A STUDY OF THE COLLEGE SUCCESS OF STUDENTS WHO DO NOT ENTER COLLEGE IMMEDIATELY UPON GRADUATION FROM HIGH SCHOOL

A THESIS

SUBMITTED TO THE DEPARTMENT OF EDUCATION AND THE GRADUATE COUNCIL OF THE KANSAS STATE TEACHERS COLLEGE OF EMPORIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

BY

LAWRENCE H. GARDNER

MAY 1936

Approved for the Major Department

Approved for the Graduate Council

ACKNOWLEDGEMENT

To Dr. H. E. Schrammel, director of the Bureau of Educational Measurements of the Kansas State Teachers College of Emporia, the writer is indebted for direction, advice, and assistance in the writing of this thesis and wishes to acknowledge his sincere gratitude.

To Dr. Edwin J. Brown, director of the Graduate Division of the Kansas State Teachers College of Emporia, who gave many helpful suggestions in the choosing of the problem, the writer desires to acknowledge his appreciation.

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CHAPTER I

INTRODUCTION

Should a student go to college immediately after graduation from high school? If a student should remain out of school and travel or work for one or more years after graduation from high school, would his chances for scholastic success be hindered to any great extent? Should parents become unduly worried if it is impossible for their boy or girl to enter college at once after graduation from high school? Would a student be just as well off if he could earn some money of his own before going to college and thus relieve his parents of the load? These are some questions which have been asked of high school principals and teachers. The answers have been largely matters of personal opinion and have been as varied as the persons giving them.

Doubtless many students go to college because they have been urged to go by a teacher, a parent, or some school chum. If some students had stayed out and worked for a while, they might never have gone to college. It is possible, however, for a student, if he has a genuine desire to attend college, to go even though he is obliged to stay out one or more years. He might gain something by the very fact that he stayed out. In the case of some students, the college, the students, and the parents would be better off if they never did go to college.

THE PROBLEM

The purpose of this study is to answer one question: are the chances for success as measured by scholastic attainment (grade marks) hindered or helped if a student, for one reason or another, does not attend college the first semester after he graduates from high school?

The answer to this question is important. The depression has forced individuals and institutions to check on their operating expenses. Family budgets have been slashed, and in some cases no budget exists. If a boy or girl may stay out a year and earn some money with which to go to college without lessening his chance of success, it might in some instances be better if he did. The college might even be better off if it did not have to tax its ingenuity to the breaking point to find jobs for boys who might be able to finance themselves if they worked for a year or two before entering college.

Some teachers and high school principals have urged their good students to attend college at once in the belief that a student's scholastic success will be hindered if he stays out of school for a while.

SCOPE OF THE STUDY

This study is based upon the college grades received by 169 men and 278 women enrolled in the Kansas State Teachers College of Emporia during the semester starting in September, 1934, who did not enter college immediately upon graduation from high school.

PROCEDURE

The complete college record of each student for the semester was tabulated on an individual record card. This card was made especially for this study and included the grades made in each subject, the decile rank of the student, and the number of semesters out between high school graduation and college entrance. His age, what he intends to do, and what he works at while in school were also included on this card. The individual case studies were first selected from the answers to questions given the students in a campus survey.

This campus survey was given the students of the Kansas State Teachers College during the school year 1934-'35. The survey was conducted by means of a questionnaire given the students by a personal interview. Among the questions on this questionnaire was this: Were you out of school for a time between high school graduation and college entrance? If so, how long? Why? The entire group of students who indicated that they had been out for a time were taken as case studies. The questionnaires were arranged in two groups within each class. That is, each class was divided into two groups, those out some time and those out no time. If those out no time were double the number of those out some time, the control group was selected by taking each alternate paper from the pile, as 1, 3, 5, and so forth. The questionnaires had not been piled in any but chance order, except that the classes had been divided into freshman, sophomore, and so forth. The cases were also divided according to sex. The grades were taken from the record cards in the Bureau of Educational Measurements.

Eight distinct groups are studied. They include freshman, sophomore, junior, and senior men and women who have been out some time between high school graduation and college entrance. The control groups include freshman, sophomore, junior, and senior men and women who have been out no time between high school graduation and college entrance. Comparisons within each of these eight groups are then made according to decile ranking. Decile ranks, or decile groups are defined as the cases between the limits of the deciles; that is, the tenth decile includes the upper ten per cent; the first decile includes the lowest ten per cent; and so forth.

Students are given decile rankings at the Teachers College on the basis of entrance tests. These entrance tests consist of a battery of tests. The battery consists of a college entrance test, an English test, a vocabulary test, a reading test, a spelling test, and a mathematics test. These tests are for the purpose of classification and guidance. No one is refused admission on the basis of these tests.

Teachers' marks, or grades, are the basis for determining the scholastic success as the term is used in this study. Teachers' grades or marks may not be the only phase of a student's life, but they can be measured and are at least one phase. The study by Schrammel and Wood, "Success and Failure of College Students,"[1] shows, among other things, that the distribution of teachers' marks over a five-year period at

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[1] H. E. Schrammel and E. R. Wood, "Success and Failure of College Students." Studies in Education, No. 3 (Emporia: the Kansas State Teachers College, 1931).

the Teachers College did not deviate far from the median for all departments. Its findings tend to substantiate the reliability of teachers' marks as a criterion for scholastic success in college.

RELATED STUDIES

A great number of studies have been made on the scholastic success of college students. The study by Fulmer, "A Study of the College Success of Graduates of Kansas High Schools,"[2] deals with the success of students from high schools of different classes in Kansas as based upon the classification given by the State Department of Education. This study reveals, among other things, that there are some factors which do not seem capable of measurement which have to do with college success. This something might be self-reliance which the student had acquired by reason of the fact that he attended a small school.

Odell, of the University of Illinois, in a study, "The Effect of Early Entrance upon College Success,"[3] arrives at the conclusion that a young student, if he is not younger than 16 years of age, has as good a chance for success in college as one older. A glance at the following data will illustrate his findings.

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[2] Virgil G. Fulmer, A Study of the College Success of the Graduates of Kansas High Schools (unpublished Master's thesis, Kansas State Teachers College, Emporia, Kansas, 1951).

[3] Charles W. Odell, "The Effect of Early Entrance upon College Success." Journal of Educational Research, 26:510-12, March, 1933.

Age at entrance	High school mark	College mark	Difference
16	87.6	85.4	-2.20
17	86.2	84.8	-1.40
18	85.0	83.5	-1.50
20	82.1	78.7	-3.40
21	81.5	83.5	2.00

The group that were 21 were the only ones to make as good or better grades in college than they made in high school. Odell does not believe that this was due to age. He holds that the 20-year-olds made the worst showing of all.

He did find that of those 16 years of age at entrance 31 per cent graduated from college. Of the 17-year-olds, 32 per cent graduated; 25 per cent of the 18-year-olds graduated, while of the 21-year-olds only 9 per cent graduated.

The only bearing that this study made by Odell has upon the present study would seem to be that the results can not be laid to age or maturity in their entirety.

CHAPTER XI

THE SCHOLASTIC SUCCESS OF MEN AND WOMEN OUT OF SCHOOL ONE OR MORE SEMESTERS BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

In this chapter an analysis is made of the grades of the students of the Kansas State Teachers College of Emporia who had been out one or more semesters between high school graduation and college entrance. All grades analyzed were made during the same semester, the fall semester of 1935. This applies to the control groups as well as to the group studied.

The comparisons made in this chapter are based upon the mean, or average, grade. In order to obtain this mean, or average, it was necessary to convert all grades made by the students during the time to be compared into numerical values, or a mark index. The letter system of marking at the Teachers College is as follows: A, superior; B, good; C, average; D, poor; and F, failing. The marks which the students had obtained were assigned the following point values: A, one point; B, two points; C, three points; D, four points; and F, five points. To find the mark index for a student, the point value of each mark was multiplied by the total semester hours of credit of that mark. These products were then added and the sum divided by the total semester hours carried by the student. This quotient is called the mark index. The highest possible index which a student could have obtained is one, and the lowest mark index possible is five. Thus if a student had an average grade of A, his mark index would be 1.00, while if the grade average were C, his mark index would be 3.00.

An illustration of the grades of a real student will make clear how the grades were converted into numerical values or a mark index. Grades for this illustration are those of a senior woman in the ninth decile. Her grades are as follows: 3 hours of A's equal 3 grade points; 8 hours of B's equal 16 grade points; 5 hours of C's equal 15 grade points; total, 34 grade points. The total grade points, 34, are then divided by 16, the number of hours carried for the semester. The quotient, 2.12, is the grade average or the mark index of this student. This same method was applied to each student in this study.

BASIC DATA

Tables I and II give in a summarized form the basic data of this study. The greater part of this data is given again in more detailed form in other tables that follow in this chapter. Table I contains the basic data necessary for a study of the men; while Table II contains the same data in regard to the women. These tables are for reference.

COMPARISON OF THE SUCCESS OF WOMEN BY DECILES

In Table III are listed the mean grades and the number and per cent of the women found in each decile group. The left one half of the table is devoted to the women who were out some time between high school graduation and college entrance; and the right one half of the table is devoted to the control group, who were out no time between high school graduation and college entrance. At the bottom of the table under each group is shown the mean decile rank of each group.

TABLE I

COMPARISON OF THE SCHOLASTIC SUCCESS OF WOMEN OUT ONE OR MORE SEMESTERS BEFORE ENTERING COLLEGE WITH WOMEN WHO ENTERED COLLEGE IMMEDIATELY UPON GRADUATION FROM HIGH SCHOOL

	Number	Average decile rank	Average grade	Sigma of the distribution	Sigma of the average
All women	278	6.45	2.46		
Freshmen out some time	90	5.53	2.64	.507	.0533
Freshmen out no time	97	5.46	2.74	.544	.0552
Sophomores out some time	30	7.00	2.39	.605	.1100
Sophomores out no time	29	5.65	2.62	.796	.1480
Juniors out some time	9	6.77	2.26	.446	.1486
Juniors out no time	9	6.55	2.60	.757	.2520
Seniors out some time	8	6.62	1.62	.509	.1800
Seniors out no time	6	5.66	2.66	.543	.1400

Read table thus: The total number of freshman women out some time is 90; their mean or average decile rank is 5.53; their mean or average grade is 2.64; the sigma of the distribution is .507; and the sigma of the average is .0533.

TABLE II

COMPARISON OF THE SCHOLASTIC SUCCESS OF MEN OUT ONE OR MORE SEMESTERS BEFORE ENTERING COLLEGE WITH MEN WHO ENTERED COLLEGE IMMEDIATELY UPON GRADUATION FROM HIGH SCHOOL

	Number	Average decile rank	Average grade	Sigma of the distribution	Sigma of the average
All men	169	6.16	2.44		
Freshmen out some time	45	4.88	2.83	.670	.102
Freshmen out no time	44	6.09	2.73	.700	.105
Sophomores out some time	19	4.73	2.51	.542	.124
Sophomores out no time	25	5.64	2.64	.607	.121
Juniors out some time	15	7.00	2.55	.637	.165
Juniors out no time	14	4.81	2.61	.593	.105
Seniors out some time	5	10.00	2.19	.676	.302
Seniors out no time	6	6.16	2.45	.427	.173

Read table thus: The total number of freshman men out some time is 45; their average decile rank is 4.88; their average grade is 2.83; the sigma of the distribution is .670; and the sigma of the average is .102.

TABLE XII

COMPARISON OF THE GRADES OF FRESHMAN WOMEN OUT SOME TIME AND FRESHMAN WOMEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Women out some time			Women out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	90	100	2.64	97	100	2.74	0.10
X	8	8	2.09	4	4	2.05	-0.06*
IX	9	10	2.18	12	12	2.21	0.03
VIII	12	13	2.45	7	7	2.51	0.06
VII	5	5	2.64	15	15	2.56	-0.08
VI	10	11	2.68	12	12	2.78	0.10
V	12	13	2.71	10	10	2.77	0.06
IV	9	10	2.72	10	10	3.10	0.38
III	8	8	2.80	10	10	2.89	0.09
II	9	10	2.96	12	12	3.28	0.32
I	8	8	3.27	5	5	3.01	-0.26
Mean decile rank	5.55			5.46			

* A grade difference preceded by a minus sign denotes that the group listed in the right half of the table surpassed the group listed in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 90 women out some time is 2.64; the mean grade of the 97 women out no time is 2.74; the difference is 0.10 in favor of the former group.

When the mean or average grade of the women out some time is compared with the women out no time, the women out some time have a mean grade of 2.64; the women out no time have a grade of 2.74, a difference of 0.10 in favor of the women out some time. The significance of this difference is discussed later in terms of critical ratio values. The women out some time have a mean decile rank of 5.53; those out no time have a mean decile rank of 5.46, a difference of 0.07 in favor of the women out some time. Only in the tenth, seventh, and first deciles do the women out no time excel those out some time in mean or average grade. For the women out no time the percentage of cases in each decile ranges from five in decile seven to 15 in deciles five and eight. For the women out no time the percentages found in each decile group range from 4 in decile ten to 15 in decile seven. It is safe to conclude that neither the women out some time nor those out no time profited to any great extent by having a larger number in any decile group.

Table IV is like Table I except that it deals with sophomore women. Table IV is exactly like Table III in that the mean grade of all women out some time and the mean grade of all women out no time and the grades of each decile group are shown. As in Table I, the percentage of cases found in each decile group is also shown, and the grade differences are shown in the column at the right. The mean grade of all sophomore women out some time in this group exceeds the mean grade of the sophomore women out no time by 0.23 grade point. Again in only three decile groups do the women out no time excel the women out some time in mean grades. This occurs in the tenth, seventh, and sixth deciles. In mean decile ranking the women out some time have a rank of

TABLE IV

COMPARISON OF THE GRADES OF SOPHOMORE WOMEN OUT SOME TIME AND SOPHOMORE WOMEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Women out some time			Women out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	30	100	2.39	29	100	2.62	0.23
X	10	33	1.84	2	7	1.38	-0.46*
IX	3	10	2.01	3	10	2.56	0.55
VIII	5	10	2.26	2	7	2.22	0.04
VII	1	3	2.50	5	17	2.21	-0.29
VI	4	13	2.65	5	17	2.53	-0.12
V	2	6	2.21	3	10	2.85	0.64
IV	0	0		3	10	3.16	
III	4	13	3.12	0	0		
II	3	10	3.00	3	10	3.14	0.14
I	0	0		3	10	3.51	
Mean decile rank	7.00			5.65			

* A grade difference preceded by a minus sign means that the group listed in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 30 sophomore women out some time is 2.39; the mean grade of the sophomore women out no time is 2.62; the difference is 0.23 in favor of the former.

7.00 and the women out no time, a rank of 5.65, a difference of 1.35 in favor of the women out some time, when decile ranking is considered. In the decile distribution of cases, the women out some time have the advantage, with 30 per cent of the cases falling in the tenth decile, while only 7 per cent of the women out no time are found in the tenth decile. Of the group of women out no time 50 per cent are found in the three upper deciles, the eighth, ninth, and tenth. In the group out some time, on the other hand, the three upper deciles claim only 17 per cent of the cases. It will be observed that the women out no time present a much more uniform group when decile distribution is considered.

Table V, for junior women, is read exactly as Table III and Table IV. The mean grade of the junior women out some time is 2.28, and the mean grade of the junior women out no time is 2.60. The mean grade of the women out some time exceeds the mean grade of the women out no time by 0.32 grade point. The mean grades of the women out some time exceed the mean grades of the women out no time in all deciles for the junior women. The decile rank of the women out some time exceeds the decile rank of the women out no time by 0.22 decile.

Table VI, for senior women, is read exactly as Tables III, IV, and V. The mean grade of the women out some time is 1.82. The mean grade of the women out no time is 2.68. The mean grade of the women out some time exceeds the mean grade of the women out no time by 1.86 grade points. As in the case of the junior women, the women out some time surpass the women out no time in all deciles. The women out some time have a higher decile rank than the women out no time by 1.96 decile rank.

TABLE V

COMPARISON OF THE GRADES OF JUNIOR WOMEN OUT SOME TIME AND JUNIOR WOMEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Women out some time			Women out no time			Grade diff.*
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	9	100	2.28	9	100	2.60	0.32
X	0	0		1	11	1.00	
IX	4	44	2.19	2	22	2.20	0.01
VIII	0	0		2	22	3.30	
VII	2	22	2.40	0	0		
VI	1	11	2.66	1	11	3.13	0.47
V	0	0		1	11	3.23	
IV	1	11	2.00	0	0		
III	0	0		1	11	3.00	
II	0	0		0	0		
I	1	11	2.35	1	11	2.00	0.27
Mean decile rank	6.77			6.55			

* A grade difference preceded by a minus sign means that the group listed in the right half of the table surpassed the group listed in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 9 junior women out some time is 2.28; the mean grade of the 9 junior women out no time is 2.60; the difference is 0.32 in favor of the former.

TABLE VI

COMPARISON OF THE GRADES OF SENIOR WOMEN OUT SOME TIME AND SENIOR WOMEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Women out some time			Women out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	8	100	1.82	6	100	2.66	0.84
X	5	57	1.37	1	16	2.38	1.01
IX	2	24	1.96	0	0		
VIII	1	12	1.81	2	33	2.41	0.40
VII	1	12	2.39	0	0		
VI	1	12	1.89	0	0		
V	0	0		0	0		
IV	0	0		0	0		
III	0	0		2	33	2.78	
II	0	0		1	16	3.13	
I	0	0		0	0		
Mean decile rank	8.62			5.66			

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the eight senior women out some time is 1.82; the mean grade of the six senior women out no time is 2.66; the difference is 0.84 in favor of the former.

COMPARISON OF COLLEGE SUCCESS OF MEN

Tables VII, VIII, IX, and X contain the basic data for the men. These are read exactly as Tables III, IV, V, and VI. In Table VII it will be noted that the mean grade of the men out some time is 2.82 and the mean grade of the men out no time is 2.73, a difference of 0.09 in favor of the men out no time. This is the only time in the comparison of the eight groups that students out some time have been excelled by the students out no time when the entire class is considered. The reason for this might be explained in the decile ranking. The mean decile of the men out no time is 6.09, as compared with 4.88 of the men out some time.

The men out some time in the sophomore class excel those out no time by 0.15 grade point. This cannot be explained by the decile ranking. In fact, as may be observed in Table VIII, the mean decile of the men out some time is 4.75, while the mean decile of the men out no time is 5.64. This is a difference of 0.91 decile rank in favor of the men out no time. Had decile ranking been a factor, the men out no time should have excelled.

The junior men out some time excel the junior men out no time in both mean grade and mean decile. In only one decile, the sixth, do the men out no time excel in mean grades.

The senior men out some time also excel the senior men out no time in both mean grades and mean decile rank.

TABLE VII

COMPARISON OF THE GRADES OF FRESHMAN MEN OUT SOME TIME AND FRESHMAN MEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Men out some time			Men out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	43	100	2.82	44	100	2.73	-0.09*
X	7	16	2.10	3	7	1.71	-0.39
IX	2	4	2.06	8	18	2.64	0.58
VIII	1	2	2.56	5	11	2.52	-0.04
VII	3	7	2.56	3	7	2.92	0.36
VI	5	12	2.97	6	14	2.78	-0.19
V	4	9	3.03	7	16	2.68	0.35
IV	3	7	3.04	5	11	3.15	0.11
III	4	9	2.49	2	4	2.57	0.08
II	5	12	3.25	3	7	3.30	0.05
I	9	21	3.32	2	4	3.10	-0.22
Mean decile rank	4.88			6.09			

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 43 freshman men out some time is 2.82; the mean grade of the 44 freshman men out no time is 2.73; the difference is 0.09 in favor of the latter.

TABLE VIII

COMPARISON OF THE GRADES OF SOPHOMORE MEN OUT SOME TIME AND SOPHOMORE MEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Men out some time			Men out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	19	100	2.51	25	100	2.64	0.13
X	2	10	2.12	3	12	2.60	0.48
IX	2	10	2.70	3	12	2.12	-0.58*
VIII	1	5	1.14	3	12	2.30	1.16
VII	1	5	2.42	2	8	2.45	0.03
VI	0	0		2	8	2.27	
V	1	5	3.11	3	12	2.86	-0.25
IV	2	10	2.41	2	8	2.26	-0.15
III	4	21	2.29	1	4	3.07	0.78
II	6	31	2.64	2	4	2.66	-0.18
I	0	0		4	16	3.47	
Mean decile rank		4.75			5.64		

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 19 sophomore men out some time is 2.51; the mean grade of the 25 sophomore men out no time is 2.64; the difference is 0.13 in favor of the former.

TABLE IX

COMPARISON OF THE GRADES OF JUNIOR MEN OUT SOME TIME AND JUNIOR MEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Men out some time			Men out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	15	100	2.35	14	100	2.81	0.46
X	3	25	2.07	2	14	2.78	0.71
IX	1	7	1.81	2	14	2.51	0.70
VIII	2	15	2.59	0	0		
VII	3	23	2.34	1	7	3.31	0.97
VI	1	7	2.68	1	7	1.60	-1.08*
V	0	0		1	7	4.07	
IV	1	7	3.06	0	0		
III	1	7	2.00	2	14	2.69	0.69
II	1	7	2.95	1	7	3.18	0.23
I	0	0		4	28	2.82	
Mean decile rank	7.00			4.85			

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 15 junior men out some time is 2.35; the mean grade of the 14 junior men out no time is 2.81; the difference is 0.46 in favor of the former.

TABLE X

COMPARISON OF THE GRADES OF SENIOR MEN OUT SOME TIME AND SENIOR MEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Decile	Men out some time			Men out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total cases	6	100	2.19	6	100	2.43	0.24
X	5	100	2.19	1	17	1.68	-0.51*
IX	0	0		0	0		
VIII	0	0		1	17	2.64	
VII	0	0		0	0		
VI	0	0		2	33	2.66	
V	0	0		0	0		
IV	0	0		1	17	2.40	
III	0	0		1	17	2.68	
II	0	0		0	0		
I	0	0		0	0		
Mean decile rank	10.0			6.16			

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the 5 senior men out no time is 2.19; the mean grade of the 6 senior men out some time is 2.43; the difference is 0.24 in favor of the former.

COMPARISON OF COLLEGE SUCCESS OF THE SEVERAL GROUPS IN TERMS OF CRITICAL RATIO VALUES

In order to evaluate more concretely the differences of the scholastic success of the students out some time and the students out no time, critical ratio values were computed. The critical ratios are found in Table XI, column four. The data listed in the column headed $\frac{D}{\text{sigma diff.}}$ are commonly referred to as critical ratios. This is the difference between the mean grade of the two groups compared divided by the sigma difference. As stated above, this quotient is called the critical ratio. In column five are listed the chances in 100 that a true difference greater than zero exists. A critical ratio of 3.00 or greater would show complete reliability. A critical ratio of 2.70 to 2.99 would show almost complete reliability. A critical ratio of 1.00 would show that there were 84 chances in 100 that a true difference existed. If the critical ratio is 0.65 or lower, it would show that there was practically no significance to the differences. There would be only 52 chances in 100 that a true difference greater than zero existed.

Table IX is read thus: the mean grade difference between the freshman women out some time and these freshman women out no time is 0.10 grade point. The difference is positive; that is, it is in favor of the women out some time. The sigma difference is .0736, and the critical ratio is 1.30. A critical ratio of 1.30 indicates that there are 90 chances in 100 that a true difference greater than zero exists

between the two groups compared.

The remainder of the table is read the same way. It is to be observed that the grade difference is negative in the case of the freshman men. This means that the group out some was excelled by 0.15 grade point by the group out no time. The critical ratio is 0.62, which indicates that there are 75 chances in 100 that a true difference exists. It is to be noted that this is the least reliable of the eight comparisons.

In terms of critical ratio values, the comparison made in regard to senior women is the most reliable. Despite the fact that there were few cases compared, the grade difference was so great that the comparison is reliable. The comparison is almost reliable in the case of the junior men.

The reliability of the measures of the differences is small in some cases. It is to be noted though that in seven of the eight comparisons the groups out some time excelled the group out no time. This would seem to indicate a trend.

AGE DIFFERENCES AND THEIR INFLUENCE

An analysis of the age differences of the two groups reveals some interesting data. The basic data concerning these facts are found in Tables XII and XIII. It will be observed in Table XII that the greatest age differences occur in the case of the freshman women, where a difference of 5.8 years is found, and in the case of the senior men, where a difference of 5.6 years exists.

TABLE XI

COMPARISON OF THE SCHOLASTIC SUCCESS OF MEN AND WOMEN OUT ONE OR MORE SEMESTERS BEFORE ENTERING COLLEGE AND MEN AND WOMEN WHO ENTERED COLLEGE IMMEDIATELY UPON GRADUATION FROM HIGH SCHOOL, IN TERMS OF CRITICAL RATIO VALUES

	Mean grade diff.	Sigma diff.	D / Sigma diff.	Chances in 100
Freshman women out some time and no time	.10	.0766	1.30	90
Freshman men out some time and no time	-.15[1]	.143	0.62	73+
Sophomore women out some time and no time	.25	.184	1.30	90
Sophomore men out some time and no time	.13	.175	0.75	77
Junior women out some time and no time	.32	.292	1.09	86
Junior men out some time and no time	.46	.193	2.38	99
Senior women out some time and no time	.84	.228	3.24	100
Senior men out some time and no time	.24	.331	0.72	76

[1] An average grade preceded by a minus sign denotes that the group out some time was exceeded by the group out no time. This occurred only in the case of the freshman boys. In all other cases these students out some time exceeded those out no time between high school and college.

Read table thus: The mean grade of the freshman women out some time exceeded the mean grade of the freshman women out no time by 0.10 grade point. In column three, the sigma of the difference is .0766. The critical ratio value is 1.30, and the chances that a true difference greater than zero exists are 90 in 100.

TABLE XII

COMPARISON OF THE AGES OF WOMEN OUT SOME TIME AND WOMEN OUT NO TIME AND MEN OUT SOME TIME AND MEN OUT NO TIME

Classification	Students out some time		Students out no time		Age diff.
	No. of cases	Mean age	No. of cases	Mean age	
Freshman women	90	24.1	97	18.3	5.8
Sophomore women	80	21.7	29	19.8	1.9
Junior women	9	21.8	9	20.0	1.8
Senior women	8	23.0	6	22.0	1.0
Freshman men	43	20.5	44	18.3	2.2
Sophomore men	19	21.2	25	19.8	1.4
Junior men	13	23.7	14	21.2	2.5
Senior men	5	25.6	5	21.0	4.6

Read table thus: The mean age of the freshman women out some time is 24.1; the mean age of the freshman women out no time is 18.3; the difference is 5.8.

TABLE XXII

COMPARISON OF GRADES MADE BY DIFFERENT AGE GROUPS OF FRESHMAN WOMEN OUT SOME TIME BETWEEN HIGH SCHOOL GRADUATION AND FRESHMAN WOMEN OUT NO TIME BETWEEN HIGH SCHOOL GRADUATION AND COLLEGE ENTRANCE

Age	Women out some time			Women out no time			Grade diff.
	No. of cases	Per cent	Mean grade	No. of cases	Per cent	Mean grade	
Total	89	100		97	100		
16	0	0		3	3	2.52	
17	0	0		14	14	2.65	
18	3	3	2.58	55	56	2.57	-0.01*
19	30	33	2.65	18	18	2.62	-0.03
20	28	31	2.78	7	7	3.10	0.32
21	10	11	2.65	0	0		
22 and over	18	20	2.46	0	0		

* A grade difference preceded by a minus sign means that the group in the right half of the table surpassed the group in the left half of the table. In all other cases the opposite is true.

Read table thus: The mean grade of the three women out some time in the 18-year-old group is 2.58; the mean grade of the 55 women out some time in the 18-year-old group is 2.57; the difference is 0.01 in favor of the latter.

In the case of the women, the age differences tend to become smaller in the upper classes. In the case of the men this is not true, for the greatest age difference is found in the case of the senior men.

In Table XIII a comparison is made of the grades made by the different age groups of the freshman women out some time and the freshman women out no time. This comparison is made by comparing age groups regardless of decile rank: 20-year-olds are compared with 20-year-olds regardless of decile rank, and so forth. As this comparison is only from the standpoint of interest, only the freshman women are so compared.

In Table XIII it will be observed that in the group of women out some time thirty are 19 years old; twenty-eight are 20 years old; and eighteen are 22 years of age or older. For the women out some time, 19 is the most frequently occuring age, but a large proportion also occurred at ages 20, 21, and 22 and over.

In Table XIII it will also be observed that in the group of women out no time the most frequently occurring age is 18 years, or a year less than that of the women out some time. In the group out no time no woman exceeds the age of 20, and only seven had reached the age of twenty.

It is to be noted that the best grades made by any age group of freshman women are made by the 18 women who are 22 years of age and over. This would seem to indicate that in the case of the freshman women maturity was the largest factor in getting grades. It would also seem that this maturity had to be 21 years of age or older to have any effect in this respect.

The women out some time made the same grades at 19 as they did

at 21, while they made the poorest grades at 20 years of any age. The women out no time also made their poorest grades at the age of 20. Odell, whose study is discussed on page 5, also found that the lowest grades were made by 20-year-olds. He also found that the best grades were made by the 21-year-old students.

Why do 20-year-olds make the poorest grades? If the group out no time is considered, it is possible that the 20-year-olds were somewhat retarded as evidenced by their age at graduation from high school. In the case of the women out some time, this same factor may affect the grades of the 20-year-olds.

The women 22 years of age or older are probably a normal group except for the fact that they did not get to attend college at once for one reason or another. It is likely that they were teaching. They saw a reason for study when the opportunity of attending college came to them.

ILLUSTRATION OF STATISTICAL TECHNIQUES EMPLOYED IN CHAPTER

The statistical technique used in arriving at the various answers will now be illustrated with an actual problem from this study. The actual data are from the study of the freshman girls.

The sigma of the distribution is found thus:

(1) Find the deviation of each grade from the mean grade of the group.

(2) Add these deviations of the whole group.

(3) Square this number and divide by the number of cases.

(4) Take the square root of this number. The result is the sigma of the distribution. The formula is

$$\sigma = \sqrt{\frac{D^2}{N}} \quad \text{or} \quad \sqrt{\frac{23.2119}{90}} = .507$$

The sigma of the average is found thus; the sigma of the distribution divided by the square root of the number of cases. The formula is

$$\sigma_{(av.)} = \frac{\sigma(dis.)}{\sqrt{N}} \quad \text{or} \quad \frac{.507}{\sqrt{90}} = .0553$$

The sigma difference is found thus: square the sigma of the average of each group and add the two squares together; then take the square root. The result is the sigma difference. The formula is

$$\sigma_{(diff.)} = \sqrt{\sigma^2_{(av.1)} + \sigma^2_{(av.2)}} \quad \text{or} \quad \sqrt{(.0552)^2 + (.0553)^2} = .766$$

The critical ratio is found thus:

$$\text{Critical ratio} = \frac{D \text{ (grade diff.)}}{\text{sigma diff.}} \quad \text{or} \quad \frac{0.10}{.0766} = 1.30$$

CHAPTER XII

SUMMARY AND CONCLUSIONS

The mean grades of the freshman women, sophomore women, junior women, and senior women out some time exceed the mean grades of the women of the same classification out no time.

The mean grade of the freshman men out some time is exceeded by the mean grade of the freshman men out no time.

The mean grades of the sophomore men, junior men, and senior men out some time exceed the mean grades of the same groups out no time.

In the case of the women there is a constant increase in the mean grade difference of the women out some time over the women out no time from freshman to senior year. This difference is as follows: freshman, 0.10; sophomore, 0.25; junior, 0.46; and senior, 0.84. Each difference is in favor of the women out no time.

There is more difference in the mean grades of the women than in the mean grades of the same classification of the men.

In some of the classes the number of cases may be too few to warrant any conclusions, but there is a constant tendency for the students out some time to out-rank the students out no time.

The higher the classification of the student, the more likely is there to be a difference in the students out some over those out no time.

One fact would seem to stand: a student's chances for success

in college are not lessened to any great extent by staying out of school for a year or more before entering college.

No conclusion can be drawn in regard to age. It seems that the 20-year-old group does the poorest work. This is not because the students are 20, but because they must have been a retarded group.

The following may have some significance in the higher ranking of the students out some time:

1. The student may have had to overcome some obstacle in order to go to college.

2. The student out some time may be a little older. It is doubtful, however, if the difference can be explained in this way.

3. Many of the women were teaching. This may have been a factor in their being able to do better work.

4. Students who have stayed out may have developed initiative and self-reliance.

5. The mean grades of the two groups may be partly explained on the basis of decile ranking, but the question arises as to what causes the persistence in higher decile ranking of those out some time?

6. Some factor not discovered in this paper may be responsible for the higher grades of those out no time.

A wider study involving more cases and more college might give a solution to the question.

BIBLIOGRAPHY

Fulmer, Virgil G., A Study of the College Success of the Graduates of Kansas High Schools. Unpublished Master's Thesis, Kansas State Teachers College of Emporia, Emporia, Kansas, 1931.

Garrett, Henry E., Statistics in Psychology and Education. New York: Longmans, Green and Company, 1926. 512 pp.

Jones, George, A. A. Jones, and H. R. Laslett, "Prediction of Success in College." Journal of Educational Research, 29:266-71, 1935.

McCall, William A., How to Measure in Education. New York: the Macmillan Company, 1923. 410 pp.

Odell, Charles W., "The Effect of Early Entrance upon College Success." Journal of Educational Research, 26:810-12, 1933.

Schrammel, H. E., and E. R. Wood, "Success and Failure of College Students." Studies in Education, No. 3. Emporia: the Kansas State Teachers College, 1931.