

Intelligence Rating of High School Pupils  
" and Their Achievement in College

by

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Intelligence Rating of High School Pupils  
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PROBLEM: A study of the college or university achievement of 160 students from 43 Kansas high schools, with a view (a) to discovering the relation of their intelligence as measured by the Terman Group Test of Mental Ability to their college or university achievement, (b) to discovering other possible factors determining this achievement, and (c) to discovering the relations between intelligence and those other factors. It should be noted that the 160 students were the total number of those who entered college or university the year 1923-1924 from the 43 high schools from which data were secured.

The great increase in college enrolment during the last decade has forced administrators to a consideration of the possibility of a still greater demand for college training, and of an analysis of that demand. The question has two distinct aspects: (1) is it possible, in view of economic difficulties, to offer adequate training to these growing numbers; and (2) are the students now entering institutions of higher learning capable of profiting by the training which

the college has offered or is fitted to offer?

Numerous opinions have been presented regarding the various phases of the subject, but a comparatively small amount of data is as yet available. Fundamental in determining any answer or solution is a knowledge of the nature of the selection of students now coming to these institutions of higher education. This involves information not only concerning those individuals who actually apply for admission to colleges and universities, but of the high school groups from which they come.

It is obviously true that if our college students are able to follow prescribed courses only with great difficulty, the problem may be of one sort if we find that these students are the most capable the country affords, and of quite another if it be true that the schools of higher education are expending a portion of their efforts on students with ability inferior to that generally found in the high schools from whence they come. This fact will remain true whether the conclusion be to modify the college to suit the demand, or to modify conditions so as to eliminate certain classes from, or to attract others to, the college.

Significant studies tending toward the discovery of the information mentioned above have been undertaken. In Indiana<sup>1</sup> and Massachusetts<sup>2</sup> state-wide surveys have been made of the intelligence of high school seniors, with a corresponding study of these students in regard to their plans for advanced study, or for chosen vocation. Both studies find that students planning to enter college show a degree of intelligence (as measured by the tests employed) slightly superior to that of high school seniors in general, or to that of those not planning for college training. The overlapping, however, is very great. MacPhail concludes from a study of the data obtained in the Massachusetts survey that 49 per cent of the boys and 44 per cent of the girls intending to continue study after high school graduation are good college risks, while 28 per cent of the boys and 26 per cent of the girls not intending to continue in school would also be good college risks. Numerous other studies of a similar nature have been

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<sup>1</sup>

Book, W.D., The Intelligence of High School Seniors, New York, The Macmillan Company, 1922.

<sup>2</sup>MacPhail, Andrew H., The Intelligence of College Students, Baltimore, Warwick and York, Inc., 1924.

carried out, but the two mentioned above are probably the most complete. It is thinkable that the discovery of the degree of mental ability necessary for success in college might be of great value to those directing the study of high school students who may be contemplating college work.

Further efforts to discover the fitness of students for study at institutions of higher education have been made through the use of various intelligence tests especially designed for college freshmen, and administered at the time of college entrance. In some institutions these have largely supplanted all other devices for determining eligibility for matriculation. Outstanding experiments are being conducted at Ohio State, Columbia, Brown, and other universities.

The present study was undertaken with a view to determining from data available at the University of Kansas the degree to which intelligence, as measured by the Terman Group Test, was a factor in the selection of students coming from Kansas high schools to institutions of higher education in the state, and the degree to which this selection of intelligence and other discoverable factors affected the college achievement of these students.

SOURCE OF DATA: In September, 1922, the Bureau of School Service at the University of Kansas, under the direction of Doctor F. P. OBrien, undertook the collection of data regarding the intelligence and achievement of students in the high schools of the state. The invitation to participate in the study was sent to all of the high schools in Kansas cities of the second and third class. During the school year of 1922-1923 forty-three (43) of these schools gave the Terman Group Test of Mental Ability to all of their high school pupils. The seniors so tested totalled 1078. These data were used as the basis for this study.

The schools thus included in this study are the ones responding to the invitation that year, all those from whom results were sent in for 1922-1923 being used. Since it is the purpose of this study to compare the intelligence scores of those who entered college with the later college achievement of those same individuals, it was impossible to use the scores for other seniors in high school for whom data for subsequent years were available. The possibility of an element of selection, in that these schools which replied may have been under superior administration, is recognized. Otherwise, they may be considered as fair samples of the group.

All tests were checked by the staff of the Bureau of School Service, so that scoring is uniform. As a further guarantee of uniformity and accuracy of data, letters detailing methods of presenting tests to students were sent to the high school principals in the schools participating. Since the tests were given with the purpose of rendering possible assistance to the schools giving them, any motive for coaching students or in any way unfairly changing scores of students was removed.

The second source of data was the annual catalogs of all institutions of higher education in Kansas. From these catalogs were secured the names of those of the 1078 students mentioned above who continued their education by enrolling in Kansas colleges and universities the fall following their high school graduation in 1923. One variation from this procedure should be noted. In the case of some few schools which published no directory for the year 1923-1924 the names were secured from enrolment lists available in the offices of the institutions. The number of these seniors who enrolled in college that year (1923-1924) was 160.

The third step in the development of the study involved the securing of detailed data concerning the college and



extra-curricular achievements of a group of students representative of the entire number who had enrolled (1923-1924) in the institutions of higher education in Kansas. This was secured through the offices of administration in four schools: University of Kansas, Kansas State Agricultural College, Ottawa University, and Baker University.

DETAIL OF SECURING DATA, AND VALIDITY OF SAMPLING:

The forty-three high schools from which the students included in this study came ranged in enrolment from 30 to 741 for grades nine to twelve, inclusive. The senior classes ranged in enrolment from 7 to 136. The schools include those in 13 second, and 30 third class cities, among the latter being 21 rural and 2 consolidated high schools. They represent the southeast mining section of Kansas, the south-central oil section, the northeast and central agricultural section, and the western short-grass country. They may thus fairly be considered a sample of the high schools of the state, with the exception of first class city high schools, such as those in Topeka, Wichita, and Kansas City.

Table 1, page 10, shows the distribution of the Terman scores of the 1078 high school seniors whose records were the basis for this study. It will be noted that the range of their scores is from 55 to 215, with a median of 137.74. Terman<sup>3</sup> gives the median for 4886 high school seniors from California and the middle west as 147, nearly ten points higher than the median for these Kansas students. He calls attention to the fact that "city schools generally make a

<sup>3</sup>Terman, Lewis W., Manual of Directions, Terman Group Test of Mental Ability, Yonkers-on-Hudson, World Book Company, 1923.

better showing than rural or village schools, and that \* \* our norms are chiefly from city schools". These Kansas students would, for the most part, come under the classification of "rural". It should be noted, also, that Terman's results were secured from tests given under widely varying conditions and that he, himself, questions the validity of some of the norms thus secured. The tests given by the Bureau of School Service were carefully supervised, detailed directions (see Appendix A) being given in addition to those contained in the regular Manual of Directions which is furnished with the test. Close cooperation of the Bureau with superintendents made possible unusual uniformity. Scoring was rechecked by the Bureau.

The above statements should be considered before drawing any conclusions from the fact that the Kansas high school seniors, as represented by the 1078 studied, fall ten points below the median for such students throughout this country. Doubtless their median score, when all factors are considered, is fairly satisfactory.

The 1078 high school seniors for whom the Terman scores were available were then listed and their names carefully checked against the enrolment lists of Kansas college and university freshmen for the school year 1923-1924. It

Table 1

Table showing distribution of scores made by 1078 seniors in 43 Kansas high schools, 1922-1923, on Terman Group Test of Mental Ability.

Number students in high school	Number seniors tested	Terman score																	
		50-59.99	60-69.99	70-79.99	80-89.99	90-99.99	100-109.99	110-119.99	120-129.99	130-139.99	140-149.99	150-159.99	160-169.99	170-179.99	180-189.99	190-199.99	200-209.99	210-219.99	
30	7				3		3		1										
35	7					1			2	1				2					
40	6			1			1		1	3									
42	8			1	1	1	1	1	1		1	1		1					
43	9			1	1	4	2			1									
46	4						2		1						1				
46	7			1			1		2		1	2							
47	8					1	1		1	1		3						1	
50	10			4			1	1	1	1	2								
52	10			1			1		3		1	3	1						
55	10			1	1		3	2		1		2							
53	7						1		1	2				1	1				
56	5						2			3									
56	9					2		2	2			2		1					
57	11				1		2	3		2	1			2					
58	8						4		1	1	1	1							
59	11			1		1	1	2	2	3		1							
60	11					1	1		2	3		2	2						
62	10				1	1		2	3	2	1	1		1					
64	10					1	4	1	2			1	1						
67	9			1		1	1	2			2	1	1						
72	12			1	1	1		2	3	2	1	1							
74	9					1	1	2		2	1				1	1			
82	8					1	1	1	2			1			1	1			
84	17			1	1	2	1	1	1	1	6	1	1	1				1	
104	21			1	1	2	1	2	1	3	2	2	3	1	1	1			
108	24					2	5	1		6	2	2	3	3					
112	21			2	1	1		1	6	1	1	1	3	3	1				
134	23			1	1	2	4	1	4	2	4	2	1					1	
160	34					1			2	5	8	2	4	2	3	2			
163	26			1	1	1	2	3	4	3	3	2	4	1	1				
165	31			1		2	5	3	4	3	3	4	4	1	1				
199	33			1	1	1	2	2	5	3	3	4	4	4	3				
208	27					2	2	5	1	3	3		7	1	1	2			
290	46			1	1	1		3	7	7	1	7	3	6	4	4	1		
302	50			1	1	3	5	5	5	5	5	7	4	1	2	1	1	1	
311	63			1	3	2	3	7	5	8	6	8	7	3	4	4	1	1	
346	58			1	1	4	7	5	4	5	5	5	6	4	3	1	2		
354	32			1			2	4	4	5	4	4	1	2	2	2	1		
536	63						4	5	7	6	8	5	8	4	3	3			
606	63					2	4	4	4	8	3	1	9	5					
629	102				1		8	7	8	1	3	8	9	1	2	3	1		
741	136			2	1	1	5	7	8	8	1	2	5	1	5	1	7	2	3

6963

1078

5 9 20 31 31 44 103 107 113 112 110 94 82 54 20 17 1

Table 2

Table showing distribution by colleges and universities of Terman scores for those of 1078 high school seniors, 1922-1923, who enrolled in Kansas colleges and universities during the academic year, 1923-1924.

Name of institution	Terman scores											No. students	Total no. students			
	80-89.99	90-99.99	100-109.99	110-119.99	120-129.99	130-139.99	140-149.99	150-159.99	160-169.99	170-179.99	180-189.99			190-199.99	200-209.99	210-219.99
University of Kans.	1	2	5	6	5	3	6	4	4	3					41	
K. S. A. C.		1		2	3	3		3	2		1	1			16	
State Schls, not T.C.																( 57)
K.S.T.C., Emporia			2	1	1					2	1				7	
K.S.T.C., Pittsburg			3	1	1			1	2	3					11	
K. S.T.C., Hays	1			1	1		1	1							5	
All Kansas T.C.'s																(23)
State supported institutions, total	2	3	5	11	12	9	3	7	9	8	8	2	1		80	80
Baker University			3		1	3		2	1	3					13	
Ottawa University	1	2	2	2	2	2		3	1	1	1	1	1		18	
Bethany College		3	1	2	2	2	1	3	1	2	1				18	
Fairmount Coll.						1									1	
Sterling College	1														1	
Coll. of Emporia			1		2	1				1					5	
Kansas Wesleyan		1	1		1	2	2		1						8	
McPherson College			1	1	1	1	1	1	2		1	1			10	
St. Benedicts Coll.	1								1						2	
Southwestern Coll.									1						1	
Washburn College	1			1		1									3	
Central College									(1)						(1)*	
Privately endowed institutions, total	2	5	4	7	6	7	11	9	7	10	6	3	2	1	80	80
Grand totals	4	8	9	18	18	14	16	16	18	14	5	3	1		160	160

\*Duplicate.

was found that 160 of the 1078 enrolled in some institution of higher education in the state during the academic year following the high school senior year. The State Teachers College at Emporia published no directory and had available no list of freshmen for 1923-1924, although complete enrollment lists were available for 1924-1925. The 160 names, therefore, include only such of these students enrolled at Kansas State Teachers College (Emporia) as continued their work some time during the second year (1924-1925). It is probable that if complete records were available in that institution five or six additional names would be added to the 160. Otherwise the list is complete.

Table 2, page 11, shows the distribution according to their Terman Test scores of these 160 students enrolled in institutions of higher education in 1923-1924. The median score of 145.36 is approximately eight points higher than that for the 1078 high school seniors, and the range of scores is from 85 to 215 as against 50 to 215 for the larger group. However, there remains the fact that the median for this group of Kansas college and university freshmen is still slightly below the Terman median for high school seniors. It would be interesting to compare scores made by students

entering these institutions of higher education with the scores made by students entering similar institutions in other sections of the country.

A further examination of the distribution of these 160 scores raises other questions. The number of cases may be too limited to warrant any final conclusions, but perhaps the facts at hand may still provide an index of what further investigation will show more conclusively. It happens that of the total number involved in this study exactly half attended schools privately endowed, and half of them schools maintained by state appropriations. This is a convenient division for some of the comparisons made in this study.

The median score for those students attending state schools is 138.35, approximately seven points below that for the whole group (145.36), and ten and one-half points below that for students attending the privately endowed colleges. Further investigation shows the median for teachers colleges to be 135, and that for Kansas University and Kansas State Agricultural College to be 138.75. Kirkpatrick,<sup>4</sup> in a study of normal school students in Massachusetts

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<sup>4</sup> Kirkpatrick, E.A., Intelligence Tests in Massachusetts Normal Schools, School and Society, January 14, 1922.

found their scores on intelligence tests to be lower than the scores for students entering other institutions of higher education in that state. These data, although limited, agree with such a conclusion. Other investigators<sup>5</sup> report no such variation. However, the median of the students entering both these groups of state schools is below that of the eighty students who entered the private colleges.

It is possible that the inclusion of Ottawa, Lindsborg, McPherson, and Lawrence high schools, all of which are located in college towns, modifies especially the results for the four institutions located in these towns. High schools from no other college towns are included. A more complete study might contain sufficient data for a comparison of students in the private schools with those in liberal arts courses in state schools, and those in liberal arts courses with students enrolled in technical courses.

Table number 3, page 15, presents the above data in condensed form.

In order to determine greater significance in the data, and to determine further factors of success or failure

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<sup>5</sup>Renshaw, Samuel, The Intelligence of Teachers in Training, Journal of Educational Research, January, 1923.

Whitney, Fred. L., Intelligence Levels among State Normal School Graduates, Journal of Educational Research, March, 1923.



Table 3

Table showing median scores on Terman Group Test of Mental Ability for (a) 1078 Kansas high school seniors, 1922-1923, and (b) the 160 of the 1078 who enrolled as college and university students for the academic year 1923-1924. The latter are grouped according to the institutions in which they enrolled.

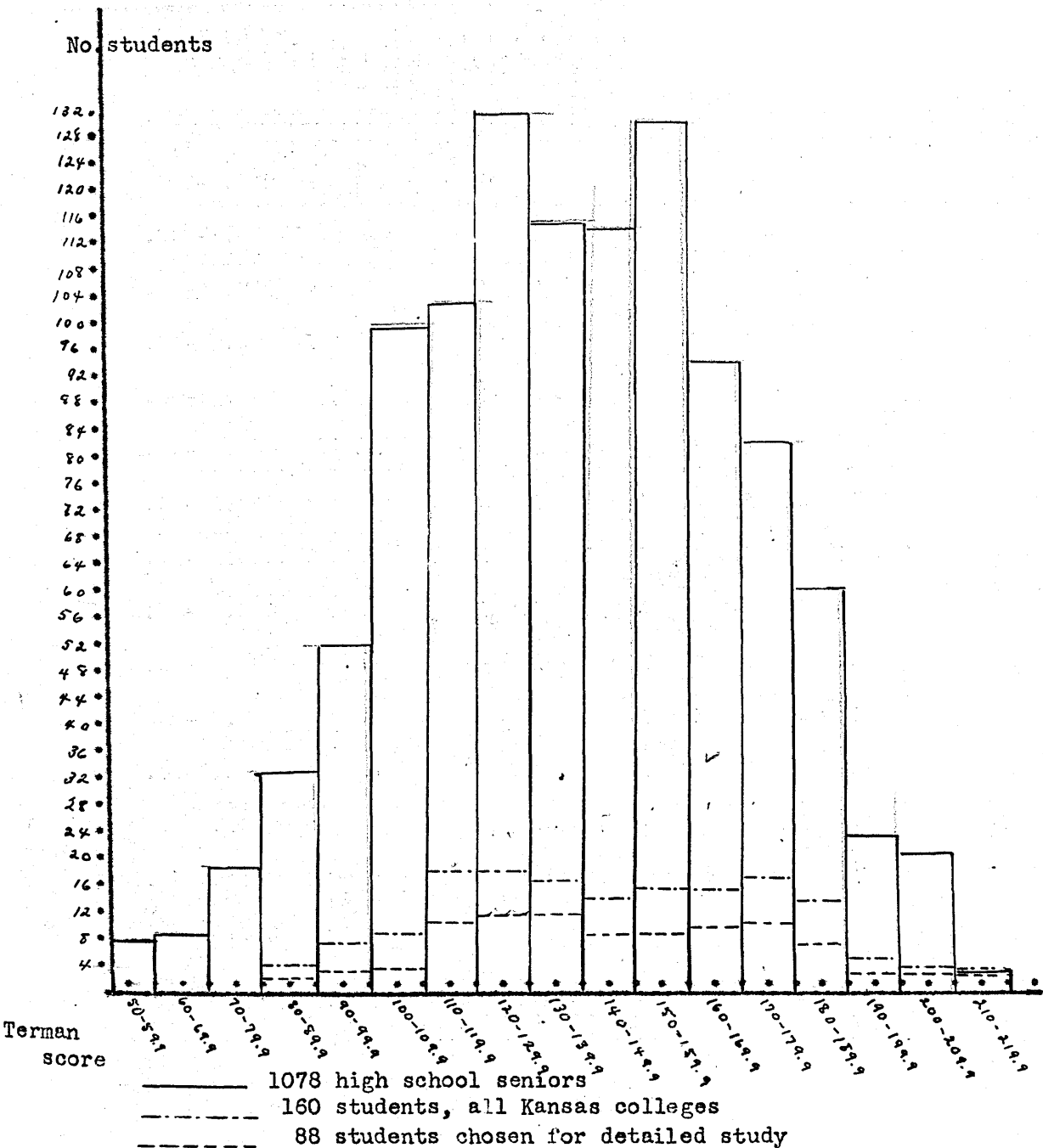
Number cases	Institution	Median Terman score
1078	43 Kansas high schools	137.74
57	Kansas State Ag. College and University of Kansas	138.75
23	Kansas state teachers colleges	135.
80	All Kansas state institutions, higher edu.	138.33
80	All Kansas privately endowed institutions of higher education	145.36
88	Baker University Ottawa University Kansas State Ag. College University of Kansas	144.37

in the college work of the students involved, a more detailed study of the college records was made of as many of the 160 students as was possible. For this purpose four schools were chosen: University of Kansas, Kansas State Agricultural College, Baker University, and Ottawa University, it being impracticable because of small numbers involved or difficulty of securing their records to include data from all of the seventeen colleges where the 160 students were enrolled. That the four schools provide a representative sampling is verified by the fact that these institutions had enrolled 88 of the 160 students, or more than half the group, and by the further fact that these 88 students were enrolled in courses in liberal arts, music, engineering, agriculture, and home economics, representing a variety of student groups as found in the seventeen institutions. No teachers college is included, but since normal training is a form of specialized vocational training it may perhaps be fairly represented by the other technical courses. However, it is granted that conclusions from this analysis are related more especially to schools other than teachers colleges.

Further validity of this sampling is found in

Table 4

Graph showing (a) distribution of Terman scores of 1078 Kansas high school seniors, 1922-1923; (b) distribution of Terman Test scores for such of above, 160 in number, as enrolled in Kansas institutions of higher education during the academic year 1923-1924; and (c) distribution of the Terman Test scores for the 88 students chosen from the 160 for detailed study.



the fact that the range of the 88 cases is identical with that of the 160, while the median for the 88 is 144.37, practically identical with that (145.36) for the larger group. Table 4, page 17, shows graphically the distribution of (a) the original group of 1078 high school seniors, (b) the 160 who entered college, and (c) the 88 persons chosen from the 160 for especial study, all with respect to scores on the Terman test.

DETAILED STUDY OF COLLEGE ACHIEVEMENT: Through the cooperation of the administration offices of the four institutions involved, the following information was secured for each of the 88 students.

1. Transcript of grades, three semesters.
2. Discipline record, including suspension for low grades.
3. Per cent of self support earned.
4. Complete list of college activities participated in.
5. Course of study pursued.
6. Race of individual.
7. Number, and dates of semesters enrolled.

The data secured covered three full semesters as well as the enrolments for the fourth (February, 1925). From a careful study of the above facts an attempt was made to discover some of the elements tending toward their college success or failure.

As an initial step in the study an index of grades was computed for each student. All four institutions use a system of grading by letter, with four passing grades and a fifth grade for conditional or incomplete credit. No credit, or a failure, is indicated by "F". Ottawa University has two degrees for conditions; the other schools have but one. Since the lowest "Condition" at Ottawa cannot be changed to a passing or satisfactory grade, these marks were,

for the purpose of uniformity, classed as failures. The following plan of weighting was adopted: highest grade, value 4; second grade, 3; third grade, 2; fourth grade, 1; and failure, 0. No value could be assigned to conditional credits, since these might later be recorded as any one of the other five marks. They were therefore disregarded in computing the indices, but a careful record of them was made for further study. All grades were further weighted with regard to value in terms of semester hours of credit. Appendix B shows in detail the method of calculation.

Table 5, which follows, page 21, is a scatter diagram showing the relation between the Terman test scores and the college indices of this group of students. Computation of correlation, using the Pearson formula, gives a value for  $r$  of 0.621, with a probable error of 0.044. This correlation is sufficiently high to be significant. The scatter diagram, moreover, shows a definite trend.

Table 5

Scatter diagram showing distribution of Terman Group Intelligence scores and grade indices for 88 students enrolled in 4 Kansas institutions of higher education.

Terman scores	80-	89.9	90-	99.9	100-	109.9	110-	119.9	120-	129.9	130-	139.9	140-	149.9	150-	159.9	160-	169.9	170-	179.9	180-	189.9	190-	199.9	200-	209.9	210-	219.9	Tot.
Grade index 0- .249	1	1			1								1																4
.25 - .499								1																					1
.50- .749						1	2																						3
.75- .999	1			1	2				1			2	1																8
1.00- 1.249						1	3	1																					5
1.25- 1.499			2					2	2				1	1															8
1.50- 1.749				2	2	1	2	1	2	1	2	1	2	1	2	1													14
1.75- 1.999				1	2			1	1	1	1	2	1				2	1				1							10
2.00- 2.249					1	1				2			1	1															6
2.25- 2.499						1	1	1	1	1	1	1	1	1	2														8
2.50- 2.749								2	1	1				3	1														8
2.75-2.999									1			1	1	1	2														5
3.00- 3.249															1		1	1	1										4
3.25- 3.499									1								1												2
3.50- 3.749																								1					1
3.75- 4.00															1														1
Totals	2	3	4	10	11	11	8	8	9	10	7	2	2	2	1														88

$r = 0.621 \pm .044$

Further facts are revealed by Table 6, showing the total number of hours enrolled by the 88 students in the three semesters, hours of failure, hours recorded as incomplete or withdrawn, and percentage of work which was unsatisfactory. The table presents data by quartile divisions of the 160 students as measured by the Terman tests. All hours for which no passing grades are recorded are here combined and considered unsatisfactory. The median score for the 160 is 145.36;  $Q_3$ , 120.69;  $Q_1$ , 170.97.

Table 6

Table showing hours enrolled, hours of failure, hours incomplete and withdrawn, and percentage of unsatisfactory work, for 88 students enrolled in 4 Kansas institutions of higher education.

Relation to Terman scores for 160	Total * semester hours enrolled	Total* hours failed	Total* hours inc. and withdrawn	Total* hrs. fail, inc., and withdrawn	Percentage hours unsatisfactory
Above median	1829.5	86	22	108	6.6
Below median	1741.	270.5	49.5	320	18.3
In lowest one-fourth	802.5	120	33	153	19
In highest one-fourth	851.5	23	0	23	2.7
In middle 50 %	1716.5	213.5	58.5	252	14.6

\* In three semesters of college work.



Table 6 shows that while the correlation between the Terman scores and grade indices may not be so high as to admit prediction of success in individual cases, there is a marked relation between the Terman scores and probability of success as measured by "pass" and "fail", when the quartile groups are considered. Thus, while students in the lowest quartile fail to make a passing grade in 19 per cent of the work for which they enroll, those in the highest quartile fail similarly in but 2.7 per cent. Making the division at the median, it will be noted that students with Terman scores below the median fail in three times as high a per cent of their work (18.33 per cent) as do those above the median (6.66 per cent).

The figures appearing in this table (6), studied in connection with the scatter diagram and correlation (Table 5) suggest the possibility that students in the upper quartile (as measured by intelligence test scores) have a stronger tendency to work below ability although holding their work up to the passing mark than do those below the median. With a larger number of cases correlation between intelligence scores and grade indices should be made for quartile groups to discover whether this be true.

An attempt was next made to discover any existing relation between Terman scores or college grade indices and the tendency of the students to drop out of school; or, conversely, the relation of intelligence or grades to persistence. Table 7 gives a summary of data regarding the 88 cases studied.

Table 7

Table showing (1) number of students who failed to enroll second year, (2) who were suspended, (3) who were partly or wholly self-supporting, and (4) number of hours per week spent by students in self-support.

(a) Relation to Terman scores for 160	(b) Total number students	(c) Number students not en- rolled second yr.	(d) Number students suspended	(e) Number students self- support- ing.	(f) Hours per wk. spent self- support
In low- est one- fourth	22	6	6	9	182
In second one-fourth	24	8	5	17	266
Below median	46	14	11	26	448
In third one- fourth	23	11	1	4	91
In highest one- fourth	19	2	0	5	84
Above median	42	13	1	9	175

Several items of the above data suggest questions, and possible conclusions, rather at variance with popular opinion. It will be noted that of the 46 students in the group whose records were investigated and who fell below the median Terman score for the entire college group, 14, or 30 per cent, failed to enroll for the second year of work; while of the 42 of this group who were above the Terman median 13, or nearly 31 per cent were not enrolled for the year 1924-1925. If these figures are typical-- and their limited number makes this open to question-- it would appear that the elimination of college students from the freshman to sophomore year is at least as high in the case of those having a *higher* score in the Terman test as of those *below* the median Terman score. However, from the highest Terman quartile only 2, or approximately 10 per cent, failed to return the second year, while from the lowest Terman quartile the loss was over 25 per cent.

With these figures those of column (d) should be considered. In all but two cases suspension was due to low grades, and in the two exceptions low grades accompanied other difficulties. "Low grades" is used here as indicating that as much as forty per cent of the work enrolled for was

unsatisfactory, this being interpreted at the University of Kansas as sufficient cause for suspension. In spite of these eleven suspensions from the lower group as compared with but one from those students above the median, the percentages of drop-outs are as noted above.

When the matter of self-support is considered it is seen that approximately three times as many students in the lower intelligence group work for part of their support as in the upper group, while the sum of hours per week devoted by the former to self-support is 448 against 175 by the latter group. Information concerning the quantity of this self-support was derived from information cards filed by students, or from administration offices in the schools where the students were enrolled. In some cases (at Baker University) hours per week were noted; in others, the per cent of self-support was given. For purposes of uniformity these per cents were reduced to an hours-per-week basis, four hours per day being considered time necessary for earning full support. Four hours is the amount of time agreed upon at most of the schools of collegiate rank in Kansas as the time which an employer may use in return for providing room and board. Students who earn more than

this ordinarily work during the summer. The evaluation is necessarily arbitrary and open to criticism. Interpretation of column (f), Table 7, should be made in the light of this fact.

A possible explanation of the fact that there is this much larger proportion of students altogether or partly self-supporting who are found below the median as measured by the Terman test, is that families of lower intelligence (from which these students presumably come) are naturally less successful and hence unable to furnish aid to their children. This preponderance of self-supporting students among the lower half may have been increased, of course, in this particular year by the crop failure which prevailed in Kansas during the summer of 1923. This crop failure forced students from rural sections (and hence, according to Terman from a group with a tendency to score low on this test) to be largely self-supporting.

It is also possible that many students of limited scholastic ability, who in prosperous years would have found employment in their local communities, were unable to do so that year and hence came to college. Even with the above two possibilities, the figures on self-support remain significant.

Table 8, which follows, shows the distribution of students who are in part or entirely self-supporting, and of those who failed to enroll the second year, in relation to their grade indices. 27 of the 37 who were at least partly self-supporting had grades which fell below the median (178.75), as against 11 from the group who had grades above the median. It should not be concluded, however, that earning their self-support is the sole cause of the low grades, since, as previously noted (Table 7) a larger percentage of students with low Terman scores than of those with the higher scores, are earning all or a part of their funds.

Table 8

Table showing relation of grade indices to drop-outs

Grade index	Total no. students	No. at least partly self-supporting	No. not in school second year.
0- .249	4	2	3
.25- .499	1	1	0
.50- .749	3	4	0
.75- .999	8	3	3
1.00-1.249	5	3	3
1.25-1.499	8	4	3
1.50-1.749	14	7	5
1.75-1.999	10	5	4
2.00-2.249	6	1	1
2.25-2.499	8	5	2
2.50-2.749	8	1	1
2.75-2.999	5	0	1
3.00-3.249	4	0	2
3.25-3.499	2	0	0
3.50-3.749	1	1	0
3.75-3.999	1	0	0
Totals	88	37	28

It should also be noted (column 4) that 19 of these students who dropped out had grades below the median (178.75), whereas only 9 of those who failed to re-enroll the second year had college grades above the median. It should be noted here that only 12 of the entire number of drop-outs were in any degree self-supporting. The above figures suggest that failure to make satisfactory marks does tend to cause students to drop out, and again directs attention to the suggestion previously made that students of less than median intelligence (median for college students) who continue school work after high school graduation may possess superior determination or persistence; since, although as a group they tend to make a comparatively high per cent of unsatisfactory marks, no larger per cent leave school than among students able to do school work with more success. If this be so, this persistence becomes an element of importance to college administration, both in its relation to probable school success and in its relation to future life success.

An attempt was next made to discover the relation of intelligence rating of the students to extra-curricular activities. Evaluation of such activities is, in the absence

of any accurate measuring device, largely unsatisfactory. For the purpose of this study the activities were listed and assigned values in accord with the men's point system at the University of Kansas, with slight variations and additions to the scale. Fraternity membership, to which the Men's Government Association assigned no points, was listed as 15. Membership in a literary society was scored 15 at Ottawa University as against 10 at other schools, since in this institution there are no fraternities or sororities, and literary societies have social as well as literary purposes. The evaluation schedule follows.

Self-support	1 to 60 points	
Men's Student Council		
President	40	"
Secretary	20	"
Other officers	15	"
Women's Government Ass'n		
Same as for men		
Y. M. or Y. W. C. A.		
President	20	"
Cabinet member	10	"
Athletic team		
Captain, major sport	40	"
Team member, major sp.	20	"
Captain, minor sport	20	"
Team member, minor sp.	15	"
Cheer leader	20	"
Regular practise, any	10	"
Active, W. A. A. ( <u>sport</u> )	10	"
School officers		
President	10	"
Other officers	5	"



Politics, active part (ranked by both Faculty member and students)		5 points
Publications		
Editor annual	40	"
Business mgr. annual	40	"
Annual staff	10	"
Organizations (membership)		
Fraternity	15	"
Debate club, drama league, orchestra, glee club, literary society, etc.	10	"
President, any above	15	"

It will be seen in Table 9, which follows, that there is a tendency for the students above the lowest quartile division of mental ability to carry more extra-curricular activities, and for students in the two lower quartile divisions to earn more points in self-support. The figures in this table are restricted to three semesters of freshman-sophomore work. It is possible that as the students progress in their college courses there will be a tendency toward heavier extra-curricular activities on the part of these superior students, but that is merely a supposition. The data at hand cannot suggest an answer. Table 9 clearly shows, however, that the combined loads of

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\*Note exception at Ottawa University, 15 points for literary society, as mentioned previously.

self-support and extra-curricular activities carried by the students of less than median mental ability are heavier than those of students of superior ability.

Table 9

Table showing distribution of points of self-support and of extra-curricular activities in relation to Terman scores for 88 college students.

Relation to Terman scores for 160	Points, self- support	Points, extra-curricular activities
Lowest quartile	390	225
Second quartile	570	355
Third quartile	195	320
Highest quartile	105	325

GENERAL CONCLUSIONS: Any general statements made from this study must be qualified by acknowledgment of the limited number of cases involved and by the additional consideration that the study covers the mental test scores of the high school senior class for but one year; moreover, these students have completed but three semesters of college or university work. On the other hand, as pointed out at the beginning of this paper, the sampling may fairly be considered representative of high school seniors in Kansas for the school year 1922-1923, and of college freshmen, Kansas, for 1923-1924.

In the degree that the data are valid the following summary of resulting questions and conclusions is submitted:

1. That the median intelligence for high school seniors in Kansas, as measured by the Terman Group Test of Mental Ability, falls below the median for high school seniors the country over, according to norms given by Terman.

2. That the median intelligence for Kansas college and university freshmen, being only slightly below Terman's norm for high school seniors, would suggest that the scores of high school seniors who later enter college in this state are near the standard.

3. That there is apparently some degree of selection among the colleges and universities themselves, leading students of highest ability to the private schools rather than to the state schools; and further leading students of lesser ability to attend the teachers colleges rather than the state university or agricultural college.

4. That for the first one and one-half years of college the correlation between mental ability as measured by the Terman test, and the college achievement, whether the latter be measured in grade index, ability to continue in school work, or tendency to participate in school extra-curricular activities, is not sufficiently high to admit prediction of the success or failure of individuals.

5. That while as stated in (4) the correlation between mental test scores and college achievement measured in terms of marks is not sufficiently high to make the tests reliable in predicting the success or failure of individuals, there is a marked relation between low mental test scores and tendency to fail in school work, and similarly between high mental test scores and tendency to pass in school work, evident when the achievements of the various quartiles of the group are compared.

6. That although students ranking in the lowest quartile as measured by the Terman test tend to fail in three times as many hours of credit as those in the highest quartile, they carry extra-curricular activities in the proportion of two (lowest quartile) to three (highest quartile) and are self-supporting in the ratio of approximately four to one, suggesting that such students may have reached college through selection in part on the basis of determination or perseverance.

The foregoing conclusions would suggest the following problems:

1. How do students entering Kansas institutions of higher education compare with students entering similar institutions in other parts of the United States, when measured by standard intelligence tests suitable to persons of college freshman age?

2. What is the comparison of mental ability of all students enrolling in private schools with those enrolled in similar courses or schools in state (Kansas) institutions?

3. Is the correlation between mental ability and school marks the same for groups of varying mental ability; that is, for example, do the marks made by students of superior mental ability show a higher or lower correlation with intelligence than the marks made by students of low grade ability?

4. Do the same groups furnish participants in extra-curricular activities during the junior and senior years, and during the freshman and sophomore years; that is, are the same factors which are operative in selecting leaders during the first two years in operation also during the last two years? or does superior intelligence become recognized by school honors (student recognition) as the college course advances?

## APPENDIX A

Directions for giving Terman Group Test of Mental Ability, as furnished to high schools by the Bureau of School Service, University of Kansas.

"Speak in a clear, distinct tone--not loud--not fast.

"Before the test booklets are distributed say to the pupils, 'I shall ask you to give your attention in this period to an exercise which bears close resemblance to a game. In the first place there will be a time limit for this exercise and your score will be determined by the speed and accuracy with which you perform these exercises in the time allowed. In the second place we shall ask that everyone play fair as you would in a basketball or any similar game. That will mean that no one will start any exercise or open the booklet until all are directed to do so. You will please not do anything until the booklets are all distributed and you are instructed just what to do.' Have the booklets distributed as quickly as possible at this point. Then say to the pupils: 'Each pupil must be provided with a pen or pencil. You will please write your name in the space indicated at the top of the first page (point out on a specimen copy just where you mean). Fill in lines two and three as quickly as possible. On line four, write the name of your city.'

"Now listen carefully to further instructions. Ask no questions. Do not look at your neighbor's paper. Work as fast and accurately as you can on each of the exercises that follow.

"Now turn over the page and fold the sheet back on the book in this way.' (Examiner demonstrates so that pupils may see.)

"Test one: This is a test of your general information.' (Examiner will read the instructions at the beginning of first test slowly, distinctly, and so that all may hear, while pupils may read at the same time. Also read the sample presented for first test. Then say, 'Ready, start.' Repeat this procedure for each of the ten separate tests.)

"Allow exactly the following time periods as indicated. Note with your pencil the exact minute and second at which the test begins. Call 'Time! All stop!' to the nearest second at the end of such periods.

Test one	2 minutes
Test two	2 minutes
Test three	2 minutes
Test four	3 minutes
Test five	4 minutes
Test six	2 minutes
Test seven	2 minutes
Test eight	3 minutes
Test nine	3 minutes
Test ten	4 minutes

"Examiners should watch time accurately. Please report any variation from these instructions in giving tests. Collect books immediately at the end of the tenth test. Assume the attitude and spirit of a game throughout the entire test period. It is desired that the pupils should not think of this test as a special or unusual kind of exercise. It is better to avoid speaking of it as an intelligence test. We want it to seem to the pupil as just an ordinary event in which each one will make the best score which he is able to make. A pleasant, courteous, encouraging attitude of examiners, combined with a businesslike precision is highly desirable."



APPENDIX B

Illustration of method used in calculation  
of college index scores.

Record of Student X.

(Grades, highest to lowest, A, B, C, D, I (incomplete),  
and F (failure)).

English	5 hours credit	Grade A	5 x 4 =	20
Biology	3 hours credit	Grade C	3 x 2 =	6
History	2 hours credit	Grade D	2 x 1 =	2
Sociology	5 hours credit	Grade F	5 x 0 =	0
Spanish	5 hours credit	Grade C	5 x 2 =	10
Mathematics	5 hours credit	Grade D	5 x 1 =	5
			<u>5 x 1 =</u>	<u>5</u>
		Total hrs.	25	43

$\frac{25}{43.00} (1.72)$  Index.

$$\begin{array}{r} 25 \\ \overline{180} \\ 195 \\ \overline{30} \\ \underline{300} \end{array}$$

## BIBLIOGRAPHY

1. Allen, William, Who Shall Go to College, School and Society, February 23, 1924.
2. Beatty, W. W., Who Can Be Educated, School and Society, October 15, 1921.
3. Book, W. F., The Intelligence of High School Seniors, as revealed by a state-wide mental survey of Indiana high schools, New York, The Macmillan Company, 1922.
4. Bridges, J. W., The Value of Intelligence Tests in Universities, School and Society, March 18, 1922.
5. Colvin, S. S., Psychological Tests at Brown University, School and Society, July 5, 1919.
6. Feingold, Gustave A., Correlation between Intelligence and Scholarship, School Review, June, 1924.
7. Hendricks, Hazel A., Status of High School Seniors, Educational Research Bulletin, Los Angeles City Schools, Volume IV, No. 3, February 16, 1925.
8. Johnston, J. B., New Demands for Differential Treatment of Students in the Colleges of Liberal Arts, School and Society, December 20, 1924.
9. Jones, Adam Leroy, Report of Committee on College Personnel Technique of the Association of American Colleges, Freshman Examination and Freshman Placement, School and Society, April 11, 1925.
10. Kelly, F. J., The American Arts College, New York, The Macmillan Company, 1925.
11. Kirkpatrick, E. A., Intelligence Tests in Massachusetts Normal Schools, School and Society, January 14, 1922.

Bibliography, continued.

12. Laird, Donald, Factors Causing Disparity between Intelligence and Scholarship in College Students, School and Society, March 18, 1924.
13. MacPhail, Andrew H., The Intelligence of College Students, Baltimore, Warwick and York, inc., 1924.
14. Madson, I. N., The Intelligence of Normal School Students and Its Relation to Learning and Teaching, Educational Administration and Supervision, October, 1924.
15. Monroe, Walter Scott, The Illinois Examination, Urbana, Illinois, University of Illinois, 1921.
16. Pintner, Rudolf, Intelligence Testing, New York, Henry Holt and Company, 1923.
17. Rector, W. G., A study in the Prediction of High School Success, Journal of Educational Psychology, January, 1925.
18. Renshaw, Samuel, The Intelligence of Teachers in Training, Journal of Educational Research, January, 1923.
19. Rice, Stuart A., The Distribution of Intelligence among College Students, Journal of Educational Psychology, February, 1925.
20. Roberts, Alexander C., Problems of College Admission, School and Society, March 3, 1923.
21. Rogers, Agnes L., The Use of Psychological Tests in Administration of Colleges of Liberal Arts for Women, Part I, Intelligence Tests and Their Use, Chapter 9, Twenty-first Year Book, The National Society for the Scientific Study of Education, Bloomington, Illinois.

Bibliography, continued.

22. Seashore, C. E., Progressive Adjustment versus Entrance Elimination in a State University, School and Society, January 13, 1923.
23. Terman, Lewis M., Intelligence Tests in Colleges and Universities, School and Society, April 23, 1921.
24. Terman, Lewis M., Manual of Directions for Terman Group Test of Mental Ability, New York, Yonkers-on-Hudson, World Book Company, 1923.
25. U. S. Bureau of Education, The Public School System of Arkansas, Bulletins 10-11, 1923.
26. West, Andrew Fleming, Education and Intelligence, Princeton, 1911.
27. Whipple, G. M., Intelligence Tests in Colleges and Universities, Part I, Intelligence Tests and Their Use, Chapter 9, Twenty-first Year Book, The National Society for the Scientific Study of Education, Bloomington, Illinois.
28. Whitney, Fred L., Intelligence Levels among State Normal School Graduates, Journal of Educational Research, March, 1923.
29. Wood, Ben D., Measurement in Higher Education, New York, Yonkers-on-Hudson, 1923.