCAT requires 70 minutes.

Procedure

Sample. Both ACT and SAT scores were available for freshmen at five colleges and universities which participated in the 1964 ACT Research Service. ACT and SCAT scores were also available for students at six other colleges and universities.

Additional data from three other studies were made available to the investigator.[1] In two of these (Chase, et al., 1963, Klingelhofer,

1964), the ACT and SAT tests were administered to randomly selected portions of the entering class. SCAT scores were also available for virtually all of Klingelhofer's students. In the other study (Eells, 1962), both ACT and SCAT were administered at eight colleges; and, at two of these, SAT results were available for a segment of the same groups. Altogether, data were available for students at 21 colleges and universities.

Since some of the colleges subdivided their samples by sex or curriculum, we obtained a total of 29 groups from the 21 colleges. All tests were taken prior to college instruction, and all grades were earned during the freshman year. Table 1 describes these institutions in terms of their enrollment, control, level of instruction, and geographic region.

Table 1

Selected Institutional Characteristics of Schools in This Sample

College	Total Enrollment	Level of Instruction	Source of Control	Geographic Region
1	3,910	Offers M.A. Degree	State	West Coast
2	19,557	Offers Ph.D. Degree	State	Rocky Mtn.
3	930	Offers M.A. Degree	State	New England
4	2,040	Four years-liberal arts	Private	New England
5	280	Junior College	Church	Middle West
6	580	Four years-liberal arts	Church	Middle West
7	614	Junior College	Private	New England
8	1,423	Four years	State	South
9	954	Offers M.A. Degree	Church	Southwest
10	31,581	Offers Ph.D. Degree	State	Middle West
11	2,488	Offers Ph.D. Degree	Private	Canada

Table 1 (cont.)

College	Total Enrollment	Level of Instruction	Source of Control	Geographic Region
12	33,956	Offers Ph.D. Degree	State	Middle West
13	5,374	Offers M.A. Degree	State	Middle West
14	3,664	Offers M.A. Degree	State	Middle West
15	6,571	Offers M.A. Degree	State	Middle West
16	9,863	Offers Ph.D. Degree	State	Middle West
17	16,843	Offers Ph.D. Degree	State	Middle West
18	4,624	Offers M.A. Degree	State	Middle West
19	4,146	Offers M.A. Degree	State	Middle West
20	17,024	Offers M.A. Degree	State	West Coast
21	354	Junior College	Community	Middle Atlantic

Criteria. Over-all freshman GPA was available for all but one sample. Additional criteria include GPA's in the following specific freshman courses: English, mathematics, social science, humanities, and science.

Statistical Treatment. Multiple correlations (R) were computed between the four ACT scores and each criterion. The same procedure was followed for the two SAT scores and for the two SCAT scores.

In the application of test results, scores are usually combined with high school grades. However, high school grades were not routinely available except for colleges and universities in the ACT Program. We assumed that all tests would have similar correlations with high school grades, and therefore the increase in validity obtained by adding high school grades to test scores would be relatively constant. This assumption was not formally tested, but it is consistent with most of the literature in academic prediction and with the experience of ACT's Research Service.[2]

Within each criterion area multiple correlations (R) were averaged using Fisher's z procedure (Edwards, 1950). This procedure was not strictly appropriate,[3] but it provided a convenient summary of two columns of R's that took cognizance of relative sample sizes.

Results and Discussion

Table 2 compares the validity of ACT and SAT for predicting over-all grades.

Table 2

Comparative Validity of ACT and SAT

for Predicting Over-all Freshman Grades

College	Group	N*	Multiple Correlation ACT	SAT
1	Men	308	.33	.38
2	Men	445	.37	.33
20	Men	175 - 183	.47	.38
1	Women	469	.46	.42
2	Women	700	.50	.42
20	Women	223 - 232	.54	.45
3	All Freshmen	127	.45	.44
12	All Freshmen	433	.48	.48
13	All Freshmen	531	.44	.41
1	Vocational Majors	202	.37	.33
4	Business Majors	264	.41	.41
4	Secretarial Educ.	215	.38	.64
11	Science Majors	187	.43	.40
11	Humanities Majors	166	.37	.38
11	Soc. Sci. Majors	149	.41	.43
	Totals	4594 - 4611	.44**	.42**

*When two N's are given, a different sample took each test; ACT N is given first.

**Computed by transforming R's to z's, weighting by N, and retransforming to R's. (Edwards, 1950).

Table 3 summarizes these data and predictive validities in other academic areas for these two batteries.[4] A similar summary of ACT-SCAT comparative validity is found in Table 4.

Table 3

Comparative Validity of ACT and SAT

for Predicting College Freshman Grades

	Criterion Area				
	Over-all	English	Math	Soc. Sci.	Science
No. of Colleges	8	5	4	5	4
No. of Correlations	15	10	6	10	11
Range of N's	127 to 700	123 to 585	30 to 605	97 to 261	62 to 254
Total N	4594-4611	2427-1988	1033-1406	1452-1461	1576-1524
Range of R's, ACT	.33 to .54	.27 to .61	.40 to .66	.23 to .70	.31 to .72
Range of R's, SAT	.33 to .64	.29 to .67	.35 to .66	.23 to .66	.30 to .70
No. times ACT higher	9	6	5	7	9
No. times SAT higher	5	4	1	2	1
Mean R*, ACT	.44	.45	.51	.48	.52
Mean R*, SAT	.42	.43	.49	.44	.50

* Computed by transforming R's to z's, weighting by N, and retransforming to R's. (Edwards, 1950). At one institution where sample sizes for some criteria were not available, the average sample size for that school was used.

Table 4

Comparative Validity of ACT and SCAT

for Predicting College Freshman Grades

	Criterion Area			
	Over-all	English	S. Sci. or Hum.	Sci. or Math
No. of Colleges	15	5	5	3
No. of Correlations	17	6	6	5
Range of N's	66 to 1857	108 to 255	135 to 227	108 to 204
Total N	9376-9771	993	987	765
Range of R's, ACT	.30 to .69	.51 to .72	.35 to .64	.36 to .54
Range of R's, SCAT	.25 to .70	.41 to .74	.23 to .62	.24 to .58
No. times ACT higher	16	5	5	3
No. times SCAT higher	1	1	0	2
Mean R*, ACT	.53	.57	.53	.44
Mean R*, SCAT	.49	.51	.44	.40

* Computed by transforming R's to z's, weighting by N, and retransforming to R's. (Edwards, 1950)

These tables suggest several conclusions:

1. Predictive results varied widely from one campus to the next. The specific validity of any test should be established for the individual college.[5]

2. Differences were noted in the predictability of curricular and sex subgroups at individual colleges. These results imply that complex colleges should develop several different equations for predicting grades so that various contingencies can be taken into account.

3. The ACT and SAT tests possessed about the same degree of predictive validity. The slight predictive advantage to ACT shown in Table 3 is too small to be of any practical consequence.

4. ACT appears to be a reliably better predictor than SCAT, both in terms of over-all grades and grades in specific courses.

There are, however, certain limitations inherent in these conclusions. In the first place, because the 21 colleges were not selected to be representative of any known population, the statistics can be applied in a strict sense only to the sample institutions. Since a reasonably diverse group of institutions was involved, however, and since the results from college to college were similar, this limitation is probably not serious.

Secondly, we did not know whether one or the other test had been used for admissions purposes. Whatever the situation, the test used for admissions would be at a disadvantage.

And finally, while sample sizes for specific courses were

occasionally so small that these samples probably produced unstable correlations, the average R's reported in Tables 2, 3, and 4 are exceptions to this deficiency.

Within these limitations, we can safely conclude that all three tests possess useful predictive validity. SCAT scores were least predictive, probably because SCAT is a much shorter test than the other two. The slight predictive advantage enjoyed by the ACT battery is probably a function of its more comprehensive nature (four tests as opposed to two) and its content (which is explicitly related to typical college freshman courses).

Most colleges today participate in one of the two national testing programs -- ACT and CEEB -- whose tests were compared in this study. Other colleges will likely make a choice soon. Our findings suggest that differences in validity between ACT and SAT were so slight that this choice might better be made on the basis of such other considerations as availability of scores, type of reports on individual students, costs, convenience to the student, and special services offered by the testing agencies.

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Footnotes

[1]Grateful acknowledgment is hereby made to Dr. Kenneth Eells, Dr. E. L. Klingelhofer, and Dr. Clinton Chase for their cooperation.

[2]An illustration of the importance of adding high school grades to test score data is found in the ACT Technical Report (American College Testing Program, 1965). For almost 600 colleges, the median correlation of ACT scores with college freshman GPA was .53; when high school grades are added, this correlation is increased to .64.

[3]The assumption that all samples came from the same population was not thought to be tenable.

[4]Tables which give individual correlations for each group and each criterion are in the appendix.

[5]Colleges participating in either the American College Testing Program or the College Entrance Examination Board Program are eligible to receive local validation studies at no cost as an aspect of these programs.

Appendix 1

Comparison of ACT and SAT

The Prediction of College English Course Grades

College	Sample	N*	ACT-R	SAT-R
1	Men	211	.27	.41
1	Women	369	.40	.29
1	Vocational Students	142	.39	.36
3	Freshmen	123	.38	.33
4	Business Majors	257	.46	.34
4	Teacher and Secr'l. Educ.	214	.42	.67
4	Teacher and Secr'l. Educ.	215	.28	.49
10	Freshmen	585 - NA	.61	.55
10	Freshmen	NA - NA	.56	.50
11	Humanities Majors	165	.39	.40

The Prediction of College Mathematics Course Grades

College	Sample	N*	ACT-R	SAT-R
3	Freshmen	103	.51	.46
4	Business Majors	259	.62	.57
4	Teacher and Secr'l. Educ.	215	.42	.66
10	Freshmen	30 - 37	.66	.62
10	Freshmen	239 - 605	.53	.42
11	Science Majors	187	.40	.35

*If two samples were involved, the number on the left is the size of the ACT sample; on the right, the size of the SAT sample. At one school, not all of the N's were available; NA refers to "Not Available."

Appendix 1 (cont.)

The Prediction of Specific College Social Science Course Grades

College	Sample	N	ACT-R	SAT-R	Course
10	Freshmen	99 - 97	.55	.54	Economics
11	Social Science Majors	135	.49	.44	Economics
10	Freshmen	180 - 188	.70	.66	Government
10	Freshmen	130 - 133	.52	.41	History
11	Social Science Majors	107	.46	.32	History
10	Freshmen	NA - NA	.66	.58	Sociology
11	Social Science Majors	130	.38	.42	Sociology
1	Women	139	.44	.42	Social Science
3	Freshmen	125	.31	.34	Social Science
4	Business Majors	261	.23	.23	Social Science

The Prediction of Specific College Science Course Grades

College	Sample	N	ACT-R	SAT-R	Course
1	Men	147	.50	.48	Science
1	Women	254	.46	.46	Science
3	Freshmen	114	.31	.30	Science
10	Freshmen	NA - 76	.55	.54	Anatomy
10	Freshmen	70 - 72	.62	.55	Biology
10	Freshmen	62 - 53	.72	.70	Chemistry
10	Freshmen	201 - 232	.65	.62	Chemistry
11	Science Majors	186	.35	.33	Chemistry
10	Freshmen	63 - 57	.40	.50	Geology
10	Freshmen	NA - NA	.69	.65	Zoology
11	Science Majors	187	.45	.41	Physics

Appendix 1 (cont.)

The Prediction of Other College Grades

College	Sample	N	ACT-R	SAT-R	Course
4	Business Majors	260	.16	.35	Accounting grades
4	Teacher and Secr'l. Educ.	215	.22	.47	Accounting grades
10	Freshmen	75 - 94	.48	.69	Education
10	Freshmen	48 - 188	.69	.56	Fine Arts
10	Freshmen	42 - NA	.54	.38	Philosophy
11	Humanities Majors	165	.32	.34	Philosophy
10	Freshmen	NA - NA	.62	.59	Psychology
10	Freshmen	NA - NA	.46	.19	Music
10	Freshmen	NA - NA	.72	.43	Business
10	Freshmen	NA - NA	.45	.37	Foreign Language
11	Humanities Majors	164	.28	.41	Languages
10	Freshmen	NA - NA	.40	.39	Speech

Appendix 2

Comparison of ACT and SCAT

The Prediction of College English Grades

College	Sample	N	ACT-R	SCAT-R
5	Freshmen	255	.56	.45
6	Freshmen	159	.55	.41
7	Medical Secretarial	108	.57	.52
7	Business	135	.53	.45
8	Freshmen	205	.51	.49
9	Freshmen	131	.72	.74

The Prediction of College Social Studies and Humanities Grades

College	Sample	N	ACT-R	SCAT-R	Area
5	Freshmen	227	.64	.62	Soc. Stud.
6	Freshmen	156	.63	.45	Soc. Stud.
7	Business	135	.55	.44	Soc. Stud.
8	Freshmen	197	.36	.24	Soc. Stud.
5	Freshmen	137	.35	.23	Foreign Language
9	Freshmen	135	.53	.53	Theology

The Prediction of College Natural Science and Mathematics Grades

College	Sample	N	ACT-R	SCAT-R	Area
5	Freshmen	121	.54	.44	Science
7	Medical Secretarial	108	.41	.34	Science
8	Freshmen	197	.36	.24	Science
7	Business	135	.51	.58	Math
8	Freshmen	204	.40	.41	Math

Appendix 2 (cont.)

The Prediction of Over-all College Grade Point Average

College	Sample	N	ACT-R	SCAT-R
5	Freshmen	159	.58	.51
6	Freshmen	164	.67	.48
7	Medical Secretarial	108	.40	.36
7	Business	135	.54	.52
8	Freshmen	205	.54	.53
9	Freshmen	135	.69	.70
12	Freshmen	1857	.50	.49
13	Freshmen	1457	.48	.42
14	Freshmen	263	.49	.44
15	Freshmen	647	.61	.57
16	Freshmen	1875	.51	.47
17	Freshmen	1371	.59	.55
18	Freshmen	66	.53	.44
19	Freshmen	387	.54	.52
20	Freshmen Men	175 - 338	.47	.42
20	Freshmen Women	223 - 455	.54	.45
21	Freshmen	149	.30	.25